

TRANSNET



ENVIRONMENTAL IMPACT



MANAGEMENT SERVICES

**FINAL SCOPING REPORT FOR THE
TRANSNET RICHARDS BAY COAL LINE:
PROPOSED NEW OVERVAAL TUNNEL,
MSUKALIGWA LOCAL MUNICIPALITY,
MPUMALANGA PROVINCE**

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FINAL SCOPING REPORT

TRANSNET RICHARDS BAY COAL LINE: PROPOSED NEW OVERVAAL TUNNEL, MSUKALIGWA LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

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REVISION AND AMENDMENTS

DATE	No.	DESCRIPTION OF REVISION OR AMENDMENT
12/01/2015	0	Draft Scoping Report for public review.
19/03/2015	1	Final Scoping Report for Authority submission.

SUMMARY DATA

SUMMARY DATA	
Project:	Transnet Richards Bay Coal Line: Proposed New Overvaal Tunnel, within Msukaligwa Local Municipality, Mpumalanga Province.
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EXECUTIVE SUMMARY

Transnet has identified the need to construct a new railway tunnel (hereafter referred to as the proposed project) parallel to, and approximately 20m south of, the existing Overvaal single tunnel, in Mpumalanga Province. The proposed project will be located on the Transnet Richards Bay Coal Line, approximately 30km south east of Ermelo. The proposed new tunnel will be ~3 994 metres in length, commencing at Chainage 24 870 in the west and exiting at Chainage 28 766.4 in the east. The existing and proposed tunnels are situated in an area that is characterised by a rolling to undulating topography. Well defined, localised drainage channels occur along the route and drain in a north easterly direction. The general surface elevation along the tunnel ranges from 1641mamsl to 1656 mamsl (metres above mean sea level) in the west and central sections, increasing to approximately 1665mamsl at the N2, and then decreasing rapidly to 1590mamsl eastwards.

The proposed project is listed as an activity which requires an Environmental Authorisation (EA) from the relevant Competent Authority (CA), under the provisions of Section 24 of the National Environmental Management Act (Act 107 of 1998) (NEMA). Environmental Impact Management Services (Pty) Ltd (EIMS) has been appointed by Transnet as the Independent Environmental Assessment Practitioner (EAP) to undertake the necessary Environmental Impact Assessment (EIA) process required in order to apply for the EA.

An application for EA was submitted to the designated CA, namely the National Department of Environmental Affairs (DEA), in October 2013. Typically the EIA process can be separated into two distinct phases, namely, Scoping phase and EIA phase. The primary aim of scoping is to undertake a preliminary assessment of how the proposed project is likely to interact with the specific characteristics of the receiving environment. The outcomes of scoping are a list of potential impacts and the identification of suitable feasible alternatives which require further investigation and assessment in the EIA phase.

A key aspect of an EIA is the need to inform and consult with the relevant receiving communities, key authorities, organisations and the general public in order to ensure a thorough and comprehensive process. A Public Participation Process (PPP), based on the requirements of Section 54 (c) of GNR543 promulgated under the National Environmental Management Act, was conducted. The PPP involved identifying I&APs, notifying them about the application, soliciting their issues and concerns with regards to the proposed project activities, and finally to communicate the findings of the study. The public has been afforded the opportunity to review and comment on this scoping report and will be involved in the future EIA phase. The comments, issues and concerns identified thus far in the PPP include the following categories:

- Eskom Specific Issues (including disruption to existing infrastructure).
- Ecology, Fauna and Flora.
- Registration and Participation.
- Employment Issues.
- Land Issues.

- Safety and Security Concerns.
- Water Issues.
- Destruction/ disruption of existing Infrastructure.
- Compensation.
- Skills development.
- Health and Safety.
- Waste Management.
- Dust Pollution.
- Draft Scoping Report (requests for information and/or acknowledgement of receipt of the report).
- Meetings (inquiries regarding meeting arrangements, including dates and venues).

No specialist studies were undertaken during the scoping phase, however a number of specialist studies are proposed to be undertaken during the EIA phase and the findings of these assessments will be used to inform the EIA report. The following key biodiversity sensitivities were identified in the in proximity to the proposed project:

- Potential location of sensitive fauna such as Highveld Golden Mole (*Amblysomus septentrionalis*), Secretary Bird (*Sagittarius serpentarius*) and Blue Crane (*Anthropoides paradiseus*);
- Potential location of sensitive flora (includes vegetation units classified as Endangered and Less Threatened);
- The proposed project will be situated within rocky ridge and wetland areas that are deemed to be of high sensitivity as they provide potential habitat and migratory connectivity for faunal species as well as the potential to host a higher diversity of floral species; and
- According to the ecological importance classification for the two quaternary catchments (C11B and W53A) in the area, the systems in the area can be classified as sensitive to moderately sensitive in terms of ecological importance and sensitivity.

Numerous potential impacts that may occur during the lifecycle of the proposed project have been identified. Each impact was described briefly in an effort to provide a preliminary assessment of which impacts require further investigation in the EIA. Of the identified impacts, the following will be included in the EIA phase for further assessment:

Table 1: Impact Summary.

Development Phase	Impact
Construction	Nuisance from dust and noise
	Visual intrusion
	Increased pressure on existing infrastructure.
	Increase in the spread of diseases (including sexually transmitted diseases)

	and HIV/AIDS).	
	Impact on sense of place.	
	Traffic congestion and pavement damage.	
	Loss of land capability (agricultural potential) and disruption of farming activities.	
	Potential markets for informal trading	
	Employment creation	
	Potential effect on tourism and eco-tourism	
	Potential increase in stock theft	
	Disruption to infrastructure and services	
	Impact on historical and cultural sites (e.g. archaeological sites, historical sites, graves and cemeteries).	
	Dust settlement impact on plants	
	Impact on habitat of threatened animals	
	Impact on threatened plants	
	Impact on protected species	
	Impact on indigenous natural vegetation	
	Impact on wetlands	
	Establishment and spread of Listed Invasive Plant Species	
	Sedimentation	
	Alteration of watercourse dynamics.	
	Impacts of water use on resource sustainability.	
	Pollution of water resources	
	Geological Instability	
	Waste management and disposal	
	Impacts on safety and security for surrounding community/ residents	
	Impacts on the safety and security of neighbouring/surrounding settlements	
	Operation	Impact on sense of place
		Impact on current land-use
Alteration of watercourse dynamics		
Impacts of Erosion		

	Pollution of water resources
	Loss of land capability (agricultural potential)

In addition, a broad range of alternatives for the proposed project were considered. The following alternatives will be investigated further and comparatively assessed in the EIA phase:

1. Process alternative: Waste handling options.
2. Location alternative: Localised site alternatives and optimisation (proposed project and associated construction activities) – within a study area of 500m on either side of the preferred alignment.
3. Technological alternatives:
 - Use of tunnel boring machine; and
 - Drill and Blast.

This scoping report constitutes the culmination of the scoping phase. The scoping report will be submitted to the DEA for review and decision making. The DEA is anticipated to instruct EIMS and the applicant to continue with the EIA phase in accordance with the plan of study outlined in this scoping report. The Plan of study provides a description of the planned approach and steps to be undertaken in the EIA phase. The key tasks to be undertaken in the EIA phase include (refer to Section 5 for more details):

- Specialist investigations, including:
 - Ecological Impact Assessment;
 - Hydrological and Hydrogeological Impact Assessment;
 - Wetland Impact Assessment;
 - Heritage Impact Assessment; and
 - Noise and Vibration Impact Assessment.
- Ongoing public consultation;
- Assessment of the significance of the impacts identified in this scoping report;
- Comparative assessment of the identified alternatives to identify the most suitable proposal; and
- Identification of relevant management and mitigation measures that should be implemented should the project be approved.

This scoping report presents the relevant information submitted to the DEA (Competent Authority) for the purposes of informed decision making. The EAP (EIMS) therefore does not have the role of decision maker with regard to the proposed project.

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APPENDICES

Appendix A	Issues and Responses Report
Appendix B	Submitted Environmental Authorisation Application
Appendix C	Locality Map and Preliminary Project Footprint Layout

LIST OF ABBREVIATIONS

BID	Background Information Document	I&AP	Interested and Affected Party
CA	Competent Authority	IRR	Issues and Responses Report
DALA	Department of Agriculture and Land Administration	LN	Listing Notice
DLA	Department of Land Administration	MDEDET	Mpumalanga Department of Economic Development, Environment and Tourism
DPLG	Department of Provincial and Local Government	MDARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
DSR	Draft Scoping Report	MLM	Msukaligwa Local Municipality
DWS	Department of Water and Sanitation	NEMA	National Environmental Management Act (Act No. 107 of 1998)
EA	Environmental Authorisation	NHRA	National Heritage Resources Act (Act No. 25 of 1999)
EAP	Environmental Assessment Practitioner	NWA	National Water Act (Act No. 36 of 1998)
EIA	Environmental Impact Assessment	OHTE	Overhead Track Equipment
EIAR	Environmental Impact Assessment Report	PoS	Plan of Study
EIMS	Environmental Impact Management Services (Pty) Ltd	PPP	Public participation process
EMPr	Environmental Management Programme	RDL	Red Data List
ER	Environmental Risk	SAHRA	South African Heritage Resources Agency
FSR	Final Scoping Report	SANBI	South African National Biodiversity Institute
GIS	Geographical Information System	SOC	State Owned Company
GVA-R	Gross Value Added by Region	SR	Scoping Report
GSDM	Gert Sibande District Municipality	TBM	Tunnel Boring Machine
GN	Government Notice	WUL	Water Use Licence
HIA	Heritage Impact Assessment		
IUCN	International Union for Conservation of Nature		
IWMP	Integrated Waste Management Plan		

1. INTRODUCTION

Transnet SOC Limited (the Applicant) requested Environmental Impact Management Services (Pty) Ltd (EIMS) to undertake the necessary steps to prepare and submit an application for environmental authorisation (EA) to the competent authority (CA), the National Department of Environmental Affairs, for the Transnet Richards Bay Coal Line: Proposed New Overvaal Tunnel (hereafter referred as the proposed project), within Msukaligwa Local Municipality, Mpumalanga Province. The proposed project is part of Transnet's expansion programme to increase the capacity of the Transnet Richards Bay Coal Line. The existing Overvaal tunnel is the only place on the entire coal line where the railway line is single, thus creating a bottleneck. The main reason for this project is to eliminate the risk of the single tunnel. Furthermore, the proposed project is aimed on improving turn-around times, thereby increasing freight handling to, and from the Port of Richards Bay.

The aim of the environmental scoping study is to:

- Describe the proposed project;
- Investigate and describe the biophysical, social and economic environment surrounding the proposed project;
- Identify potential impacts that may occur as a result of the proposed project;
- Identify potential feasible alternatives to the proposed project;
- Communicate the above information to interested and affected parties in an accessible and transparent manner;
- Describe the public consultation process followed and to record all comments and suggestions received and all issues raised during the scoping process; and
- Outline the planned impact assessment process, including defining any specialist studies required and set their terms of reference.

The scoping study culminates in the compilation of a scoping report that summarises the findings and recommendations of the Scoping Phase, as well as a Plan of Study (PoS) for the Environmental Impact Assessment (EIA) that outlines the suggested way forward during the EIA phase. The scoping report and the PoS for EIA will be submitted to the DEA for decision making and comment after public review of the documents.

An important component of an EIA process is the undertaking of a public participation process (PPP). The PPP has been, and will continue to be undertaken during Impact Assessment Phase, and is described in detail in Section 5 of this report.

1.1 *NEED FOR THE PROJECT*

Transnet is the largest and most crucial part of the freight logistics chain that delivers goods across South Africa. Transnet delivers thousands of tons of goods around South Africa through its rail networks both to and from its ports.

The existing Overvaal Tunnel, completed in 1976, is situated in Mpumalanga, between Ermelo and Piet Retief on the Richards Bay Coal Line. The line has a stretch of single track on the edge of the escarpment at Overvaal, where there is only one tunnel on the single track. Approximately 40 percent of all rail freight in South Africa passes through this single track Overvaal Tunnel. A significant portion of South Africa's international primary commodity exports pass through this tunnel hence its importance cannot be over-emphasized.

A derailment on the single track section or, at worst in the Overvaal Tunnel itself, would be economically disastrous and consequently much thought has been given to the solution of the problem. After investigating various options to deal with this concern, the construction of a second tunnel adjacent to the existing tunnel was found to be the preferred option.

1.2 TERMS OF REFERENCE

According to Chapter 24 of the NEMA, and in an effort to give effect to the general objectives of Integrated Environmental Management, the potential consequences and impacts on the environment of certain listed activities, which are likely to have a detrimental impact on the environment, must be considered, investigated, assessed and reported on. Consequent to Chapter 5 of NEMA the Minister of Water and Environmental Affairs (DWEA) has promulgated a set of regulations relating to what activities require an EA (GNR 544, 545, and 546) as well as regulations pertaining to the process (GNR 543) to be followed in terms of considering, investigating, assessing and reporting on potential environmental impacts these activities may have. Further details regarding the specific legislative requirements pertaining to this application are presented in Section 3.

EIMS has been appointed by the applicant as the EAP for the purposes of considering, investigating, assessing and reporting on the potential environmental impacts (known as the EIA process) pertaining to the proposed project. In accordance with the EIA Regulations (GNR 543, Regulation 17) EIMS, as the EAP, must *inter alia*:

- Be independent;
- Have expertise in conducting EIA including knowledge of the NEMA, the regulations and any applicable guidelines;
- Perform the work relating to the application in an objective manner;
- Comply with the NEMA, the Regulations and all other applicable legislation; and
- Disclose to the applicant and the CA all material information that reasonably has or may have the potential of influencing the decision by the CA or the objectivity of the assessment and reporting.

EIMS is a private and independent environmental management consulting firm with in excess of 20 years' experience in conducting EIA's and complies with the requirements of Regulation 17 listed above. The individual EAP responsible for preparing this scoping report is Mr Tshivhangwaho Mudau. Brief details of Mr Mudau's expertise and experience are presented in Table 2.

Table 2: EAP Details.

Environmental Assessment Practitioner	
Full Name:	Tshivhangwaho Mudau
Qualifications:	B. Environmental Sciences (Honours)
Key experience:	<p>An Environmental Practitioner with 8 years of experience. Key experience includes:</p> <ul style="list-style-type: none"> • Environmental Impact Assessments • Project Management • Environmental Permitting • Environmental Management Plans • Basic Assessments Process • Water Use Licensing • Environmental Compliance Monitoring

Please refer to Appendix B for the CV of Mr Mudau as well as the Declaration of Independence from EIMS.

An application for EA was submitted to the designated CA, namely the National Department of Environmental Affairs (DEA), in October 2013. The EIA process is currently underway and this scoping report serves to report on the outcomes of the required Scoping phase of the EIA. The primary objectives of the Scoping phase are:

- To identify issues that will be relevant for consideration of the application;
- To identify the potential environmental impacts of the proposed activity; and
- To identify the feasible and reasonable alternatives to the proposed activity.

2. PROJECT LOCATION AND DESCRIPTION

This section serves to provide a description of the nature and extent of the proposed project.

2.1 LOCATION

The proposed project, located on the Transnet Richards Bay Coal Line, is located approximately 30km south east of Ermelo (refer to Table 3 and Figure 1). The proposed project will be approximately 4 metres in length, commencing at approximately chainage 20 080 in the west and exiting at approximately chainage 25 815 in the east.

Table 3: Proposed Project location.

Attribute	Details
Province:	Mpumalanga
District Municipality:	Gert Sibande
Local Municipality	Msukaligwa
Closest Town:	Ermelo
Start Point (Western end)	26° 42' 42.38"S 30° 09' 42.79" E
Approximate Centre Point:	26° 42' 51.38"S 30° 10' 46.71" E
End Point (Eastern end)	26° 43' 01.04"S 30° 11' 53.03" E
Farm names and portions to be affected by the proposed project	<ul style="list-style-type: none"> • Buhrmansvallei 297 IT (Portion 0, 2, 5, 8, 9, 13, 15); • Twyfelaar 298 IT (Portion 0 and 9); and • Mavieriestad 321 IT (Portion 4).

The proposed project will be situated in an area that is characterised by a rolling to undulating topography. Localised well defined drainage channels located along the route, drain in a north easterly direction. The general surface elevation along the existing tunnel ranges from 1641mamsl to 1656 mamsl (metres above mean sea level) in the west and central section increasing to approximately 1665mamsl at the N2 and then decreasing rapidly to 1590mamsl eastwards.

The land uses surrounding the existing tunnel and proposed project includes primarily agricultural lands. The section along which the proposed project is located is currently used for grazing and cultivation. The regional area is also characterised by coal mining activities.

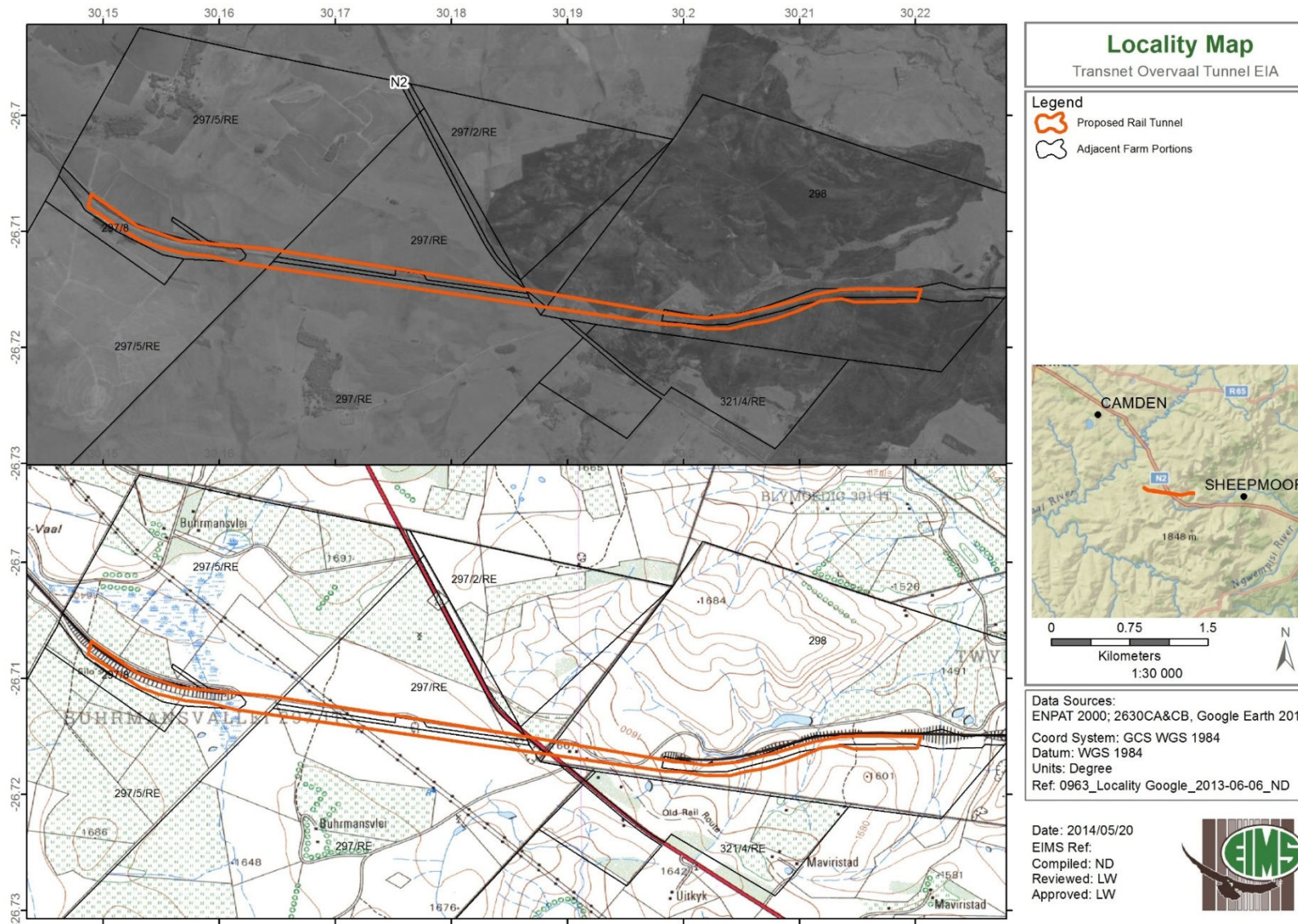


Figure 1: Locality map showing the approximate location of the proposed project.

2.2 PROPOSED PROJECT

The proposed project requires the construction and operation of a new Transnet railway line within a new underground tunnel. The proposed construction of the second Overvaal Tunnel is part of an expansion programme to increase the capacity of the existing Richards Bay coal line to the Port of Richards Bay. The proposed project is required in order to improve turn-around times, thereby increasing freight handling to, and from, the Port of Richards Bay. The proposed project entails the following:

- Excavation and construction of a second Overvaal tunnel parallel to the existing tunnel (at least 6.2m diameter and approximately 3.97km long, including tunnel portal structures);
- Rehabilitation of one ventilation shaft above the existing Overvaal tunnel and the construction of ventilation shafts above the new Overvaal tunnel;
- Cross passages between the two Overvaal tunnels;
- Construction of a tunnel drainage system;
- Construction of a railway and perway, including the extension of platforms at approaches;
- Installation of cross overs and switches at tunnel approaches;
- Establishment of rail signaling and a communication system;
- Installation of all overhead track equipment (OHTE) through the new tunnel including tying into the existing double line;
- Tunnel lighting and distribution in accordance with the Occupational Safety and Health (OSH) Act and regulations;
- Construction of future service road access, including the widening of the approach cuttings; and
- Construction of yards and lay down areas.

The preliminary project footprint design is presented in Appendix C. Figure 2 below provides a representation of what a typical double track tunnel will look like.

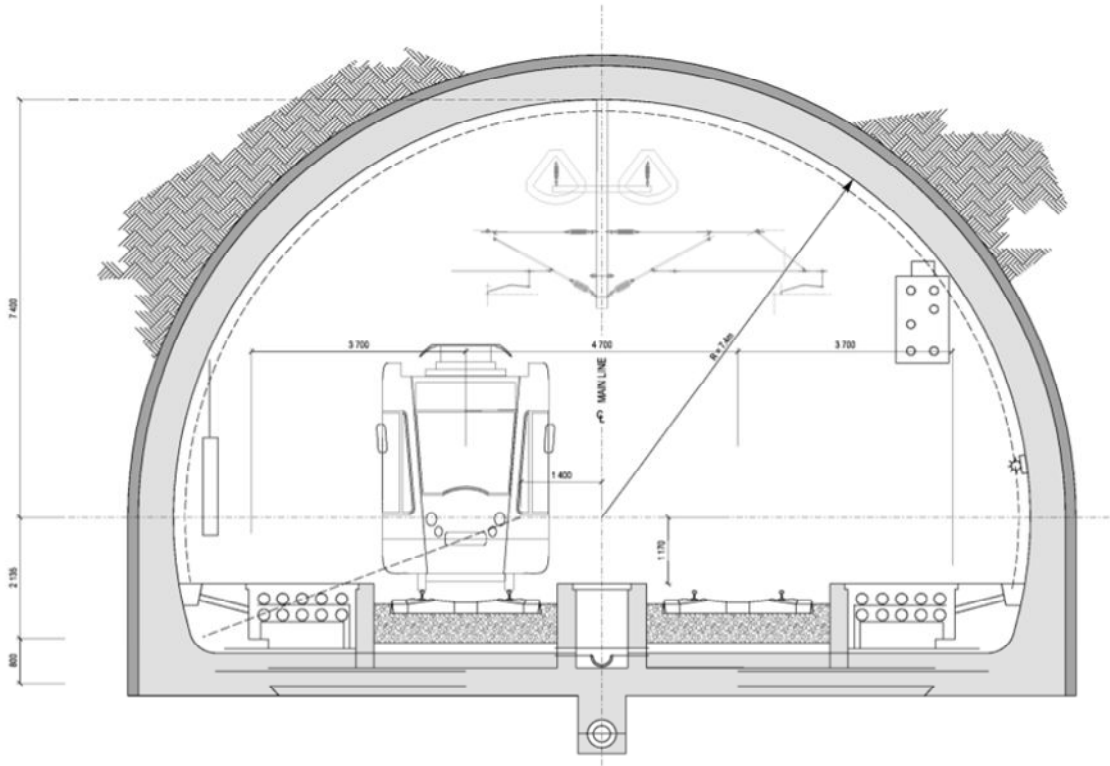


Figure 2: Typical cross-section of a double track electrified tunnel (Aurecon; 2014).

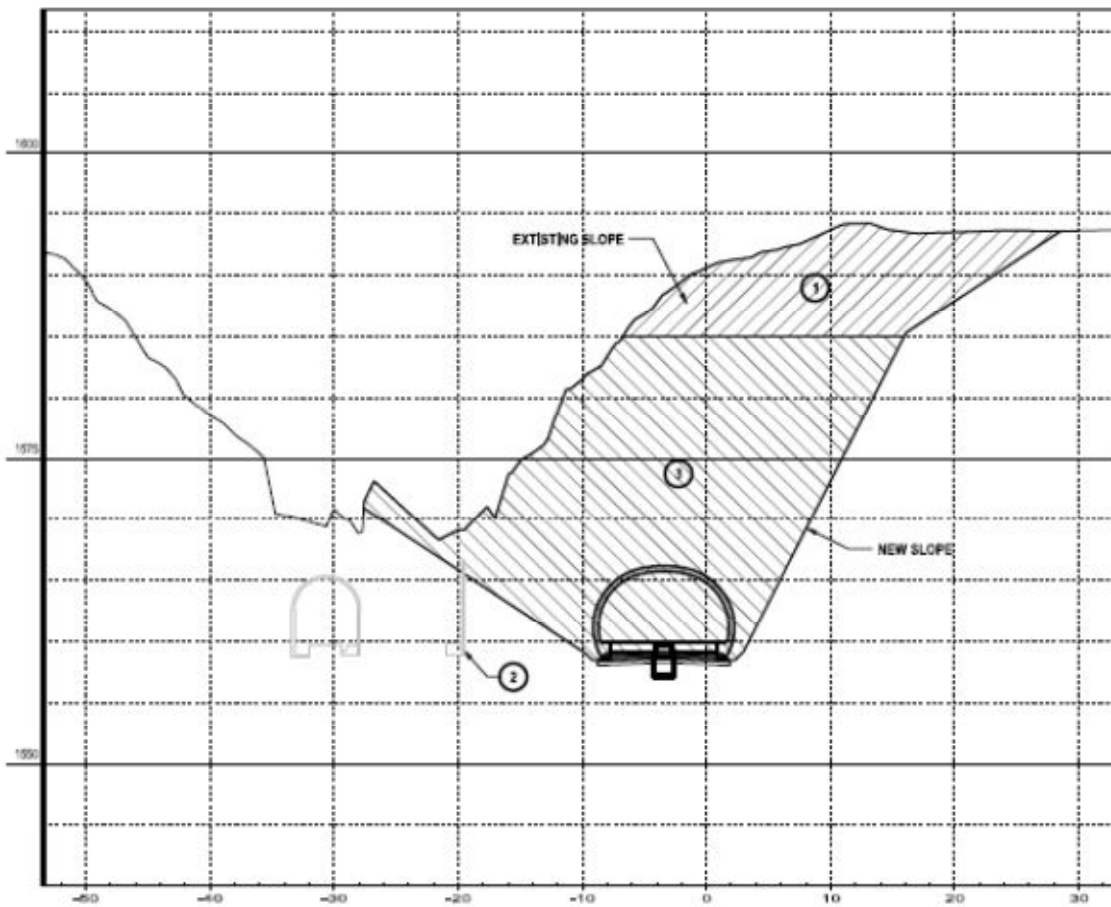


Figure 3: Existing and New Tunnel cross-section at the Eastern portal (Aurecon; 2014).

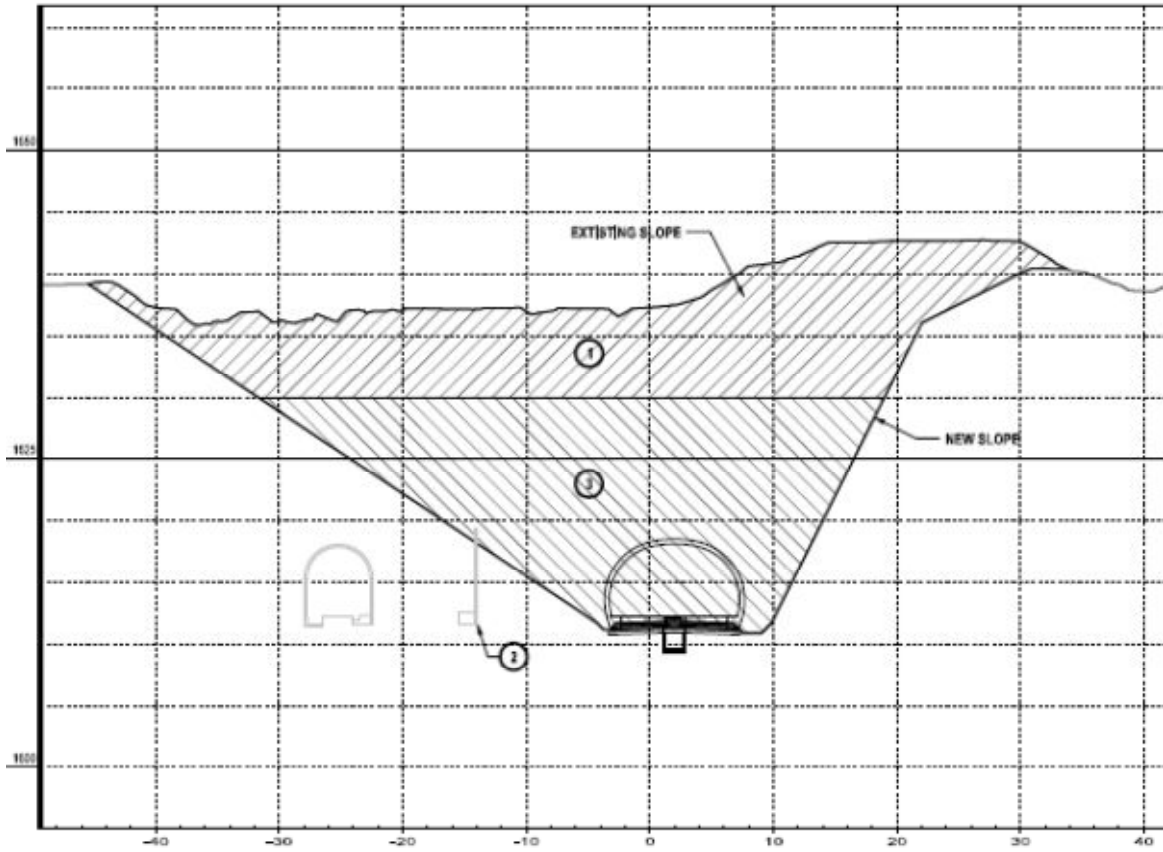


Figure 4: Existing and New Tunnel cross-section at the Western portal (Aurecon; 2014).

In summary therefore this EIA is being undertaken to assess the potential environmental impact of the activities listed above. The implementation process is currently at the feasibility stage.



Figure 5: Representative view of the existing tunnel.

2.3 CONSTRUCTION PHASE ACTIVITIES

Construction phase activities will involve among other things the following: site acquisition, site clearance, excavation, tunnelling (either TBM or drill and blast), drainage, foundations, rail, infrastructure, OHTE, signalling, and ventilation.

2.3.1 Tunnel Construction

The construction process typically commences with site establishment. Site establishment deals with the provision of infrastructure (primarily temporary infrastructure) required for the purposes of construction and to allow the contractors to commence physical work. Services (including temporary services) need to be installed including water, sewage, and power, and land levelled, access roads built and construction offices established. The terrain needs to be fenced off and security control and first aid facilities put in place. Depending on the contractor appointed and the site specific details there may be a need for a concrete batching plant to be erected for the construction process. In the event that a concrete batching plant is required the relevant permits, approvals, and authorisations will be obtained by the contractor.

A laydown area will be established at the project site and will contain a site office, chemical toilets and lock-up facilities for valuables. It is anticipated that no fuel or oil will be stored within the laydown area of the project site (to be confirmed during the EIA Phase). Electricity will most probably be

provided by mobile generators. Electricity will be used for lighting and industrial use such as welding and powering electrical equipment.

A waste storage area will be established and will be used to store waste on site before removal by an appropriate licensed contractor. All wastes will be managed and disposed of in a manner to prevent potential impacts on the environment and risks to human health. The Contractor will be responsible for waste control within the construction site, removal of waste material produced from the site and to implement any mitigation measures to minimise waste or redress problems arising from the waste from the site. Activities during the construction phase will result in the generation of a variety of wastes which can broadly be classified into distinct categories based on their nature and the options for their disposal. These include:

- Excavated materials suitable for reclamation and fill;
- Construction and demolition waste some of which may be suitable for reclamation and fill. This category includes the vegetation cleared at the commencement of the works;
- Chemical waste;
- General refuse; and
- Sewage.

In respect of excavated material, a total of approximately 1 000 000 m³ of material will be generated by the construction of the tunnel and entrance / exit cuttings (please refer to Figure 3 and Figure 4 above). It is anticipated that only a negligible amount of material will be suitable for reuse on this project. However this material could possibly be reused on other projects. Material may have to be transported off-site to a public fill facility or to another site for reuse. The storage, handling and transportation of excavated material prior to utilisation on site or disposal of any unsuitable material at public fill sites could lead to the generation of dust and may be visually intrusive and waste management control will be required to prevent any impacts.

The site area, including the temporary haul and construction roads, will have to be cleared of the vegetation at the start of construction. This process will include trees, and the mixture of topsoil and vegetative matter that will not be suitable for public fill, which will require disposal to the landfill. However, by stripping/uprooting the vegetation first, before removing the top soil, it would be possible to separate the earth into material for reuse on site, material suitable for public fill and the fraction that would require disposal to landfill. In this way, the amount of waste will be minimised.

It is unlikely that any large quantities of chemical wastes will be generated during the construction phase of this project; however construction materials should be handled, stored, transported and disposed of in an appropriate manner. Other wastes including sewage and general refuse will be generated and these will also need to be collected and disposed offsite appropriately. Principles of waste minimisation at source, segregation for reuse, recycling and treatment or disposal will be applied to the handling of waste.

Raw materials will be sourced locally and abroad and include steel reinforcing, signalling equipment, sleepers, fasteners, cement, ballast stone, fireproofing and insulation, electrification equipment etc.

Water will be sourced locally or trucked in by road. In certain instances boreholes may be drilled with permission from the Department of Water and Sanitation (DWS). Location of the boreholes will be determined in consultation with DWS and the relevant landowners.

For the construction phase, skilled and unskilled labourers will be required. Skilled labour will be sourced nationally, including Mpumalanga Province. However semi-skilled and unskilled labour will be sourced locally as far as practicable. Skilled labourers will be required to operate machinery and equipment on site. Skilled artisans and supervisors will also be required. Unskilled workers will be used for manual labour tasks on site.

It is at this stage not yet known how many employees will be active on site during construction. The construction area will need to make provision for the construction staff and will include a temporary construction camp. The construction camp would typically include:

- Access facilities;
- Ablution facilities;
- Areas for the storage of hazardous substances required for construction (e.g. oils and lubricants that will be stored and dispensed at the construction camp);
- Material lay-down areas;
- Accommodation facilities (if required);
- Waste storage and transition areas (various waste streams);
- Offices;
- Parking areas;
- Fuel storage;
- Water storage facilities;
- Stormwater management facilities; and
- Workshop areas.

Light pollution is anticipated at night due to the fact that there is a possibility that construction can be undertaken on a 24hr basis. In terms of scheduling it is anticipated that the construction phase will be over a period of approximately 24 months.

2.3.2 Access roads

Whilst every reasonable effort will be made by Transnet to maximize the use of existing roads, the construction process and the operation of the facilities will require access by construction and maintenance vehicles respectively. Access to the site is generally relatively easy through a well-established access road that connects to the N2 highway travelling from Ermelo to Piet Retief. Access to the existing tunnel is only via railway maintenance road. The construction of access roads for the purposes of construction (e.g. delivery of the tunnel boring machine and other construction material and equipment, etc.) may be required however this will be temporary.

The main activities involved in the construction of a typical road include:

- Route surveying and pegging;

- Land procurement and land and rights processes (for permanent roads- temporary roads will require landowner consent);
- Identification and licensing of suitable sources of road building materials (e.g. borrow pits);
- Bulk earthworks, grading and contouring;
- Import of materials for layering; and
- Surfacing (e.g. asphalt, gravel).

For the purpose of construction, it is anticipated that construction of temporary access roads will be undertaken by the relevant contractor appointed by Transnet.

2.4 OPERATION PHASE ACTIVITIES

The operational phase refers to the actual operation of the proposed project and associated structures; e.g. railway lines. The Overvaal tunnel engineering components include:

- A double tunnel structure (Accommodates two tracks) – a completely sealed/waterproof inverted arch tunnel approximately 4 km in length, including portal structures;
- Construction of a physical barrier between the two tracks;
- Walkways on both sides of the tunnel and barrier protected sanctuaries for material storage;
- Ventilation solutions to be designed and provided for both the existing tunnel and the new tunnel;
- Use by diesel- electric locomotives– high temperature mitigation, and air quality control;
- Mechanical fit outs;
- Extension of the existing cross passages (to provide linkage between the two tunnels);
- Fire proof doors at the cross tunnels;
- Tunnel drainage system;
- Insulation of the new tunnel;
- Railway and Perway, including extension of platforms at approaches;
- Transition technology;
- Cross-over and switch-yards at tunnel approaches;
- Rail signaling system and communication (signal relay equipment outside tunnel);
- Permanent warning system for the new and existing tunnel (must have an automated pantograph warning system on the outside of the tunnel);
- Power supply for operations;
- All OHTE through the new tunnel including tying into the existing double line including switching arrangements and tunnel profiles;
- Tunnel lighting and distribution in accordance with the OSH Act and regulations;
- Sufficient cable ducts to allow for any future works;
- Sufficient plug points for emergency and maintenance; and
- Communications infrastructure.

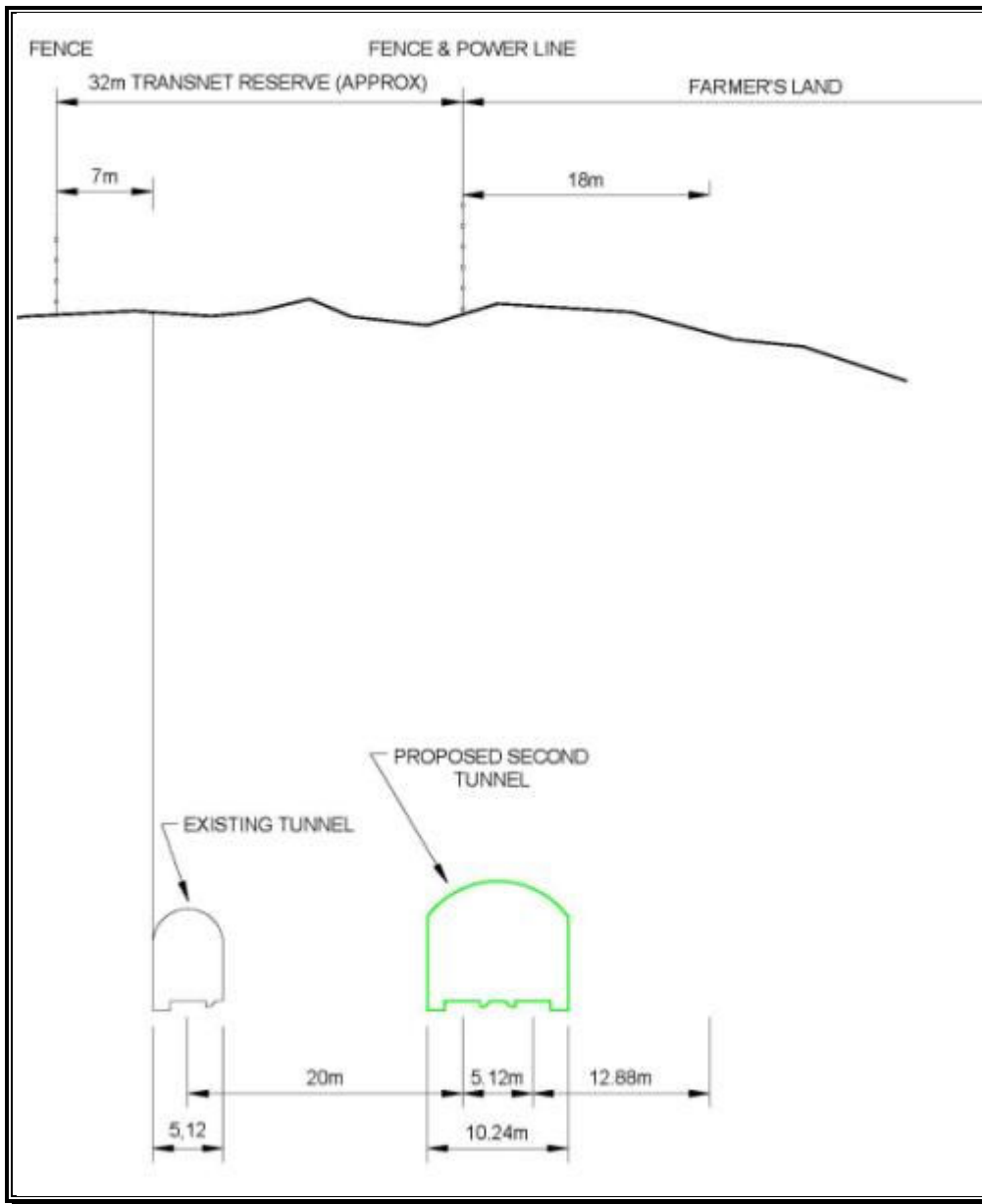


Figure 6: View of the existing and proposed tunnel.

The operation of the tunnel is unlikely to put a significant burden on local services and infrastructure. The facility is typically unmanned and would not require service provision except for maintenance of rail, OHTE, which will not be required on a frequent basis.

The following type of personnel will be recruited for the operational phase of the project, as the capacity of the line is increased over time: administrators, private secretaries, yard masters, yard officials, yard foreman, sundry workers, section managers, chief shedmen, shed assistants, shedmen, train assistants, train control officers, service drivers, train drivers and general workers. In addition and indirectly, both temporary and permanent jobs will be created in the manufacture of wagons and equipment for the railway line.

The proposed project and associated railway line will typically only require a single access road for the purposes of maintenance during operation phase.

2.5 DECOMMISSIONING PHASE

In accordance with the requirements of the EIA regulations it is important to consider and assess the likely impacts resulting from the decommissioning of the facility and infrastructure. It is important to note that at present there is no intention to decommission the proposed project and associated railway lines at any time in the near future. Where necessary, applicable maintenance and repairs will be carried out to ensure continuous operation.

In the unlikely event that the facility needs to be decommissioned, a proper procedure should be followed. Decommissioning typically involves the following activities:

- Disconnection and removal of equipment;
- Dismantling and demolition of structures;
- Re-use, recycle, reduce, and/or dispose of relevant materials;
- Re-instatement of disturbed areas; and
- Rehabilitation and monitoring.

The ultimate objective of the decommissioning would be to re-instate the affected areas to a state in similar or better condition to the current environment.

3. ENVIRO-LEGAL REQUIREMENTS

This section provides an overview of the governing legislation identified which may relate to the proposed project. The primary legal requirement for this project stems from the need for an EA to be granted by the DEA in accordance with the requirements of the NEMA. In addition there are numerous other pieces of legislation which should be considered by Transnet in order to assess the potential applicability of these for the proposed activity. Other legislation that is potentially applicable to the project includes:

- National Environmental Management: Biodiversity Act (Act No. 10 of 2004);
- Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA);
- National Water Act (Act No. 36 of 1998);
- National Environmental Management: Waste Act (Act No. 59 of 2008);
- National Environmental Management: Air Quality Act (Act No. 39 of 2004);
- Environment Conservation Act (Act No. 73 of 1989);
- National Forests Act (Act No. 84 of 1998);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004);
- National Heritage Resources Act (Act No. 25 of 1999);
- The South African National Roads Agency Limited and National Roads Act (Act No. 7 of 1998);
- The Constitution (Act No. 108 of 1996); and
- Mpumalanga Roads Act (Act No. 1 of 2008).

3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT NO. 107 OF 1998)

The National Environmental Management Act (Act No. 107 of 1998) as amended (NEMA), aims to protect the environment, and stipulates that developments must be socially, environmentally and economically sustainable, and that disturbances and pollution of the environment must be avoided, minimised and remedied. The Act also provides for the equitable access to environmental resources, to meet basic human needs. Decisions on the environment must be taken in an open and transparent manner, and resources must be held in trust for the public and protected as such. NEMA also makes provision for the cost of remedying pollution, and all such costs shall be paid by the polluter.

Section 24 (2) in NEMA, 1998 provides for activities which may have a detrimental effect on the environment and may not commence without environmental authorisation (EA) from the competent authority. In Section 24 (4 & 5) provision is made for the Regulations which stipulate the minimum procedures for the issuing of and monitoring compliance with environmental authorisations. Section 24 (8), states that authorisations or permits obtained under any other law for an activity listed or specified in terms of this Act does not absolve the applicant from obtaining authorisation under this Act.

In accordance with Sections 24 (2) and (D) of the NEMA, the Minister has published (in GNR 544, 545, and 546) a list of activities that require EA prior to commencement of these activities. In this regard Table 4 provides a list of the specific activities extracted from the Regulations which the proposed project may potentially trigger, and which consequently have been applied for in this application for EA. It is important to note that at the time of preparing the scoping report the detailed project designs and plans were being generated by the appointed Engineering, Procurement, Contract Management Consultant (EPCM) and the applicability of these listed activities will be confirmed once designs and plans are completed.

Table 4: Anticipated NEMA Listed Activities.

Activity #	Listed Activity Description	Reason for Inclusion
NEMA listed activities - Government Notice R544 – Listing Notice 1		
2	The construction of facilities or infrastructure for the storage of ore or coal that requires an atmospheric emissions license in terms of the National Environmental Management: Air Quality Act (Act No. 39 of 2004).	Materials excavated for the tunnel will need to be stored on or near to the site.
9 (i), (ii)	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water - (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more, excluding where: a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b. where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.	Facilities for bulk transportation of stormwater may be required as part of the construction or operational activities for this project. The dimensions of the stormwater infrastructure are unknown at present but will be clarified during the EIA process.
11(ii); (vi); (xi)	The construction of: (ii) channels; (vi) bulk storm water outlet structures; (xi) infrastructure or structures covering 50 square metres or more – where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	There are numerous wetlands and a stream in the vicinity of the proposed project. The new tunnel and associated infrastructure (e.g. channels and stormwater systems) may exceed 50m ² . The extent of the required infrastructure will be defined during the EIA process. A wetland delineation study during the EIA process will determine the proximity of any such infrastructure to a watercourse.
13	The construction of facilities or infrastructure for the storage, or for the storage	The construction phase of the project is likely to require storage and/or handling

Activity #	Listed Activity Description	Reason for Inclusion
	and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	of dangerous goods. The nature and volumes of such goods will be determined during the EIA process.
18 (i)	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from:</p> <p>(i) a watercourse –</p> <p>but excluding where such infilling, depositing, dredging, excavation, removal or moving; (a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (b) occurs behind the development setback line.</p> <p>[Corrected by “Correction Notice 2” of 10 December 2010, GN No. R. 1159].</p>	The construction process will require removal of rock and soil in the vicinity of a watercourse (i.e. wetland and stream in the vicinity of the proposed new tunnel site). The volumes to be removed and the exact locations are unknown at present and will be determined during the EIA process.
24	The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule or thereafter such land was zoned open space, conservation or had an equivalent zoning.	It is anticipated that land larger than 1000 m ² will be transformed for the construction of the proposed new tunnel. A portion of the construction will be within a rail reserve. However, to accommodate the new tunnel, some of the agricultural land to the south of the existing rail reserve will be acquired and transformed.
28	The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a [new, or amendment of, an existing] permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	Upgrading the ventilation and drainage system for the existing tunnel will be part of this project and thus may require amendment to existing permit/license or a new permit. This will be defined and determined during the EIA process.

Activity #	Listed Activity Description	Reason for Inclusion
<p>39 (i); (ii); (v)</p>	<p>The expansion of facilities or infrastructure for the bulk transportation of water, sewage or stormwater where:</p> <p>(a) the facility or infrastructure is expanded by more than 1000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more. excluding where such expansion: (i) relates to transportation of water, sewage or storm water within a road reserve; or (ii) where such expansion will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</p>	<p>The existing stormwater facilities in place for the existing tunnel may need to be expanded and upgraded to accommodate the new tunnel. The extent of this expansion and new capacity is unknown at present and will be determined during the EIA process as part of the construction plan.</p>
<p>40 (iv)</p>	<p>The expansion of (iv) infrastructure by more than 50 square metres...within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, but excluding where such expansion will occur behind the development setback line.</p>	<p>There are numerous wetlands and a stream in the vicinity of proposed project. The construction of the new tunnel is likely to require expansion of existing infrastructure (e.g. channels, stormwater systems) exceeding 50m², which may affect the surrounding wetlands and/or stream. A wetland delineation study during the EIA process will determine the proximity of any of the above-mentioned infrastructure to a watercourse, and the construction plan will clarify the extent of any such infrastructure.</p>
<p>49 (ii)</p>	<p>The expansion of facilities or infrastructure for the bulk transportation of dangerous goods: (iii) in solid form, outside an industrial complex or zone, by an increased throughput capacity of 50 tons or more per day.</p>	<p>Coal will be transported by the proposed new tunnel and may be classified as a dangerous good if it were to contaminate surrounding soil and water. Some existing rail infrastructure may require expansion to accommodate the new tunnel and railway. The additional throughput of coal to be transported per day is unknown at present, it will be quantified during the EIA process.</p>
<p>53</p>	<p>The expansion of railway lines, stations or shunting yards where there will be an increased development footprint –</p>	<p>The proposed new tunnel will be located approximately 20m from the existing tunnel. It is anticipated that there will be a requirement to construct beyond the existing rail reserve. Some of the construction activities for the new tunnel may require expansion of existing associated infrastructure. The nature and extent of</p>

Activity #	Listed Activity Description	Reason for Inclusion
		the said infrastructure and the development footprint is unknown at present and will be determined during the EIA process.
NEMA listed activities - Government Notice R545 – Listing Notice 2		
3	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	The construction phase of the project is likely to require storage and/or handling of dangerous goods. The nature and volumes of such goods will be determined during the EIA process.
5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	Some air and/or water pollution may occur as a result of construction activities (oil spillages, dust & noise during construction). Emissions may also result from the ventilation shafts (e.g. diesel fumes) during operation as part of tunnel maintenance. Sources of pollution and their management will be determined during the EIA process and mitigation and management thereof to be included in the Environmental Management Programme. The storage of Ore may also be triggered under the NEM:AQA.
11	The construction of railway lines, stations or shunting yards,	The proposed new tunnel will be approximately 20m from the existing tunnel. Some of the construction activities will be within the existing rail reserve. However, there will be a need to expand the existing servitude to accommodate the new tunnel and all its associated infrastructure (including railway lines in the tunnel).
17	The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils in anticipation of the extraction or removal of peat or peat soils.	Soil will be removed and vegetation disturbed during the construction of the proposed new tunnel. The nature of the soil and vegetation types disturbed by construction activities will be defined during the EIA process.
NEMA listed activities - Government Notice R546 – Listing Notice 3		
2	The construction of reservoirs for bulk water supply with a capacity of more than 250 cubic metres.	Water supply may be required for the construction of the new tunnel, the nature and dimensions (including capacity) of such infrastructure is unknown at present and will be determined during the EIA process.

Activity #	Listed Activity Description	Reason for Inclusion
3(a)	The construction of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast: (a) is to be placed on a site not previously used for this purpose, and (b) will exceed 15 metres in height, but excluding attachments to existing buildings and masts on rooftops.	A communication rail signalling system will be required. The location and dimensions of the said structure(s) will be clarified during the EIA process
4	The construction of a road wider than 4 metres with a reserve less than 13.5 metres.	Access roads wider than 4 metres and with a reserve less than 13.5 metres may be required during construction and/or operation of the proposed new tunnel. The dimensions and locations of such roads will be determined during the EIA process.
10	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.	The construction phase of the project is likely to require storage and/or handling of dangerous goods. The nature and volumes of such goods will be determined during the EIA process.
12	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.	It is envisaged that some natural vegetation cover will be cleared during construction. The extent and type of vegetation to be cleared is unknown at present but will be determined and classified during the EIA process.
13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list. (2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010.	It is envisaged that some natural vegetation cover will be cleared during construction. The extent and type of vegetation to be cleared is unknown at present but will be determined and classified during the EIA process.
14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) purposes of agriculture or afforestation	It is envisaged that some natural vegetation cover will be cleared during construction. The extent and type of vegetation to be cleared is unknown at present but will be determined and classified during the EIA process.

Activity #	Listed Activity Description	Reason for Inclusion
	inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes; (2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list; (3) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010.	
16 (iv)	The construction of: (iv) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	There are numerous wetlands and a stream in the vicinity of the proposed project. The new tunnel and associated infrastructure (e.g. channels and stormwater systems) may exceed 10m ² . The extent of the required infrastructure will be defined during the EIA process. A wetland delineation study during the EIA process will determine the proximity of any such infrastructure to a watercourse.
19	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.	The widening and/or lengthening of existing access roads may be required. The required changes (if any) to existing roads will be determined during the EIA process and will be part of the construction plan.
24 (d)	The expansion of (d) infrastructure where the infrastructure will be expanded by 10 square metres or more – where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	There are numerous wetlands and a stream in the vicinity of the proposed project. Existing infrastructure utilized for the existing tunnel expansion (e.g. channels and stormwater systems) may require expansion. The identification of existing infrastructure that requires expansion, and the extent thereof, will be defined during the EIA process. A wetland delineation study during the EIA process will determine the proximity of any such infrastructure to a watercourse.

In accordance with the provisions of Sections 24 (5), (M), and Section 44 of the NEMA the Minister has published regulations (GNR 543) pertaining to the required process for the conducting of EIA's in order to apply for, and be considered for, the issuing of an EA. These regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity. The regulations differentiate between a simpler Basic Assessment Process (required for activities listed in GNR 544 and 546) and a more complete EIA process (activities listed in GNR 545). In the case of this project there are at least four activities in GNR 545 which is triggered and as such a full EIA process is necessary. Figure 7 provides a graphic representation of the EIA process.

This EIA process is currently at the stage where the scoping report and Plan of Study for EIA (PoS), following public review, will be submitted to the DEA for consideration and decision making. In the event that the scoping report and PoS is approved then the EIA phase will commence. The primary objectives of this phase include:

- Comparative assessment of selected feasible alternatives;
- Detailed assessment of identified potential impacts; and
- Identification of reasonable and practicable mitigation and management measures.

The EIA phase will culminate in the compilation of an Environmental Impact Report (EIR) and an Environmental Management Programme (EMPr). It is important to note that provision has been made for further public consultation and involvement during the EIA phase.

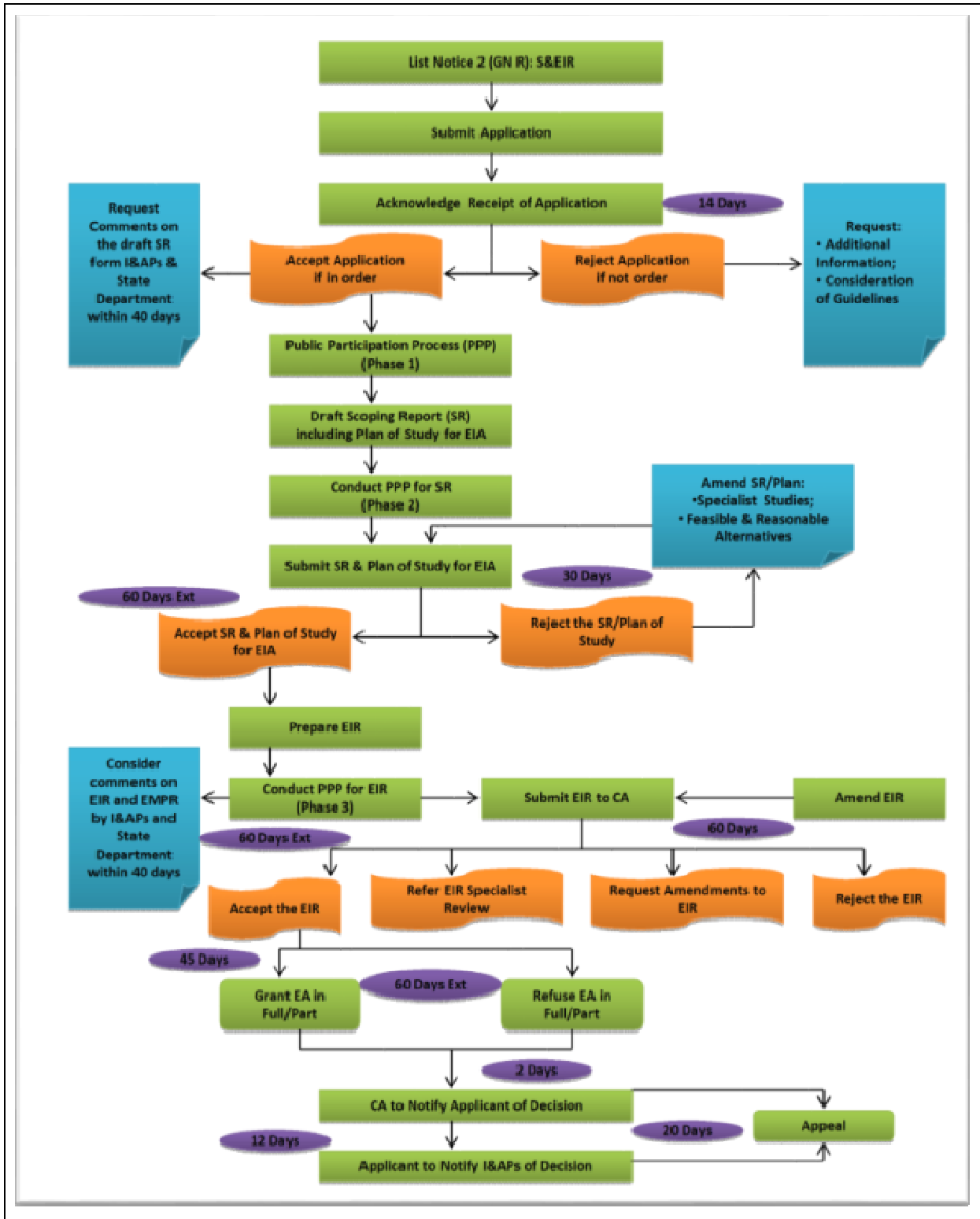


Figure 7: NEMA EIA process.

3.2 MINERAL AND PETROLEUM RESOURCES ACT (ACT NO. 28 OF 2002)

The Minerals and Petroleum Resources Development Act (Act 28 of 2002) (MPRDA) governs the sustainable utilisation of South Africa's mineral resources. In the event that the proposed activities require material (e.g. sand, gravel, aggregate) for the purposes of construction then the provisions of the MPRDA may apply.

In accordance with Section 5 (4) of the MPRDA: "no person may prospect for or remove, mine, conduct technical co-operation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto without: an approved Environmental Management Programme or approved Environmental Management Plan; a representative permit or right; and notifying and consulting with the landowner or lawful occupier of the land on question".

With respect to creating borrow pits there will be a requirement for either a mining permit (less than 5ha) or a mining right (larger than 5ha) depending on the extent of the proposed borrow pit. These mining permits and rights require the compilation of an environmental management plan or an environmental management programme (including an EIA) respectively, as well as a public consultation process, prior to being considered. The decision making authority in respect of these permits / rights is the Department of Mineral Resources (DMR). In addition, by virtue of the fact that the construction process involves significant extraction of material, there may be a need to obtain a relevant right under the MPRDA. This will be clarified in consultation with the representatives from the DMR.

3.3 THE NATIONAL WATER ACT (ACT NO. 36 OF 1998)

This Act sets out the fundamental principles of sustainability and equity for the protection, use and development, conservation, management and control of water resources in South Africa. The guiding principal acknowledges the basic human needs and the need to protect water resources.

Unless water uses (if any) required for the project are permissible water uses as envisaged in the NWA, a water use licence (WUL) will be required for those water uses referred to by submitting an application to the Department of Water and Sanitation (DWS). Transnet has appointed the EAP to apply for all necessary permits/ licences.

Potential Section 21 water uses which may be applicable to this project include¹:

- Activity 21 (a): Taking water from a water resource.
 - **Applicability:** Depending on the location of the proposed activities and the facilities required for construction there may be a need to extract water from available

¹ It is important to note that there may be additional Section 21 water uses which may be triggered. Transnet must ensure that all water uses are legal.

resources (incl. surface and/or groundwater). In the event that water is to be obtained from an unlicensed natural resource then there may be a need to apply for a WUL.

- Activity 21 (c): Impeding or diverting the flow of water in a watercourse.
 - **Applicability:** This listing applies to any activity that would impede or alter the flow of a wetland, seepage area, or river. Access roads, or other activities that require construction inside these features, to stop or divert the flow, would trigger this listing. The construction of the tunnel underground may indirectly alter the subterranean water flows and therefore may require a WUL.
- Activity 21 (i): Altering the bed, banks, course or characteristics of a water course.
 - **Applicability:** the NWA Regulations defines altering as “the temporary or permanent alteration of a watercourse for...”. The available dictionary definition of alteration is, “change, revise, modify, vary, transform, adjust, adapt, convert, remodel, restyle, refashion, remould, revamp, correct, amend”. In the event that any activities, whether temporary or permanent, which results in the alteration of a watercourse may require a WUL.
- Activity 21 (g): Disposing of waste in a manner which may detrimentally impact on a water resource.
 - **Applicability:** Disposal of waste (rock material) from the proposed tunnel if not undertaken properly, may have negative impacts to the existing surface water bodies within and around the proposed site.
- Activity 21 (j): Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.
 - **Applicability:** As it is the case with the existing tunnel, all water that will accumulate within the tunnel will be channeled towards existing stream that is situated towards the east of the proposed site.

3.4 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT NO. 59 OF 2008)

The purpose of this Act is to prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development. In addition sustainable development requires that the generation of waste is avoided, or where it cannot be avoided, that it is reduced, re-used, recycled or recovered and only as a last resort treated and safely disposed of.

Section 19 of the Act, allows that the Minister may, by notice in the Gazette, publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Such activities require a waste management licence. The activities listed include the following categories:

- Storage of waste;
- Reuse, recycling and recovery;
- Treatment of waste;

- Disposal of waste;
- Storage, treatment and processing of animal waste; and
- Construction, expansion or decommissioning of facilities and associated structures and infrastructure.

Each of the listed activities has an associated threshold which, if exceeded, would trigger the requirement for a waste management licence (thresholds relate to, inter alia, volumes, time, and throughputs). It is presently anticipated that listed waste management activities will be triggered by the proposed project.

Table 5: Anticipated NEMWA Listed Activities.

Activity #	Listed Activity Description	Reason for Inclusion
NEMWA Listed Activities - Government Notice R718		
Category A; Activity 1	The storage, including the temporary storage of general waste at a facility, that has the capacity to store in excess of 100m ³ of general waste at any one time.	Some general waste will be generated during construction (i.e. excavated rock, domestic waste etc.) which will need to be stored on site prior to being re-used or disposed. The expected volumes of such waste are unknown at present but will be determined during the EIA process.
Category A; Activity 2	The storage, including the temporary storage of hazardous waste at a facility that has the capacity to store in excess of 35m ³ of hazardous waste at any one time.	Some accidental contamination of soil and other substrates (e.g. fuel, concrete wash water, etc.) may occur during construction, and this hazardous waste will need to be temporarily stored on site prior to disposal. The expected volumes of such waste are unknown at present but will be determined during the EIA process.
Category A; Activity 3	The storage, including the temporary storage of general waste in lagoons.	Some general waste (incl. inert waste) may be stored temporarily on site during construction. The exact amounts are unknown and will be determined during the EIA process.
Category A; Activity 5	The sorting, shredding, grinding or bailing of general waste at a facility that has the capacity to process in excess or one ton of general waste per day.	Some general waste (incl. inert waste) will be produced during construction and may need to be sorted & shredded on site. The exact amounts and processes are unknown and will be determined during the EIA process.
Category A; Activity 7	The recycling or re-use of general waste of more than 10 tons per month.	General waste will be produced during the construction of the proposed new tunnel; some of this waste (e.g. waste rock) may be re-used on and/or off site. The details of pertaining to amounts of general waste to be re-used and the actual uses is unknown at present and will be determined during the EIA process.
Category A; Activity 14	The disposal of inert waste in excess of 25 tons and with a total capacity of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorised by or under other legislation.	Some inert waste such as waste rock produced during construction will need to be disposed to a licensed dump site and/or other area's (e.g. used to backfill old quarries etc. The amounts and uses thereof will be clarified during the EIA process.
Category A; Activity 15	The disposal of general waste to land covering an area of more than 50m ² but less than 200m ² and with a total capacity not exceeding 25 000 tons.	Some general waste including waste rock and domestic waste produced during construction may need to be disposed to a licensed dump site. The amounts thereof will be clarified during the EIA process.
Category A; Activity 16	The disposal of domestic waste generated on premises in areas not serviced by the municipal service where the waste disposed does not exceed 500kg per month.	Domestic waste will be produced during construction and operation of the proposed new tunnel. The exact volumes and disposal options are unknown at present and will be determined during the EIA process.
Category A;	The construction of facilities for activities listed in Category A of this Schedule (not in isolation to associated activity).	As a precautionary measure this activity is included, its relevance to the proposed

Activity #	Listed Activity Description	Reason for Inclusion
Activity 18		new tunnel construction will be determined during the EIA process.
Category A; Activity 19	The expansion of facilities of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of pollution, effluent or waste.	Upgrading the ventilation and stormwater systems for the existing tunnel will be part of this project and thus may require amendment to existing permit/licence or a new permit. This will be defined and determined during the EIA process.
Category B; Activity 10	The disposal of general waste to land covering an area in excess of 200m2.	General waste will be produced for this development and will need to be disposed of. However, the amount and disposal options, of general waste to be produced during construction will be determined during the EIA process.
Category B; Activity 11	The construction of facilities or activities listed in Category B of this Schedule (not in isolation to associated activity).	As a precautionary measure this activity is included, its relevance to the proposed new tunnel construction will be determined during the EIA process.

It is further important to consider the provision of Section 16 of the Act which requires that:

- “ A holder of waste must, within the holders power, take all reasonable measures to-
 - a. avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;
 - b. reduce, re-use, recycle and recover waste;
 - c. where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
 - d. manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;
 - e. prevent any employee or any person under his or her supervision from contravening the Act; and
 - f. prevent the waste from being used for unauthorised purposes.”

These general principles of responsible waste management will be incorporated into the requirements in the EMPr to be implemented for this project.

3.5 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT (ACT NO. 39 OF 2004)

The National Environmental Management: Air Quality Act (NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

- (a) to protect the environment by providing reasonable measures for-
 - i. the protection and enhancement of the quality of air in the republic;
 - ii. the prevention of air pollution and ecological degradation; and
 - iii. securing ecologically sustainable development while promoting justifiable economic and social development; and
- (b) Generally to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and wellbeing of people.

Section 21 of the NEMAQA allows that the Minister to publish a list of activities which may result in atmospheric emissions and which may have a significant detrimental effect on the environment. The NEMAQA further requires that no person may, without a provisional atmospheric emissions licence or an atmospheric emissions licence conduct an activity which is listed in accordance with Section 21. Due to the fact that the construction process involves significant extraction of material, there may be a need to obtain a relevant right under section 21 of the NEMAQA for storage of extracted material/ ore. This will be clarified in consultation with the representatives from the Department during the draft scoping report review period. Transnet is however advised to reassess the project closer to commencement, once further detail is available, to confirm. Of specific importance for the proposed project is the potential for the activity to result in the generation of dust and smoke emissions.

In terms of the Government Notice No. R. 827 of 1 November 2013 as promulgated under the National Environmental Management Act: Air Quality Act, 2004 (Act No. 39 of 2004), a standard for the acceptable dust fall rate is as stipulated in Table 6 below for residential and non-residential areas.

Table 6: Acceptable dust fall rates (Government Notice R.827).

Restriction area	Dust fall rate (D) (mg/m ² /day, 30-days average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months.
Non-Residential area	600 < D < 1200	Two within a year, not sequential months.

Section 32 of the NEMAQA also makes reference to the fact that the Minister may inter alia prescribe measures for the control of dust and measures to be taken to prevent nuisance caused by dust. In addition section 9(1) of the NEMAQA makes allowance for the Minister to publish a list of national ambient air quality standards to be implemented throughout South Africa. GNR 1210 of December 2009 provides these standards for various ambient pollutants. With respect to the proposed project, the notice makes provision for an ambient air quality standard for Particulate Matter (i.e. dust) as presented in Table 7. Transnet must ensure that these ambient standards are met during construction and operation.

Table 7: National ambient air quality standard for particulate matter

Averaging period	Concentration	Frequency of exceedance	Compliance date
24 hours	120 µg/m ³	4	Immediate- 31 December 2014
24 hours	75 µg/m ³	4	1 January 2015
1 year	50 µg/m ³	0	Immediate – 31 December 2014
1 year	40 µg/m ³	0	1 January 2015

The reference method for the determination of the particulate matter fraction of suspended particulate matter shall be EN12341

3.6 ENVIRONMENT CONSERVATION ACT (ACT NO. 73 OF 1989)

The Environment Conservation Act (Act 73 of 1989) (ECA) was, prior to the promulgation of the NEMA, the backbone of environmental legislation in South Africa. To date the majority of the ECA has been repealed by various other Acts, however Section 25 of the Act and the Noise Regulations

(GNR 154 of 1992) promulgated under this section are still in effect. These regulations serve to control noise and general prohibitions relating to noise impact and nuisance.

The noise control regulations will need to be considered by Transnet in relation to the potential noise that may be generated during the construction of the proposed project and railway lines. The two key aspects of the noise control regulations relate to disturbing noise and noise nuisance.

Section 4 of the regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the regulations as 'a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.

Section 5 of the noise control regulations in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as 'any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person'. Noise nuisance is anticipated from the proposed project particularly to those residents that are situated in close proximity to the project site.

South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with the ECA noise regulations.

3.7 NATIONAL FORESTS ACT (ACT NO. 84 OF 1998)

According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that '*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister*'.

No protected trees are anticipated within the vicinity of the proposed project due to the fact that the area has been disturbed through grazing and agricultural activities. However it is recommended that proper mitigation be implemented to protect those trees if encountered when selecting sites for construction camps and lay down areas.

3.8 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO. 10 OF 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004)(NEMBA), 'provides for: the management and conservation of South Africa's biodiversity within the framework of the NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute (SANBI); and for matters conducted therewith".

In terms of the Biodiversity Act, Transnet has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorization of the area (not just by listed activity as specified in the EIA regulations).
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

Regulations published under the NEMBA also provides a list of protected species, according to the Act (GNR 151 dated 23 February 2007, as amended in GNR 1187 dated 14 December 2007).

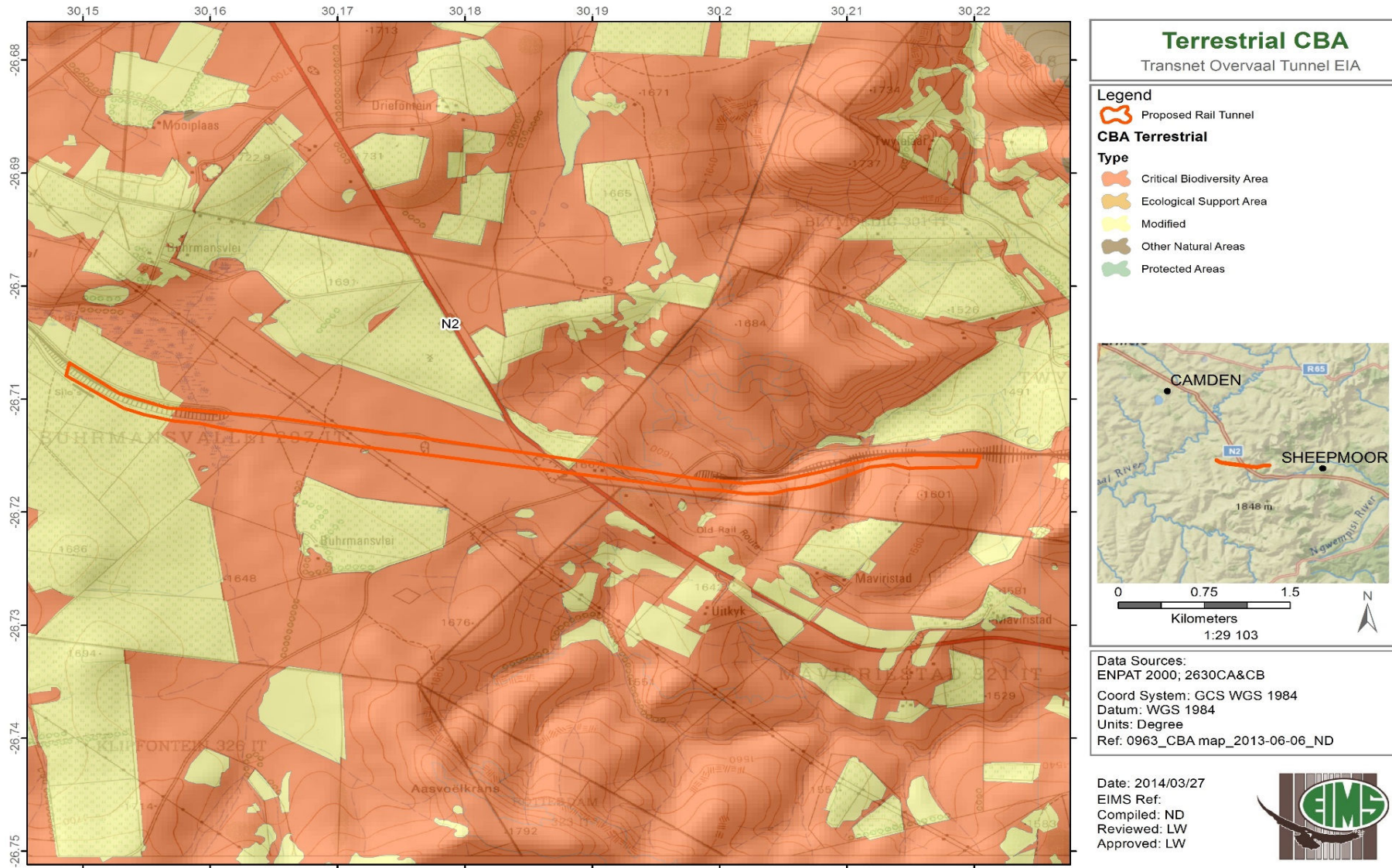


Figure 8: View of terrestrial ecosystem within the project site (SANBI).

3.9 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (10/2004): ALIEN AND INVASIVE SPECIES LIST (2014)

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

- **Category 1a Listed Invasive Species:** Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated.
- **Category 1b Listed Invasive Species:** Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled.
- **Category 2 Listed Invasive Species:** Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.
- **Category 3 Listed Invasive Species:** Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

The provisions of this act have been considered and where relevant will be incorporated into the requirements of the EMP.

3.10 THE NATIONAL HERITAGE RESOURCES ACT (ACT NO. 25 OF 1999)

The National Heritage Resources Act (Act 25 of 1999) (NHRA) provides for the protection of heritage resources of South Africa, which are of cultural significance or other special value by introducing an integrated and interactive system for the management of national heritage resources.

The NHRA stipulates that cultural heritage resources may not be disturbed without authorization from the relevant heritage authority. Section 34 (1) of the NHRA states that “*no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...*”. NEMA Section 23 (2) (b) states that integrated environmental management should “*...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage*”.

Section 38 of the NHRA states that any person who intends to undertake a linear development exceeding 300m in length must at the earliest stages of the development, notify the responsible Heritage Resources Authority and furnish them with details regarding the location, nature, and extent

of the proposed development. The Responsible Heritage Resource Authority could, within 14 days of receipt of such notification; request a heritage impact assessment (HIA) if there is any reason to believe that the heritage resources in the area may be affected.

The South African Heritage Resources Authority (SAHRA), as the responsible Heritage Resources Authority, was notified of the proposed project. A specialist phase 1 heritage impact assessment will be conducted for this project and the findings incorporated into the EIA process. In terms of the SAHRA Paleontological map this area is of high paleontological importance and will require a Phase 1 paleontological study to inform the EIA process.

3.11 THE SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED AND NATIONAL ROADS ACT (ACT NO. 7 OF 1998)

The South African National Roads Agency Limited (SANRAL) and National Roads Act (Act 7 of 1998) makes provision for a national roads agency for the Republic to manage and control the Republic's national roads system and take charge, amongst others, of the development, maintenance and rehabilitation of national roads within the framework of government policy; for that purpose to provide for the establishment of SANRAL ; to prescribe measures and requirements with regard to the Government's policy concerning national roads, the declaration of national roads by the Minister of Transport and the use and protection of national roads; to repeal or amend the provisions of certain laws relating to or relevant to national roads; and to provide for incidental matters.

The Act provides for certain processes and procedures which should be followed in the event that any structures are erected on or within the defined 'building restriction area' of a National Road. In this regard EIMS has included SANRAL as a pre-identified key Interested and Affected Party (I&AP) and as such they will be informed of the proposed project and will be provided with an opportunity to comment on all submissions. The proposed project is traversed on the eastern side by the N2 road (falling under the jurisdiction of this Act). The provisions of this Act will be applicable and must be considered by Transnet.

3.12 THE CONSTITUTION (ACT NO. 108 OF 1996)

Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -

- prevent pollution and ecological degradation;
- promote conservation; and
- secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

The public's right to be involved in decisions that may affect them is enshrined in the South African Constitution. Section 57(1) of the new Constitution provides that: "The National Assembly may (b)

make rules and orders concerning its business, with due regard to representative and participatory democracy, accountability, transparency and public involvement”.

This provision, along with several others gave rise to many new trends in South African legislation. In environmental legislation, the idea of public participation (or stakeholder engagement) features strongly and especially the National Environmental Management Act (Act No. 107 of 1998 - NEMA) and the recent regulations passed under the auspices of this Act makes very strict provisions for public participation in environmental decision-making.

Public participation can be defined as “a process leading to a joint effort by stakeholders, technical specialists, the authorities and the proponent who work together to produce better decisions than if they had acted independently” (Greyling, 1999, p. 20). From this definition, it can be seen that the input of the public is regarded as very important indeed.

3.13 MPUMALANGA ROADS ACT, 2008

The main objectives of the act include the following:

- to provide for the establishment, transformation, restructuring and control of the Mpumalanga Provincial road network;
- to develop and implement Provincial road policy and standards; to provide for optimum road safety standards, efficient and cost-effective management of the Provincial road network, the maintenance of Provincial roads assets and the provision and development of equitable road access to all communities within the Province;
- to provide for transparency in the development and implementation of the Provincial road network policies and practices; and to provide for matters connected therewith.

4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

For the purposes of this report the receiving environment has been categorised into the Physical, Biological, Socio-economic and Cultural components.

4.1 PHYSICAL ENVIRONMENT

4.1.1 Climate

The proposed project will be situated on the Highveld in the Mpumalanga Province. The area is characterized by cool, dry winters (May to August) and warm, wet summers (October to March), with April and September being transition months. The summers are mild with most of the rainfall, frequently in the form of thundershowers, occurring during the summer (<http://www.weathersa.co.za>).

Temperature

Average monthly minimum and maximum temperatures for the Ermelo weather station (No 0479870X) is shown in Table 8. Average daily maximum and minimum summer temperatures

(November to February) at the weather station range between ~29°C and ~32°C, while winter temperatures (May to August) range between ~23°C and ~26°C respectively (South African Weather Service).

Table 8: Temperature data for Ermelo for 2010 obtained from the South African Weather Service (Station No 0479870X)

Month	Temperature (°C)	
	Average Daily Maximum	Average daily Minimum
January	29.5	12.4
February	29.1	8.8
March	28	9.1
April	25.7	2.5
May	23.6	3.3
June	23.7	1.3
July	23.1	-0.9
August	26.1	5.2
September	30.5	2.1
October	32	6.8
November	32.6	5.7
December	33	8.3

Wind

As per the South African Weather Services, dominant wind is from the west northwest which blows approximately 15% of the time, with winds exceeding 5.7m/s, with other prevailing winds from the north west (11%) and west (9%). A secondary wind field blowing from the east (10%) and east south east (9%) are also noted, indicating a general wind reversal trend for the wind profile. The area does not experience strong winds, with the maximums not exceeding 8.8m/s.

Mean annual precipitation

The average rainfall of the area surrounding the proposed project is ~750 mm per annum, (Msukaligwa Spatial Development Framework, 2010).

4.1.2 Geology and Soil

According to Mucina & Rutherford, 2006 and with reference to Figure 18, the Eastern Highveld Grassland is comprised of red to yellow sandy soil of the Ba and Bb land types found on shale's and sandstones of the Madzaringwe formation (Karoo Supergroup) (refer to Figure 9). On the other hand the Wakkerstroom Montane Grassland is comprised of the mudstones, sandstones and shale of the Madzaringwe and Volkrust (Karoo Supergroup) were intruded by voluminous Jurassic dolerite dykes and sills. Ac land type is dominant, while Fa and Ca are of subordinate importance.

The proposed project is underlain by a succession of sedimentary rocks of the Karoo Sequence. Locally the Karoo Sequence is represented by rocks of the Vryheid Formation, Ecca Group. The Karoo sediments comprise siltstones, carbonaceous siltstones and sandstones. These rocks have been intruded by a massive dolerite sill. Localised faulting is evident but displacements are generally

slight. The dolerite comprised a fine grained chill zone close to the contact with the Karoo. A gradation from fine grained dolerite about the Karoo contact to a coarse grained dolerite with depth was noted. No petrographic analyses were undertaken and hence the gradation from fine grained through medium grained to coarse grained dolerite is based on a visual assessment only. Faulting is evident in the area and the drainage paths observed on the surface topography are considered to be controlled by the structural geology, (Jones and Wagener, 2010). The borehole data supports the information from the construction of the existing tunnel in that the dolerite sill is massive and that the proposed project will also be located entirely within the dolerite sill (see Figure 10 for geological characteristics of the proposed project site).

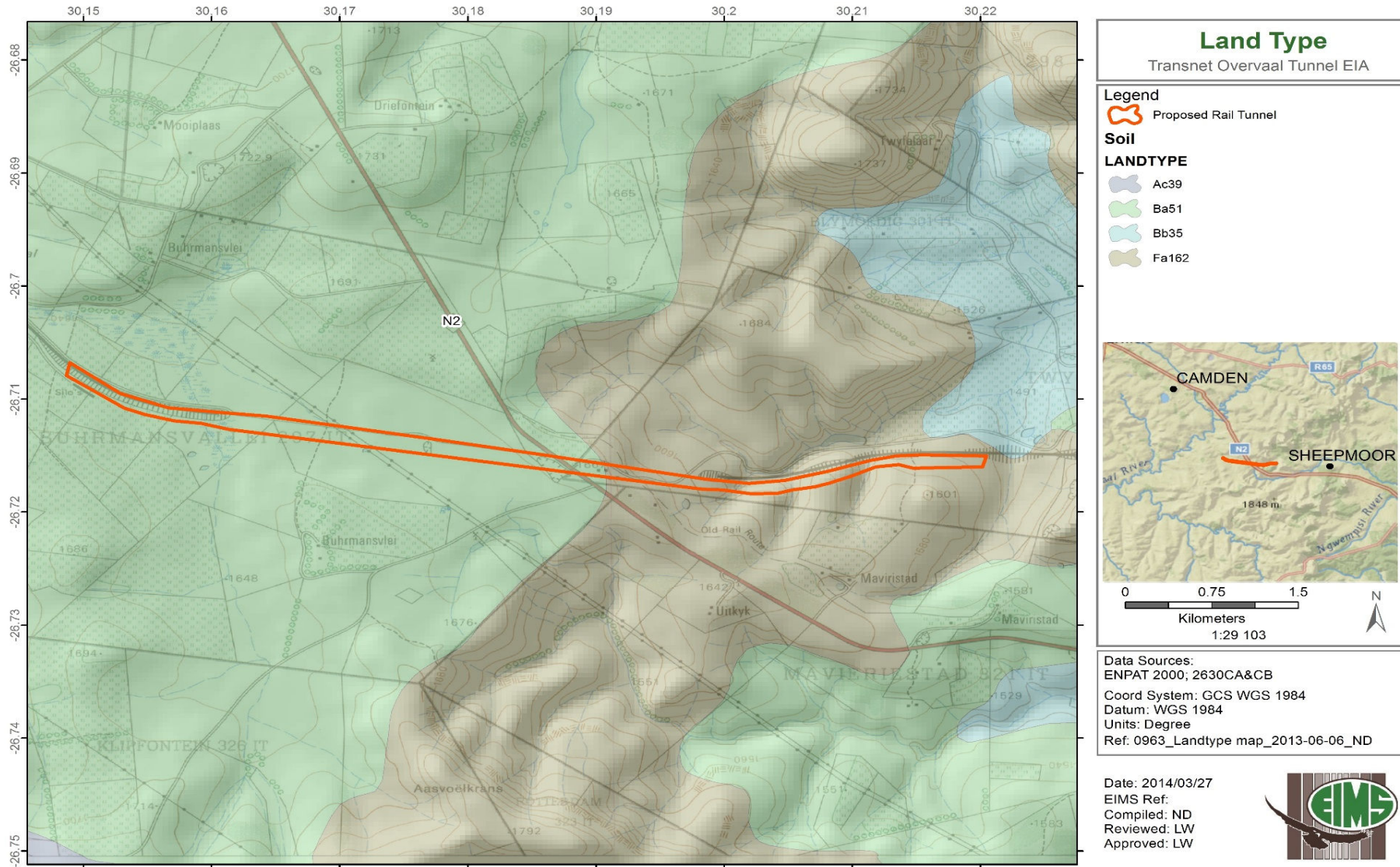


Figure 9: View of land types characterising the project proposed project site.

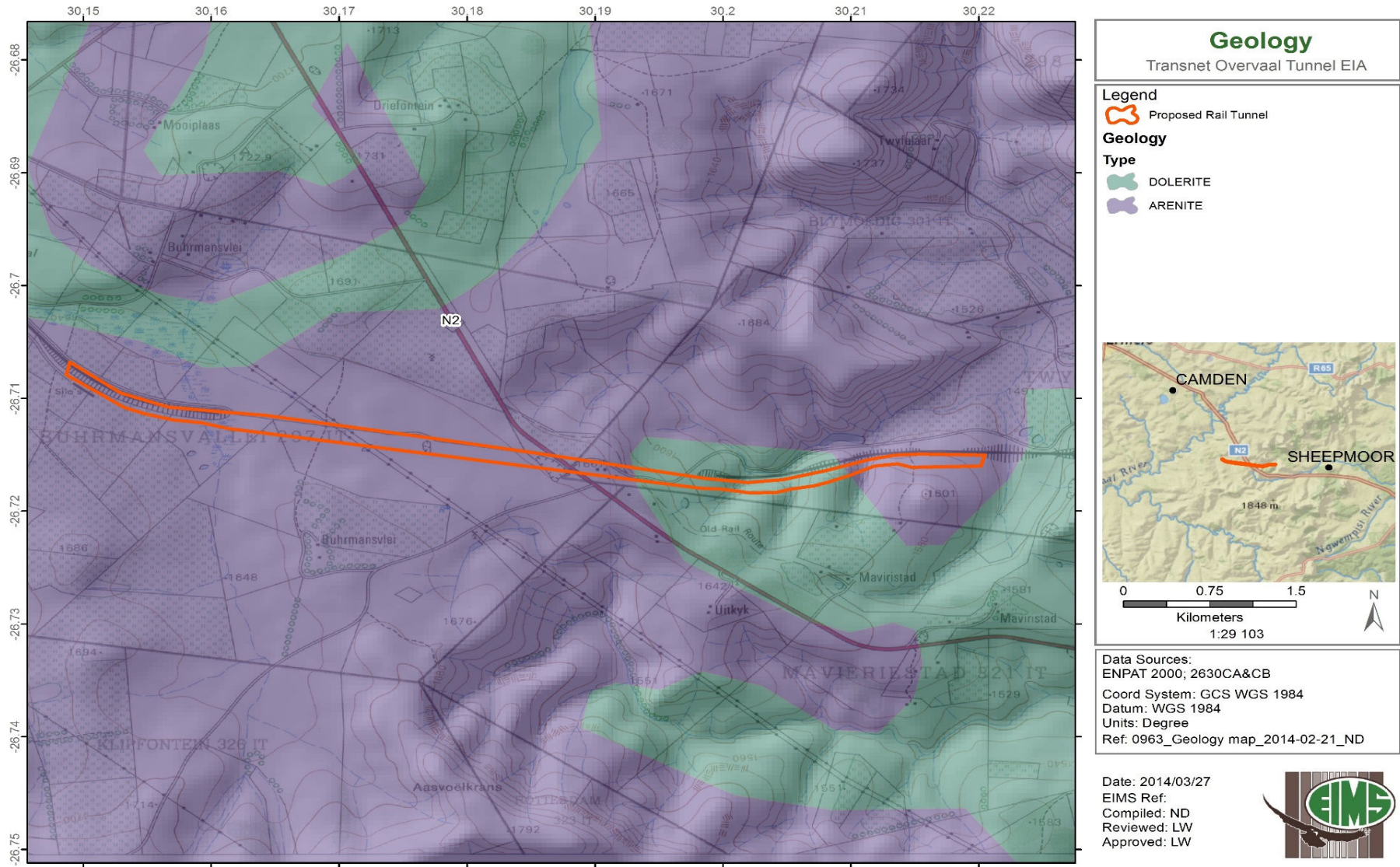


Figure 10: Geological characteristics of the proposed project site.

4.1.3 Topography

The proposed project is situated in an area that is characterised by a rolling to undulating topography (refer to Figure 11). The general surface elevation along the proposed project route ranges from 1641mamsl to 1656 mamsl (metres above mean sea level) in the west and central section's increasing to approximately 1665mamsl at the N2 and then decreasing rapidly to 1590 mamsl eastwards, (Jones & Wagener, 2010).

4.1.4 Hydrology

The hydrological characteristics of the receiving environment can be described in terms of the surface water features and the ground water features found in the vicinity of the proposed project.

The proposed project site falls within both the Upper Vaal WMA (proposed Vaal WMA) and Inkomati – Usuthu WMA (used to be called Usuthu - Mhlathuze WMA, (refer to Figure 14). The major rivers traversing the municipal area include the Vaal, Klein Vaal, Waterval, Slang, Sandspruit, Olifants, Komati, Seekoeispruit, Usutu, Ngwempisi, Hlelo, Assegaai, Wit, and Phongolo. Stretches of both the Vaal and Phongolo River, largely form the southern boundary of the District. These feed into a number of prominent dams distributed throughout the District, namely the Nooitgedacht, Vygeboom, Jericho, Hey/Shope, Grootdraai and a part of the Vaal Dam adjoining the south-western corner of the District.

Apart from the general drainage system, the district is known for its numerous wetlands and pans. These generally dominate the surrounding areas of Chrissiesmeer and Wakkerstroom. Importantly, wetlands not only contain high species diversity, but play a significant ecological role. Furthermore, wetlands function as landscape amenities by helping with hydrologic management, flood attenuation, stormwater control, erosion control, and pollution control. Consequently, wetland areas should be avoided for development purposes (Gert Sibande District Municipality SDF, 2009).

With regards to the surface water features there are a number of drainage systems around the proposed project site that drain into the Vaal River and Usutu River. The proposed project site is located in the Vaal River Catchment upstream of the Grootdraai Dam and the Great Usutu River catchment upstream of the Morgenstond Dam. The proposed project site is situated in the C11B quaternary sub-catchment of the Vaal River primary catchment and W53A quaternary catchment of the Great Usutu River. According to the ecological importance classification for the two quaternary catchments (C11B and W53A) in the area (refer to Figure 14), the systems in the area can be classified as sensitive to moderately sensitive in terms of ecological importance and sensitivity.

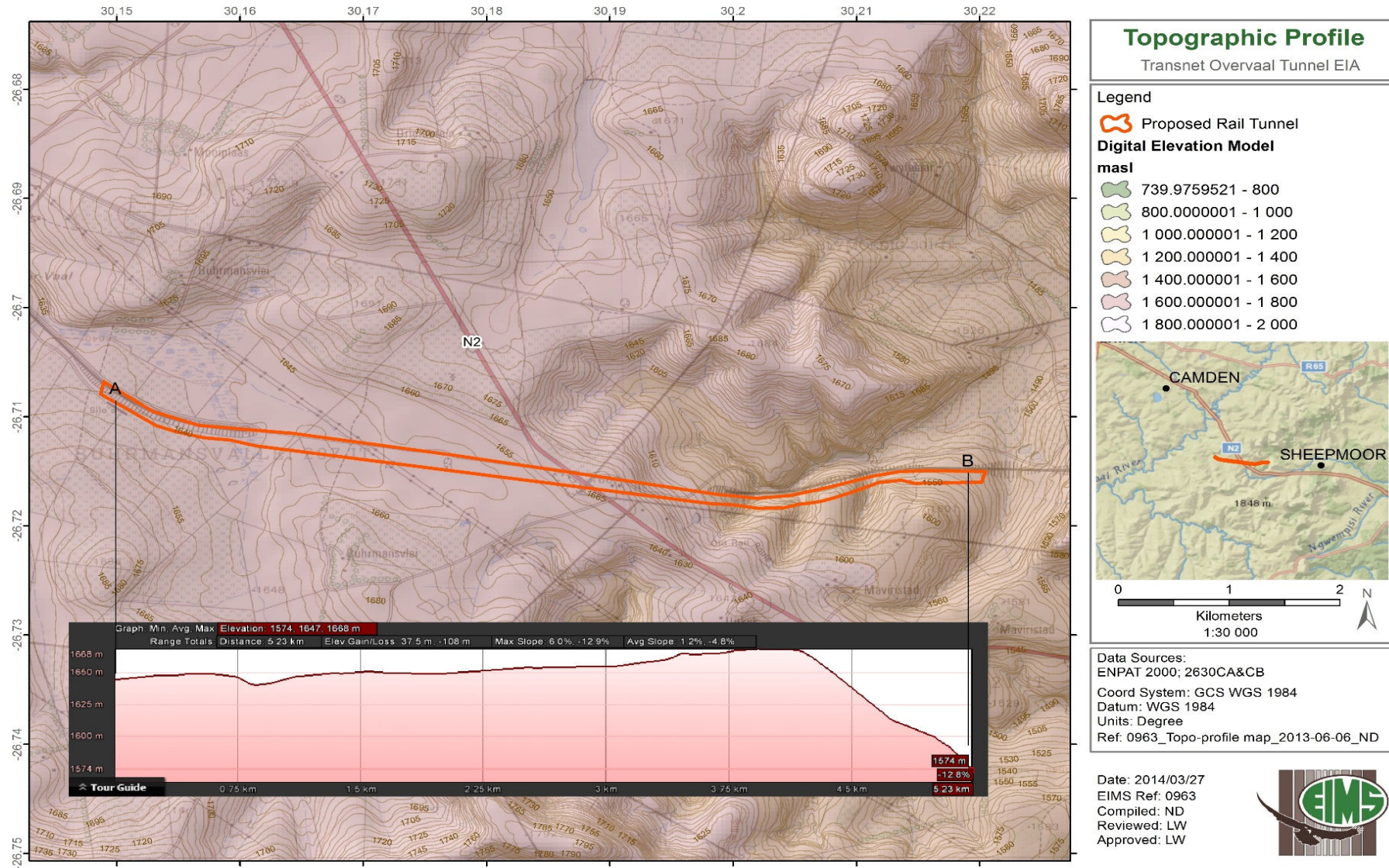


Figure 11: Topography of the proposed project site.

Most of the proposed project site is underlain by Karoo sediments intruded by a dolerite sill and, consequently, two aquifers were expected, namely a shallow Karoo aquifer and a deeper, fractured, dolerite aquifer (Jones and Wagener, 2010). The aquifers in the area provide a widespread base flow component to a number of surface watercourses that will be affected should adverse impacts occur on the quality or availability of the resource.

Groundwater and surface water in the area is dominated by magnesium cations and bicarbonate alkalinity, which represents clean, relatively young water. Any water related impacts which may occur are likely to affect the local area water quality for a long duration. These impacts have the potential to contaminate the groundwater and soil environment which in turn can affect water quality in surface water sources in the area.



Figure 12: View of the stream situated towards the eastern end of the proposed project site.



Figure 13: View of the stream situated towards the western end of the proposed project site.

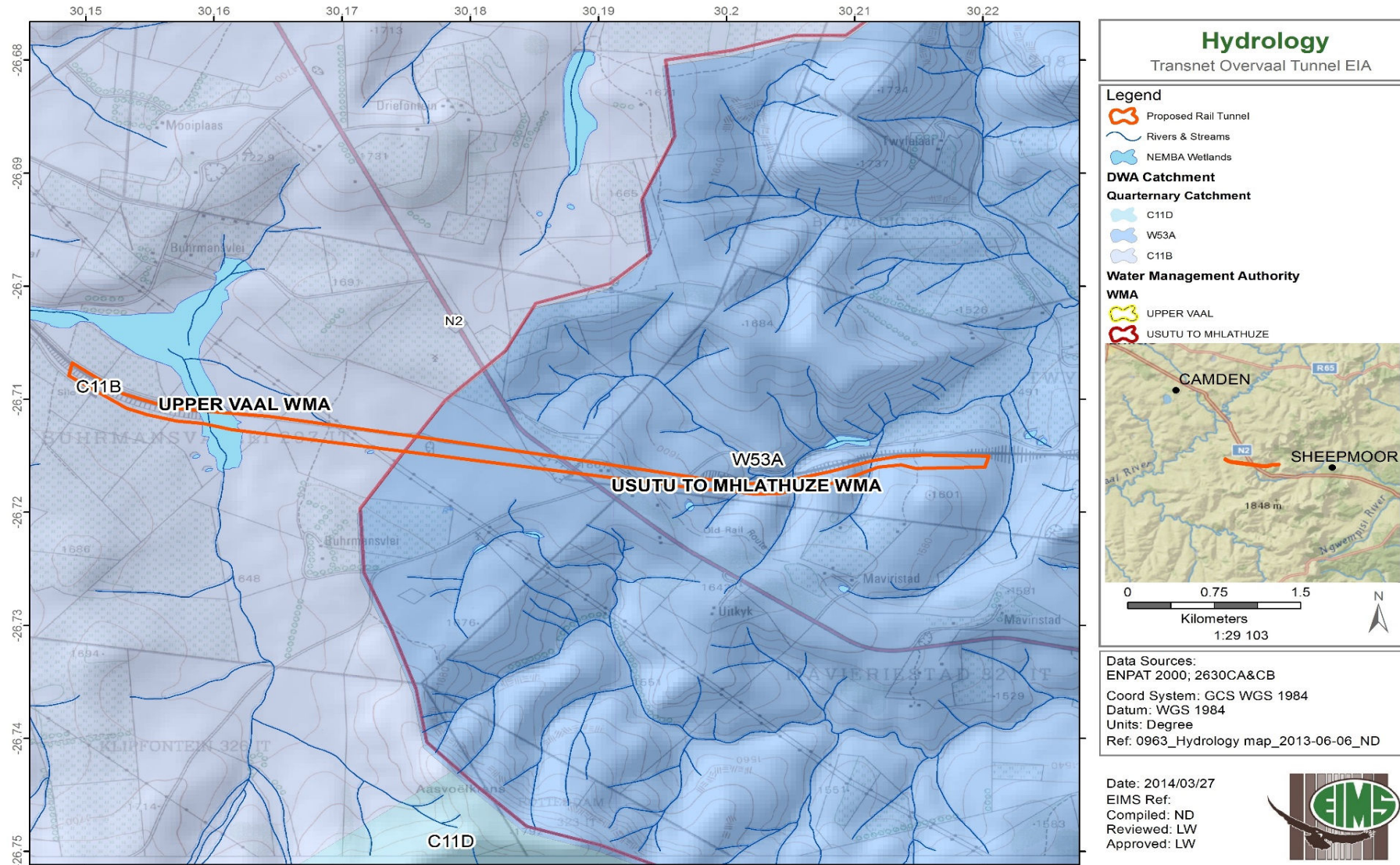


Figure 14: Hydrological characteristics of the proposed project site.

4.2 LAND USE AND LAND COVER

This section provides a brief description of the land cover and land use noted within the vicinity (regional and local) of the proposed project site.

4.2.1 Residential

Msukaligwa Local Municipality (MLM) is one of 7 local municipalities under the jurisdiction of the Gert Sibande District Municipality (GSDM). Please refer to section 4.5 for the planning and development policies relevant to GSDM. MLM is situated in the southern part of Mpumalanga. Its western boundary is approximately 150km east of Gauteng and its eastern boundary is approximately 8km west of the Swaziland border and is surrounded by the following local municipalities:

- Albert Luthuli and Steve Tshwete to the northeast and north;
- Govan Mbeki to the west;
- Lekwa to the southwest;
- Pixley ka Seme to the south; and
- Mkhondo to the southeast.

MLM is ~830 957 ha in extent and comprises 13% of the Gert Sibande District Municipality in Mpumalanga Province with the estimated population of 124 319.

The proposed project site is situated approximately 15 km towards the west of Sheepmoor settlement. The Sheepmoor settlement is mainly residential and, other than surrounding agricultural activities, there is no local economic base. Few residential houses exist within close proximity to the proposed project, towards the eastern tunnel exit. Majority of the landowners are small-scale livestock farmers and utilize the area for dry land crop cultivation. It is important that selection of the proposed project associated activities (e.g. lay down areas and construction camp) site takes the location of the existing houses within the farm into consideration.



Figure 15: View of AFGRI storage facilities and the Richards Bay Coal Line section towards the north of the proposed project site.

4.2.2 Agriculture and farming

Vast areas within and around the proposed project site are currently being utilized for dry land crop cultivation. Agriculture accounted for about 4.7% of the Gross Value Added by Region (GVA-R) but its significance lies in its share of employment, which was roughly 17.6% in 2007. (Msukaligwa Spatial Development Framework, 2010).

The area has very productive agricultural land with an average rainfall of 750 mm per annum, (Msukaligwa Spatial Development Framework, 2010). The general land use within the broader vicinity of the proposed project is seasonal cultivation of maize, soya bean, and livestock rearing (mainly sheep and cattle). Based on observations during the site visits, it is understood that the directly adjacent properties undertake a mixture of livestock grazing and cultivation (primarily maize).

4.2.3 Mining

Mining industry is very active in the region with coal being the primary product/mineral being mined, typically through open cast mining. Coal mining has been an important sector in the local economy for

many years. Increased international and local (Eskom) demand for coal has provided a huge impetus to the South African coal mining industry and MLM is no exception. Plans are in the pipeline for a number of new coal mines in the vicinity of Ermelo and these will have a significant positive impact on the local economy, not only directly through the creation of more jobs, but also indirectly through the stimulation of other economic sectors such as transport, construction, etc. (Msukaligwa Spatial Development Framework, 2010).

4.2.4 Tourism

The Chrissiesmeer lakes district is situated approximately 35km north of the proposed project site. The area incorporates some unique and very beautiful landscapes somewhat reminiscent of the Scottish highlands and offers world-class bird watching opportunities.

The N2 national road crosses over the proposed project route and is anticipated to be a route traveled by local tourist traffic. Overvaal Guesthouse is situated approximately 2 km towards the north west of the proposed project.

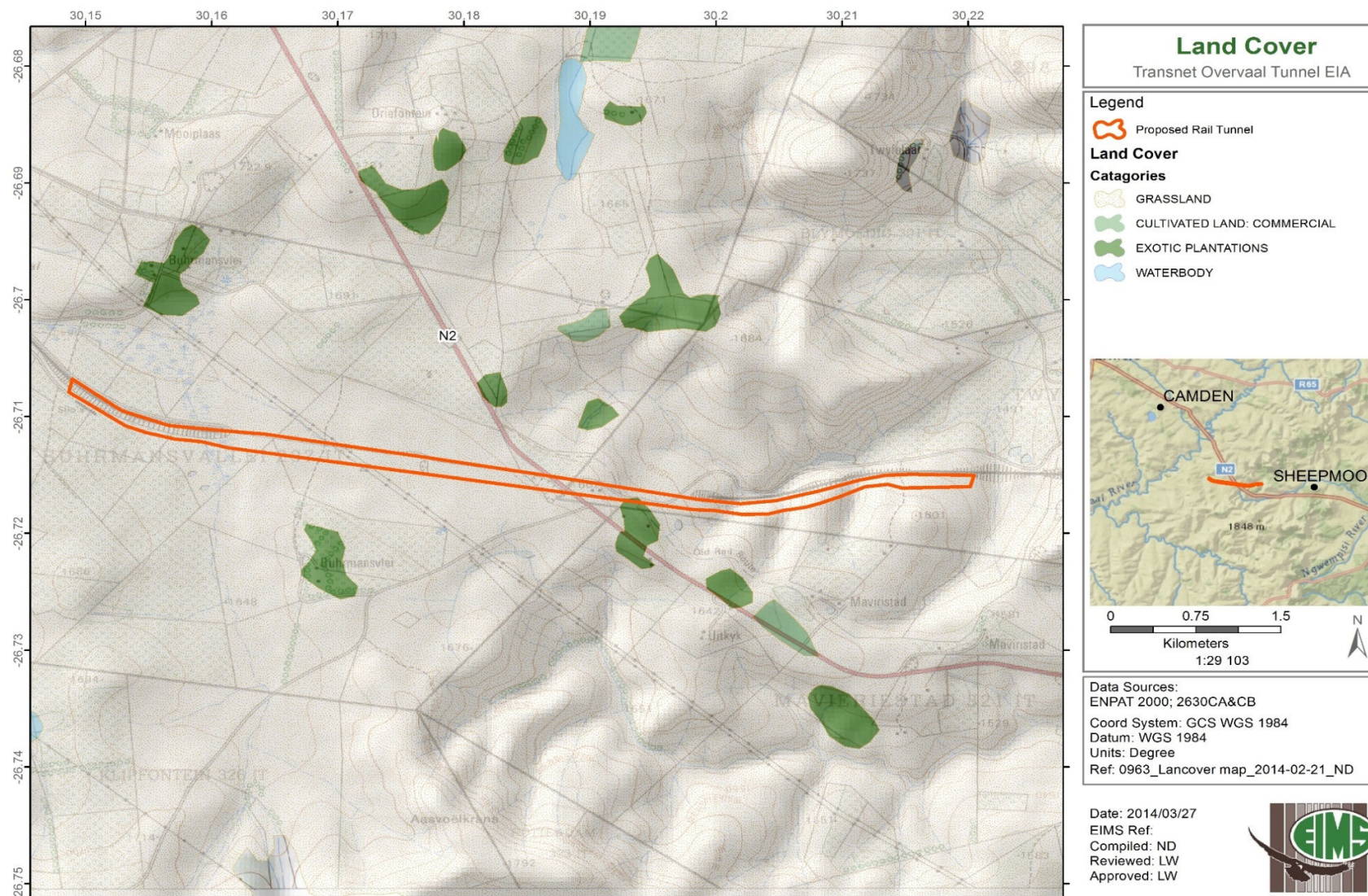


Figure 16: Land cover map

4.2.5 Biodiversity and Conservation Areas

In terms of uniqueness, Mpumalanga's most important aspects are its diversity of grassland habitats, center of grassland species diversity (refer to Figure 18) and the strong ecological gradient role the Escarpment plays with respect to fauna and flora diversity (Mpumalanga Province, 1999). The GSDM is certainly no exception, and is home to several areas of high biodiversity and six centers of endemism (the only area where a certain species or species exist), namely Barberton, Badplaas, Chrissiesmeer, and the three Wakkerstroom areas. Consequently, the District plays host to a number of regionally significant ecological corridors and important conservation, biodiversity and environmental heritage areas – as identified by the Mpumalanga Biodiversity Conservation Plan (2006) and the Mpumalanga Integrated Spatial Framework.

Notably, although environmentally sensitive areas are found throughout the District due to the grassland nature of the municipal landscape, areas of “irreplaceable” and “highly significant” biodiversity are concentrated along the north – south alignment followed by the Escarpment.

The following conservation areas are situated within the MLM:

- The Holkranse natural heritage area is situated on the N17 midway between Ermelo and Chrissiesmeer (approximately 40 km to the north of the proposed project).
- The Morgenstond Dam Nature Reserve straddles the south eastern boundary of the municipality (approximately 35 km to the east of the proposed project).
- The Jericho Dam Nature Reserve conserves grasslands areas around the dam, which is situated in the south eastern part of the municipality (approximately 30 km to the east of the proposed project).
- The Nu Scotland Conservancy is situated on Provincial Road R65 in the eastern part of the municipality south of the Chrissiesmeer panveld and northwest of the Jericho Dam (approximately 30 km to the east of the proposed project).
- The Rietvaal Conservancy straddles the south western boundary of the municipality along the Vaal River, and is characterized by extensive floodplain wetlands (approximately 20 km to the west of the proposed project).

It is anticipated that all of the above-mentioned conservation areas will fall outside of the zone of influence of the proposed project.

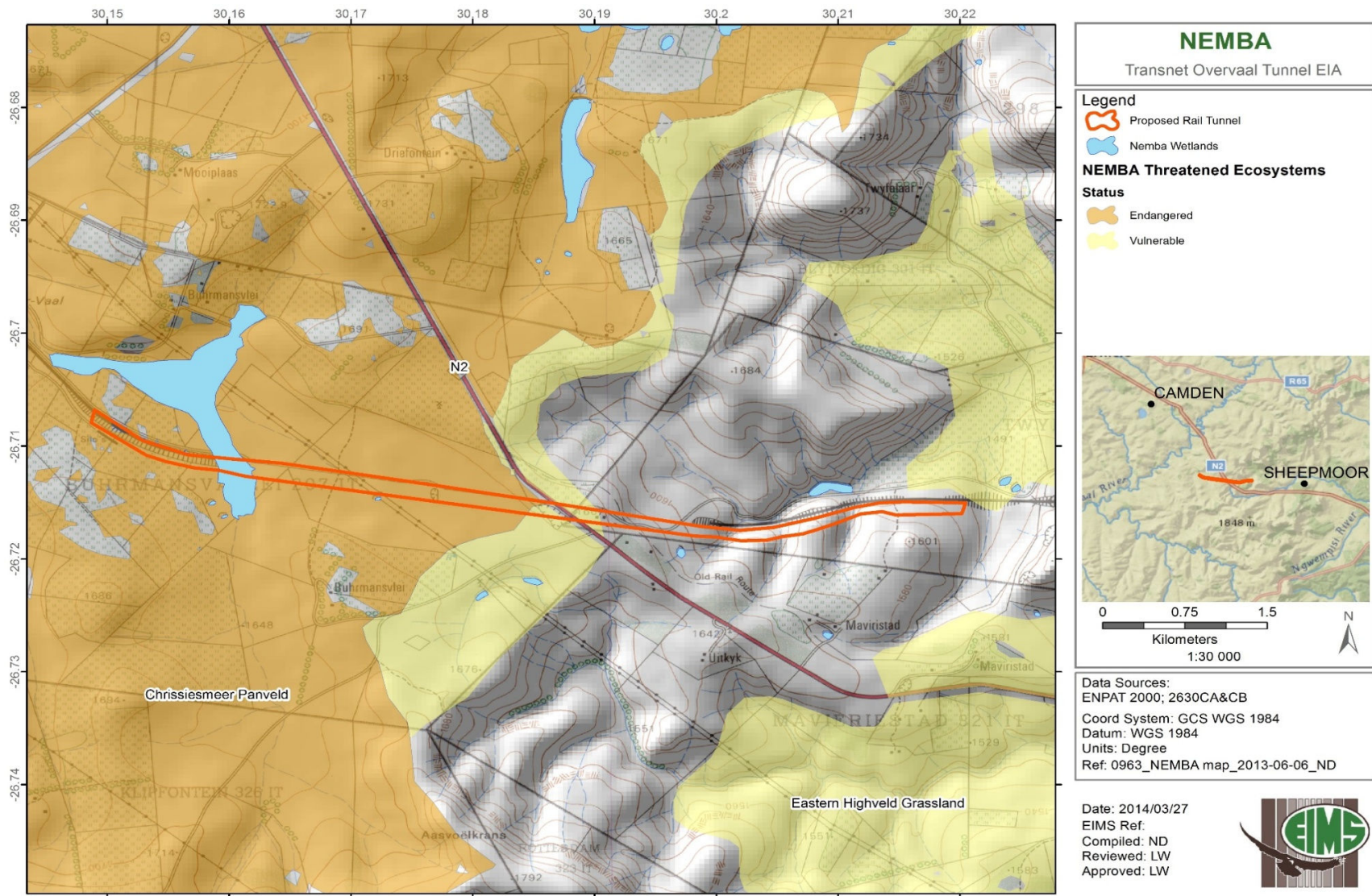


Figure 17: National Environmental Management Biodiversity Act Threatened Ecosystem.

4.3 BIOLOGICAL ENVIRONMENT

4.3.1 Vegetation type and Landscape Characteristics

While biomes and bioregions are valuable as they describe broad ecological patterns, they provide limited information on the actual species that are expected to be found in an area. Knowing which vegetation type an area belongs to provides an indication of the floral composition that would be found if the proposed project site was in a pristine condition, which can then be compared to the observed floral list and so give an accurate and timely description of the ecological integrity of the proposed project site. With reference to Figure 18, the proposed project site falls within the Eastern Highveld Grassland and Wakkerstroom Montane Grassland vegetation types (Mucina & Rutherford, 2006).

The Eastern Highveld Grassland is considered endangered. Only a very small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and in private reserves (Holkrans, Kransbank, Morgenstond). Some 44% is transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. Cultivation may have had a more extensive impact, indicated by land-cover data. No serious alien invasions are reported, but *Acacia mearnsii* can become dominant in disturbed areas. Erosion is very low (Mucina & Rutherford, 2006).

The Wakkerstroom Montane Grassland is Least Threatened (please refer to Figure 17). The conservation target is 27%, with less than 1% statutorily protected in the Paardeplaats Nature Reserve. Land use pressures from agriculture are low (5% cultivated) probably owing to the colder climate and shallower soils. The area is also suited to afforestation, with more than 1% under *Acacia mearnsii* and Eucalyptus plantations. The black wattle is an aggressive invader of riparian areas. Due to the fact that the proposed project site is characterised by two vegetation types, erodability differ between those vegetation types and is regarded as very low (78%) and low (19%) (Mucina & Rutherford, 2006).

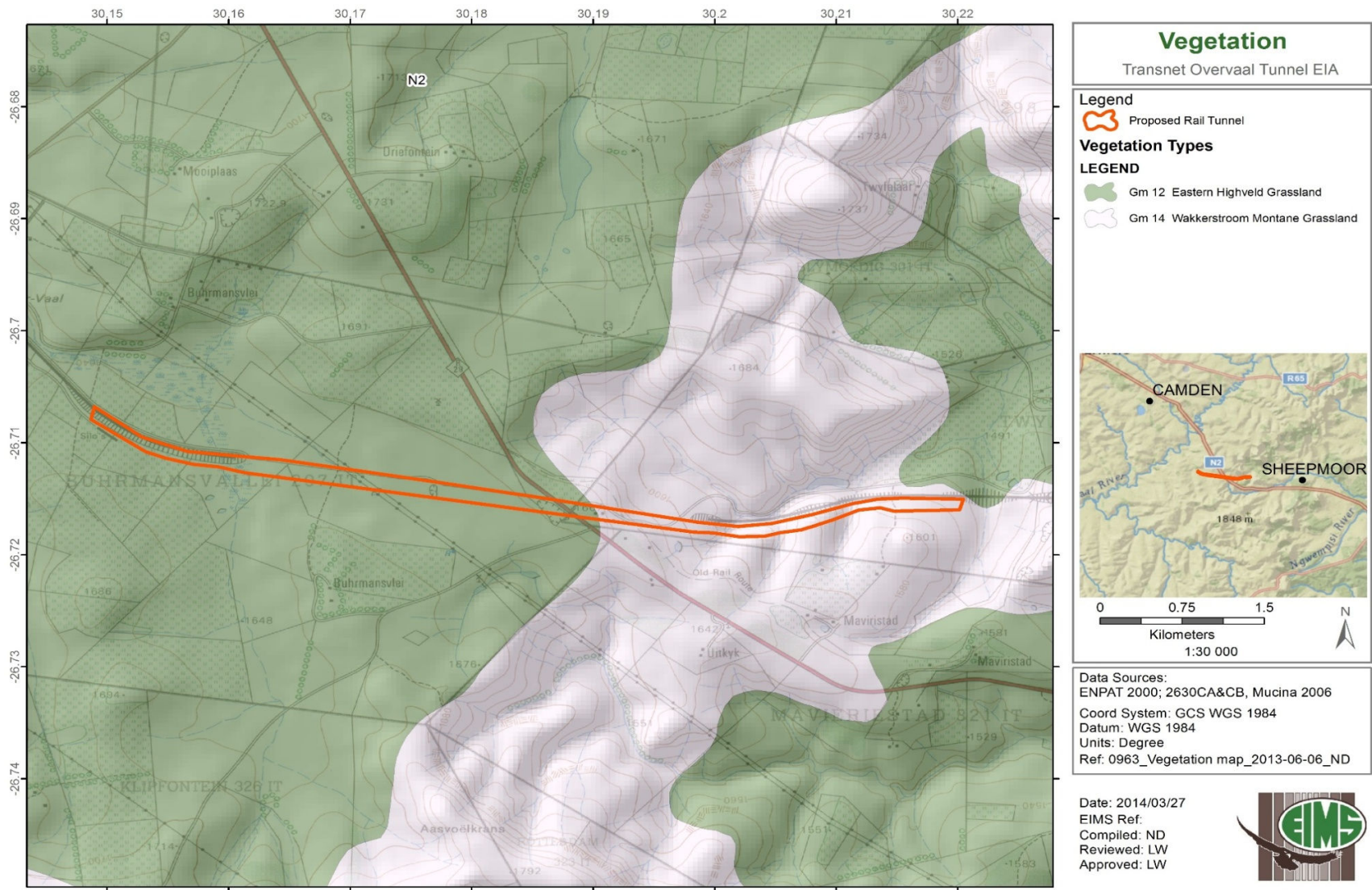


Figure 18: Vegetation types within and around the proposed project site.

4.3.2 Floral Characteristics

Eastern Highveld Grassland

In terms of recent vegetation classifications, a portion of the proposed project site occurs within the Eastern Highveld Grassland vegetation type (Mucina & Rutherford, 2006). This vegetation occurs in slightly, to moderately, undulating plains including some low hills and pan depressions. The vegetation is short dense grassland dominated by the usual Highveld grass composition (*Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis africana*, *Diospyros lyciodes* subsp. *lyciodes*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismsontanum*).

Key indicator species of this vegetation type include:

- Succulent herbs: *Aloe ecklonis*
- Low Shrub: *Anthospermum rigidum* subsp. *pumilum* and *Stoebe plumosa*
- Geophytic herbs: *Gladiolus crassifolius*, *Haemanthus humilis* subsp. *Hirsutus*, *Hypoxis rigidula* var. *pilosissima* and *Ledebouria ovatifolia*
- Grass: *Aristida aequiglumis*, *A. congesta*, *A. junciformis* subsp. *galpinii*, *Brachiaria serrata*, *Cynodon dactylon*, *Digitaria monodactyla*, *D. tricholaenoides*, *Elionurus muticus*, *Eragrostis chloromelas*, *E. curvula*, *E. plana*, *E. racemosa*, *E. sclerantha*, *Heteropogon contortus*, *Loudetia simplex*, *Microchloa caffra*, *Monocymbium cerasiiforme*, *Setaria sphacelata*, *Sporobolus africanus*, *Sporobolus pectinatus*, *Themeda triandra*, *Trachypogon spicatus*, *Tristachya leucothrix*, *T. rehmannii*, *Alloteropsis semialata* subsp. *eckloniana*, *Andropogon appendiculatus*, *A. schirensis*, *Bewisia biflora*, *Ctenium concinnum*, *Diheteropogon amplexans*, *Harpochloa falx*, *Panicum natalense*, *Rendlia altera*, *Schizachyrium sanguineum*, *Setaria nigrirostris* and *Urelytrum agropyroides*
- Herbs: *Berkheya setifera*, *Haplocarpha scaposa*, *Justicia anagalloides*, *Pelargonium luridum*, *Acalypha angustata*, *Chamaecrista mimosoides*, *Dicoma anomala*, *Euryops gilfillanii*, *E. transvaalensis* subsp. *setilobus*, *Helichrysum aureonitens*, *H. caespitium*, *H. callicomum*, *H. oreophilum*, *H. rugulosum*, *Ipomoea crassipes*, *Pentanisia prunelloides* subsp. *latifolia*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala* and *Wahlenbergia undulate*

Wakkerstroom Montane Grassland

In terms of recent vegetation classifications, a portion of the proposed project site occurs within the Wakkerstroom Montane Grassland vegetation type (Mucina & Rutherford, 2006). This unit is a less obvious continuation of the Escarpment that links to southern and northern Drakensberg escarpments. It straddles this divide and is comprised of low mountains and undulating plains. The vegetation comprises predominantly short montane grasslands on the plateaus and the relatively flat areas, with short forest

and *Leucosidea* thickets occurring along steep, mainly east-facing slopes and drainage areas. *L. sericea* is the dominant woody pioneer species that invades areas as a result of grazing mismanagement.

Key indicator species of this vegetation type include:

- Small Trees: *Canthium ciliatum*, *Protea subvestita*
- Tall Shrubs: *Buddleja salviifolia*, *Leucosidea sericea*, *Buddleja auriculata*, *Diospyros lycioides* subsp. *guerkei*, *Euclea crispa* subsp. *crispa*, *Rhus montana*, *R. rehmanniana*, *R. Transvaalensis*
- Low Shrubs: *Asparagus devenishii*, *Cliffortia linearifolia*, *Helichrysum melanacme*, *H. splendidum*, *Anthospermum rigidum* subsp. *pumilum*, *Clutia natalensis*, *Erica oatesii*, *Felicia filifolia* subsp. *filifolia*, *Gymnosporia heterophylla*, *Helichrysum hypoleucum*, *Hermannia geniculata*, *Inulanthera dregeana*, *Metalasia densa*, *Printzia pyrifolia*, *Rhus discolor*, *Rubus ludwigii* subsp. *Ludwigii*
- Graminoids: *Andropogon schirensis*, *Ctenium concinnum*, *Cymbopogon caesius*, *Digitaria tricholaenoides*, *Diheteropogon amplexans*, *Eragrostis chloromelas*, *E. plana*, *E. racemosa*, *Harpochloa falx*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Microchloa caffra*, *Themeda triandra*, *Trachypogon spicatus*, *Tristachya leucothrix*,
- *Alloteropsis semialata* susp. *eckloniana*, *Aristida juncifomis* subsp. *galpinii*, *Brahiaria serrata*, *Diheteropogon filifolius*, *Elionurus muticus*, *Eragrostis capensis*, *Eulalia villosa*, *Festuca scabra*, *Loudetia simplex*, *Rendlia altera*, *Setaria nigrirostris*
- Herbs: *Berkheya onopordifolia* var. *glabra*, *Cephalaria natalensis*, *Pelargonium luridum*, *Acalypha depressinerva*, *A. peduncularis*, *A. wilmsii*, *Aster bakerianus*, *Berkeya setifera*, *Euryops traansvaalensis* subsp. *setilobus*, *Galium thunbergianum* var. *thunbergianum*, *Geranium ornithopodioides*, *Helichrysum cephaloideum*, *H. cooperi*, *H. monticola*, *H. nudifolium* var. *nudifolium*, *H. oreophilum*, *H. simillimum*, *Pentanisia prunelloides* subsp. *latifolia*, *Plectranthus laxiflorus*, *Sebaea leiostyla*, *S. sedoides* var. *sedoides*, *Selago densiflora*, *Vernonia hirsuta*, *V. natalensis*, *Wahlenbergia cuspidata*
- Geophytic Herbs: *Hypoxis costata*, *Agapanthus inapertus* subsp. *intermedius*, *Asclepias aurea*, *Cheilanthes hirta*, *Corycium dracomontanum*, *C. nigrescens*, *Cyrtanthus tuckii* var. *transvaalensis*, *Disa versicolor*, *Eriospermum cooperi* var. *cooperi*, *Eucomis bicolor*, *Geum capense*, *Gladiolus ecklonii*, *G. Sericeovillosus* subsp. *sericeovillosus*, *Hesperantha coccinea*, *Hypoxis rigidula* var. *pilosissima*, *Morea brevistyla*, *Rhodohypoxis baurii* var. *Confecta*
- Semiparasitic herb: *Striga bilabiata* subsp. *Bilabiata*

Construction activities and overall development related activities may lead to the destruction of habitat, direct removal of vegetation and loss of biodiversity and vegetation cover, while disturbance of soils may lead to the proliferation of alien vegetation which in turn may lead to a decrease in natural floral species diversity and lead to altered vegetation community structure. Any impacts affecting the overall floral biodiversity may extend beyond the activity footprint if not managed.

Heavy vehicle movement may have significant impacts on the level of dust present in the atmosphere. Vegetation in close proximity to the areas of dust deposition is likely to become covered with dust, which could inhibit life-sustaining processes of plants. Over extended periods of time, this could result in die-off of vegetation in areas of heaviest dust deposition. Ineffective rehabilitation of exposed areas may also fail to alleviate dust generation beyond rehabilitation.

Construction and introduction of foreign material such as soils may lead to the introduction of alien invader species, impacting on the floral characteristics of the subject property. Ineffective rehabilitation and monitoring of disturbed areas after construction could also lead to loss of species diversity.

According to the SANBI Red Data List (RDL)/protected floral species of concern such as *Boophane disticha* (Least Concern) exist within and around the proposed project site. Collection of these species may lead to a decrease of communities within the rocky ridges and wetland areas. Activities and encroachment of footprint areas and associated infrastructure will pose a threat to RDL/ protected floral species such as *Gunnera perpensa*, *Crinum bulbispermum* and *Gladiolus malvinus* which according to SANBI occur in patches around the proposed project site.

4.3.3 Fauna

In terms of faunal habitat, significant open space areas are present which most likely support a medium to high diversity of faunal species, especially birds, invertebrates and smaller mammals. Migratory corridors (wetlands/rivers) seem to be intact in most areas, enhancing connectivity to neighbouring natural areas.

The majority of the proposed project site has been significantly transformed, with cattle and sheep grazing. However, the rocky ridge area along with the wetland areas present within and around the proposed project site provide sufficiently intact habitat for many natural and wild endemic mammal species.

Based on SANBI integrated biodiversity information, RDL faunal species namely Secretary bird (*Sagittarius serpentarius*) and Blue Crane (*Anthropoides paradiseus*) exist in abundance within and around the proposed project site. African Grass Owl (*Tyto capensis*) also exists in the proposed project site, however in less abundance than the other two bird species described above (<http://sibis.sanbi.org/>). All three species are likely to frequent the wetland and rocky areas to forage. The habitat is well suited for a diverse representation of bird life.

The Blue Crane, Secretary Bird and African Grass Owl are all classified by the International Union for Conservation of Nature (IUCN) RDL and Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) (now referred to as Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs - MDARDLEA) and NEMBA as being Vulnerable in South Africa. It is thus essential to ensure that no construction or any other related activities encroach upon the wetland zones or associated buffer zones in order to preserve their habitats. Proper care should be taken

during construction to preserve marsh grass (*Leersia hexandra*) that surrounds the wetland areas, in order to ensure the survival of this threatened invertebrate species.

Furthermore the proposed project site is considered as a potential location of sensitive fauna Highveld Golden Mole (*Amblysomus septentrionalis*) (<http://afrotheria.net>). According to IUCN RDL the African bullfrog, (*Pyxicephalus adspersus*) does not exist within the proposed project site; however the species is common in other areas around the proposed project site.

4.4 SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT

4.4.1 Socio-economic Environment

The 2014 – 2015 Integrated Development Plan document is meant to guide development and planning for the financial year in question while also serving as a revised version of the 2011 – 2016 IDP. The IDP is therefore revised to address the changing circumstances and demands within the communities/civil society with emphasis on improving socio-economic situation, strengthening local economic development, meeting the millennium targets, improving service delivery mechanisms, strengthening and improving inter-governmental relations and community participation. The document is therefore prepared in accordance with the Municipality's legal obligation in terms of Section 34 of the Local Government: Municipal Systems Act, 2000, Act 32 of 2000.

The municipality is predominantly rural in nature with key anchor towns that dominate the urban settlements. These create a big challenge for the municipality to provide services especially at the rural or farmlands and coordinated planning and development became expensive in services provision. The Municipality comprises of the following towns: Ermelo; Breyten; Davel; Sheepmoor; Lothair; Chrissismeer; Warburton and Surrounding rural or farm lands. The Municipality also comprises of Mining operations, Timber Industries, Agricultural Land, Transport and Tourism areas as its economic base.

The labour force characteristics within Msukaligwa Municipality when comparing the period 2001 to 2011, employment rate stood at 42.6% in 2011 which has increased by 5.8% from 2001. There is a decrease of 7.2% in unemployment during the period 2001 to 2011. The economically active persons are showing a reduction in 2011 when compared to 2001 figures which may imply that people are being absorbed by the labour market or retiring as figures show an increase on those persons that are not economically active. There is still a lot to be done in dealing with the unemployment challenge which the local municipality, district municipality, business/private sector and government sectors should collectively come up with strategies to deal with this problem. The statistics show that 13,615 jobs were created during the period 2001 to 2011 which reduced the unemployment rate to 15.6%, (Msukaligwa Municipality: Final Integrated Development Plan 2014/2015).

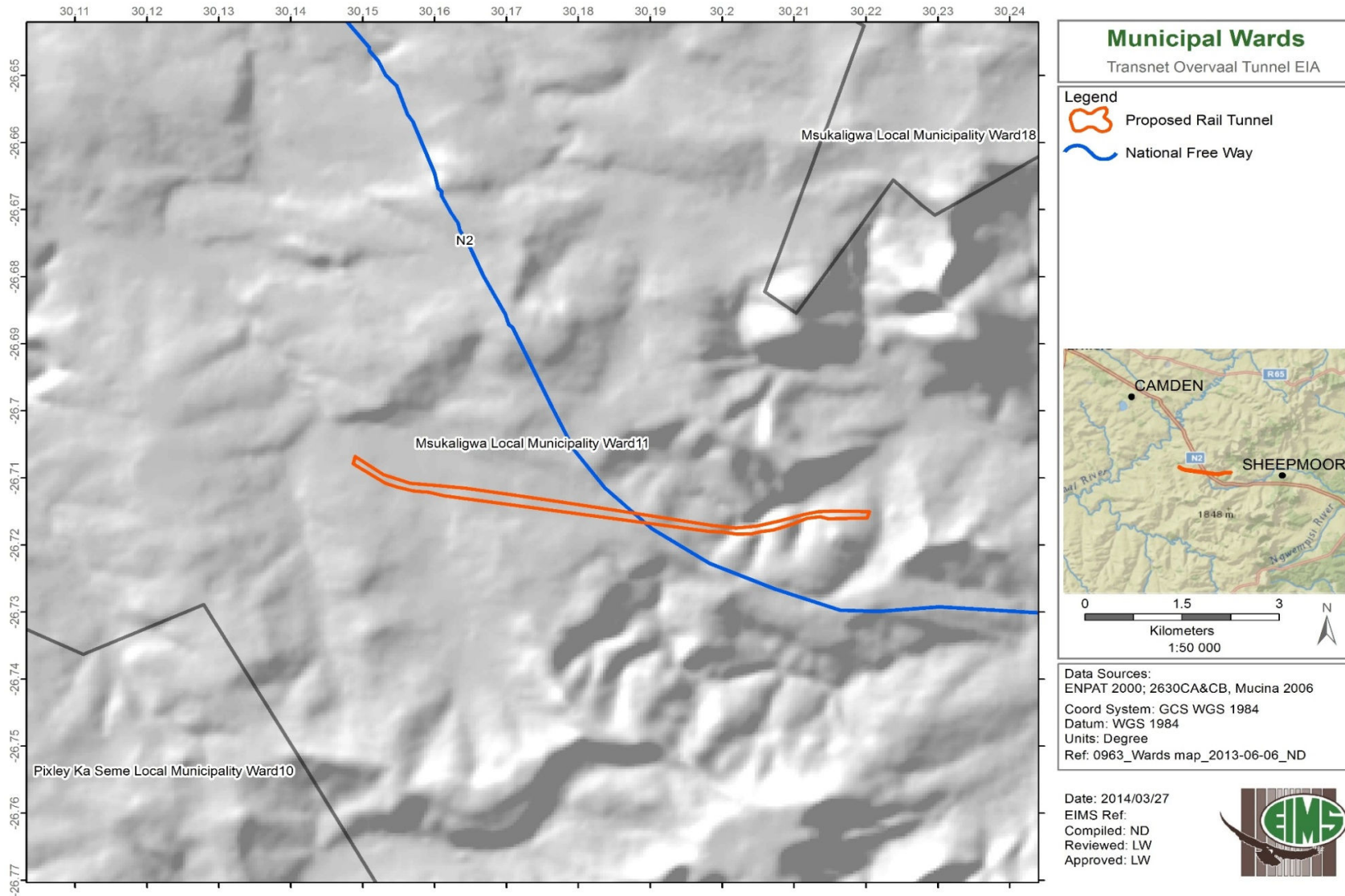


Figure 19: View of MLM ward 11 where the proposed project site is situated.

4.4.2 Population Statistics for the MLM

Msukaligwa population dynamics is based on statistics derived from Statistics South Africa 2001 to 2011, the Gert Sibande District Municipality and other sources. Statistics South Africa data had been used for the demographics and where data could not be derived from Statistics South Africa, other sources had been used. The population of Msukaligwa shows a growth of 19.7% from 2001 to 2011 at an average annual growth of 2% and grew with 24564 persons. There is also a significant increase on the Asian and Coloured population of 52% and 61% respectively during the period 2001 to 2011.

All age groups reflect increase in population with large age groups being 0 – 14 comprising of 45409 persons and 15 – 34 comprising of 57748 persons. The youth population contributes 39% of the total population of Msukaligwa. With the youth population contributing a larger percentage of the population, this is a clear indication that most of the youth are joining the job market implying that the municipality together with sector departments and NGOs must proactively engage in a joint effort to address issues of unemployment, skills development, provision of basic services and housing. According to the 2011 census data, females contribute 50.4% and males 49.6% of the total population of Msukaligwa municipality, (Msukaligwa Municipality: Final Integrated Development Plan 2014/2015).

Table 9: Population statistics of the MLM.

Demographics	Number of People	Distribution
Black	131625	88
White	14707	10
Coloured	892	0.6
Asian/Indian	1678	1.1
Other	475	0.3
Total	149377	100

4.4.3 Infrastructure and services within the Municipality

The following section describes the intentions of the Municipality in addressing some of the social challenges faced.

Water provision

The municipality shall through the District and in partnership with all spheres of government strive to meet the millennium target in ensuring access to water for all by 2015. Provision of clean drinking water (potable water) is still a challenge more especially at rural / farmlands within the municipality. In providing Water, the Municipality shall ensure that water is provided to schools, clinics and all other social amenities. It is therefore ensured that prior to approval of construction of clinics and schools there is water provided to such amenities more especially ensuring that farm schools have

water where the farm owners cannot provide. The municipality is a water services authority and therefore responsible for supply of water within its area of jurisdiction.

While the supply of water to residents of the municipality is of high priority, the municipality must further ensure that water supplied is of good quality thus being compliant to the blue drop quality standards. To ensure continuous monitoring of water quality within the district, Gert Sibande District Municipality water testing laboratory situated in Msukaligwa, Ermelo has been built to service the district. Water testing is therefore done on a monthly basis. The appointment of Randwater to assist with Operations and maintenance for the next 3 years will also have an effect on improving the water quality in Msukaligwa.

The Ermelo and Wesselton areas are currently experiencing water supply crises due to the raw water supply dams running dry. Due to the drought problem, the Ermelo area was declared a disaster area and DWA intervened in assisting the municipality by funding for the provision of an emergency 350mm gravity feed main pipeline that will supply the Northern water treatment works with raw water. Also as a temporary measure, water to residential households at the affected areas is being supplied through water carts. A permanent 400mm pipeline is currently under construction. This will ensure maximum water supply to both purification plants in drought situations, (Msukaligwa Municipality: Final Integrated Development Plan 2014/2015).

Sanitation

Proper sanitation provision still remains a challenge in the municipality. There are a large number of people in direct need of proper sanitation facilities. The vastness of wards within the municipality and private land owners is problematic with regards to sanitary service delivery. The municipality planned to meet the challenge of eradicating the bucket system by 2007, and replace them with water borne and VIP pit latrine systems at those units where buckets were used. Sheepmoor is an area without proper sanitary services and the municipality is in the process of installing a sewer network. Currently proper sanitation within the municipality is still a challenge which requires long term planning (Public Service Commission, 2013).

Proper sanitation provision still remains a challenge in the municipality. There is high number of people in dire need for proper sanitation facilities. The vastness of wards within the municipality and private land owners is problematic when coming to sanitation service delivery. The municipality planned to meet the challenge of eradicating the bucket system by 2007, and replace them with water borne and VIP pit latrine systems at those units where buckets were used. Sheepmoor is another area without proper sanitation services and the municipality has installed sewer net work which is not yet completed. As mentioned above it should be noted that there are those areas where it is difficult to render proper sanitation services and the municipality is therefore engaging all relevant stakeholders to seek solutions for the problem areas.

Electricity

Msukaligwa Local municipality comprises seven admin units. Electricity supply is therefore rendered by the municipality where license is held by the municipality and by Eskom for those areas licensed

to Eskom. There are no backlogs with regard to electricity supply the reason being that electricity connections can only be done to existing structures. Since the connections rely on the houses built, there won't be any backlog for electricity connections. The only challenge is at the farms where some land owners are not willing to contribute towards electrification of their farm dwellers.

Housing

The main challenge faced by the municipality is the shortage of land for housing purposes at some units of the municipality and the only way to overcome this challenge is by securing enough land for human settlements and other social amenities. Due to financial constraints the municipality is unable to secure/procure enough land for this purpose and therefore rely on assistance from Department of Rural Development and Land Reform (DRDLR), Department of Agriculture, Rural Development and Land Administration (DARDLA), Department of Cooperative Governance and Traditional Affairs (COGTA) and other funding sources to secure land for housing. Assistance should therefore be sought from the said departments to assist in funding for land that can be utilised for sustainable human settlement. Since human settlement goes along with other basic services, a challenge still remains with the municipality to service some of the land available for human settlements which is one of the most contributing factors to housing backlog as communities cannot be housed without services. The municipality should therefore work jointly with the District and all relevant government departments in order to overcome this backlog.

The municipality had over the past five years received allocations for a number of low cost housing units. A total of 648 housing units are still outstanding. Some of the outstanding units have been built but not completed while others were not built at all. There are factors contributing to this problem which may include slow completion of projects, insufficient sites for housing, uncontrolled land invasion (illegal Squatting), farm evictions and urban migration of employment seekers, (Msukaligwa Municipality: Final Integrated Development Plan 2014/2015).

Roads

Msukaligwa municipality is being crossed through by the three National roads which are N17 going through to Swaziland, N2 Through to KZN East coasts and N11 through to KZN Newcastle. N4 (Maputo Corridor) Pretoria through Nelspruit to Mozambique is one of the corridors passing at the North of Msukaligwa Municipality linking Msukaligwa through N11. This corridor is situated at a distance of less than 90km from the Northern border of Msukaligwa. These corridors are linking the municipality with major economic hubs like Gauteng, Harbours and International countries like Swaziland and Mozambique. Road and rail haulage of coal supplying power stations and exports has also contributed in provision of job opportunities to communities within and outside the municipal boundaries. Economic opportunities should therefore be explored on the proposed Lothair – Swaziland rail link and the Majuba rail link.

Health Facilities

Over the past five years, 300 new health facilities have been built, including 160 new clinics. Ten new hospitals have been built or refurbished in Ladybrand, Germiston, Mamelodi, Natalspruit, eThekweni, Zola, Bojanala, Vryburg District, Swartruggens, Khayelitsha and Mitchell's Plain. Mother to child transmission of HIV has declined sharply and the number of people who are receiving anti-retroviral treatment, from one million to 2.4 million people in 2013. The target for the next administration is to ensure that at least 4.6 million people are enrolled in the anti-retroviral programme.

Education facilities

Taking into consideration the way in which the municipality is growing and the shortage of skills within communities, there is a need for at least a tertiary institution within the District. With development of Ermelo extension 32, 33 and 34 with a total of ± 2134 housing units and neighbouring New Ermelo settlement with ± 1650 housing units there is need for a high school in addition to the six high schools currently available.

The matric pass rate has gone up from around 61 percent in 2009 to 78 percent last year and the bachelor passes improve each year. The teacher training and are re-opening teacher training colleges to meet the demand is also been investigated. 370 new schools replacing mud schools and other unsuitable structures were built around the country and the programme continues. Student enrolments at universities increased by 12% while further Education and Training college enrolments have increased by 90%, (Msukaligwa Municipality: Final Integrated Development Plan 2014/2015).

Waste Management

The waste management services offered by the Msukaligwa Local Municipality has been evaluated in terms of waste management service delivery, i.e. waste collection and refuse removal, disposal and recycling. A comprehensive study has been undertaken to obtain and evaluate the status quo of waste management within the municipality. Arising out of this study, gaps in service delivery and the needs and priorities of the municipality have been identified. The report has revealed that the ideal waste management situation is not yet achieved. This includes:

- Non-compliance with the environmental legislation and non-adherence to the operation of landfill sites as accordance with the prescribed standards.
- Financial constraints due to limited budget allocated for waste management.
- Aging and unreliable machinery to enable the departments operation.
- Low morale amongst the departmental staff.
- Lack of formalization of recycling, illegal dumping where service is not rendered as well as lack of inadequate Waste Information System.

These needs and gaps identified will be used in subsequent phases of the project to develop plans and strategies in order to improve the efficiency and effectiveness of the Waste Management services undertaken by the municipality

4.4.4 Tourism

Tourism also contributes to economic growth of the municipality as being boosted by areas like the Lake Chrissie wetlands, the Big foot at Athurseat, the bushman paintings at Breyten area and hospitality areas like Indawo game lodge.

The Chrissiesmeer lakes and wetland area is one of the most unique wetland areas in South Africa and is a world-renowned bird-watching area. Some important ecological habitats also exist in the eastern parts of the municipality, in the Warburton area. Furthermore there are also a number of sites of historical significance, such as old battle fields. The town of Chrissiesmeer has a historical character with many good examples of old Transvaal architecture and some sandstone houses and structures worth conserving. The town has potential to develop into a tourism hub, however development has to be dealt with sensitively in order not to destroy the existing ambiance and charm of the town. In 2014 an area of 60 000 around the town was declared as a protected area.

In terms of statistics derived from Global Insight, Recon (Pty) Ltd., Regional Economic Explorer Version 2.0C, Msukaligwa municipality is estimated to be contributing R 45 353.00 per annum to the regional economy and the province. The municipality should through the District strive to expand the economic contribution through the economic growth and development strategy.

Regionally MLM is well-located on the crossroads of three major national roads (N2, N11 and N17), approximately halfway between Gauteng and the Mpumalanga lowveld and Kruger National Park, which makes it a convenient stopover for tourists traveling between these two destinations. The area is also close enough to Gauteng to serve as a weekend tourist destination, similar to places such as Dullstroom (Msukaligwa Spatial Development Framework, 2010: Final Report).

4.4.5 Cultural, Archaeological, and Historical Environment

Based on EIA specialist studies done for other projects in the vicinity of the proposed project, it is expected that the study area and surrounding areas have a historical and archaeological history and that there is potential for archaeological and historical sites and material to exist within proximity to the proposed project. In addition, as a result of initial site investigations and review of available spatial and other data, potentially significant heritage features within proximity of the proposed project could include:

- the old railway route (surface);
- farming activities and associated structures;
- graves (marked and unmarked) that are anticipated to occur near the surrounding settlement areas;
- Paleontological features associated with the underlying sedimentary rock formations;

- Archaeological sites, specifically late stone age and iron age; and
- Rock engravings.

Concentrations or patterns of archaeological remains were noticed during Heritage assessment, it is important to note that there may be extra heritage features within the proximity of the proposed project which were not identified by the EAP and the Heritage specialist. These features are potentially buried. For this reason it is suggested that a professional heritage practitioner (archaeologist, paleontologist, and historian) be appointed to investigate the surrounding areas. Findings of the specialist heritage impact assessment will be included in the final EIA report. Furthermore, in terms of the SAHRA Paleontological map this area is of high paleontological importance and will require a Phase 1 paleontological study to inform the EIA process.

4.5 RELEVANT PLANNING AND DEVELOPMENT POLICIES

Development in South Africa is broadly guided and directed by a wide range of legislation. In addition, local and provincial authorities have a number of policies and plans which guide development within the bounds of their specific jurisdiction. Three such policies are of particular importance for the GSDM, namely:

- The National Spatial Development Perspective (NSDP);
- The Mpumalanga Provincial Growth and Development Strategy (MPGDS); and
- The Mpumalanga Rural Development Programme (MRDP).

Furthermore, a number of Planning Frameworks at District or Local Municipality level are of significant importance, namely:

- The Final Integrated Development Plan (IDP) for GSDM; and
- The Msukaligwa Local Municipality Integrated Waste Management Plan (IWMP).

This section provides a brief overview of the above-mentioned key planning and development policies for the GSDM and one of its local municipalities, MLM, in which the proposed project site is located. An overview of each of these planning and development policies and frameworks is presented, and aspects that are aligned (either positively or negatively) are highlighted.

4.5.1 National Spatial Development Perspective (NSDP)

The National Spatial Development Perspective (NSDP) was initiated in 1999 with the purpose of not only providing strategic assessment of the spatial distribution and socio-economic characteristics of the South African population, but gaining a shared understanding of the distribution of economic activities and potential across the South African landscape. The NSDP currently delineates a number of guidelines for infrastructure investment in South Africa. The NSDP argues that government's social objectives will be best achieved through infrastructure investment in economically sustainable areas with proven development potential. Therefore, areas displaying little or no potential for growth should only be provided with the constitutionally mandated minimum levels of services, and the focus

of government spending should rather be on the people (social development). Consistent with this philosophy, and given the need to reach and sustain an annual economic growth rate of 6% each year, the NSDP argues that resources and collaborative government action should be concentrated on maintaining and growing the economy in the 26 locations currently contributing 83% of the National GVA, of which the GSDM is part of.

However, of the local municipalities within GSDM, only one is classified as having potential for high levels of economic activity (Goven Mbeki Municipality). The NSDP classification for selected Municipalities in GSDM list MLM as an area of high levels of poverty concentration, as well as an area of combined poverty and economic activity. Furthermore, in terms of the Business Function Index in GSDM, only Volksrust is listed under the areas with high levels of formal local economic activity where there is a high dependence on the surrounding area for resource input.

The proposed project will provide an opportunity to contribute towards poverty alleviation through potential job creation during the construction phase of the project. This would be in line with principles emanating from the broad philosophy and actions put forward by the NSDP, to guide development decisions whereby inequalities within the communities would be addressed by focusing on people and not places; and would be providing basic services, local transfer, and labour market information in areas with high levels of poverty and low development potential.

4.5.2 Mpumalanga Provincial Growth and Development Strategy (MPGDS)

Another important government initiative implemented during the past few years is the PGDS programme. The PGDS was compiled with the parameters set by the NSDP, as well as the Sustainable Rural Development Strategy. The PGDS is aimed at providing strategic directives to District and Local Municipalities in formulating their more detailed IDP's and Spatial Development Frameworks (SDF's). The Mpumalanga PGDS was revised and adopted in 2008, and has identified six priority areas, namely:

- Economic Development (i.e. investment, job creation, business and tourism development);
- Infrastructure Development (i.e. urban/rural infrastructure, housing, and land reform);
- Human Resource Development (i.e. adequate education opportunities for all);
- Social Infrastructure (i.e. access to full social infrastructure);
- Environmental Development (i.e. protection of the environment and sustainable development); and
- Good Governance (i.e. effective and efficient public sector management and service delivery).

The above highlighted priority areas are in line with the proposed project, in terms of potential job creation during the construction phase of the project, and in relation to the special care that needs to be taken when considering feasible alternatives.

4.5.3 Mpumalanga Rural Development Programme (MRDP)

The Mpumalanga Rural Development Programme (MRDP) was established in 2001, and its main objective was to contribute towards an “improvement of the social and economic situation of the rural poor”. The programme focuses on the creation of income and employment in rural areas, and its key concepts include:

- Self-reliance/empowerment (strengthen the self-help capabilities of the communities and emphasize development planning);
- Economic growth (encourage local economic development, employment, and income generation through promotion of small micro-sized rural enterprises and the participation of the private sector);
- Sustainability (improve viable and sustainable natural resource utilisation);
- Capacity building (strengthen, advise, and train service providers);
- Innovation (develop innovative concepts for public service delivery);
- Mainstream (get innovations on track);
- Coping with HIV/AIDS (plan, design, and implement relevant strategies in order to cope with HIV/AIDS); and
- Stakeholder participation (ensuring participation by all concerned).

It is important for the GSDM and its local municipalities, which includes the Msukaligwa Local Municipality within which the proposed project is to take place, to draw the concepts and principles of this plan down to local level, through spatial development policies and strategies.

The priority areas most aligned with the proposed project are those highlighted in bold above. The creation of jobs during construction could financially empower the local communities, as well as improve individuals’ sense of self as a result of those previously unemployed being able to provide for themselves and their families. Moreover, through participating in the construction of the proposed project, and taking into account future developments likely to occur in the area, capacity in construction or other associated job opportunities would be cultivated which could facilitate economic growth in the Msukaligwa Local Municipality. Throughout the process of applying for authorization of the proposed project, public involvement has been and will continue to be a prominent factor. Furthermore, during the construction phase of the proposed project continuous communication with landowners in the affected areas will be expected/ mandated.

4.5.4 Final Integrated Development Plan 2010/ 2011 for Gert Sibande District Municipality

According to the GSDM Municipal Manager, the IDP serves as a barometer both for GSDM and its citizens towards the realization of the District’s development vision. A number of Key Strategic Focal Areas are identified by the GSDM Manager as important in making a significant impact towards improving the plight of the District’s communities, these are: Municipal Transformation and Organization Development; Municipal Financial Viability and Management; Local Economic

Development; Infrastructure Development and Service Delivery; Social Development and Community Services; and Intergovernmental Relations, Good Governance and Public Participation.

A number of the IDP priority issues and objectives for the GSDM have been identified to address the most pressing development challenges facing the District. Consequently, a number of the priority development issues and objectives stemming from the IDP process serve as development guidelines in the delineation of a SDF for the GSDM. These include:

- To accelerate the provision of, and to ensure that, all communities have access to clean water and decent sanitation infrastructure by 2010;
- To accelerate the provision of, and to ensure that, all communities have access to electricity services by 2012;
- To accelerate the provision of, and to ensure that, all communities have access to better roads and stormwater infrastructure;
- To provide infrastructure that will create an environment that is conducive to economic growth and development;
- To provide infrastructure via using the approach of the Expanded Public Works Programme (EPWP), so as to halve unemployment by 2014;
- To accelerate the provision of quality health services that is affordable and accessible to all communities;
- To support the provision of comprehensive community facilities and services (school, clinics, etc.) to all communities where needed;
- To ensure that housing developments are located closer to places of work/economic opportunity;
- To provide comprehensive and effective disaster management, fire and emergency services to all communities;
- To ensure comprehensive transport planning in support of economic growth and development;
- To promote tourist attraction areas, and to increase the participation and beneficiation of the previously marginalised communities; and
- To ensure protection of the environment, through proper management of the proposed project construction activities.

4.5.5 Integrated Waste Management Plan for MLM (Phase 1)

Waste is a predictable consequence of development, and it must be managed in order to conserve natural resources and protect people and the environment. Waste is driven by three primary factors: the increasing production of goods; an ever expanding population and a growing economy (DEAT, 2002). Due to increased population growth and urban and industrial development, there is an increased demand for waste service provision in terms of storage and collection facilities and services, handling and transportation, treatment and ultimately disposal services and facilities.

In South Africa, each Municipality is now required to prepare an Integrated Waste Management Plan (IWMP) as part of their Integrated Development Planning process. This requirement brings integrated waste management down to the local level, where it has the greatest potential to make an impact on our society and the environment.

The GSDM, with the financial assistance of the Development Bank (South Africa) Pty Ltd and the Mpumalanga Department of Land Affairs and Agriculture (DALA), initiated the development of a district IWMP, focusing on the general waste management services offered by the local municipalities within its area of jurisdiction.

The main objective of compiling an IWMP is to integrate and optimise waste management so that the efficiency of the waste management system is maximised, and the impacts and financial costs associated with waste management are minimised, thereby improving the quality of life of all South Africans. An IWMP must therefore provide a comprehensive overview of waste management planning.

The MLM IWMP (2011) report constitutes Phase 1 for the MLM. This report details the status quo or current situation of waste management within the MLM and looks at the existing waste management practices and systems which are currently being implemented within the municipal area, and their effectiveness. The objective of the status quo, or gap analysis, as the first phase in the development of an IWMP for GSDM, is to qualify and quantify all aspects related to current waste management services and practices carried out by the municipalities, with a view to using this information as a basis for future waste management planning. This report therefore includes a situational analysis of the various themes of solid waste management relevant to MLM and the GSDM e.g. the areas serviced, the waste management services rendered, their efficiency, cost effectiveness, social and environmental acceptability, etc. Specific objectives of the gap analysis phase, as outlined in the terms of reference for the project, include:

- Obtain information on the current population of the area, growth estimates, densities and the population's socioeconomic categories and income levels;
- Identify and/or estimate the types and amounts of general waste generated in the municipal area, and the composition thereof;
- Describe and assess the existing waste management systems and practices;
- Determine the costs associated with providing the waste management services;
- Appraise the services in terms of quantity, quality, legal, social and environmental impacts and public acceptance.

From the above, shortcomings in service delivery are identified. These will be used to develop the strategies and implementation plan for the IWMP. Recommendations relating to identified gaps in service delivery will be made and strategies to be developed will provide details of inter alia where the existing systems can be enhanced and improved upon and what additional systems and resources will be required to ensure that the entire municipal area is optimally covered in terms of waste management services.

During construction of the proposed project a large amount of waste, particularly waste rock, will be produced. As outlined, National Environmental Management Act (Act 107 of 1998), the White Paper on integrated pollution and waste management (2000) and the National Waste Management Strategy (2011) all embrace the common goal of Integrated Waste Management, based on the principles of waste avoidance, waste minimization, reuse and recycling and responsible disposal. Waste management during construction must therefore, focus on the minimization and avoidance of waste generation at source, especially in the case of toxic or hazardous waste. All design options should first of all seek to reuse or recycle waste streams and where this is impossible seek to dispose of waste in a manner, which is least detrimental to the environment.

It is therefore recommended that the requirements of the MLM integrated waste management plan and other planning and development policies including those of GSDM be considered during various stages of the proposed project development.

5. DESCRIPTION OF ALTERNATIVES

The identification of alternatives is a key aspect of the success of the scoping process. All reasonable and feasible alternatives must be identified and screened to determine the most suitable alternatives to consider and assess in the EIA phase. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of this scope. Such constraints include financial, social and environment related issues that will be discussed in the evaluation of the alternatives. Alternatives can typically be identified according to:

- Process alternatives;
- Route alternatives;
- Technological alternatives;
- The No-Action alternative (No-Go)

For any alternative to be considered feasible such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. As mentioned in Section 1.1 the need for the proposed project includes the following key drivers:

- The need to increase the current capacity of the coal line; and
- The need to reduce the risk associated with a single track bottleneck on the coal line.

For this reason, alternatives considered by the applicants' appointed engineering and technical team have been presented herein. These alternatives are described and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical as well as environmental perspective.

Alternatives can also be distinguished into discrete or incremental alternatives. Discrete alternatives are overall development options, which are typically identified during the pre-feasibility, feasibility and or scoping phases of the EIA process (DEAT; 2004). Incremental alternatives typically arise during the EIA process and are usually suggested as a means of addressing identified impacts. These

alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives.

5.1 PROCESS ALTERNATIVES

The EIA guideline published by the DEA uses the following examples to illustrate the nature of process alternatives: ‘the re-use of process water in an industrial plant, waste minimizing or energy efficient technology, or different mining methods’.

Process alternatives imply the investigation of alternative processes or technologies that can be used to achieve the same goal. This includes using environmentally friendly designs or materials, and reusing scarce resources like water and non-renewable energy sources.

Process alternatives will be defined and implemented as incremental alternatives during the EIA phase and in the EMPr. Specific process alternatives which will be considered further include the following:

5.1.1 Tunnel Options

The following alternatives relating to the design capacity of the proposed project are considered:

- **Construction of a second double track tunnel adjacent to the existing tunnel- preferred alternative**

This alternative is currently the preferred alternative and as such is presented in detail in Section 3 of this report. The doubling of the tunnel was considered to be the most feasible option based on various considerations, including: operations, costing and environmental impact (e.g. increase in coal export, efficient use of the railway line with no congestion, etc.). The tunnel will have to cater for a double track. From an operations perspective this option will have the greatest advantage as it follows more or less the same alignment as the current line and will thus have the shortest runtime of all the options reviewed.

Based on the feasibility study undertaken by the appointed engineers, comparison of the total cost between various identified options reveals the new tunnel-option (Option 4) as the most economical option with reduced operational, social and environmental challenges.

Advantages	Disadvantages
<ul style="list-style-type: none"> • A double line tunnel parallel to the existing single line tunnel is a viable option as it will address future needs. A double line tunnel will also address security issues in case of damage or collapse in one tunnel, operation can be shifted to the other tunnel while repairs are undertaken. 	<ul style="list-style-type: none"> • A large amount of waste rock material will be produced during the construction of a double line tunnel when compared to a single line tunnel. • Direct footprint and associated environmental impacts will be slightly greater than a single line tunnel. However

<ul style="list-style-type: none"> • From an operations perspective this option will have the greatest advantage as it follows more or less the same alignment as the current line and will thus have the shortest runtime of all the options reviewed. • According to the feasibility study undertaken by Aurecon, this option is most economical with reduced operational, social and environmental challenges. • Lower impact on wetlands. • Minimal impact on farmland. • Alleviate the danger of single line congestion. 	<p>the broader impacts and possibly the most significant impacts will be of a similar extent and magnitude as a single line tunnel.</p> <ul style="list-style-type: none"> • Excavation in close proximity to the existing tunnel • Damage to existing tunnel will delay or stop coal export
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Construction of a double line tunnel is Transnet’s preferred alternative which offers solutions to both current situation and future capacity challenges. This option is considered viable and it will be further considered during the EIA phase.

5.1.2 Waste Handling

The construction of the proposed project will result in the generation and accumulation of significant quantities of waste rock and excavated materials (general waste as defined by the Waste Act). This section discusses available alternatives applicable to handling and management of waste rock and associated material.

- Stockpile all rock waste removed from the tunnel excavation, undertake rehabilitation and blend with the surrounding environment.

Advantages	Disadvantages
<p>Rehabilitation, if undertaken properly, can be a good solution to deal with a large amount of waste rock to be produced during construction/ excavation.</p>	<ul style="list-style-type: none"> • If rehabilitation is not undertaken properly this can lead to visual impacts to the surrounding residents and road users. • Waste rock dumps could also contribute to dust and water pollution to surface and groundwater resources. • Direct impact on the flora/fauna within the footprint of the waste stockpile. • Not in line with good waste practices- the material may have an economic value for

other uses (e.g. building roads, infill, etc.).

This option will further be considered during the EIA phase.

- Disposal of waste rock at registered waste disposal site.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Avoids direct environmental impacts associated with the storage of the materials on site (e.g. loss of habitat). • Formally and legally disposed. 	<ul style="list-style-type: none"> • Not in line with good waste practices- the material may have an economic value for other uses (e.g. building roads, infill, etc.). • Licensed waste facilities usually have a finite capacity for disposal of wastes- by disposing of this material unnecessarily at a licensed facility the capacity of the facility is reduced. • Licensed facilities are likely to restrict the potential to retrieve this material for future use.

The contractor should be responsible to ensure the waste is collected and disposed of properly and that appropriate measures are taken to minimise adverse impacts such as dust generation. Transnet must ensure that all necessary waste disposal permits are obtained. Transnet have appointed the EAP to apply for all the necessary permits/licenses. This option will further be assessed during the EIA phase.

- Sell waste rock to various construction or mining companies that could further sell or use waste material to close and rehabilitate their old borrow pits.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Selling of rock material to mining companies or other third parties, can be considered another viable option in dealing with a large amount of waste and associated environmental impacts. • This option encourages the reuse of waste material and at the same time achieving an economic benefit from the sales of the material. • Indirectly benefits the environment as it may reduce local demand for quarry materials 	<p>Selling waste rock may require a mining permit from the Department of Mineral Resources. This can be considered a disadvantage to the proposed project due to the fact that additional time will be required to undertake the required process before obtaining the necessary waste permit, thereby causing delay to the planned/ scheduled project completion.</p>

and consequently reduce or prolong the life of existing quarries in the vicinity.	
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This option together with the two waste management options mentioned above are considered feasible and will be considered further during the EIA phase. Considering the volumes of the material likely to be excavated for this proposed project, there may be a need to pursue certain or all of the alternatives presented in this section with regard to waste.

In general the process alternative, particularly waste handling during the construction phase will be assessed further to identify the best waste management alternative.

5.1.3 Need Option

This section discusses various options/alternatives that might be considered in order to address Transnet's current problem other than considering double lane tunnel construction.

- Increase rail wagon capability.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Without considering technical constraints currently experienced by Transnet it is anticipated that increase in wagon capability, and /or shunting capability can help to minimize Transnet's current capacity problem. • No need to construct a new tunnel. 	<ul style="list-style-type: none"> • Increase in rail wagon capability and shunting capacities, will not address rail capacity challenges that Transnet might encounter in future. • The current risk of having a single line tunnel for the main coal line will not be addressed.

This option is not considered feasible and it will not be considered further during the EIA process.

- Consideration of other means of transport in getting commodities to the port, (e.g. hauling trucks through road).

Advantages	Disadvantages
<ul style="list-style-type: none"> • No need to construct a new tunnel with associated environmental impacts. 	<ul style="list-style-type: none"> • Transportation of material by road over a long distance is considered a costly operation that can lead to following impacts: <ul style="list-style-type: none"> - Water pollution through coal spillages. - Increase in road accidents. - Traffic congestion. - Road surface damage. • Trains can move more tons of commodities than

	<p>trucks, typically at a lower cost.</p> <ul style="list-style-type: none"> • According to the EPA, the greenhouse gas emissions associated with vehicles may be five times as much as other modes of freight transport (http://www.mnn.com).
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According to the Msukaligwa Spatial Development Framework, heavy trucks transporting coal are causing a lot of damage to the municipal, provincial and national roads, which in turn have negative impacts on local economic development and the tourism industry. In terms of the need option construction of the new double tunnel is considered the most economical option with reduced operational, social and environmental challenges while meeting the applicant's need. Therefore, both options discussed above will not be considered feasible and they will not be considered further during the EIA phase.

5.2 LOCATION ALTERNATIVES

Location alternatives relate to the main project components (e.g. tunnel route) as well as the location of ancillary activities and structures (e.g. construction camps, laydown areas, staff accommodation, etc.).

At this stage the proposed project (tunnel route) is anticipated to be located approximately 20m south of the existing Overvaal tunnel. The final route option for this project will however be determined by the underlined geology, the acquisition of the required land, and other technical and environmental aspects. Specific route options which could be considered include:

- Consideration of local route deviations (within close proximity to the existing tunnel) and options for ancillary activities, as a result of local technical and environmental sensitivities; and
- Consideration of other alternative routes in areas away from the existing tunnel (above and/or below ground).

5.2.1 Localised alternatives

With regards to the location of the ancillary structures and construction activities (e.g. laydown areas), it will be important to identify the site specific environmental and technical constraints. These opportunities and constraints will define the ultimate location for these features. Consequently the exact footprint of the proposed project and the associated construction activities will need to be considered and comparatively assessed in the EIA phase. It is proposed that a detailed environmental sensitivity analysis is done for a study area spanning ~500m on either side of the proposed preferred tunnel route and that this is utilized to identify and compare localized alternatives for the project and the ancillary activities. This will be presented in the EIA Phase.

The possible alternative of locating the accommodation facilities for the construction teams at the closest town (e.g. Sheepmoor or Ermelo) as opposed to a Greenfield site within proximity to the proposed project must also be considered during the EIA.

Advantages	Disadvantages
<p>Location of the construction staff village within an existing built up area (e.g. Ermelo or Sheepmoor) is expected to have significant advantages, including: better access to existing service infrastructure; access to existing social services; and reduced Greenfield impacts.</p>	<ul style="list-style-type: none"> • Consideration of new location near the proposed project cannot be considered a feasible/ better option due to the fact that municipal services are not available in the area. • Consideration of Greenfield area for accommodation will mean additional environmental impacts (e.g. disturbance of natural vegetation and destruction of habitats through vegetation clearing).

5.2.2 Macro Alignment Alternatives

Macro alignment alternatives refer to broader scale options and alternatives for the project. This section is informed primarily by the feasibility studies carried out by the appointed engineering team and focuses primarily on the technical feasibility of the various options.

- **Option 2: Deviation with gradients not exceeding 1:66 (on surface)**

The appointed engineering team identified an alternative route, branching off at chainage 18.55 km on the western side of the existing tunnel, linking back to the coal line at chainage 33.60 km (Figure 20).

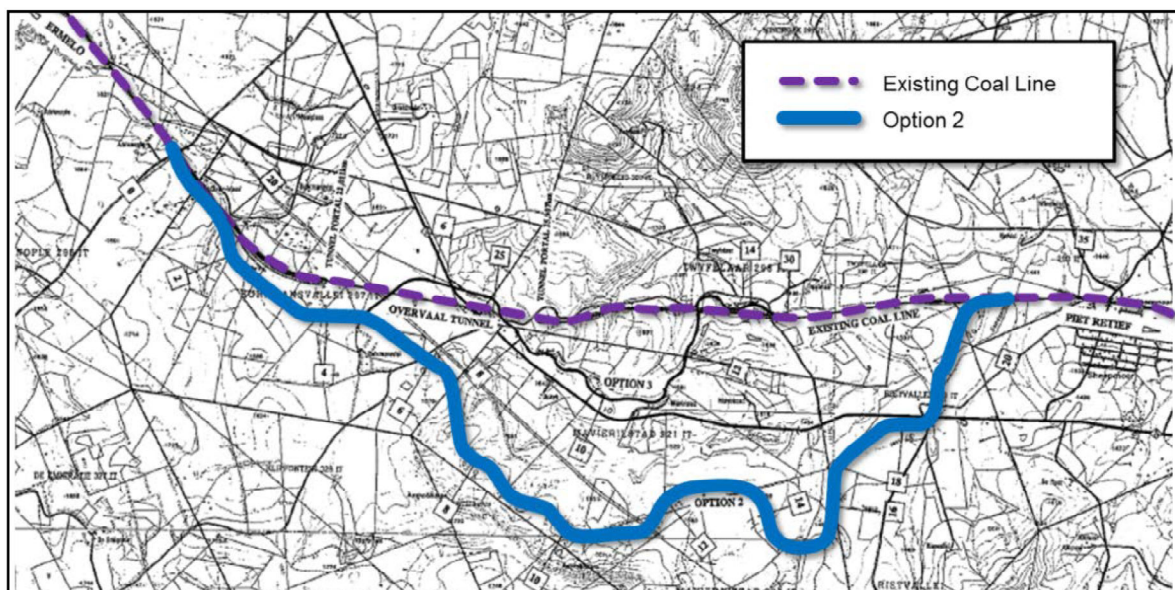


Figure 20: Optional Alignment (Aurecon; 2014).

The total length of the deviation is approximately 21 km. Due to the longer distance that this option covers, substantial earthworks would be required during the implementation of this option, resulting in a high Capex value. This alignment was investigated as a double line instead of a single line. In an attempt to avoid tunneling and reduce the depths and heights of cuts and fills respectively, the horizontal alignment for this option consists of many curves, some of which are at the minimum radii of 500m. The table below provides a brief overview of the anticipated advantages and disadvantages associated with this alternative.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Except for the substantial earthwork, no tunneling is required for this option. • Minimal impact on existing operations during construction 	<ul style="list-style-type: none"> • It is expected that speed restriction may have to be imposed on this deviation due to tight curves and steep grades throughout the alignment. This, together with the extra length added to the alignment could result in longer travel times when compared to the option of doubling the tunnel alongside the existing alignment. • Though this option may relieve the effect of the bottle neck of the current single line tunnel, it may become a bottle neck itself for future operations if it is difficult for trains to navigate this alignment due to the alignment complexities and constraints. • In an attempt to avoid tunneling and reduce the depths and heights of cuts and fills respectively, the horizontal alignment for this option consists of many curves which are not ideal for heavy haul (approximately 200 wagon trains). • A large section of this option alignment is situated against the steep slopes of hilly terrain, which could pose potential complications with construction of this alignment. • Furthermore this option alignment passes through many farming properties which might pose challenges with regard to land acquisition. • Possible impact on wetland/catchment southwest of existing line. • This option will significantly increase the footprint of the

	<p>activity with consequent environmental impacts.</p> <ul style="list-style-type: none"> • Additional length to be travelled – 6.5 km • Additional length of Greenfield railway line to be constructed – 21.6 km
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Due to its disadvantages and substantial earthworks that will be required during the implementation of this option, resulting in a high CAPEX value, this option has not been considered feasible from a technical perspective and consequently will not be investigated further during the EIA phase.

• **Option 3: Deviation linking onto and following the old uplifted route**

This option makes use of the old uplifted route which has sub-standard radii (145m) as well as sub-standard grades (1:40) (Figure 21). This alignment will only be able to accommodate shorter train lengths, having a negative impact on the overall capacity of the line.

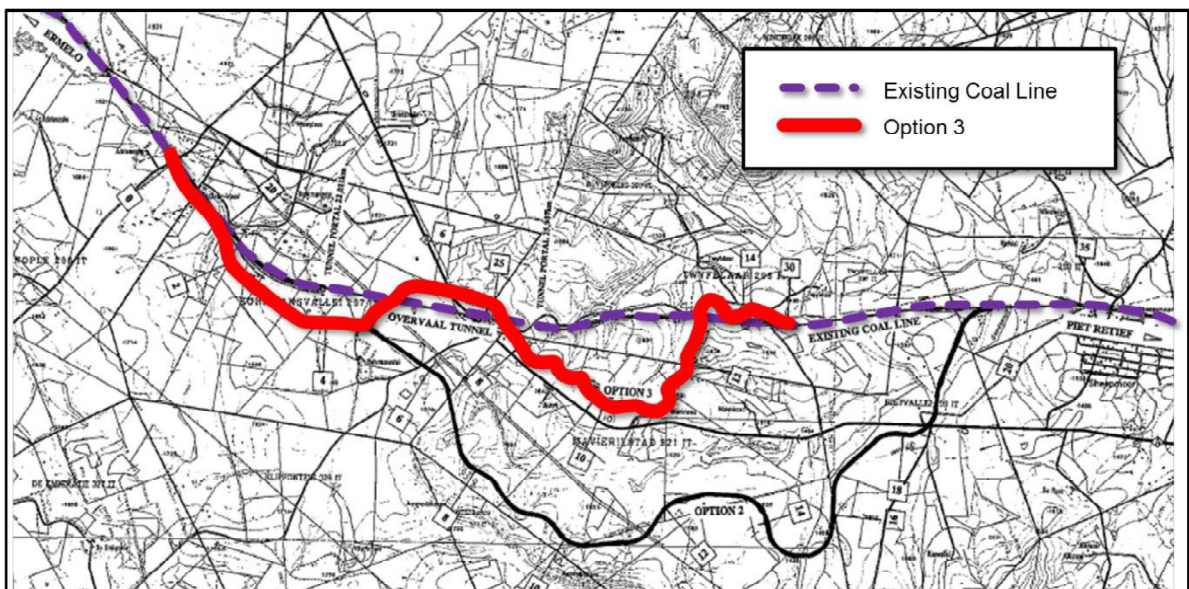


Figure 21: Route alternative: old rail route (Aurecon; 2014).

This option is, therefore, not considered a viable option and will not be investigated further during the EIA phase.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Except for the substantial earthwork due to the amount of distance that this option will cover, no tunneling is required. • Minimal impact on existing operations during construction 	<ul style="list-style-type: none"> • This alignment will only be able to accommodate shorter train lengths, which will have a negative impact on the overall capacity of the line. • Additional distance to be travelled • Will require considerable earthworks

	<ul style="list-style-type: none"> • Substandard radii and grades • Sharp curves and short straight sections might require speed restrictions resulting in an increased operational time which would, in turn, reduce throughput • Construction on steep slopes • Passes through farming land, substantial amount of additional land to be acquired – increased by amount of earthworks required • Possible impact on wetland/catchment southwest of existing line
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• **Option 5: Additional route identified**

A potential route alternative was identified by the engineering team. This alternative deviates from the existing alignment at a point roughly 3 km before the entrance to the existing tunnel and continues south of the existing alignment. The first 8 km of the alignment follows the same alignment as option 2 and thereafter follows a unique alignment to a point further along the existing alignment, just before the town of Sheepmoor.

The horizontal alignment for this option has several sharp curves, most of which require the minimum allowable radius of 500m. These sharp curves are often coupled with short straight sections and are both required in order for the alignment to pass through the mountainous terrain at acceptable vertical grades.

Advantages	Disadvantages
<p>Except for the substantial earthwork due to the amount of distance that this option will cover, no tunneling is required.</p>	<ul style="list-style-type: none"> • Due to the alignment constraints, specifically the sharp curves and short straight sections of the horizontal alignment, speed restrictions could possibly be imposed. These speed restrictions coupled with the increase in alignment length would result in increased operational time which would, in turn, reduce throughput. • Unavoidable deep cuts of up to 40m deep are expected for a 1.5 km section of the alignment starting at about 4.5 km from the start. These deep cuts form wide openings

	<p>at the natural ground level which increases the required farm land as well as the environmental impact of the alignment.</p> <ul style="list-style-type: none"> • Due to the many horizontal curves and mountainous terrain restrictions, the alignment length is increased by more than 4km with the entire alignment being a newly constructed double track section as opposed to utilising the existing alignment. • This option will significantly increase the footprint of the activity with consequent environmental/financial impacts.
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Due to the disadvantages identified, this option is not considered viable and therefore it will not be assessed further during the EIA phase of the proposed project.

- **Option 6: Additional route identified**

The option 6 alignment was identified as a possible alternative to the current tunneling option. The option 6 alignment is situated slightly north of the existing railway alignment. The focus of this alternative was to identify an alignment which would not require a tunnel to be constructed.

This alternative consists of many curves and short straight sections. Small curve radii were utilised in order to navigate down the mountainous region through which the current tunnel passes. As a result this alignment is approximately 20 percent longer compared to the current alignment.

Required deep cuts will also result in wide cuts, which would negatively impact the surrounding environment. These deep cuts would also pose the challenge of constructing a pass-over for the N2 highway 40m above the railway line. Furthermore a number of bridges are required to cross over the rivers in fairly deep valleys along the alignment.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Except for the substantial earthwork due to the amount of distance that this option will cover, no tunneling is required. • Minimal impact on existing operations during construction 	<ul style="list-style-type: none"> • The double line construction of the Option 6 alignment could potentially pose different challenges compared to those of constructing a tunnel. Such a challenge would include the construction of the formation against steep slopes of the mountainous terrain. • Due to the nature of the terrain and alignment of Option 6, it is expected that speed restrictions would have to be enforced through the tight curves and steep grades of this alignment. This together with the increased length of

	<p>the alignment would most likely result in longer travel times through this section.</p> <ul style="list-style-type: none"> • Required deep cuts will also result in wide cuts, which would negatively impact the surrounding environment. This deep cut would also pose the challenge of constructing a pass-over for the N2 highway 40m above the railway line. • Furthermore a number of bridges are required to cross over the rivers in fairly deep valleys along the alignment. • This option will significantly increase the footprint of the activity with consequent environmental impacts. • Additional length to be travelled by train: 3.5 km • Additional length of Greenfields railway line to be constructed: 18.6 km • Substantial volume of earth works required • Will require an underpass below the N2 (40 m beneath) • Possible impact on wetland/catchment northeast of existing line
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Due to the challenges and disadvantages associated with this alternative, option 6 is not considered viable and it will not be further investigations during the EIA phase.

Based on the assessment of various options identified above, the activity as described in Section 2.2 (*second double track tunnel adjacent to the existing tunnel- also known as Option 4*) is considered the only feasible alternative for the proposed development and it will be investigated further during the EIA phase.

5.3 TECHNOLOGICAL ALTERNATIVE

Selection of the techniques to be adopted for construction of a tunnel section shall take into account the nature of the substrata and the levels of the tunnel involved. Technological alternative for this development will involve various options that can be considered for construction of the proposed project which include the following: use of a tunnel boring machine (TBM) or drill and blast.

5.3.1 Use of a tunnel boring machine

Tunnel boring by way of a TBM is often used for excavating long tunnels. An effective TBM method requires the selection of appropriate equipment for different rock mass and geological conditions. The TBM may be suitable for excavating tunnels which contain competent rocks that can provide adequate geological stability for boring a long section tunnel without structural support.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Potential environmental impacts (noise, dust and visual) on sensitive receptors are anticipated to be reduced when compared to conventional drill and blast methods. The impacts are typically restricted to those located near the launching and retrieval shafts. • TBMs have the advantage of limiting the disturbance to the surrounding ground and producing a smooth tunnel wall. This significantly reduces the cost of lining the tunnel. • TBM's are typically safer than alternative excavation options. • The TBM is typically less labour intensive. • TBM's typically result in less vibration. 	<ul style="list-style-type: none"> • Extremely hard rock can cause significant wear of the TBM rock cutter and may slow down the progress of the tunneling works to the point where TBM becomes inefficient and uneconomical and may take a longer time than the drill-and-blast tunneling method. • The major disadvantage is the upfront cost. TBMs are expensive to construct, and can be difficult to transport. However, as a tunnel becomes longer, the cost of tunnel boring machines versus drill and blast is actually less this is because tunneling with TBMs is much more efficient and results in a shorter overall project timeframe. • Vibration impacts can be a concern particularly to humans and animals residing within and around the proposed project site due to the constant vibration frequencies (reverberation). • TBM's are very dependent on suitable rock conditions. • Requires separate electricity supply • Will require the construction of a haul road on the Maviristad side. • Can only be undertaken at one site. • Requires a bigger footprint to start

The TBM option is considered feasible and it will be further considered during the EIA process.

5.3.2 Drill and Blast

This tunneling method involves the use of explosives. Drilling rigs are used to drill blast holes in the surface to a designated depth. Explosives and timed detonators (delay detonators) are then placed in the blast holes. Once blasting is carried out, waste rock and soils are transported out of the tunnel before blasting continues.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Blasting would significantly reduce the duration of vibration, though the vibration level (intensity) may be higher when 	<ul style="list-style-type: none"> • Potential hazard associated with establishment of a temporary magazine site for overnight storage of explosives.

<p>compared with TBM tunneling (with proper blast design & techniques vibration can be reduced).</p> <ul style="list-style-type: none"> • More labour intensive than TBM. • Drill and blast is typically more cost effective and flexible (i.e. less dependent on rock conditions). • Can be undertaken at more than one site simultaneously. 	<ul style="list-style-type: none"> • Adequate structural support measures are required when adopting this method for tunneling. • Possible damage to existing tunnel resulting in delay in operations • Once blasting is carried out, waste rock and soil is transported out of the tunnel before further blasting which is time consuming when compared to TBM; (http://miningandblasting.wordpress.com).
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The drill and blast option is considered feasible at this stage and will be assessed further in the EIA phase.

5.4 NO-GO ALTERNATIVES

The “No-Go” or “No-Action” alternative refers to the alternative of not embarking on the proposed project at all. This alternative would imply that the current status quo without the proposed project would continue. It is important to note that the No-Go alternative is the baseline against which all other alternatives and the development proposal are assessed.

When considering the No-Go alternative, the impacts (both positive and negative) associated with any other specific alternative or the current project proposal would not occur and in effect the impacts of the No-Go alternative are therefore inadvertently assessed by assessing the other alternatives. In addition to the direct implications of retaining the status quo there are certain other indirect impacts, which may occur should the No-Go alternative be followed. The No-Go alternative as a specific alternative is not considered feasible for the following reasons:

Advantages	Disadvantages
<p>No additional disturbance of land and development related negative impacts.</p>	<ul style="list-style-type: none"> • If the proposed project does not proceed in its entirety then Transnet will not be able to meet its mandate with regard to the transport of a significant portion of South Africa’s international primary commodity which passes through this tunnel. • Positive impacts associated with the proposed project will not occur (e.g. Employment creation during construction and operation). • If the proposed project does not proceed the risk associated with the single tunnel will remain

unaddressed.

6. PUBLIC PARTICIPATION

In environmental legislation, public participation (or stakeholder engagement) features strongly. NEMA and the regulations passed under the auspices of this Act makes very strict provisions for public participation in environmental decision-making. The public is classified as a group whose interest may be affected positively or negatively by a proposed activity and/or who are concerned with a proposed activity and its consequences. Such a group is referred to as Interested and Affected Parties (I&APs) and they should be adequately engaged in processes that affect their biophysical, social, cultural and economic environment. I&APs include stakeholders, the authorities, technical specialists, and the proponent. Identifying relevant I&APs and making sure they are involved in the public participation process from the beginning of a project is very important not only because it is a requirement of the EIA Regulations, (2010) under NEMA, but because issues and alternatives raised by I&APs help to focus the process and enhance the quality of the decision taken by the authorities.

To ensure an effective process, the objectives, as well as the partaker's responsibility, appropriate approaches and techniques, should be clearly defined. The level of engagement considers the social profile of stakeholders, context-related issues (literacy etc.), and the spatial scale of the proposed activity.

6.1 METHODOLOGY

The methodology for the Public Participation Process was based on the requirements of Regulation 54 of the EIA Regulations (GN R.543) promulgated under Section 24(5) of the NEMA, as well as previous experience with Scoping studies. This involved identifying I&APs, notifying them about the application, and soliciting their issues and concerns with regards to the proposed project's activities through correspondence, focus group and public meetings.

6.2 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

Key I&APs include all identified key stakeholder groups (e.g. ward councilors, municipalities, government departments and NGOs). The Key I&APs were mostly pre-identified but some were registered during the site visits and at public meetings (See Appendix A for the Key I&AP database).

There are various landowners in the vicinity of the proposed project site and those were included/ recorded as I&APs. I&APs can be described as those people who have a concern about a development, project, policy or action and who need to be consulted during the process of decision making. In an effort to ensure that all potentially applicable landowners are identified the contact details of all of the landowners within the proposed project site were identified via the following process:

- A Windeed search was conducted to obtain the contact details of the affected landowners, where available; and
- Where the property was owned by a company, a CIPRO search was carried out to identify the owners and details.

A few landowners belonging to the Bamabanani Sakhisizwe Communal Property Association requested to be registered during the initial site visit. Please refer to Appendix A for the full landowner database. The following Key I&APs were identified for involvement in this process:

- | | |
|---|---|
| <ul style="list-style-type: none"> • Msukaligwa Local Municipality • Msukaligwa Fire Protection Association • Gert Sibande District Municipality • Federation for a Sustainable Environment • Mpumalanga Department of Economic Development, Environment and Tourism • Mpumalanga Tourism and Parks Agency • Mpumalanga African Farmers Union • National Department of Mineral Resources • Mpumalanga Department of Mineral Resources • Mpumalanga Department of Human Settlement • Mpumalanga Department of Health & Social Development • Mpumalanga Department of Agriculture, Rural Development and Land Administration • Mpumalanga Department of Public Works, Roads and Transport • National Department of Provincial and Local Government • SANRAL • National Department of Agriculture • Mpumalanga Department of Labour • Mpumalanga Wetland Forum | <ul style="list-style-type: none"> • National Union of Mine Workers (NUM) • National Department of Rural Development and Land Reform • Mpumalanga Department of Rural Development and Land Reform • Mpumalanga Department of Economic Development, Environment and Tourism • Mpumalanga Department of Co-Operative Governance and Traditional Affairs • Mpumalanga Department of Water and Sanitation • National Department of Water and Sanitation • Earthlife Africa • SECCP of Earthlife Africa • Eskom • WESSA - National and Northern Areas • South African Heritage Resources Agency (SAHRA) - National • South African Heritage Resources Agency (SAHRA) - Mpumalanga • Transnet • Birdlife South Africa • Chamber of Mines of South Africa • Agricultural Research Council • Agri Mpumalanga • Endangered Wildlife Trust |
|---|---|

- Mpumalanga Department of Agriculture, Rural Development and Land Administration
- AFGRI Operations
- National Department of Environmental Affairs
- Strauss Attorneys
- Birdlife South Africa
- Savannah South Africa

6.3 NOTICES, ADVERTISEMENTS, AND BACKGROUND INFORMATION DOCUMENTS

This section provides details on the notifications that were distributed as part of the public participation process to date.

6.3.1 Initial Notification

Public notices provide an official announcement of an intent to undertake a certain activity and provide I&APs with the opportunity to comment. Notification during this public participation process was given in the following manner (please refer to Appendix A for details and relevant proof):

- 30 x A2 size correx notices, 10 of which were written in Afrikaans, 10 in SiSwati and 10 in English, placed at key points in and around the proposed project site;
- Distribution of A4 pamphlets (English, SiSwati and Afrikaans) to all local landowners and occupiers of land;
- Distribution of A4 pamphlets and Background Information Documents (BID) at key points within the surrounding communities;
- Placement of A3 size notices at key community points within the surrounding towns, such as Clinic, Municipality and Shops; and
- An advertisement (English and Afrikaans) placed in Highveld Tribune Newspaper.

The notices and written notification gave I&APs the opportunity to submit their issues/queries/concerns to the environmental consultants, EIMS, of which the contact person, telephone number, email address and fax number were clearly stated on the notice. Comments/concerns and queries were encouraged to be submitted in either of the following manners:

- Electronically (fax, email)
- Telephonically, or
- Written letters.

6.3.2 Draft Scoping Report Notification

Notification regarding the availability of the Draft Scoping Report, a component of the PPP, was given in the following manner:

- Notification letters (English, Afrikaans and isiZulu), faxes, and/or emails were distributed to all I&APs (pre-identified key I&APs as well as I&APs registered during the initial notification period; and
- All affected landowners within the study area boundary were notified.

Written notification afforded all I&APs the opportunity to submit their issues/queries/concerns on the Proposed Development and the content of the Draft Scoping Report. The contact person, contact number, email and faxes were clearly stated on the distributed notifications. I&APs were encouraged to submit their comments/concerns and queries in either of the following manners:

- Electronically (fax, email);
- Telephonically; and/or
- Written letters.

Copies of the Draft Scoping Report were made available at public venues and online (see Table 10 below for details) for perusal and comment by all I&APs. All comments received by EIMS have been included into the Issues and Response Report (IRR) and will be submitted to the DEA for consideration and decision making.

Table 10: Opportunities provided for Public Participation

Public Participation Phase			
Action	Description	Publication/Place	Date
Announcement of Project.	Newspaper Advertisements.	Highveld Tribune Newspaper.	29 October 2013.
Public Notification.	Landowner Notification.	Landowners were notified via email, fax and post.	09 October 2013.
Public Notification.	Placement of site notices.	Thirty A2 site notices (10 in English, 10 in Afrikaans and 10 in siSwati) were placed at key locations within the proposed project site.	24 October 2013.
Public Notification.	Placement of notices.	Thirty-five A3 notices (10 in English, 10 in Afrikaans and 15 in SiSwati) were placed at key locations within the proposed project site (the village of Sheepmoor & the town of Ermelo).	24 October 2013.
Public Notification.	Distribution of notices.	A4 pamphlets and Background Information Documents (BIDs) were distributed to local landowners and occupiers of land around the proposed project site.	24 October 2013.
Public Notification.	Notification of key I&AP's and other	I&AP's were notified via e-mail, fax and post.	29 October 2013.

	stakeholders.		
Public Information.	Initial focus group and public meetings.	Bambanani Sakhisizwe – Maviristad; Overvaal Guest House; B. Maseko Primary (Sheepmoor).	13 th - 14 th November 2013.
Public Notification.	Availability of the draft scoping report and public meetings for public review.	Notification of availability was sent to all registered I&APs via e-mail, fax and post.	12 th January 2015.
Public information.	Draft scoping report focus group and public meetings.	Bambanani Sakhisizwe – Maviristad; Overvaal Guest House; Sheepmoor Community Hall	27 th – 28 th January 2015.
Public Notification.	Availability of the final scoping report for public review and Authority Decision.	Notification of availability will be sent to all registered I&APs via e-mail, fax and post.	19 March 2015.
Public Notification.	Authority decision on the final scoping report.	Notification of availability will be sent to all registered I&APs via e-mail, fax and post.	To be confirmed.
Public Notification.	Availability of the draft EIAR for Public review.	Notification of availability will be sent to all registered I&APs via e-mail, fax and post.	To be confirmed.
Public Notification.	Availability of the Final Environmental Impact Assessment Report (EIAR).	Notification of availability will be sent to all registered I&APs via e-mail, fax and post.	To be confirmed.
Public Notification.	Notification of Authority decision on EIAR.	Notification of availability will be sent to all registered I&APs via e-mail, fax and post.	To be confirmed.

6.4 PUBLIC MEETINGS

Public meetings were held on the 13th and 14th of November 2013 at the Marivistad – Bambanani Sakhisizwe, Overvaal Guesthouse and B. Maseko Primary School (Sheepmoor). During the meeting, initial notification of the proposed project was presented to those who attended. I&APs were given an opportunity to ask questions and to provide comment.

Furthermore, during the review period of the Draft Scoping Report, two public meetings were conducted on the 28th January 2015. The first public meeting took place at the Overvaal Guesthouse between 10h00 and 12h00, and the second meeting was at the Sheepmoor Community Hall between 13h00 and 15h00. During the public meetings, the EAP presented the findings of the Draft Scoping Report prior to opening the floor for comments, concerns and/or queries.

6.5 DOCUMENT REVIEW

In accordance with the requirements of Regulation 56 of GNR 543, the I&APs will be afforded the opportunity to comment on all submissions to be made to the DEA. The draft scoping report was made available for review by the public at the various public places (Ermelo public library and the Sheepmoor community hall). The draft scoping report was also placed on the EIMS website (www.eims.co.za) and made available for download. The registered I&APs were advised of the availability of the draft scoping report and requested to submit comments to EIMS.

Comments obtained during the public review period of the draft scoping report are included in the IRR that will be submitted together with this final report to the relevant authorities. The final scoping report will be placed on the EIMS website for public review, and notification will be distributed to registered I&APs regarding its availability for review and comment.

6.6 RESPONSE FROM I&APS

The I&APs were provided with various mediums through which they could provide comment namely through facsimile, telephone, email and post. All such correspondence with the I&APs has been recorded and incorporated into the IRR (Appendix A) throughout the Scoping Phase and will continue throughout the EIA Phase. The summary of issues and concerns identified thus far in the public participation process include the following:

- Eskom Specific Issues related in Eskom servitudes
- Ecology, Fauna and Flora
- Registration and Participation
- Employment Issues
- Land Issues
- Safety and Security Concerns
- Water Issues
- Destruction to Existing Infrastructure
- Compensation
- Skills development
- Health and Safety
- Waste Management
- Dust Pollution
- General Issues
- Draft Scoping Report (requests for information and/or acknowledgement of receipt of the report).
- Meetings (inquiries regarding meeting arrangements, including dates and venues)

7. ENVIRONMENTAL CONCERNS AND POTENTIAL IMPACTS

This section provides feedback on the concerns and potential impacts identified during the Scoping phase.

7.1 APPROACH AND METHODOLOGY

The primary objective of the EIA process is the identification, investigation and assessment of potential impacts. The final assessment and consequent provision of suitable alternatives, management and mitigation measures, is achieved through a four step process, namely:

- Screening and identification of potential impacts and alternatives;
- Investigation of selected potentially significant impacts and feasible alternatives;
- Assessment of significance of potentially significant impacts and comparative assessment of feasible alternatives; and
- Identification of measures to avoid, manage, mitigate, and reduce the potentially significant impacts and identification of the most preferred alternative.

This scoping report attempts to fulfil the first two steps in the process. The EIA phase and consequent Environmental Impact Report (EIR) and EMP_r will address the remaining steps. This section of the scoping report therefore serves to identify and describe the potentially significant impacts associated with the proposed project.

7.2 IMPACT IDENTIFICATION

Issues have been determined through various site visits, consultation of published information, brainstorming amongst the consultants and specialists, and issues raised by I&AP's during the public consultation.

A matrix was developed to identify the potential impacts of the proposed project during each of the project phases (namely construction, operation and decommissioning), for various components of the receiving environment (namely Social, economic, cultural and heritage, ecology, hydrology, physical and air). Table 11 shows the impacts (positive and negative) identified in the matrix.

Table 11 : Impact identification.

Development Phase	Socio-economic Impacts			Biophysical Impacts			Other
	Social	Economic	Heritage	Ecology	Hydrology/ geo-hydrology	Physical/ air	
Construction	Nuisance from dust and noise	Loss of land capability (agricultural potential) and disruption of farming activities.	Impact on historical and cultural sites (e.g. archaeological sites, historical sites, graves and cemeteries).	Dust settlement impact on plants	Sedimentation	Erosion	Waste management and disposal
	Fire hazard	Potential markets for informal trading		Impact on habitat of threatened animals			
	Visual intrusion	Employment creation.		Impact on threatened plants	Impacts of water use on resource sustainability.	Soil pollution	
	Potential in-migration of people.	Opportunities for local contractors and SMEs.		Impact on protected species	Pollution of water resources	Air pollution	
	Increased pressure on existing infrastructure.	Potential effect on tourism and eco-tourism		Impact on indigenous natural vegetation		Geological Instability	

	Impacts on pedestrian and road safety.	Potential increase in stock theft		Impact on wetlands			
	Impacts on the safety and security of neighbouring/surrounding settlements.	Disruption to infrastructure and services		Establishment and spread of Listed Invasive Plant Species			
	Increase in the spread of diseases (including sexually transmitted diseases and HIV/AIDS).	Impact on property values					
	Impact on sense of place.						
	Traffic congestion and pavement damage.						
	Potential increase in stock theft.						
Operation	Impact on sense of place	Loss of land capability (agricultural			Alteration of watercourse	Erosion	

		potential)			dynamics		
	Noise	Impact on current land-use				Unstable foundations	
		Impact on property values			Pollution of water resources		
		Impact on existing infrastructure					
Decommissioning							Waste management and disposal

7.3 DESCRIPTION OF POTENTIAL IMPACTS

This section provides a brief description of each identified impact as well as an indication as to whether the specific impact will be assessed further in the EIA phase.

7.3.1 Construction Phase

Nuisance from dust and noise

During the construction of the proposed project, dust pollution is anticipated due to clearing of vegetation for lay down areas and a construction camp. A small settlement (Bambanani Sakhisizwe Communal Property Association) is located towards the eastern side of the proposed project, which is close enough to be affected by noise and dust-related impacts during construction. A farm homestead and the Overvaal Guesthouse as well as AFGRI storage facilities (Silo's) are situated in close proximity to the proposed project and could be affected during construction. The significance of this impact will in addition to the proposed project depend on the exact location of the lay down area and construction camp in relation to those sensitive receptors.

This impact will require further detailed investigation and assessment during the EIA phase.



Figure 22: View of the AFGRI storage facilities to the western tunnel exit

Geological Instability

The existing tunnel and surrounding area is underlain by a succession of sedimentary rocks of the Karoo Sequence. Localised faulting is evident but displacements are generally slight.

This impact will require further detailed investigation and assessment during the EIA phase. Management and mitigation measures will be identified and included in the EIA and subsequent EMPr.

Fire hazard

Increased human activities during construction add to the risk of accidental veld and forest fires. Construction activities are often associated with fire risks. These risks could result from:

- Exposed fires (e.g. for cooking and warmth);
- Cigarettes and discarded ignition sources;
- The creation and maintenance of fire breaks;
- Vegetation clearing/ burning; and
- The use of flammable liquids.

The area surrounding the proposed project is rural in nature and many of the properties rely on cultivation or grazing. Uncontrolled fires pose a significant risk to the surrounding environment, from a socio-economic and a biodiversity point of view. This impact can be mitigated and managed through standard measures and controls, and as such will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Visual intrusion

From a visual impact point of view, the significance of the impact is dependent on various criteria. The proposed tunnel will be underground, however there may be potential visual impacts associated with the construction phase in particular. These are described and discussed briefly herein:

- Visual Intrusion: The nature of intrusion or contrast (physical characteristics) of the construction camp and construction related activities (including dust) may impact on the visual quality of the surrounding environment and its compatibility / discord with the landscape and surrounding land use.
- Visibility: The area / points from which project components will be visible. In this case, it will include the number of farmsteads and the length of road with possible views towards the components of the proposed project.
- Visual exposure: Visual intrusion and visibility - qualified with a distance rating - indicate the degree of intrusion. Visual exposure relates directly to the distance of the view. It is a criterion used to account for the limiting effect of increased distance on visual impact. The impact of an object in the foreground (0 – 800m) is greater than the impact of that same object in the middle ground (800m – 5.0 km) which, in turn is greater than the impact of the object in the background (greater than 5.0 km) of a particular scene. Distance from a viewer to a viewed

object or area of the landscape, influences how visual changes are perceived in the landscape. Generally, changes in form, line, colour, and texture in the landscape become less perceptible with increasing distance. The impact of an object diminishes at an exponential rate as the distance between the observer and the object increases. In summary the closer a receptor (e.g. farmstead) is to a visual intrusion (e.g. construction camp/ stockpiles) the greater the likely visual impact.

- Sensitivity: Sensitivity of visual receptors and views to the proposed project (including the construction activities) will depend on:
 - The location and context of the viewpoint;
 - The expectations and occupation or activity of the receptor; and
 - The importance of the view (this may be determined with respect to its popularity or numbers of people affected, its appearance in guidebooks, on tourist maps, and in the facilities provided for, its enjoyment and references to it in literature or art).

The most sensitive receptors may include:

- Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape;
- Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; or
- Occupiers of residential properties with views affected by the proposed project and associated construction activities.

Other receptors which may be less sensitive to the proposed project may include:

- People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value); and
- People travelling through or past the affected landscape (proposed project and associated construction activities) in cars, on trains or other transport routes; and people at their place of work.

The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

It is anticipated that the construction of the proposed project is likely to have a cumulative visual impact including aspects such as:

- Construction vehicles associated with the construction (e.g. cranes, hauling vehicles, TLB's, etc.); and
- Facilities specifically associated with the construction, such as the temporary construction camps and lay down areas.

The cumulative effect is the end result of the visual effect when taking into consideration the visual effect of the existing elements / structures in combination with the structures of the proposed project. Significant visual impacts are only anticipated during construction and not during the operation of the facility since the tunnel will be underground. The likely visual impact of construction activities is anticipated to be a factor when comparing the identified location alternatives and consequently will be assessed in the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Potential in-migration of people

According to the World Bank, the induced population increase associated with a development initiative is estimated to equal the number of people employed on the project. However, in applying this statement, caution must be exercised to take into account the geographical, social, and socio-economic context within which the development is taking place, as well as the type of development, as these are factors that may increase or decrease the multiplier. On a project of this nature, which is localised, away from towns or settlements, with a limited number of employment opportunities, and relatively specialised skills requirements, in-migration to the surrounding areas, per se, is not seen as a significant impact.

If in-migration does occur, migrants could potentially come from surrounding towns like Piet Retief, Amsterdam, Amersfoort, Ermelo and others. In-migration would be in the form of job seekers, informal vendors, and criminal opportunists in the vicinity of the construction camp. Criminal elements may target construction workers as well as landowners and farm labourers, which can lead to an increase in general theft, house breakings, and threats to personal safety.

This impact will not vary according to the final project location and there are standard management and mitigation measures which can be applied to reduce the significance of this impact. This impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Increased pressure on existing infrastructure

The construction camp/s would require ready access, access to a water source, sanitation facilities, and appropriate waste management systems. The proposed project is expected to result in limited pressure on existing infrastructure and where impacts will occur, these will be limited mostly to the construction phase of the project. Where possible, construction sites should tap/link into existing infrastructure and services for these purposes. It is understood that there is an existing access road and borehole which may be used as a source of water. There would however be a requirement to construct temporary infrastructure for sanitation facilities and waste disposal, and this is anticipated to trigger the listed activity under NEM:WA. As such limited infrastructure and services may thus have to be established on the site or the construction camp. Solid waste and sewage will require proper disposal at registered disposal and treatment facilities.

The impact will depend on the outcome of the comparative assessment of the identified alternative of locating the accommodation facilities for the construction teams at the closest town (e.g. Ermelo or

Sheepmoor) as well as locations of respective construction camps and facilities. This impact will require further detailed investigation and assessment during the EIA phase.

Impacts on pedestrian and road safety

In order to construct a tunnel and associated railway lines, a significant amount of material (e.g. Rails, Sleepers, Ballast and other accessory components) is required, and all this material needs to be transported to the site by heavy construction vehicles.

Depending on the source of these materials and components, they will either be transported eastwards from Gauteng Province, or northwards from KZN, passing through a number of towns on the way. En route to the site, the increased number of heavy vehicles on the roads could impact on safety of motorists, other road users and, especially through towns, on pedestrians.

This impact relates to standard road safety concerns and there are standard road safety measures and mitigation measures which can be implemented to effectively mitigate this impact and reduce the potential significance. Consequently, this impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Impacts on the safety and security of neighbouring/surrounding settlements

The presence of construction workers, but more importantly, the potential influx of, especially, criminal opportunists, could potentially affect the safety and security of residents of surrounding settlements, farmers, farm labourers, and construction workers. These impacts could include poaching of wildlife and livestock. The closest settlement (Sheepmoor) is some distance away, but there are numerous farm homesteads and farm labourer houses in proximity to the proposed project.

There are standard management and mitigation measures available which can be applied to reduce the significance of this impact. This impact will require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will be identified and included in the EMPr as well.

Increase in the spread of diseases (including sexually transmitted diseases and HIV/AIDS)

Any construction or development activity which causes migration of people has the potential to increase the spread of diseases. In this case, one of the most serious of these is HIV/AIDS. Induced migration, as well as the movement of contractor construction workers from elsewhere in the country, can potentially increase the spread of HIV/AIDS. Also, the construction of the proposed project will require construction materials to be transported to the site. Drivers of heavy vehicles are commonly seen as a contributing factor to the spread of the disease.

Activities such as prostitution and varying levels of promiscuity are often associated with groupings of construction workers. This could lead to scenarios where an infected construction worker coming into the area spreads the disease through unprotected intercourse with sex trade workers or local individuals, who, in turn, will spread it locally. Alternatively, an uninfected construction worker could

become infected through unprotected intercourse and, on return to his/her place of origin, spread the disease there. By implication, the potential increase in the transmission of sexually transmitted diseases (STDs) and HIV/AIDS becomes an issue of great concern, as it is especially problematic in a country where infection rates are already high. This is of particular concern, considering the proximity of established settlements (e.g. Sheepmoor) to the proposed project.

There is also the risk that if the construction camp is not managed efficiently, a lack of adequate water, sanitation, and waste facilities may lead to unhygienic living conditions and the easy spread of water-borne diseases. Such events will not only affect construction workers and thereby the progress on the construction of the proposed project, but may also spread to local communities.

Due to the national importance of the HIV/AIDS pandemic, this impact is considered to be of high significance. Whilst there are standard management and mitigation measures for dealing with this impact, it is anticipated that this impact will be influential to the decision making process for this EIA. This impact will therefore require further detailed investigation and assessment during the EIA phase.

Traffic congestion and pavement damage

It is anticipated that the construction of the proposed project will generate significant volumes of traffic as a result of:

- Large construction vehicles and plant mobilizing and demobilizing on the site;
- Transport of equipment for the proposed project by means of heavy vehicles; and
- Daily vehicle movements to and from site by the construction teams.

The additional traffic volumes have the potential to increase the local and regional traffic patterns and may result in localised congestion. In addition, the utilisation of existing roads may exceed the existing capacity and consequently may result in degradation of the road surfaces.

This impact will require further detailed investigation and assessment during the EIA phase.

Impact on sense of place

Sense of place can be described as 'characteristics that make a place special or unique, as well as to those that foster a sense of authentic human attachment and belonging'. The construction of the proposed project within an area that holds a specific sense of place may have the potential to alter this. The impact on the sense of place is closely linked to the likely visual impact of an activity. For the purpose of construction, lay down areas and a construction camp will be required and will have impacts on the visual characteristics of the area. It has to be noted however that the potential visual impacts will be limited primarily to the construction period, and consequently the duration of the likely impact on sense of place will be limited.

This impact, linked to the visual impact, is intrinsically dependant on the specific locality of the proposed project, and associated construction activities, and as such will be considered in detail in the EIA phase.

Loss of land capability (agricultural potential) and disruption of farming activities

During construction, landowners who farm livestock may need to move their stock away from the areas surrounding the proposed project and associated construction activities. Construction activities may pose risks to animals in terms of potential poaching, as well as safety due to the increased movement of heavy and other construction vehicles. This could affect farmers' grazing plans in terms of the rotation of stock between grazing camps.

This impact will require further detailed investigation and assessment during the EIA phase.

Potential markets for informal trading

The closest grocery stores and shopping facilities to the proposed project are located in Sheepmoor, which is approximately 12 km away from the proposed project. This relatively far distance will make informal vendors close to the construction site an attractive option for construction workers.

The presence of informal vending and trading stalls in close proximity to construction camps and/or the construction sites could, if not managed carefully, result in littering and uncontrolled dumping of refuse.

This impact will depend significantly on the location of the construction camps and worker accommodation and as such will require further detailed investigation and assessment during the EIA phase. Further detailed investigation and assessment on this impact will be undertaken by EIMS during the EIA phase.

Employment creation

At this stage of the proposed project, it is not clear exactly how many people would be employed during construction. However, the construction of a tunnel is a specialized task which requires fairly specialized construction personnel. Therefore, a significant number of the construction team would be coming from elsewhere, and job opportunities for local people will be limited to temporary unskilled jobs, on-site and in the construction camp. Apart from direct employment, local people and businesses could benefit through the supply of goods and services to the appointed contractors.

The limited impact of temporary employment can be both positive and negative. The fact that unemployment is currently such a critical consideration in South Africa leads to the suggestion that any potential employment should be considered in any decision making. Consequently both the positive and negative impacts will require further detailed investigation and assessment during the EIA phase.

Opportunities for local contractors and SMEs

Job opportunities for local people would be limited to unskilled jobs. However, Transnet places an emphasis on Small and Medium Enterprises (SMEs) and thus, if there are local contractors with the required skills and experience to conduct activities such as the construction of access roads and the erection of fences, opportunities could exist for these contractors during the construction process.

The significance of this positive impact is anticipated to be consistent regardless of the potential alternatives. Transnet has standard policies regarding procurement for contracts. This impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Potential effect on tourism and eco-tourism

Overvaal guest house is situated approximately 2 km to the north west of the proposed project and it might be affected both positively (i.t.o. providing accommodation facilities for contractors) and negatively (i.t.o. impact on other guests) by the proposed project during construction. Other tourism areas such as Wakkerstroom and Volksrust are far enough away from the proposed project not to be significantly affected by it.

The significance of this impact is closely linked to the physical location of the proposed project and specifically the construction activities as well as the consequent visual intrusion. Further detailed investigation and assessment on this impact will be undertaken by EIMS during the EIA phase.

Potential increase in stock theft

The theft/loss of a small number of livestock units could lead to substantial losses for surrounding landowners. A number of activities associated with the proposed project may result in increased stock theft on farms neighboring the construction camp and those traversed by the proposed project. These activities may include, but are not limited to;

- The potential influx of migrants,
- The presence of a number of construction workers in the construction camp, and
- Workers accessing farms for construction.

The fact that the surrounding land-use and local economy relies heavily on farming practices suggests that this impact should be considered in the decision making process. Further detailed investigation and assessment is required during the EIA phase.

Disruption to infrastructure and services

The construction process may result in accidental damage to services. With reference to Figure 23 below Eskom transmission and distribution lines transverse the proposed project. Vibration during construction may also have negative impacts on the AFGRI facilities (Silo's) and residential house that exist within proximity to the proposed project. This could have knock-on effects on the surrounding communities. This potential impact will be considered and assessed in the EIA phase by EIMS.



Figure 23: View of the Eskom power lines crossing the area of the proposed project.

Impact on property values

The construction phase is likely to result in significant short term disruption in the local and regional context. The negative impact on property prices during the construction phase are typically short term impacts related to the negative perceptions and other negative impacts related to a typical construction process (including traffic, dust, noise, security etc.). This impact is anticipated to affect the local properties surrounding the proposed project.

This impact will be of a similar significance regardless of the specific location of the construction facilities and the majority of the nuisance factors which are anticipated to influence the temporary property price will be addressed and mitigated under other identified impacts. Consequently it is not anticipated that the impact of construction on property prices requires further detailed investigation and assessment during the EIA phase. Management and mitigation measures will however be identified and included in the EIA and subsequent EMPr.

Impact on historical and cultural sites

The construction of the proposed project has the potential to damage cultural and historical features (including paleontological and archaeological features). The proposed project is situated in a temperate to cool summer climate with cold winters and is therefore not generally suitable for Iron Age habitation. According to Huffman's (2007) distribution sequences of the Iron Age, the area does not fall within any known culture related to the Iron Age. Graves within the area surrounding the proposed

project are rarely noted in maps and documents and if there is any can only be identified during field work (Huffman's, 2007).

This impact will require further site specific investigation for any areas where surface disturbance may be expected and in particular the proposed locations for the construction camp/s.

In terms of the SAHRA Paleontological map this area is of high paleontological importance and will require a Phase 1 field assessment.

Dust settlement impact on plants

The dust generated during construction has the potential to settle on plants which may reduce the ability of the plants to pollinate and photosynthesize. This impact is likely to be of short duration and limited to local areas surrounding the dust sources. In addition there are standard management and mitigation measures which can be implemented to reduce the significance of this impact.

This impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Impact on habitat of threatened animals

Threatened animal species are affected primarily by the overall loss of habitat. Loss of a population or individuals of threatened animal species could lead to a direct change in the conservation status of the species, possibly local extinction. This may arise if proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:

- fragmentation of populations of affected species;
- reduction in area of occupancy of affected species; and
- loss of genetic variation within affected species.

For any other species a loss of individuals or localized populations is unlikely to lead to a change in the conservation status of the species.

Furthermore the area surrounding the proposed project is considered as a potential location of sensitive fauna Highveld Golden Mole (*Amblysomus septentrionalis*) (<http://afrotheria.net>). According to the IUCN red list map, the African bullfrog (*Pyxicephalus adspersus*), which has a conservation status of Least Concern (LC) may occur in areas surrounding the proposed project.

No specialist studies have been undertaken during the scoping phase, however an ecological specialist has been appointed to undertake an ecological assessment of the proposed project and the findings of the study will be included in the EIA report. This impact will require further detailed investigation and assessment during the EIA phase.

Impact on threatened plants

Plant species are especially vulnerable to infrastructure development due to the fact that they are immobile and consequently cannot move out of the path of the construction activities. Loss of a population or individuals of threatened plant species could lead to a direct change in the conservation status of the species. This may arise if the proposed infrastructure and associated construction activities are located where they will impact on such individuals or populations. Consequences may include:

- fragmentation of populations of affected species;
- reduction in area of occupancy of affected species; and
- loss of genetic variation within affected species.

These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species overall survival chances.

The area surrounding the proposed project is considered as a potential location of sensitive flora which includes vegetation units classified as Endangered and Less Threatened. No specialist studies have been undertaken during the scoping phase however an ecological specialist has been appointed to undertake ecological assessment of the proposed project and the finding of the study will be included in the EIA report. Assessment of this impact will further be undertaken by EIMS as part of the as part of the EIA process.

Impact on protected tree species

In terms of section 5(1) of the National Forests Act, 1998 “no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an applicant and subject to such period and conditions as may be stipulated”. According to SANBI few specimens of protected flora species such as *Gunnera perpensa*, *Crinum bulbispermum* and *Gladiolus malvinus* occur within and around the proposed project. Encroachment of habitats by laydown area, construction camp and other associated infrastructure will pose a threat to those protected floral species if not properly managed.

This impact is very dependant on the exact location of surface disturbances that will occur during the construction of the proposed project, and as such will require further detailed investigation and assessment during the EIA phase. No specialist studies have been undertaken during the scoping phase however an ecological specialist has been appointed to undertake ecological assessment of the proposed project and the finding of the study will be included in the EIA report.

Impact on indigenous natural vegetation

Construction of infrastructure may lead to direct loss of vegetation. This will lead to localised or more extensive reduction in the overall extent of vegetation. Where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased

vulnerability (susceptibility to future damage) of the habitat and a change in the conservation status (current conservation situation). Consequences of the impact occurring may include:

- Negative change in conservation status of habitat (Driver et al. 2005);
- Increased vulnerability of remaining portions to future disturbance;
- General loss of habitat for sensitive species;
- Loss in variation within sensitive habitats due to loss of portions of it;
- General reduction in biodiversity;
- Increased fragmentation (depending on location of impact);
- Disturbance to processes maintaining biodiversity and ecosystem goods and services; and
- Loss of ecosystem goods and services.

The proposed project falls within proximity to the Eastern Highveld Grassland and Wakkerstroom Montane Grassland Biomes. These biomes are classified as Endangered and Least Threatened respectively in the scientific literature (Mucina & Rutherford, 2006).

This impact will require further detailed investigation and assessment during the EIA phase.

Impact on wetlands

According to the ecological importance classification for the two quaternary catchments (C11B and W53A) in the area, the systems can be classified as sensitive to moderately sensitive in terms of ecological importance and sensitivity which, in their present state, can be considered to be Class B (minimally modified) streams and Class C (moderately modified) streams based on the certainty of desktop methods (Kleynhans, 1999).

Construction may lead to some direct or indirect loss of, or damage to, wetlands or drainage lines, or impacts that affect the catchment of these wetlands. This could lead to localized loss of wetland habitat and may lead to downstream impacts that affect a greater extent of wetlands or impact on wetland function. Where these habitats are already stressed due to degradation and transformation, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Physical alteration to wetlands can have an impact on the functioning of those wetlands. Consequences may include:

- Increased loss of soil;
- Loss of or disturbance to indigenous wetland vegetation;
- Loss of sensitive wetland habitats;
- Loss or disturbance to individuals of rare, endangered, endemic and/or protected species that occur in wetlands;
- Fragmentation of sensitive habitats;
- Impairment of wetland function;
- Change in channel morphology in downstream wetlands, potentially leading to further loss of wetland vegetation; and
- Reduction in water quality in wetlands downstream of infrastructure.

The area surrounding the proposed project contains significant areas protected by law under the NWA and it is essential that the exact location and sensitive of these systems which occur in close proximity to the proposed project are determined. An understanding of the location and sensitivity of surrounding wetlands is required to ensure that mitigation measures can be put in place to avoid and/or reduce potential impacts. There is also a legal obligation to apply for a WUL for any wetlands that may be affected by the proposed project.

A wetland and aquatics specialist has been appointed to undertake an assessment of the proposed project the potential impacts on surrounding water resources. The finding of this study will be included in the EIA report. This impact will therefore be investigated and assessed during the EIA phase.

Establishment and spread of Listed Invasive Plant Species

Major factors contributing to invasion by alien invader plants includes high disturbance, negative grazing practices and deforestation. Exotic species are often more prominent near infrastructural disturbances than further away (Gelbard & Belnap 2003). Consequences of this may include:

- Loss of indigenous vegetation;
- Change in vegetation structure leading to change in various habitat characteristics;
- Change in plant species composition;
- Change in soil chemical properties;
- Loss of sensitive habitats;
- Loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
- Fragmentation of sensitive habitats;
- Change in flammability of vegetation, depending on alien species;
- Hydrological impacts due to increased transpiration and runoff; and
- Impairment of wetland function.

No serious alien plant species invasions are reported, but *Acacia mearnsii* can become dominant in disturbed sites (Mucina & Rutherford, 2006). There are standard practices, protocols, and management measures which can be implemented in order to reduce the significance of this impact to a negligible level. This impact will require further detailed investigation and assessment during the EIA phase.

Sedimentation

Construction activities have the potential to increase exposed surface which in turn can increase local and regional sediment loads in surface water resources. This may be especially prevalent during high rainfall events. Increased sediment loads in local surface water resources can affect sun penetration, water temperature, and available oxygen to aquatic environments. This impact is of specific relevance to the construction of the proposed project as a large area is required for excavation material. The probability and magnitude of this impact is dependent to a large extent on the proximity of the construction camps/s to the receiving water resources and as such will need to be considered relative to each potential location of ancillary activities.

This impact will require further detailed investigation and assessment during the EIA phase.

Pollution of water resources

Water resource refers to both surface water and ground water. During construction certain hazardous substances will be utilized (e.g. fuels, oils, pesticides, herbicides, sewage, etc.). If not correctly controlled, these substances can inadvertently enter the local and regional water resources. The probability and magnitude of this impact is dependent to a large extent on the correct use, implementation and storage of relevant hazardous and dangerous substances, and less on the proximity of the construction sites to the receiving water resources.

Seepage from general dirty water areas as well as spillages of hydrocarbons from construction activities, have the potential to contaminate the surface and groundwater environment which in turn can affect water quality in surface water and groundwater resources in the area. Polluted water will also have a negative impact effect on the habitat for threatened faunal species such as the giant African bullfrog (*Pyxicephalus adspersus*) which is dependent on good quality surface water. Water related impacts tend to be applicable for a long duration.

The significance of this impact can largely be reduced through the implementation of standard management and mitigation measures, however due to the importance of water resources in South Africa; this impact will require further detailed investigation and assessment during the EIA phase.

Alteration of watercourse dynamics

According to the farmers in the area the existing tunnel collects most of the surface water from the vicinity of the tunnel and surrounding properties and pumps it to the eastern end of the tunnel near Sheepmoor, thereby leaving the western area with little or no water for their use. The construction of the proposed project may necessitate alteration to the local topography. This may in turn alter flow velocity, volumes, and the nature of local drainage patterns. It may also impact on the dynamics of the receiving water resources. This is specifically relevant during high rainfall events. The probability and magnitude of this impact is dependent to a large extent on the proximity of the construction sites to the receiving water resources and on the nature of the receiving topography.

This impact will require further detailed investigation and assessment during the EIA phase.

Impacts of water use on resource sustainability

The construction process may require large volumes of water for general consumption, dust suppression, wash bays, firefighting, etc. The proposed project is isolated from available municipal supplies and as such water required on site is likely to be obtained from local water resources. These water sources can be either, surface water, or groundwater (boreholes). It is anticipated that many of the existing landowners have access to existing boreholes which could be utilized during construction. It is understood that DWS may allow the Applicant to utilise a portion of the registered water user's allocation, subject to the necessary approval from DWS and a written agreement with the registered water user from a registered borehole. The abstraction of water from local water resources may have a negative impact on the sustainability of supply from these water resources and as such may

negatively impact on other water users. This impact will require further detailed investigation and assessment during the EIA phase.

Erosion

The construction process involves the clearing of topsoil and removal of stabilising vegetation. Once the soils are exposed and/or disturbed, they are more susceptible to erosion (wind and water) which may restrict vegetation growth. In addition to the removal of vegetation and disturbance of topsoil the alteration of local drainage patterns may exacerbate the erosion potential (e.g. concentration of stormwater).

The significance of this impact can largely be reduced through the implementation of standard management and mitigation measures and as such this impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMP.

Impact of borrow pits

The construction process is likely to require access to suitable construction materials such as sand, gravel and aggregate. These materials are typically acquired from borrow pits. There are significant environmental impacts associated with these borrow pits. The nature and extent of these impacts is dependent on the specific locality of the selected borrow pits and the volumes of materials required. At this stage there is not specific detail available regarding the borrow pits and therefore a meaningful assessment of their impacts is impossible. For the purposes of this EIA process it is suggested that available, licensed, local sources of material be sought as opposed to the construction of new borrow pits. In addition it is anticipated that there will be a surplus of material as a result of the excavation for the proposed project and such material should be utilized where possible.

In the event that new borrow pits are required for construction purposes then the relevant contractor or the Applicant would be required to obtain a mining permit/ right in accordance with the MPRDA. The specific environmental impacts associated with these borrow pits will require detailed investigation and assessment as part of the MPRDA permitting process.

The potential environmental impacts associated with the borrow pits will therefore not be considered further in this EIA. Relevant management measures will however be included in the EMP to ensure that the potential environmental impacts are adequately identified and managed.

Soil pollution

During construction, hazardous substances may come in contact with the soils and result in localised pollution. These aspects may include: leaking petrochemical/ hydrocarbon products from construction vehicles and storage facilities; spills at the construction camps; sewerage and grey water from ablution facilities; and waste water from wash bays and batching plants.

The area surrounding the proposed project is largely agricultural in nature and as such uncontrolled and un-remediated pollution of the soils may have a significant negative impact. It is anticipated that the

probability of this impact occurring can be adequately minimised through the implementation of standard management and mitigation measures. In addition, the implementation of standard remedial and corrective action in the event of contamination is anticipated to reduce the extent and magnitude of this impact significantly. Consequently this impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Air pollution

The construction process may generate sources of air pollution. These may include:

- Smoke generated from burning of vegetation for clearing or fire breaks;
- Smoke from fires at construction camps (According to the Transnet environmental standards fire is not allowed within the construction camp);
- Increased PM10 and airborne particulates from dust; and
- Vehicles exhaust emissions.

The air pollution is typically local and regional in extent and the significance will depend partially on the proximity of the sources to sensitive receptors (e.g. homesteads, etc.), but to a larger extent on the actual magnitude of the relevant emissions and sources. The dominant wind in the area is from the west northwest which blows approximately 15% of the time, with winds exceeding 5.7m/s, with other prevailing winds from the north west (11%) and west (9%). As a result, it is most likely that during construction wind will blow dust towards Sheepmoor. The significance of this impact can generally be mitigated through the implementation of standard management measures. Consequently this impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

Geological Instability

The existing tunnel and surrounding area is underlain by a succession of sedimentary rocks of the Karoo Sequence. Locally the Karoo Sequence is represented by rocks of the Vryheid Formation, Ecca Group. The Karoo sediments are comprised of siltstones, carbonaceous siltstones and sandstones. These rocks have been intruded by a massive dolerite sill. Localised faulting is evident but displacements are generally slight. The drainage paths observed on the surface topography are considered to be controlled by the structural geology (Jones & Wagener, 2009). The borehole data supports the information from the construction of the existing tunnel in that the dolerite sill is extensive and that the proposed project will also be located entirely within the dolerite sill (Jones & Wagener, 2009).

The nature of the underlying geological features and the stability/ instability thereof will determine the types of excavations required and the extent to which blasting (if preferred) is required. The construction of a tunnel on unstable geological formations increases the risk of potential failure. In this regard it is crucial that the geotechnical stability of the specific location of the proposed project is considered and if necessary mitigating measure provided. The significance of this impact is primarily

dependent on the nature of the underlying geology and will be considered and assessed in further detail in the EIA phase.

Waste management and disposal

The construction of the tunnel will result in the generation and accumulation of significant quantities of waste rock and excavated materials. Based on basic calculations it is anticipated that ~300 000m³ of rock will be excavated and disposed of.

The contractor should be responsible to ensure the waste is collected and disposed of properly and that appropriate measures are taken to minimise adverse impacts such as dust generation. The EAP and Transnet must ensure that all necessary waste disposal permits are obtained. Considering the volumes of the material likely to be excavated for this proposed project, there may be a need to pursue certain or all of the alternatives presented in this section with regard to waste.

The following alternatives applicable to handling and management of waste rock and associated material will be investigated and implemented where possible.

- Stockpiling of all rock waste removed from the tunnel excavation, undertake rehabilitation and blend with the surrounding environment.
- Disposal of waste rock at registered waste disposal site.
- Sell waste rock to various construction or mining companies that could further sell or use waste material to close and rehabilitate their old borrow pits.

Other wastes material that will be generated as a result of the construction process will typically include:

- Solid wastes (construction debris, inert materials-overburden, cement bags, wrapping materials, timber, cans, wire, nails, food, and other organic wastes, etc.); and
- Liquid wastes (oil, paint, sewage, fuel, etc.).

The management of waste will be applicable throughout the construction process. The significance of this impact is anticipated to be dependent on the final location selected for temporary storage of waste rock (see Figure 24 below for the possible spoil site). It should however be noted that the currently spoil site selected might change depending on outcome of the EIA and the specialist studies. The significance of this impact can generally be mitigated through the implementation or management measures in an EMP. It is recommended that a separate waste management plan be prepared for the proposed site during construction, for proper management of all produced waste.

This impact will require further detailed investigation and assessment during the EIA phase. Management and mitigation measures will be identified and included in the EIA and subsequent EMP.

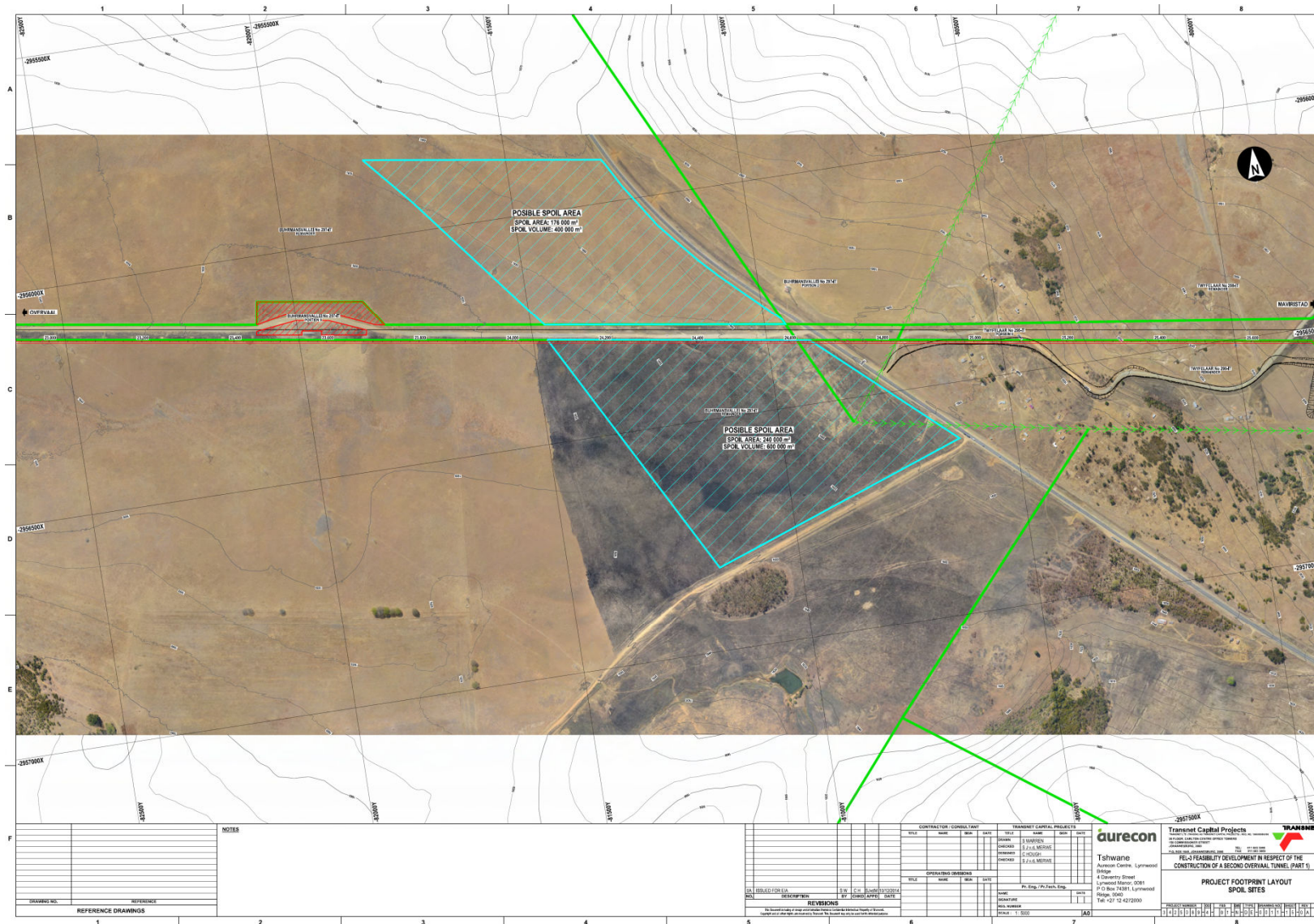


Figure 24: Possible spoil site during construction.

7.3.2 Operational Phase

Impact on sense of place

The construction of the proposed project is not anticipated to significantly impact on the sense of place because the same land use already exists as a result of the existing tunnel and railway line. In addition the majority of the proposed project will be underground and therefore not a significant visual intrusion.

Under operation phase, this impact will not be considered and assessed in further detail in the EIA phase.

Impact on current land-use

The construction of the proposed project will not compromise the possibility for alternative land-uses within the designated footprint except for the service servitude that needs to be fenced off. The exact location of the proposed project route will need to be considered in order to ensure that the surrounding land-uses are not directly impacted upon (e.g. locating the new tunnel far away from the existing tunnel will require additional land to be fenced off for service roads and maintenance purposes). The physical land to be permanently disturbed (as opposed to temporary construction activities) by the proposed project will be limited since the facility will be underground, which will allow land uses to still continue above ground.

This impact will be considered and assessed in further detail in the EIA phase.

Impact on property values

It is often a concern that the negative impacts of the aesthetic environment, and the ongoing management and maintenance of the Transnet infrastructure and servitudes, may have a negative impact on future property prices. Transnet has a land and rights process for negotiating and compensating landowners for the physical land. This is typically a separate process that must be negotiated with the individual landowners directly affected by the land acquisition for the project.

This impact will not be considered and assessed in further detail in the EIA phase.

Impact on existing infrastructure

The operation of the tunnel is unlikely to put a significant burden on local services and infrastructure. The facility is typically unmanned and do not require service provision except for maintenance operation that will not be required on a frequent basis.

This impact will not be considered and assessed in further detail in the EIA phase.

Alteration of watercourse dynamics

The proposed project will consist of a large area where the local topography will be altered and the localised drainage patterns altered. This has the potential to result in greater surface and stormwater runoff towards the lower end of the tunnel. This could in turn alter the current flow regime within the local river systems. According to the farmers in the area the existing tunnel collects most of the

surface water from the vicinity of the tunnel and surrounding properties and pumps it to the eastern end of the tunnel near Sheepmoor thereby leaving the western area with little or no water for their use.

The probability and magnitude of this impact is dependent to a large extent on the proximity of the proposed project to the receiving water resources; the stormwater collection and discharges; and on the nature of the receiving topography.

This impact will require further detailed investigation and assessment during the EIA phase.

Pollution of water resources

The operation of the proposed project will require the use of hazardous substances, most notably, the use of oils and grease. Depending on the specifications of the oils the hazardous nature of these can vary. There is a risk that these hazardous substances can directly and indirectly enter the local environmental pathways, e.g. surface water, groundwater, and soils. Further the railway often collects debris and materials that fall from the rail cars (including coal dust and debris) which when mobilized into the stormwater system could potentially affect downstream water resources. This potential impact can be largely managed and mitigated through correct design and operation practices.

However, due to the national importance of water resources, this impact will require further detailed investigation and assessment during the EIA phase.

Loss of land capability (agricultural potential) and disruption of farming activities

All farming activities currently practiced in the vicinity of the proposed project are anticipated to be able to continue as no surface land will be taken except for the enclosed service road that already exists. Since the proposed project doesn't necessarily require the acquisition of surface land no major piece of land anticipated to be permanently lost for any form of agriculture.

This impact will require further detailed investigation and assessment during the EIA phase.

Noise

During operation noise is anticipated to affect those individual that are located in close proximity to the proposed project (e.g. Bambanani Sakhisizwe Communal Property Association, AFGRI storage facilities and Overvaal Guest House). The significance of this impact is not anticipated to be of high concern since the tunnel already exists.

Impacts of Erosion

Erosion may occur during the short, medium, and longer term of the operation of the proposed project specifically at the exits of the tunnel, as well as drainage and stormwater discharge points. It will be crucial to ensure that evidence of erosion is monitored on an ongoing basis and rectified where applicable. Soil erodibility (in respect of soil properties) in proximity to the proposed project is reported to be very low (Mucina & Rutherford, 2006), however considering that the receiving environment has high topographic variability, there are localised areas where erosion potential may be high.

This impact will require further detailed investigation and assessment during the EIA phase.

7.3.3 Decommissioning

With reference to Section 2.5, it is important to note that at present there is no intention to decommission the proposed project and associated railway lines at any time in the near future. Where necessary, applicable maintenance and repairs will be carried out to ensure continuous operation. The EIA process does however require the consideration of impacts in the unlikely event that the facility is eventually decommissioned.

The primary impact to consider in the decommissioning phase relates to the correct and appropriate management and disposal of wastes. Certain materials, structures and substances which remain following cessation of operations at the site will be regarded as hazardous. In this regard a comprehensive site decommissioning environmental management plan must be prepared for the site and must include a comprehensive waste management plan. The significance of this impact can be reduced through the implementation of effective management and mitigation measures.

In this regard the impact will not require further detailed investigation and assessment during the EIA phase. Appropriate management and mitigation measures will however be identified and included in the EMPr.

7.4 DISCUSSION

The primary purpose of this section is to provide a comprehensive assessment of the proposed project and to identify a list of potential positive and negative environmental impacts resulting from the project. Each of these impacts have been presented and briefly discussed in Section 7.3 and a recommendation made as to whether the specific impact required further detailed investigation. In this regard Table 12 presents the impacts which at this stage are not anticipated to require further investigation and assessment in the EIA phase.

Table 12: Impacts not to be considered and assessed further in the EIA phase.

Development Phase	Impact
Construction	Fire hazard
	Potential in-migration of people.
	Impacts on pedestrian and road safety.
	Opportunities for local contractors and SMEs.
	Impact on property values
	Erosion
	Impact of borrow pits
	Soil pollution
Operation	Impact on property value

	Air pollution
	Impact on existing infrastructure
Decommissioning	Waste management and disposal

The remaining impacts not listed in Table 12 and discussed in Section 7.3 of this scoping report will be investigated and assessed in further detail in the EIA phase. Please refer to Table 1 for the list of impacts that require further assessment during the EIA phase.

8. CONCLUSIONS AND RECOMMENDATIONS

The primary aim of scoping is to undertake a preliminary assessment of how the proposed project will interact with the specific characteristics of the receiving environment. The outcomes of scoping are a list of potential impacts and the identification of suitable feasible alternatives which require further investigation and assessment in the EIA Phase.

The following key biodiversity sensitivities were identified within proximity to the proposed project:

- Potential location of sensitive fauna such as the Highveld Golden Mole (*Amblysomus septentrionalis*), Secretary bird (*Sagittarius serpentarius*) and Blue Crane (*Anthropoides paradiseus*), <http://sibis.sanbi.org/>).
- Potential location of sensitive flora (includes vegetation units classified as Endangered and Less Threatened);
- The proposed project falls within rocky ridge and wetland areas that are deemed to be of high sensitivity as they provide potential habitat and migratory connectivity for faunal species as well as the potential to host a higher diversity of floral species. and
- According to the ecological importance classification for the two quaternary catchments (C11B and W53A) in the area, the systems can be classified as sensitive to moderately sensitive in terms of ecological importance and sensitivity.

Numerous potential impacts have been identified. Table 11 presents the identified impacts and Section 7.3 describes each impact briefly in an effort to provide a preliminary assessment of which impacts require further investigation in the EIA. Of the identified impacts, numerous have been identified which do not require any further detailed investigation and assessment (refer to Table 12). Relevant management and mitigation measures applicable to these impacts will however be included in the EMP of the EIA Phase.

In addition a broad range of alternatives for the proposed project were considered (refer to Section 5). The following alternatives will be investigated further and comparatively assessed in the EIA phase:

1. Process alternative: Waste Handling options.
2. Location alternative: Localised site alternatives and optimisation (proposed project and associated construction activities)- within a study area of 500m on either side of the preferred alignment.
3. Technological alternatives:

- Use of tunnel boring machine; and
- Drill and Blast.

9. PLAN OF STUDY FOR EIA

In accordance with the requirements of Regulation 28 (1(n)) of the NEMA EIA Regulations (GNR543), a PoS, must be included in the scoping report. The PoS must set out the proposed approach to the EIA Phase and must include:

- A description of tasks to be undertaken;
- An indication of the stages at which the relevant authorities will be consulted;
- A description of the proposed method of assessing the environmental issues and alternatives; and
- Particulars of the proposed public participation process to be undertaken during the EIA phase.

Upon acceptance of this PoS for EIA by the competent authority, EIMS will proceed with the EIA process. The primary purpose of the EIA process is to:

- Address issues that have been identified in the Scoping;
- Assess alternatives to the proposed project in a comparative manner (identified during scoping);
- Assess all identified impacts and determine the significance of each impact; and
- Formulate mitigation measures.

Public participation is once again a key element of the EIA process. The following approach will be adopted in the EIA phase:

- Source specialist input to address the issues raised during scoping and investigate the relevant alternatives;
- Assess impacts and their significance (see method for assessing significance at 9.3 below);
- Suggest mitigation measures;
- Compile the Environmental Impact Report (EIR); and
- Public / authority participation throughout.

9.1 SPECIALIST STUDIES

In order to adequately and objectively inform the EIA, detailed specialist studies will be undertaken during the EIA Phase. The following specialist studies are recommended:

- Ecological Impact Assessment;
- Hydrological and Hydrogeological Impact Assessment;
- Noise and Vibration Impact Assessment;
- Heritage Impact Assessment; and
- Wetland Impact Assessment.

The following general approach will be utilised by each specialist:

- Identified potential impacts (cumulative, direct and indirect) will be quantified (where possible) and fully described for each feasible alternative.
- Identified potential impacts will be evaluated in accordance with the agreed methodology to determine significance. Significance will be determined by considering and quantifying where possible, the nature, extent, duration, intensity and probability of each potential impact.
- Comparative assessment of the identified alternatives.
- Recommendations must be made regarding mitigation and / or management measures to address the unavoidable impacts identified.
- Residual impacts after mitigation will be evaluated (in accordance with the assessment methodology described above) such that actual implemented results can be measured against those predicted.
- Each specialist will be required to contribute to the preparation of a detailed site specific EMPr relating to the specific field of expertise and impacts identified, based on the mitigation and management measures identified.

9.2 ENVIRONMENTAL ISSUES & POTENTIAL IMPACTS IDENTIFIED DURING THE SCOPING PROCESS

Based on the findings of the scoping phase (refer to Section 7.3), numerous impacts have been identified which do not require any further detailed investigation and assessment (refer to Table 12). Relevant management and mitigation measures applicable to these impacts will however be included in the EMPr of the EIA Phase. The remaining impacts identified will, with the assistance of the identified specialists, be assessed further in the EIA phase (refer to Table 1) in accordance with the methodology presented in Section 9.3.

9.3 METHOD OF ASSESSING IMPACTS

The impact assessment methodology is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

9.3.1 Determination of Environmental Risk:

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER).

The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the

Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R)}{4} \times N$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 13:

Table 13: Criteria for determination of impact consequence.

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site)
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly

		affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the 'C' has been determined the 'ER' is determined in accordance with the standard risk assessment relationship by multiplying the 'C' and the 'P' (refer to Table 14). Probability (P) is rated/scored as per Figure 25.

Table 14: Probability scoring.

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative 'ER' associated with the impact. 'ER' is therefore calculated as follows:

$$ER = C \times P$$

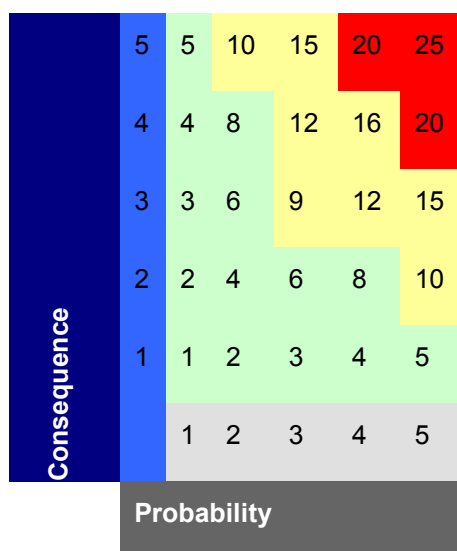


Figure 25: Determination of environmental risk.

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These 'ER' scores are then grouped into respective classes as described in Table 15.

Table 15: Significance classes

Environmental Risk Score	
Value	Description
< 9	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥9; <17	Medium (i.e. where the impact could have a significant environmental risk),
≥ 17	High (i.e. where the impact will have a significant environmental risk).

The impact 'ER' will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

9.3.2 Impact Prioritisation

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented in the preceding section, it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition, it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact 'ER' (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority / significance issues and impacts. The 'PF' will be applied to the 'ER' score based on the assumption that relevant suggested management/ mitigation impacts are implemented.

Table 16: Criteria for the determination of prioritisation.

Public response (PR)	Low (1)	Issue/ impact raised in < 30% of responses.
	Medium (2)	Issue/ impact raised in >30% and < 60% of responses.
	High (3)	Issue/ impact raised in >60% of responses.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 16. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{PR} + \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a subsequent PF ranging from 1 to 2 (refer to Table 17).

Table 17: Determination of prioritisation factor.

Priority	Ranking	Prioritisation Factor
= 3	Low	1
3 – 9	Medium	1.5

= 9	High	2
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In order to determine the final impact significance the 'PF' is multiplied by the 'ER' of the post mitigation scoring. The ultimate aim of the 'PF' is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 18: Environmental Significance Rating

Value	Description
< 9	Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
≥9; <17	Medium (i.e. where the impact could influence the decision to develop in the area),
≥ 17	High (i.e. where the impact must have an influence on the decision process to develop in the area).

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

9.4 ASSESSMENT OF FEASIBLE ALTERNATIVES

With reference to Section 5 the following alternatives will be investigated further in the EIA Phase:

1. Process alternative: Waste handling options.
2. Location alternative: Localised site alternatives and optimisation (proposed project and associated construction activities)- within a study area of 500m on either side of the preferred alignment.
3. Technological alternatives:
 - Use of tunnel boring machine; and
 - Drill and Blast.

With reference to Section 9.3 each potential impact will be assessed for significance. In addition the likely significance for the identified alternatives where relevant will be provided. In order to identify the most suitable alternative the impact significance ratings will be recorded and summed to obtain a final significance rating score per alternative. In addition each alternative will be assessed in terms of the likely advantages and disadvantages and a final recommendation will be made as to the most favorable alternative.

9.5 PREPARATION OF EIR AND EMPR

An EIR will be compiled for the application in accordance with the requirements of Sections 31, 32, and 33 of GNR 543. The EIR typically contains the following:

- Details of the EAP;
- A description of the proposed activity;
- A description of the location of the tunnel and the identified alternatives;
- A detailed description of the need and desirability of the proposed activity including advantages and disadvantages that the activity will have on the environment and community;
- A description of the receiving environment;
- A description of all identified impacts and an assessment of the significance of each impact before and after implementation of proposed mitigation measures;
- A description of the methodology used in determining significance of identified impacts;
- A description and comparative assessment of all alternatives identified during scoping;
- A summary of the findings and recommendations of any Specialist Studies;
- A description of assumptions, uncertainties and gaps in knowledge;
- A final recommendation as to whether the activity should be authorised and under what conditions;
- An Environmental Impact Statement including key findings;
- A draft Environmental Management Programme; and
- Copies of any and all specialist studies carried out.

A draft EIR and EMPr will be provided to the public for comment and a copy of the Final EIR and EMPr will be submitted to the competent authority for review.

9.6 PUBLIC PARTICIPATION PROCESS

The public participation process undertaken during Scoping (refer to Section 5) will be the base for ongoing consultation and involvement.

The I&AP database (including landowners, key I&APs as well as registered I&APs) will be utilised for notifications during the EIA public consultation process. The database will be added to, as and when, new I&APs are identified. Throughout the project, stakeholders will be encouraged to get into contact with the EAP Teams to raise issues, ask questions or make suggestions. Comments received will be recorded in the IRR.

The following opportunities for further consultation and notification will be afforded during the EIA phase:

- An advertisement will be placed advising the general public of the opportunity to register as an I&AP as well as the opportunity to review and comment on the Draft EIR (advertisement to be placed in the Highveld Tribune Newspaper in English and Afrikaans);

- The Draft EIR will be made available for a period of 30 days in the same manner as the Draft scoping report (refer to Section 5);
- The final EIR will be made available on the EIMS website for public review;
- During the review period of the Draft EIR, two public meetings will be undertaken. Public meetings will be held at the Overvaal Guest House and the Sheepmoor community hall.

At the end of the project, the relevant authority may issue an EA. It is a requirement that all registered I&APs are informed of the decision and the consequent opportunity to appeal. The EA will be advertised in the same form as the other advertisements. Letters will be sent to all registered stakeholders.

9.7 AUTHORITY CONSULTATION

The following steps will be undertaken to ensure authority consultation:

- The DEA will be provided with a copy of the Draft EIR for distribution to other relevant organs of state and authorities, prior to placement for public review; and
- The final EIR will be submitted to the DEA for review and decision making.

9.8 ASSUMPTIONS AND LIMITATIONS

This section provides a list of assumptions, and limitations applicable to this Scoping Report:

- It is assumed that all information provided by the applicant and the technical team which informed the environmental consultants as well as which is contained within this report is reliable, accurate and up-to-date.
- The maps prepared and the source data were supplied in various formats and required spatial adjustment for the mapping purposes. The inaccuracy of these maps is not expected to detract from the primary purpose of broad delineation of sensitive areas.
- The Scoping Report and impact identification was informed by and prepared based on: expert specialist knowledge (for aspects which included specialist sub-consultants); professional opinion; and literature research.

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