DRAFT BASIC ASSESSMENT REPORT

JG AFRIKA REF NO: 5530

PROPOSED REHABILITATION OF A SECTION OF THE EXISTING ROAD D684, AND THE PROPOSED CONSTRUCTION OF A NEW SECTION OF ROAD TO LINK THE R104 AND THE D684, AT THE SIKHULULIWE VILLAGE, NEAR MIDDELBURG, MPUMALANGA PROVINCE

MARCH 2023

Competent Authority:

agriculture, rural development, land & environmental affairs
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

Client:

Mafube Coal Mining (Pty) Ltd

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SYNOPSIS:
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QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification

Verification	Capacity	Name	Signature	Date
By Authors	Snr Environmental Scientist	Sonja van der Merwe		07/03/2023
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EXECUTIVE SUMMARY

It is the intention of Mafube Coal Mining (Pty) Ltd on behalf of the Mpumalanga Department: Public Works, Roads and Transport to provide a new access road to the Sikhululiwe Village, which is located approximately 31.6km east of Middelburg in the Mpumalanga Province. Refer to Figures 1 and 2.

Currently access to the Sikhululiwe Village is obtained via the existing Provincial Road D684, which is a gravel road. The existing D684 takes a detour before joining the R104, with very sharp turns along the way (refer to Figure 1). The D684 runs in a north-south direction and passes the Sikhululiwe Village, situated to the west of the D684.

The residents of the Village approached Mafube Coal Mining (Pty) Ltd (hereafter referred to as Mafube Coal) with their issues and concerns regarding the safety and conditions of the existing access road. The resident requested Mafube Coal to assist with the provision of a new direct and safer access road.

Based on their request, Mafube Coal approached the Mpumalanga Department: Public Works, Roads and Transport with a development concept to provide a new access road to the Village that follows the alignment of the existing D684. A summary of the development concept is provided below:

- D684 Rehabilitation:

  It is proposed to rehabilitate a section of the D684 gravel road, along its current alignment, with a small realignment along the existing s-curve to straighten the road. The section to be rehabilitated is 3393.3m (3.39km) in length and is shown in Figures 1 and 2, and coordinates are provided in Table 1. Rehabilitation will involve the resurfacing of the road (tarring the road), the realignment of the existing s-curve, and the upgrading of existing stormwater structures.

  The new surfaced section of the D684 will consist of two 3.5m surfaced lanes with 1.5 m unsurfaced shoulders. A road reserve width of 30m will be applicable where space allows. The current road reserve width is 25m.

- New Proposed Section of Road

  The new proposed section of road will be 0.217 km (217 m) long and will provide a direct link between the rehabilitated section of the D684 and the R104. The proposed new section of road will have 3.5 m wide surfaced lanes with 1.5 m unsurfaced gravel shoulders.

  The road reserve will be 30 m wide. This road will be a single carriageway with one lane in either direction.

Based on the outcome of the Specialist investigations, as well as the Impact Assessment, all negative impacts associated with this project will be of low significance with the implementation of mitigation measures as provided in the Impact Assessment and the EMPr (Appendix C). With the implementation of mitigation measures, none of the impacts will have adverse or long-term environmental impact on the surrounding environment.

It should be noted that the outcome of the Public and Commentary Authority Consultation Phase are not yet included in this Draft Basic Assessment Report, as this Report will be made available for Public and Commentary Authority review at the same time as this Draft Report is reviewed by DARDLEA. The outcome of the Public and Commentary Authority Consultation Phase may alter the Environmental Impact Statement, as comments may have an impact on the outcome of the Impact Assessment.

The informal cemetery must be preserved. A brick wall must be constructed around the perimeter of the cemetery to protect it during the construction and operational phase, as was suggested by Dr Johnny van Schalkwyk, the Heritage Specialist.

SAHRA requested the Draft Basic Assessment report before they make a decision on the relaxation of the standard buffer zone. It is not known at this stage whether SAHRA will relax the 30m development buffer required between the cemetery and the proposed new section of road. Should SAHRA not completely relax this buffer, the alignment of the proposed new road section will have to be amended, and this may have an impact on the Impact Assessment, and potentially may affect additional landowners, which means that the outcome of the Public Consultation Phase may also change.

The study area falls within a highly sensitive palaeontological area, which means that fossils may occur. Special precaution must be taken during the construction phase to ensure that fossils that may be uncovered are not damaged or destroyed, and the necessary steps must be taken to preserve these fossils.

The following was mentioned in the Surface Water Ecosystems Ecological, Delineation and Impact Survey Report:

- *No alignment alternatives were presented for analysis at the time of the survey. As the new road section has been shown to impinge on a wetland unit (as shown in Figure 17), the ecological functionality of the wetland unit would benefit from a slight shift in alignment to accommodate this feature. The alignment as presented does not, however, constitute a fatal flaw as the wetland unit has suffered a considerable loss of function due to historical land use and infrastructure development."*

As the alignment of the proposed new section of road is not fatally flawed, and as the wetland was already altered, a change in the route alignment is not required at this stage. The outcome Geotechnical Investigation may suggest an amendment to the alignment as construction in the wetland may impose additional construction costs. Again, the SAHRA 30m development buffer may have an impact on the alignment of the proposed new road section.

In terms of the DFFE Screening Assessment the project is situated within Strategic Gas Pipeline Corridors Phase 8: Rompco (Republic of Mozambique Pipeline Company) Pipeline Corridor. It will be investigated during the Public Consultation Phase whether the project will have an impact on the Gas Pipeline, and the necessary mitigation measures will be discussed with Rompco.

In terms of the Screening Report, the study area is situated within the "Air Quality Highveld Priority" area. The Sikhululiwe Village access road will improve current dust pollution generated by the D684 gravel road, as the road will be surfaced. The road will therefore not contribute to additional Air Quality issues already experienced in the study area.

Positive impacts associated with construction include:

- Skills development and knowledge transfer in the surrounding area through job creation during the construction phase; and
- Provision of a safe access road to the Sikhululiwe Village vehicles and pedestrians.
- The local residents will have the new safer and direct access route which they have been requesting for a very long time.

It is perceived that these positive impacts identified will be long term and will have sustainable benefits.

The Draft Basic Assessment Report and Environmental Management Programme (EMPr) have been circulated to registered IAPs and relevant Commentary Authorities for review and comment as part of the legislated 30-day public participation process. Comments received on the Draft BA Report and EMPr will be consolidated and included in a Final BA Report, which will be submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) for a decision on Environmental Authorisation (EA). Construction cannot commence until such time as a positive EA is obtained.

This BA Report has been drafted in accordance with the EIA Regulations (2014, as amended) and adheres to the requirements contained in Appendix 1 of GNR 982, as noted in the table below.

Content of a BA Report (2014 EIA Regulations, as amended)

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
Appendix 1, Section 3 (a)	Details of – (i) The EAP who prepared the report; and the expertise of the EAP; and (ii) The expertise of the EAP, including a curriculum vitae.	Section 4 Appendix G
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel. (ii) Where available, the physical address and farm name. (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 2
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is –	Section 2

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	(i) A linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered. (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Sections 2 and 6
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 6
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 2
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site, and location within the site, including-	
	(i) Details of all alternatives considered; (ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 2 Section 10
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the way the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed. (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated. (vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 10 Section 8 Section 12 Section 12 Section 12
	(viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and (xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 12 N/A Section 2 Section 13

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
Appendix 1, Section 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Sections 8 and 12
Appendix 1, Section 3 (j)	An assessment of each identified potentially significant impact and risk, including- (i) Cumulative impacts. (ii) The nature, significance and consequences of the impact and risk. (iii) The extent and duration of the impact and risk. (iv) The probability of the impact and risk occurring. (v) The degree to which the impact and risk can be reversed. (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be avoided, managed, or mitigated.	Section 12
Appendix 1, Section 3 (k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.	Section 9
Appendix 1, Section 3 (l)	An environmental impact statement which contains- (i) A summary of the key findings of the environmental impact assessment. (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Sections 2, 9 and 13
Appendix 1, Section 3 (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	Section 9
Appendix 1, Section 3 (n)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Sections 8, 9 and 12
Appendix 1, Section 3 (o)	A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 13
Appendix 1, Section 3 (p)	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 13
Appendix 1, Section 3 (q)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	Section 14
Appendix 1, Section 3 (r)	An undertaking under oath or affirmation by the EAP in relation to- (i) The correctness of the information provided in the report.	Section 15

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	(ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties. (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	-
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	-

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TABLE OF CONTENTS

LIST OF APPENDICES

List of Abbreviations

BA	Basic Assessment
BID	Background Information Document
DARDLEA	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
DFFE	Department of Forestry, Fisheries, and the Environment
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EIS	*Ecological Importance and Sensitivity*
EMPr	Environmental Management Programme Report
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
MDPWRT	Mpumalanga Department: Public Works, Roads and Transport
NEMA	National Environmental Management Act (Act 107 of 1998)
NWA	National Water Act (Act 36 of 1998)
PES	Present Ecological State
PHRA	Provincial Heritage Resources Agency
RDL	Red Data Listed
SANBI	South African National Biodiversity Institute
SAHRA	South African Heritage Resources Association
SAHRIS	South African Heritage Resources Information System
SAWS	South African Weather Services
SFI	Soil Form Indicators

SWI	Soil Wetness Indicators
TUI	Terrain Unit Indicators
VUI	Vegetation Unit Indicators
WETLAND-IHI	Wetland Index of Habitat Integrity
WMA	Water Management Area

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1. INTRODUCTION

It is the intention of Mafube Coal Mining (Pty) Ltd on behalf of the Mpumalanga Department: Public Works, Roads and Transport to provide a new access road to the Sikhululiwe Village, which is located approximately 31.6km east of Middelburg in the Mpumalanga Province. Refer to Figures 1 and 2.

Currently access to the Sikhululiwe Village is obtained via the existing Provincial Road D684, which is a gravel road. The existing D684 takes a detour before joining the R104, with very sharp turns along the way (refer to Figure 1). The D684 runs in a north-south direction and passes the Sikhululiwe Village, situated to the west of the D684.

The residents of the Village approached Mafube Coal Mining (Pty) Ltd (hereafter referred to as Mafube Coal) with their issues and concerns regarding the safety and conditions of the existing access road. The resident requested Mafube Coal to assist with the provision of a new direct and safer access road.

Based on their request, Mafube Coal approached the Mpumalanga Department: Public Works, Roads and Transport with a development concept to provide a new access road to the Village that follows the alignment of the existing D684.

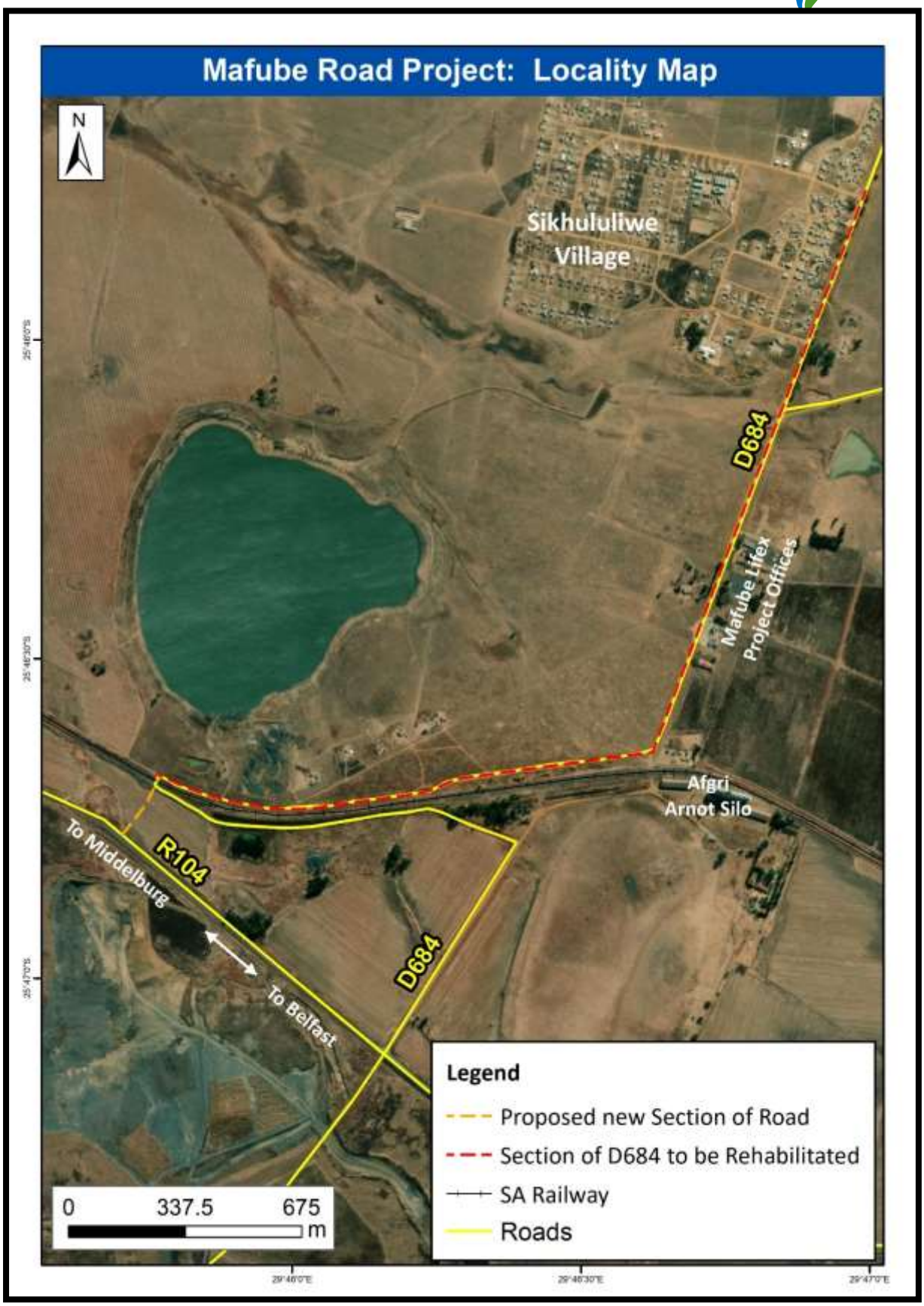


Figure 1: Locality Map (Small)

Figure 1: Locality Map (Large)

2. PROJECT DETAILS

2.1. Location

The project is located in the Nkangala District Municipality, and the Steve Tshwete Local Municipality within Wards 7 and 9.

The coordinates of the project are provided in Table 1:

Table 1: Project Coordinates

Name	Section	Decimal Degrees (WGS84)		Deg Min Sec (WGS84)	
		X (East)	Y (South)	South	East
Proposed new section of road to be constructed	Start	29.762744	-25.77802	25° 46' 40.872" S	29° 45' 45.878" E
	Mid	29.762248	-25.778876	25° 46' 43.954" S	29° 45' 44.093" E
	End	29.761607	-25.779631	25° 46' 46.672" S	29° 45' 41.785" E
Section of D684 to be Rehabilitated	Start	29.762611	-25.777957	25° 46' 40.645" S	29° 45' 45.400" E
	Mid	29.777207	-25.77671	25° 46' 36.156" S	29° 46' 37.945" E
	End	29.783008	-25.762631	25° 45' 45.472" S	29° 46' 58.829" E

Refer to Figures 1 and 2 (Locality Maps). Copies of these maps are also attached to Appendix A of this Basic Assessment Report.

2.2. Project Scope

2.2.1. Rehabilitation of a Section of the existing D684

This will involve the rehabilitation of a Section of the existing D684 gravel road, along its current alignment. The section to be rehabilitated is 3.19km in length and is shown in Figures 1 and 2, and coordinates are provided in Table 1. Rehabilitation will involve the resurfacing of the road (tarring the road), and the upgrading of existing stormwater structures.

The new surfaced section of the D684 will consist of two 3.5m surfaced lanes with 1.5 m unsurfaced shoulders. A road reserve width of 25m will be applicable where space allows. The current road reserve width is also 25m.

New minor culverts may be required along this section to be upgraded. No bridges will be constructed along this section.

2.2.2. New Proposed Section of Road

The new proposed section of road will be 0.21 km (210 m) long and will provide a direct link between the rehabilitated section of the D684 and the R104. The proposed new section of road will have 3.5 m wide surfaced lanes with 1.5 m unsurfaced gravel shoulders.

The road reserve will be 30 m wide. This road will be a single carriageway with one lane in either direction.

2.2.3. Other Structures

Culverts will be located at the following locations, as presented in Table 2, along the D684 and the proposed new section of road.

Table 2: Location of Culverts

No	Culvert	Culvert Size	Decimal Degrees (WGS84)		Deg Min Sec (WGS84)	
			Y (South)	X (East)	South	East
1	0+037 New section of road	1 x 600 x 450 BC	-25.7793	29.7618	25° 46' 45.831" S	29° 45' 42.503" E
2	0+085 D684-A	1 x 600 x 450 BC	-25.7684	29.7806	25° 46' 6.423" S	29° 46' 50.120" E
3	0+994.900 D684-B	2 x 1500 x 900 BC	-25.7689	29.7803	25° 46' 8.0992" S	29° 46' 49.423" E
4	1+050.000 D684-B	2 x 1200 x 900 BC	-25.7783	29.7635	25° 46' 42.008" S	29° 45' 48.655" E
5	Village Road 1	750 dia PC	-25.7664	29.7812	25° 45' 59.377" S	29° 46' 52.442" E
6	Village Road 2	750 dia PC	-25.7628	29.7828	25° 45' 46.134" S	29° 46' 58.225" E

The location of the above culverts is depicted in Figure 3.

2.2.4. Physical Size of the Activity

Details about the project footprint is provided in Table 3.

Table 3: Development Footprint

Route Section	Route Length (m)	Servitude Width (m)	Area (m^2)	Area (ha)
New section of road	212.72	30	6,381.72	0.64
Section of D684 to be Rehabilitated	3,218.45	25	80,461.33	8.05

2.2.5. Site Access

The D684 is an existing road and therefore ready access exist for the upgrading of the section of the D684. Access to the new proposed access road is directly gained from the D684. No access road or construction roads will be required during the construction phase.

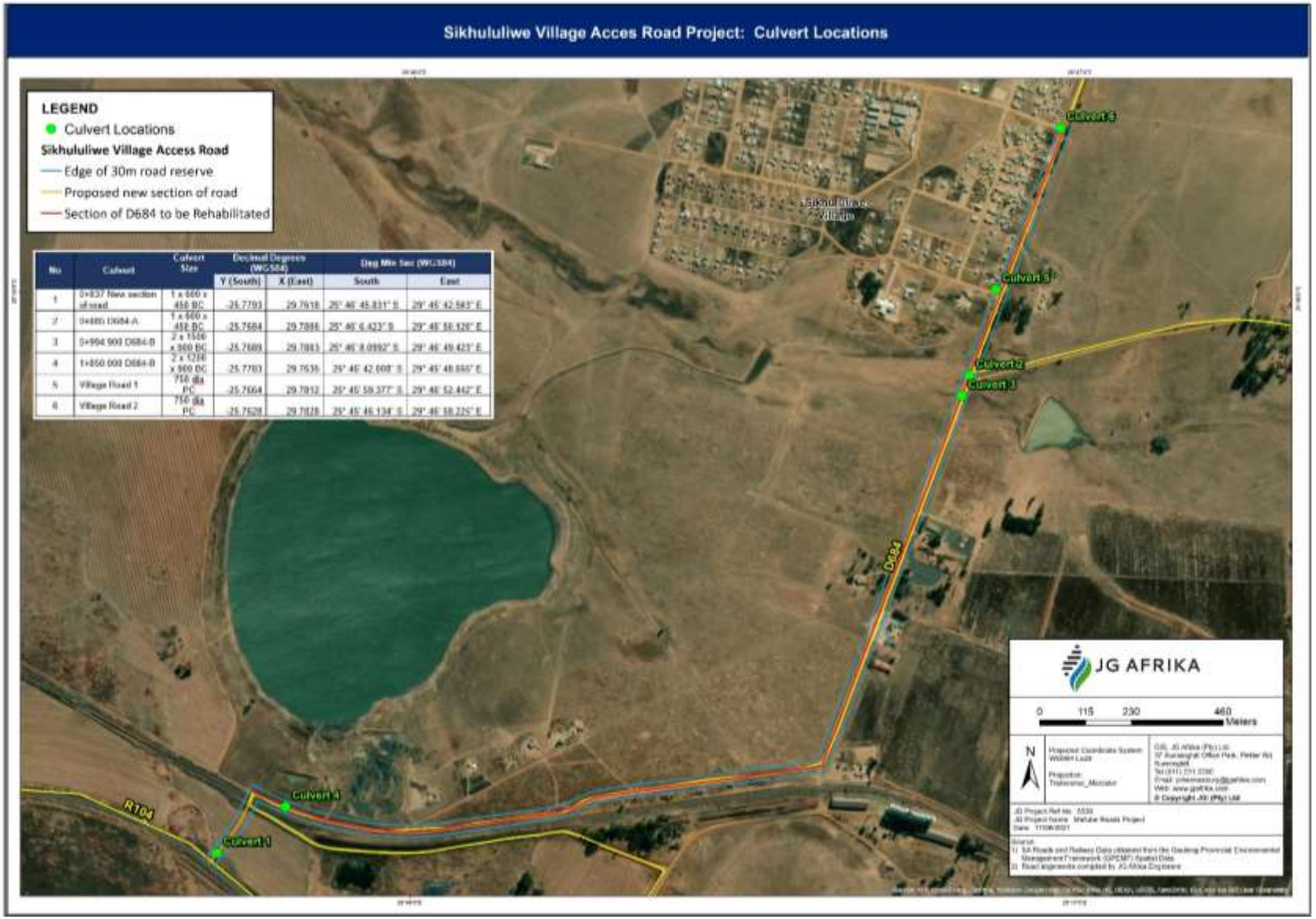


Figure 3: Location of Culverts

2.2.6. Preliminary Road Designs

A Preliminary Design for the rehabilitation of the D684 and for the new proposed section of road was compiled by the JG Afrika (Pty) Ltd roads engineers. Copies of the Preliminary Design and the Preliminary Design Report is attached to Appendix B of this Basic Assessment Report.

2.2.7. Site Photographs

Various photographs of the site taken by JG Afrika (Pty) Ltd, EnviRoss CC and Dr Johnny van Schalkwyk are presented below.

<table>
<tr><th colspan="2">Site Photograhps</th></tr>
<tr><td colspan="2">  
Photos 1 and 2: Taken in a South Western direction. The informal cemetery can be seen</td></tr>
<tr><td> 
Photo 3: Taken in a South Western direction. The area where the new road will be constructed is shown.</td><td> 
Photos 4: Taken in a North Eastern direction. The railway crossing can be seen, with the large depression wetland in the background.</td></tr>
</table>

Site Photograhps	
 **Photo 5:** Vandalised Arnot Railway Station situated along the D684	 **Photo 6:** Grain silos situated along the D684.
 **Photo 7:** A section of the existing gravel road to be rehabilitated.	 **Photo 8:** Typical characteristics of the open areas, which can be classified as improved grasslands (i.e., grassland areas that are improved to increase grazing value).
 **Photo 9:** Formal cultivation is a prominent driver of ecological change within the project area. This is the area where the new road section is to be constructed.	 **Photo 10:** An existing gravel road that runs parallel to the existing railway, which is used largely as a service road as well as an access for the agricultural sector.

Site Photograhps	
 **Photo 11:** Excavated trenches are commonplace within the project area that have been historically established to control surface water runoff patterns and to prematurely drain wetland areas.	 **Photo 12:** Earth berms are commonplace within the project area that have been historically established to increase the cultivation potential of the agricultural sector.
 **Photo 13:** Existing bridge/culverts. This allows surface water drainage beneath the existing railway.	 **Photo 14:** Another trench that was established to manipulate surface water drainage, which has prematurely drained the wetland units within many areas. Land use and the resultant alteration of the hydrological features of the wetland units are regarded as a dominant driver of ecological change.
	

Site Photograhps	
Photo 15: An impoundment captures surface water runoff before it enters the large depression wetland unit.	**Photo 16:** Another section of the existing roadway that is to be rehabilitated.
 **Photo 17:** Part of the road section to be rehabilitated. The village can be seen in the distance on the left side of the road.	 **Photo 18:** Areas along the roadway to be rehabilitated that associate with residential buildings where exotic trees have been purposefully cultivated.
 **Photo 19:** The main wetland watercourse within the survey area that runs from east to west.	 **Photo 20:** The bridge design of the main watercourse, showing the series of side-by-side culvert pipes.
	

<table>
<tr><th colspan="2">Site Photograhps</th></tr>
<tr><td>Photo 21: Grazing pressure as a driver of ecological change within the wetland areas becomes more prominent with proximity to the village area.</td><td>Photo 22: An area to the south of the village where excavations resulting from sand winning and/or historical borrow pits that has resulted in transformation of wetland zones.</td></tr>
<tr><td> 
Photo 23: Another view of the excavated area showing the level of landscaping.</td><td> 
Photo 24: A section of the road that was constructed within wetland habitat that has completely altered the functionality of the wetland area. Wetland seepage still occurs within some areas to drain within the road reserve.</td></tr>
<tr><td> 
Photo 26: Wetland seepage zones occur along the eastern side of the existing road, but ecological function within this section of wetland has been lost.</td><td> 
Photo 27: A view of the road section looking to the south. Vegetated wetland zones can be seen on the eastern side (left) and seep zones within the road drain can be seen in the distance.</td></tr>
</table>

2.3. Project Proponent

The Mpumalanga Department: Public Works, Roads and Transport is the project applicant. The project is funded by Mafube Coal Mining (Pty) Ltd.

2.4. Project Need and Desirability

The existing Provincial Road D684 is a gravel road, which is in a poor condition, especially in wet weather. Access to the Sikhululiwe Village is currently obtained via the D684, however, there is currently no direct access between the D684 and the R104. The existing D684 takes an indirect route to the Sikhululiwe Village. By upgrading the D684, a surfaced road will be provided which will help with the accessibility to the Sikhululiwe Village during rainy weather. A more direct route is also proposed to decrease travel time to the village, with the establishment of a link between the existing R104 and the D684.

2.5. Affected Properties

The rehabilitation of the existing D684 gravel road will be undertaken within the existing road reserve, and no private land will be affected by the upgrade.

The proposed new 210 m section of road will be constructed on Portion 7 of the Farm Springboklaagte 416 JS (T0JS00000000041600007), which is currently being used for Agriculture. Portion 7 is owned by the Mafube Coal Mining (Pty) Ltd, and is being leased by Alzu Ondernemings (Pty) Ltd.

The new proposed section of road to be constructed will also cross a Transnet Railway line, at an existing level crossing. Suitable traffic measures will be implemented to improve the existing traffic and pedestrian safety measures.

2.6. Construction Camp

The construction camp will be situated on Mafube Coal property. Once a contractor has been appointed, the contractor should liaise with the Wetland Specialist (EnviRoss CC) to find the best suitable location for the construction camp to ensure that the camp is situated outside of the wetland areas.

2.7. Contractors Camp

No Contractors camp will be established. Contractors will overnight in Belfast or Middelburg and will travel to site daily. Transport will be provided by the contractor.

2.8. Construction Commencement and Duration

Should Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) decide to grant authorisation for this project, construction will likely commence in February 2021. A Water Use Authorisation is also required for this project, which must be in place, prior to the undertaking of any construction activities within areas regulated by the Department of Water and Sanitation.

2.9. Construction Methodology

A construction methodology was compiled by the JG Afrika (Pty) Ltd Roads Engineers. A copy of the construction methodology is attached to Appendix C of this Basic Assessment Report.

The construction methodology utilised at the wetland crossing will be as follows:

- Prior to the commencement of any construction works within demarcated area a WULA will be obtained.
- The construction will take place during the drier winter months.
- Prior to construction commencing, photographs will be taken of the wetland area.
- The existing road layer works, and pipe culverts will be removed.
- A geotextile membrane will be placed across the wetland area.
- Dump rock will be placed on top of the geotextile membrane to create a pioneer layer.
- The rock fill layer will then be placed using a tipper and the material will be spread by a dozer. Water and roller passes will be as per the project specifications.
- The box culvert slabs will be construction and the box culverts installed using the open cut method.
- Upon completion of the installation of the rock fill layer the remainder of the road will be constructed using standard construction methods.
- Gabion mattresses will be installed at the inlet and outlets of the portal culverts to slow the velocity of the water.

2.9.1. General:

- Construction will take place in half widths with stop/go's so that traffic can utilised the existing portion of road while the other portion of road is being constructed.
- No traffic whatsoever will be allowed in the wetland area.
- Construction will take place during the drier winter months.
- Photographs will be taken throughout the construction process.
- Inspections will take place as per the requirements of the authorisation.
- Any alien vegetation will be removed manually.

A drawing showing the wetland crossings is included in Annexure A of the construction methodology which is attached to Appendix B of this Basic Assessment Report.

2.9.2. Materials and construction equipment

The following equipment is likely to be used:

- Excavators
- Rollers
- TLB's
- Tipper trucks
- Water carts.

The following materials will be utilised for the construction of the road in the vicinity of the wetland crossing:

- Precast pipe culverts with cast in situ concrete bases
- Pioneer layer (rockfill) of 400mm (minimum) thickness in vlei/pan areas
- A stable subgrade compacted to 90% Mod AASHTO, using impact rolling or a heavy 20 tonne vibratory roller with in-situ subgrade of G10 material class quality
- A 300 mm thick G7/ G9 material class selected layer
- A 125 mm G7 or C5 cement stabilised subbase as an alternative for the detail design
- A 100 mm G4 material class base,
- Single seal surfacing for the general road with a 25 mm thick asphalt at intersections.

2.9.3. Handling of all materials, excess materials, and waste materials

- No construction materials may be stored or disposed of within the wetland area and buffer zone.
- All materials must be disposed of at an approved site
- No concrete batching within the wetland area or buffer zone
- No refuelling may take place within the wetland area or buffer zone.

2.9.4. General Notes:

- All construction will take place in accordance with the Environmental Management Programme Report (EMPr) and any specific requirements stipulated by the Department of Water and Sanitation and Department of Environmental affairs in the relevant authorisations.
- A detailed method statement for the construction through the wetland will be provide by the appointed contractor prior to construction. This will be signed off by the ECO.

2.10. Provision of Services

During the construction phase a combination of municipal and groundwater will be used. Groundwater will be obtained from registered or licensed boreholes. Electricity will be obtained from the current municipal network within the study area. Back-up generators will be supplied where necessary.

2.11. Construction Waste Management

All solid waste generated during the construction phase will be stored in a designated area at the construction camp in Waste Skips. These skips will be emptied once a week and waste will be taken to the nearest municipal landfill site.

Very little solid construction waste will be generated during the construction phase. Excess backfill material will be spread along the servitude or disposed of at the nearest licensed municipal landfill site. Building rubble and concrete rubble must be disposed of at this landfill site.

The EMPr attached to Appendix C of this Basic Assessment Report discusses waste management during the construction and operational phases in more detail.

2.12. Alternatives Considered

Two alternative alignments were initially investigated by the JG Afrika (Pty) Ltd roads Engineers. One of the alternatives looked at making use of the mine road, however, this alternative was eliminated as it is not feasible due to the safety risks associated.

Only one feasible alternative exists, and it is the alternative presented and discussed in this Basic Assessment Report.

2.13. Affected Landowners / Communities

The upgrading of the existing D684 gravel road will be undertaken within the existing road reserve, and no private land will be affected by the upgrade.

The proposed new 210 m section of road will be constructed on Portion 7 of the Farm Springboklaagte 416 JS (T0JS00000000041600007), which is currently being used for Agriculture. Portion 7 is owned by the Mafube Coal Mining (Pty) Ltd, and is being leased by Alzu Ondernemings (Pty) Ltd.

The proposed new section of road will also cross a Transnet Railway line, at an existing level crossing. Traffic calming measures will be implemented to improve the existing traffic and pedestrian safety measures.

The residents of the Village approached Mafube Coal with their issues and concerns regarding the safety and poor conditions of the existing access road. The resident requested Mafube Coal to assist with the provision of a new direct and safer access road.

Based on their request, Mafube Coal approached the Mpumalanga Department: Public Works, Roads and Transport with a development concept to provide a new and improved access road to the Village that follows the alignment of the existing D684.

2.14. Employment Opportunities

Employment opportunities will be available during the construction phase of this project, and the local community will get preference. Sourcing and recruiting will be done through the Mafube Local Employment Procedure.

2.15. Operational Phase Details

No potable water will be required during the operational phase. No ablution facilities will be required during the operational phase.

Maintenance of the road will be undertaken if and when required. The most common maintenance activities to be undertaken will be vegetation maintenance within the road

reserve, and inspection of the stormwater management infrastructure, and road surface. Road maintenance will be undertaken in accordance with the Mpumalanga Department: Public Works, Roads and Transport's Standard Road Monitoring and Maintenance Plan.

2.16. Future Decommissioning of the Project:

The proposed road upgrade to the Sikhululiwe Village will not be decommissioned in the foreseeable future. The road will become part of the Mpumalanga Road network and will remain in operation for many years to come.

As mentioned earlier in this Report, the residents of the Village requested Mafube Coal to assist with the provision off a new access road, and therefore this new road is needed, and will be needed for years to come as it will serve the village of Sikhululiwe.

3. AUTHORISING AUTHORITIES

In terms of the Environmental Authorisation phase, the **Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA)** will be the authorising / decision making authority.

In terms of the Water Use Authorisation, the **Department of Water and Sanitation** will be the authorising / decision making authority.

3.1. Commentary Authorities

The following authorities are involved in the project, and comments on this project and this Basic Assessment Report will be sourced from these authorities. A list of the commentary authorities is provided in Table 4.

Table 4: Commentary Authorities

Commentary Authority
Nkangala District Municipality
Steve Tshwete Local Municipality
South African Heritage Resources Association
Department of Mineral Resources
Department of Water and Sanitation *(commentary authority on the Environmental Authorisation Phase)*

4. PROJECT ENVIRONMENTAL ASSESSMENT PRACTITIONER

JG Afrika (Pty) Ltd is a specialist consultancy firm, offering services in the following sectors, amongst others:

- Environmental impact and environmental management.
- Geotechnical engineering.

- Geohydrology.
- Hydrology.
- Aquatic sciences (wetlands and watercourses).
- Waste management; and
- Various engineering sectors (roads, structures, municipal, etc.).

JG Afrika (Pty) Ltd is one of the longest established consulting engineering practices in South Africa, with 98 years of engineering and environmental consultancy experience since its founding. The company has offices throughout South Africa and employs a staff of approximately 200. The company has offices in Johannesburg, Cape Town, Durban, Pietermaritzburg, Port Elizabeth and Postmasburg. The company also has international offices in Maun, in Botswana and in Maputo, in Mozambique.

The environmental department of the company has developed over the years and can provide a full spectrum of services including water use authorisation applications environmental impact assessments, environmental management plans, strategic environmental assessments, integrated waste management plans and the development and implementation of environmental management systems in terms of ISO 14001:2004.

In September 2017, JG Afrika (Pty) Ltd obtained ISO 9001:2015 Certification for its quality standards for all its offices in South Africa, by the Dekra Certification Board.

JG Afrika (Pty) Ltd is a **Level 1 BBBEE** company partly owned by black professionals who are registered civil engineers, technologists, Institutional and Social Development (ISD) and training consultants. In addition, JG Afrika (Pty) Ltd is committed to ensuring greater representation in the ownership and management of the company. To this end, the company strives to continually seek opportunities to expand its black empowerment programme.

Details of the project team members are provided in Table 6.

Table 6: Project Team

Name, Position in Firm & Qualification	Years' Experience	Professional Registration	Experience
Jefrey Pilusa **Position in Firm:** Executive Associate **Qualification:** Pr. Eng, PhD (Mech Eng Sc, M (Chem Eng Tech)	16 Years	**Professional Engineer (Registration No 20170300).**	Jefrey is an Associate Chemical Engineer, specialising in Solid Waste Management for JG Afrika (Pty) Ltd. Jefrey has over 15 years industrial experience as a process design engineer for solid-liquid separation capital equipment used in various mining and metallurgical applications. He has further industrial experience in treatment, recovery and re-use of hazardous waste. He has been involved in academic research activities on a postgraduate and postdoctoral level in the field of energy recovery from waste, alternative fuels, hazardous waste

Name, Position in Firm & Qualification	Years' Experience	Professional Registration	Experience
			management and municipal solid waste management. Jefrey is a registered Professional Engineer and Chartered Engineer: Pr. Eng (20170300); CEng (656166)
Mr Tom Speirs **Position in Firm:** Senior Associate **Qualification:** Bachelor of Science – University of Natal	34 Years	Pr Sci Nat- Registration No. 400104/94. NHBRC (geotechnical). Registration No. 601708.	Tom Speirs has thirty-four years of experience in the fields of engineering geology, geotechnical and materials engineering. He has undertaken geotechnical, geological and materials work throughout Southern Africa, East, West and Central Africa, Madagascar and eastern Australia. His responsibilities have included all phases of projects from preparing initial proposals and cost estimates through the review and investigation stages to the compilation of completion reports, as well as providing technical input during construction. He currently manages the technical aspects of the geotechnical division in the Pietermaritzburg branch, including mentorship of subordinates, peer review and quality control. His fields of expertise include road and dam geotechnical investigations, foundations, identification of construction material sources, slope stabilisation, engineering geological and land utilisation mapping.
Mrs Sonja van der Merwe **Position in Firm:** Senior Environmental Scientist **Qualification:** BA (Hons) Geography and Environmental Management	17 Years	**Pr.Sci.Nat (Registration No 115689)** **EAPASA (*Registration Pending*)**	Sonja is a senior Environmental Scientist with 17 years of experience in the Environmental Consultancy Field. She has experience in project management, environmental impact assessments, basic assessments, public participation, environmental management plans and programmes, environmental control auditing, and mine closure planning and Geographic Information Systems. Sonja is a member of the International Association for Impact Assessments (IAIA).
Ryan Jonas **Position in Firm:** Senior Environmental Scientist **Qualification:** MSc (Environmental Science)	16 Years	**Pr.Sci.Nat (Registration No 400159/15)** **EAPASA (Registration No2019/1674)**	Ryan Emslie Jonas is a professionally registered Environmental Scientist and works in the field of environmental management for large infrastructure-related developments, mining and Renewable Energy projects (solar and wind energy facilities) within Africa. He has acquired 16 years (full time) consulting experience in managing and executing various application

Name, Position in Firm & Qualification	Years' Experience	Professional Registration	Experience
			processes for a diverse range of large infrastructure developments, mining and renewable energy (solar and wind energy facilities) projects in order to obtain environmental authorisations, licenses for waste management, water uses, air emissions release and compiling and implementing environmental management programmes. Ryan has also fulfilled numerous environmental compliance monitoring functions for infrastructure-related developments (e.g. roads, pipelines, airport developments, housing and mixed-used projects), renewable energy and various mining and industrial sites throughout Southern Africa. His project management experience includes client liaison, scheduling, professional services contract (i.e. NEC3) management, progress reporting, managing sub-consultants and junior staff, invoicing and ensuring the quality of deliverables to a Client. Also proficient in tender, expression of interest and proposal writing for local as well as IFC / World Bank projects. Ryan has gained an excellent working knowledge of African (i.e. South Africa, Zambia, Kenya, Lesotho, Mauritius, Namibia) and International Finance Corporation / World Bank environmental legislative requirements for major infrastructure, renewable energy and mining developments.
Ms Ntsebo Mkhize **Position in Firm:** Senior Environmental Assessment Practitioner **Qualification:** M (Env Mgmt.), BSc (Hons) (Env Mgmt.), BSc (Hons) (Geog), BSc (Landscape Arch.)	8 Years	**EAPASA (Registration No 2019/1489)**	Ntsebo Mkhize has eight (08) years working experience in Environmental Management. She is a Registered Environmental Assessment Practitioner with the Environmental Assessment Practitioner Association of South Africa (EAPASA) and holds a Master's in Environmental Management (with distinction). Her project experience spans tools such as Environmental Impact Assessments (EIAs), Basic Assessments (BA), Water Use Licence Applications (WULAs) and Waste Management Licence Applications (WMLs), Atmospheric Emissions Licences (AELs).

5. EXTERNAL SPECIALISTS

Details of the external specialists involved in this project are provided in Table 7.

Table 7: External Project Team

Name and address of proposed Sub-Consultant	Nature and Extent of Work
EnviRoss CC	Surface Water Ecosystems Ecological, Delineation and Impact Surveys
	Terrestrial Biodiversity Ecological and Impact Surveys
Dr Johnny van Schalkwyk	Phase 1 Cultural Heritage Impact Assessment
Dr Heidi Fourie	Palaeontological Impact Assessment: Phase 1 Field Study

6. LEGISLATIVE REQUIREMENTS

A list of all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations are provided in Table 8:

Table 8: List of Applicable Legislation, Policies and/or Guidelines

Title of legislation, policy, or guideline:	Administering authority:	Promulgation Date:
The Constitution of South Africa (No 108 of 1996)	National	18 December 1996
National Environmental Management Act No. 107 of 1998 as amended.	National & Provincial	27 November 1998
Environmental Impact Assessment Regulations, 2014, as amended	National & Provincial	07 April 2017
National Water Act 36 of 1998	National & Provincial	20 August 1998
National Heritage Resource Act No. 25 of 1999	National & Provincial	28 April 1999
National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004)	Department of Environmental Affairs (DEA)	07 June 2004
National Forest Act 84 of 1998	National	20 October 1998
Mpumalanga Nature Conservation Act No 10 of 1998	Provincial	28 October 1998

A summary of the main pieces of legislation pertaining to this project is provided below.

6.1. National Environmental Management Act

The Environmental Impact Assessment (EIA) Regulations, 2014, as amended, as promulgated in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 consists of the following:

- Regulation 982 provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process.
- Listing Notice 1 define activities which will trigger the need for a Basic Assessment process.
- Listing Notice 2 define activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required.
- Listing Notice 3 define certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were reviewed to determine which activities in terms of the above listing notices would be triggered by the proposed project, and what Environmental Authorisation Process would be required. Details of the listed activity triggered is provided in Table 9.

Table 9: Listed Activities triggered in terms of the EIA Regulations, 2014, as amended

Listing Notice and Activity No	Description of the Listed Activity	Applicability of the Activity
Listing Notice 1: 12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres: or **(ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more.</u>** where such development occurs— (a) **<u>within a watercourse</u>**. (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. excluding—	**"watercourse"** means – (a) a river or spring. (b) a natural channel in which water flows regularly or intermittently. (c) a wetland, pan, lake, or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the *Gazette*, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and a reference to a watercourse includes, where relevant, its bed and banks; and **"wetland"** means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically

Listing Notice and Activity No	Description of the Listed Activity	Applicability of the Activity
	(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies. (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies. (dd) where such development occurs within an urban area. (ee) **where such development occurs within existing roads, road reserves or railway line reserves**; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil. **The upgrading of the D684 will not trigger this listed activity, as the upgrade will take place within an existing road reserve.** **The construction of the new section of road will trigger this activity as the new section of road will extend into the wetland area.**
Listing Notice 1: 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse. but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback. (b) is for maintenance purposes undertaken in accordance with a maintenance management plan. (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies.	The upgrading of the D684 may require the construction of new minor culverts which may trigger this activity, depending on the extent of the wetland buffers. The construction of the proposed new section of road will trigger this activity, as this new section of road will extend into a wetland area.

Listing Notice and Activity No	Description of the Listed Activity	Applicability of the Activity
	(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	
Listing Notice 3: 14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres: or (ii) infrastructure or structures with a physical footprint of 10 square metres or more. where such development occurs— (a) **within a watercourse.** (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse. excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. **f. Mpumalanga** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies. (bb) National Protected Area Expansion Strategy Focus areas. (cc) World Heritage Sites. (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority. (ee) Sites or areas identified in terms of an international convention. (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic	In terms of the following data: • Council for Scientific and Industrial Research. 2018 National Wetland Map 5 Ecosystem threat status and protection level [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 26 November 2019 The D684 and the proposed new section of road traverse's wetland areas.

Listing Notice and Activity No	Description of the Listed Activity	Applicability of the Activity
	biodiversity plans adopted by the competent authority or in bioregional plans. (gg) Core areas in biosphere reserves; or (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve, where such areas comprise indigenous vegetation.	

6.2. National Water Act

Section 21 of the National Water Act (Act 36 of 1998) defines a list of activities which require a Water Use Authorisation. Listed activities in terms of Section 21 include the following:

- 21(a) taking water from a water resource.
- 21(b) storing water.
- 21(c) impeding or diverting the flow of water in a watercourse.
- 21(d) engaging in a stream flow reduction activity contemplated in Section 36 of the Act.
- 21(e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1).
- 21(f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.
- 21(g) disposing of waste in a manner which may detrimentally impact on a water resource.
- 21(h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.
- 21(i) altering the bed, banks, course, or characteristics of a watercourse.
- 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: and
- 21(k) using water for recreational purposes.

Construction activities associated with the Sikhululiwe Village Access Road will occur within a radius of 500m from the delineated edge of these wetland units. Activities (c) and (i) of Section 21 will be triggered, and a Water Use Authorisation will therefore be required for this project. Activity 21(c) is defined in the Act as “impeding or diverting the flow of water in a watercourse”.

6.3. National Heritage Resources Act

In terms of Section 38 of the Heritage Resources Act (Act 25, 1999), a Heritage Impact Assessment must be undertaken for the following developments:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length.
- The construction of a bridge or similar structure exceeding 50 m in length.
- Any development or other activity which will change the character of a site
    - Exceeding 5 000 m^2 in extent; or
    - Involving three or more existing erven or subdivisions thereof; or
    - Involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    - The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.
- The re-zoning of a site exceeding 10 000 m^2 in extent; or
- Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development.

A Heritage Impact Assessment is required in terms of Section 38 of the Heritage Act.

6.4. Mpumalanga Nature Conservation Act No 10 of 1998

The Mpumalanga Nature Conservation Act (No 10 of 1998) (MNCA), which came into commencement from 1 January 1999, provides a legislative guideline pertaining to biodiversity conservation at the provincial level. The MNCA provides a list of prohibited activities pertaining to collecting, hunting (including fishing), and/or destroying biodiversity and natural resources. It provides reference lists of fauna and flora species that (amongst others) are protected due to conservational concerns, trade limitations, collection pressure, habitat transformation and other drivers of ecological change.

7. AUTHORISATION PROCESSES REQUIRED

7.1. Environmental Authorisation

In terms of the Legislative Review as provided in Section 6 of the Basic Assessment Report, a Basic Environmental Assessment is required for this project.

The aim of the BA process is to identify and assess the potential impacts associated with the proposed project and to develop measures through which potential negative biophysical and socio-economic impacts can be mitigated and positive benefits can be enhanced. The BA will ensure that all issues are integrated into the lifecycle of the project. This will occur during the planning, construction, and operational phases.

A Basic Assessment Process includes amongst others the following phases:

- A Public Participation Process as described in Regulation 41 of the EIA Regulations, 2014, as amended.
- The undertaking of Specialist Studies, where necessary, in accordance with Appendix 6 of the EIA Regulations, 2014, as amended.
- The compilation of a Draft and Final Basic Assessment Report in accordance with Regulation 19 of the EIA Regulations, 2014, as amended; and
- The compilation of an Environmental Management Programme Report (EMPr) in accordance with Appendix 4 of the EIA Regulations, 2014, as amended.

The Draft Basic Assessment will be made available for public review for a 30-day review period.

7.2. Water Use Authorisation

A General Authorisation Process is applicable to this project, based on the outcome of the department of Water and Sanitation's (DWS) Risk Assessment that was completed by EnviRoss CC. The General Authorisation Process will consist of the following:

- Completion of the Pre-Application Forms on the DWS Electronic Water Use Authorisation Application System (EWULAAS)
- Completion of the Phase 1 Application Forms
- Completion and Submission of all relevant technical information that will be included in the General Authorisation Report.
- DWS review and decision making.

8. ENVIRONMENTAL SCREENING ASSESSMENT

8.1. Findings of DFFE Screening assessment

The Screening tool developed by the Department of Forestry, Fisheries and the Environment (DFFE) were used to develop a Screening Report for the proposed project. A copy of this Screening Report is attached to Appendix H of this Report.

In terms of the Screening Report, the study area is situated within:

- Air Quality Highveld Priority area.
- Strategic Gas Pipeline Corridors Phase 8: Rompco Pipeline Corridor

The following summary of the development site environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Table 9.1: Site Sensitivities

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme		X		
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme				X
Defence Theme				X
Paleontology Theme	X			
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

8.2. Findings of Desktop Assessment

A desktop assessment was undertaken by JG Afrika (Pty) Ltd using the following information:

- Council for Geosciences 1:250 000 Geological Map 2528, Pretoria.
- Spatial biodiversity in information for the Steve Tshwete Local Municipality, downloaded from the South African National Biodiversity Institute's (SANBI) BGIS website, on 19 April 2020.
- Industrial Research. 2018 Artificial Wetlands [Vector] 2018. Available from the SANBI Biodiversity GIS website, downloaded on 26 November 2019.
- Council for Scientific and Industrial Research. 2018 National Wetland Map 5 Ecosystem threat status and protection level [Vector] 2018. Available from the SANBI Biodiversity GIS website, downloaded on 26 November 2019.
- South African National Biodiversity Institute. 2018 Terrestrial ecosystem threat status and protection level - remaining extent [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 26 November 2019.
- South African National Biodiversity Institute. 2018 Final Vegetation Map of South Africa, Lesotho, and Swaziland [Vector] 2018. Available from the Biodiversity GIS website, downloaded on 26 November 2019.

The outcome of the Desktop Assessment is discussed below in Sections 8.2.1 – 8.2.7.

8.2.1. Geology and Soils

In terms of the Council for Geosciences 1:250 000 Geological Map 2528, Pretoria, Geology in the study area consists of (A Geology map is provided in Figure 4.):

- Sandstone, shale and grit with coal and oil-shale beds (grey). Vryheid Formation, Ecca Group, Karoo Supergroup. Permian
- Granophyre, pseudogranophyre. Rashoop Granophyre Suite, Bushveld Complex. Mokolian.

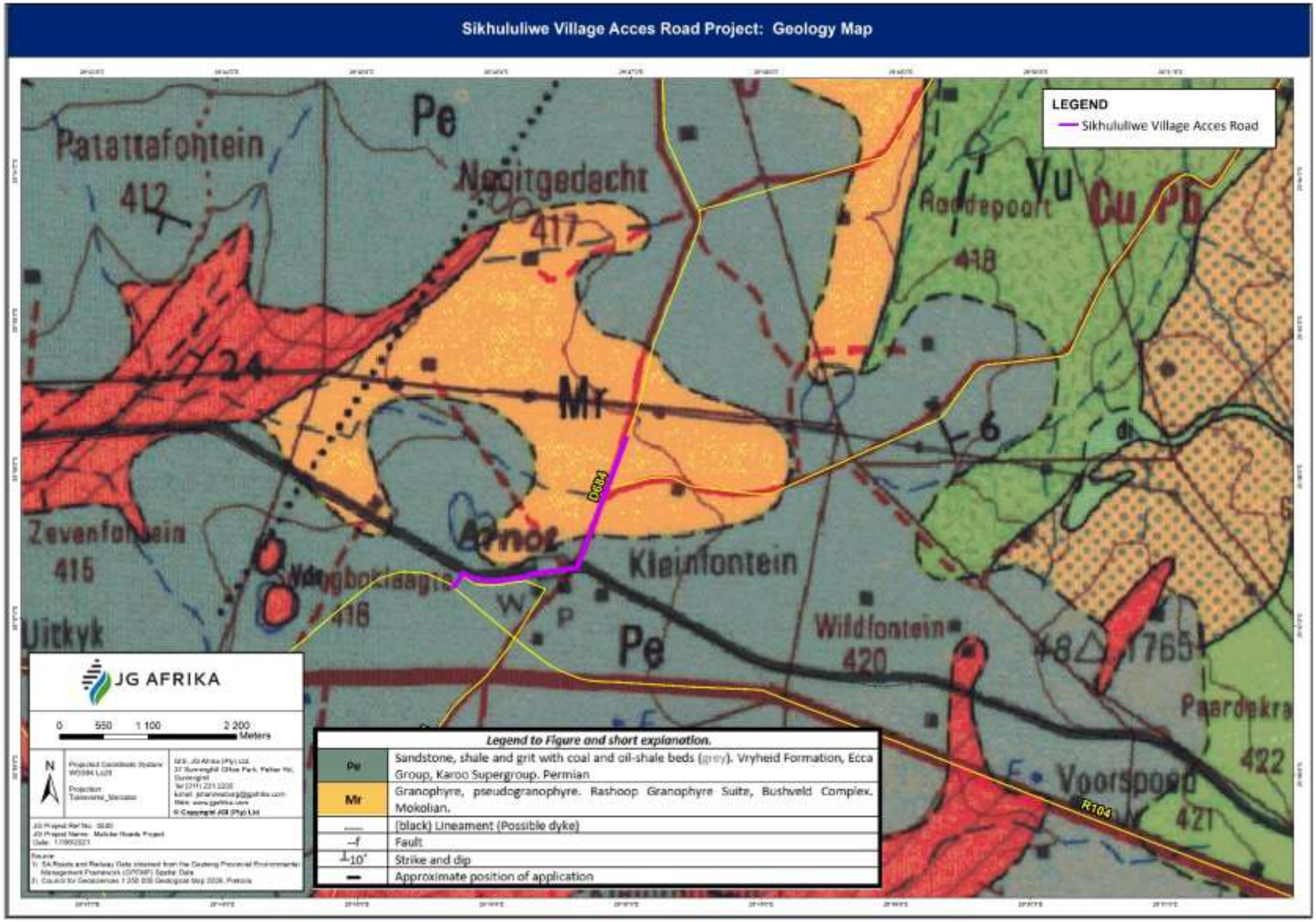


Figure 4: The geology of the development area

8.2.2. Topography

The topography of the region is classified as moderately undulating plains and pans.

8.2.3. Land Use and Socio-Economic Environment

The dominant land use within the study area is agriculture, with active cultivation. The raising of livestock is a prominent feature. The area is associated with a railway line and a railway station. The railway stations building appears to be abandoned. Gravel roads are also a prominent feature, with random residential areas along the D684 also occurring. The Sikhululiwe Village area located toward the northern section of the study area has been developed more recently. There is also a growing mining sector within the area, with much of the historical farmlands now forming part of actively mined areas. Open grassland areas still occur and have been utilised for grazing purposes. The grasslands have been transformed due to the land use.

The project area is situated within the Steve Tshwete Local Municipality, within sub-place, Steve Tshwete NU. A breakdown of the Census 2011 data for the Steve Tshwete NU is provided in Table 10. The average household income for the Steve Tshwete NU is depicted in Figure 5.

Table 10: Steve Tshwete NU – Breakdown of Census 2011 data

Steve Tshwete NU – Breakdown of Census 2011 data	
Total population	26,079
Young (0-14)	24,1%
Working Age (15-64)	71,5%
Elderly (65+)	4,4%
Dependency ratio	39,8
Sex ratio	124,3
Population density	7 persons/km2
No schooling aged 20+	16,9%
Higher education aged 20+	4,5%
Matric aged 20+	24,7%
Number of households	6,625
Average household size	3,5
Female headed households	23,9%
Formal dwellings	69,2%
Housing owned/paying off	22,6%
Flush toilet connected to sewerage	35,3%
Weekly refuse removal	20,4%
Piped water inside dwelling	36,2%
Electricity for lighting	60,5%

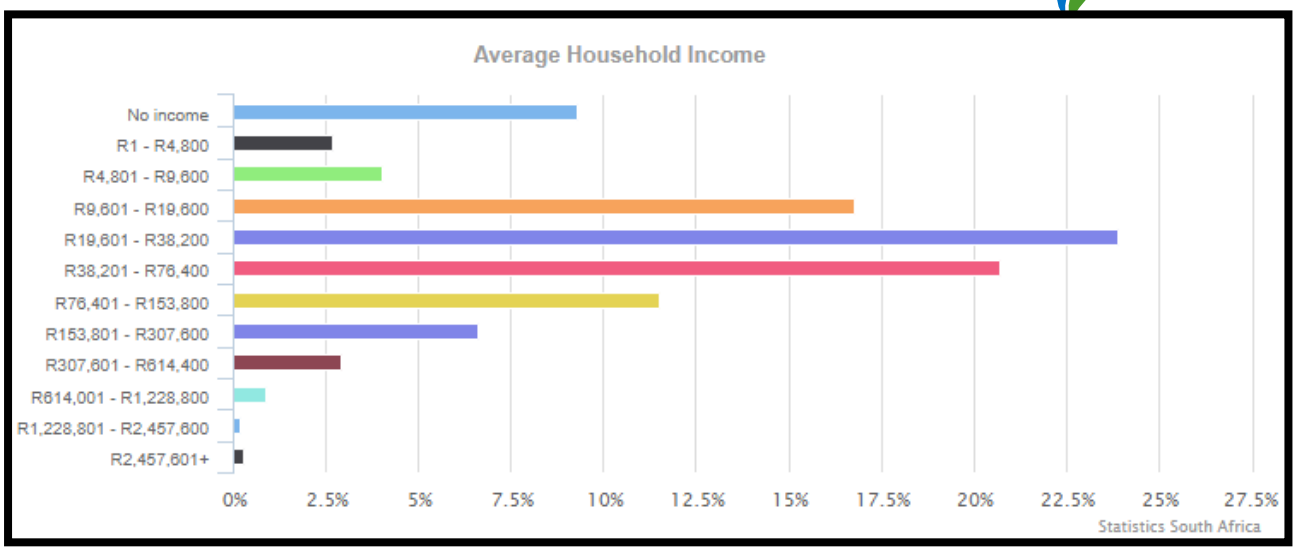


Figure 5: Steve Tshwete NU – Average Household Income

The Steve Tshwete Sub-Place consist of various small areas. In terms of the Census data, the project area is situated within small areas 0355 and 0302:

- Small Area 0355:
  - Area: 89.52 km²
  - Population: 1,392 (15.55 per km²)
  - Households: 265 (2.96 per km²)

- Small Area 0302
  - Area: 110.70 km²
  - Population: 837 (7.56 per km²)
  - Households: 169 (1.53 per km²)

Census 2001 data for these two small areas are provided in Figures 6-8

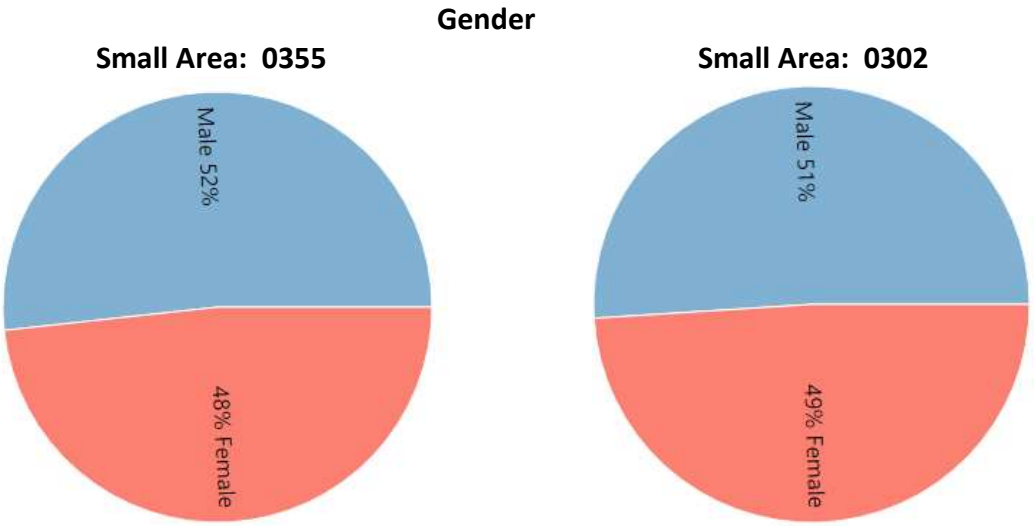


Figure 6: Population by Gender

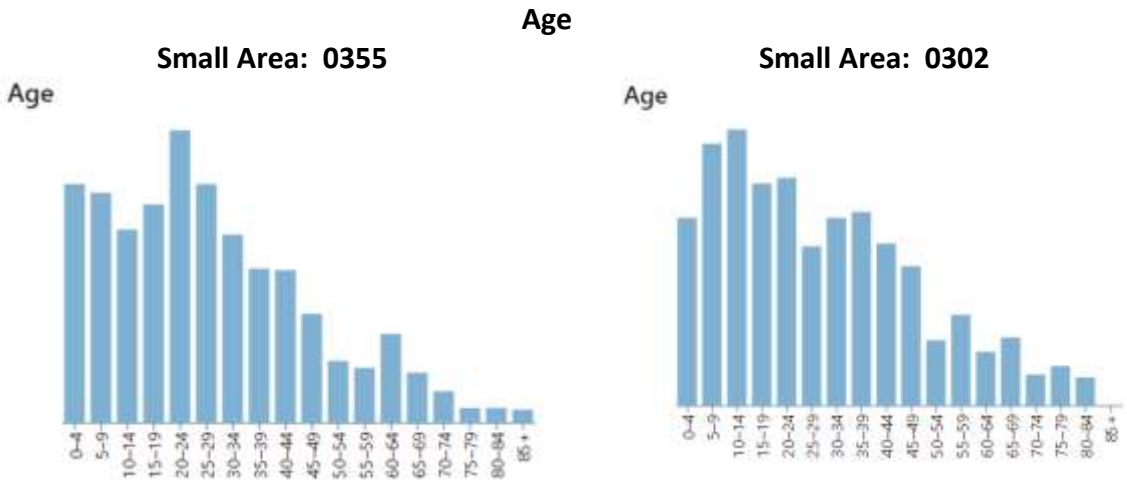


Figure 7: Population by Age

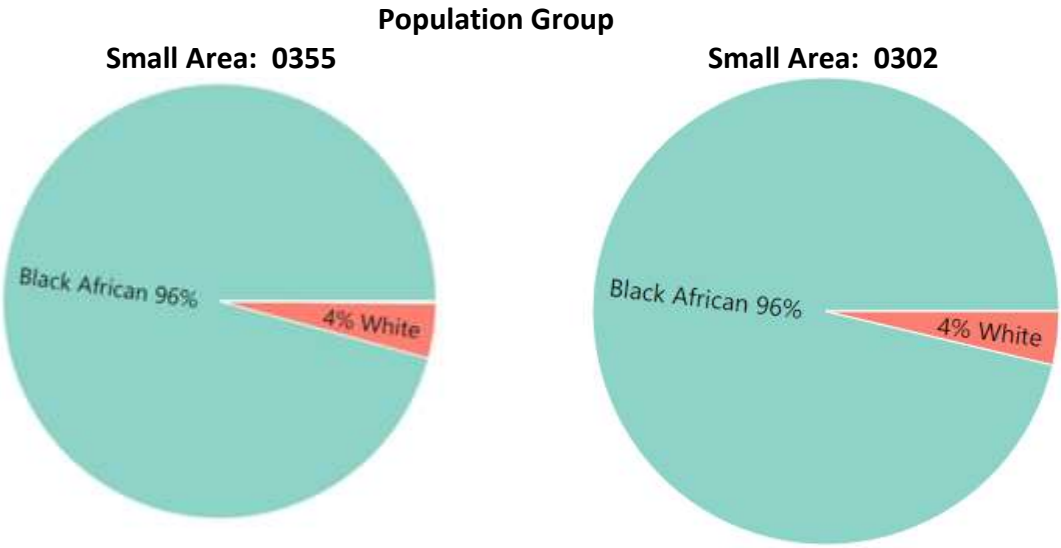


Figure 8: Population Group

8.2.4. Vegetation and Sensitive Habitats

The study area is situated within the Grassland Biome, and the Mesic Highveld Grassland Bioregion. Vegetation cover in the study area is comprised of Eastern Highveld Grassland, which is considered to be Vulnerable (VU). Refer to Figure 9. In terms of the SANBI Terrestrial Ecosystem data, some untransformed areas of this natural vegetation cover still exist within the study area. Refer to Figure 9.

A Terrestrial Biodiversity Ecological and Impact Surveys was undertaken by EnviRoss CC as part of this Basic Assessment Process. A summary of the survey undertaken by EnviRoss is provided in Section 9.2 of this Report, and a copy of the full Report compiled by EnviRoss CC is attached to Appendix D of this Basic Assessment Report.

8.2.5. Aquatic Environment (Wetland and Watercourses)

In terms of the National Wetland Map 5 there is one wetland crossing along the section of the road earmarked for rehabilitation (D684), and two other wetland areas in close proximity to the D684. The proposed new section of road is also situated in close proximity to one of these wetland areas. The National Wetland Map 5 is shown in Figure 10.

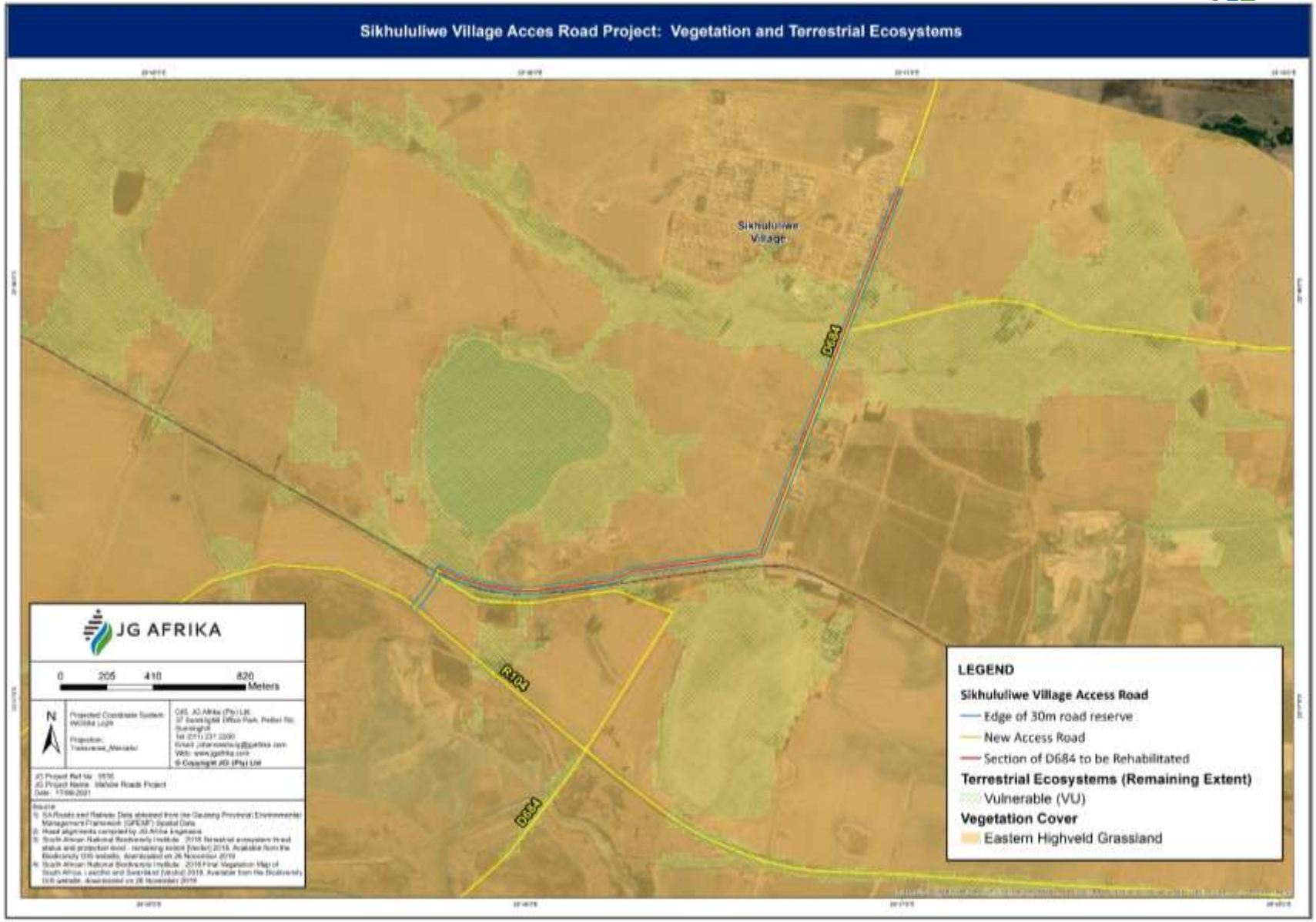


Figure 9: Terrestrial Biodiversity Map

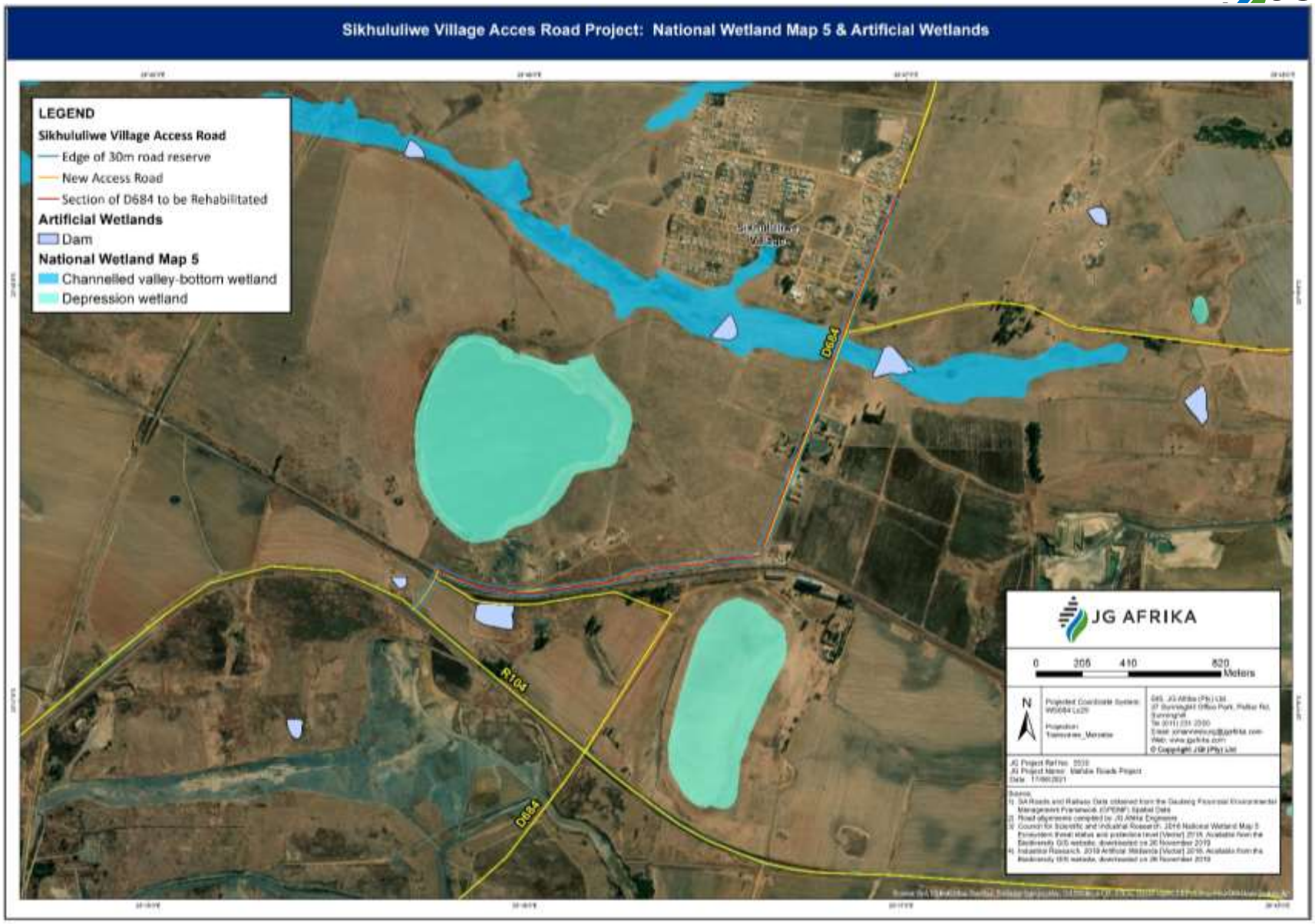


Figure 10: National Wetland Map 5 and Artificial Wetland

A Surface Water Ecosystems Ecological, Delineation and Impact Surveys was undertaken by EnviRoss CC as part of this Basic Assessment Process, and the findings of this investigation shows the following:

- There are three wetland crossings along the D684, with another wetland in proximity: and
- The wetland associated with the new section of road, extends further than presented on the National Wetland Map 5, and therefore the proposed new section of road traverses this wetland area.

A summary of the survey undertaken by EnviRoss is provided in Section 9.1 of this Report, and a copy of the full Report compiled by EnviRoss CC is attached to Appendix D of this Basic Assessment Report.

8.2.6. Archaeological and Cultural Historical

There is an informal cemetery situated near the proposed new section of road. The reserve of the proposed new section of road will be in close proximity to the informal cemetery. Refer to Figure 11.

A Phase 1 Cultural Heritage Impact Assessment was undertaken by Dr Johnny van Schalkwyk. A summary of the Assessment undertaken by Dr van Schalkwyk is provided in Section 9.3 of this Report, and a copy of the full Report compiled by Dr van Schalkwyk is attached to Appendix D of this Basic Assessment Report.

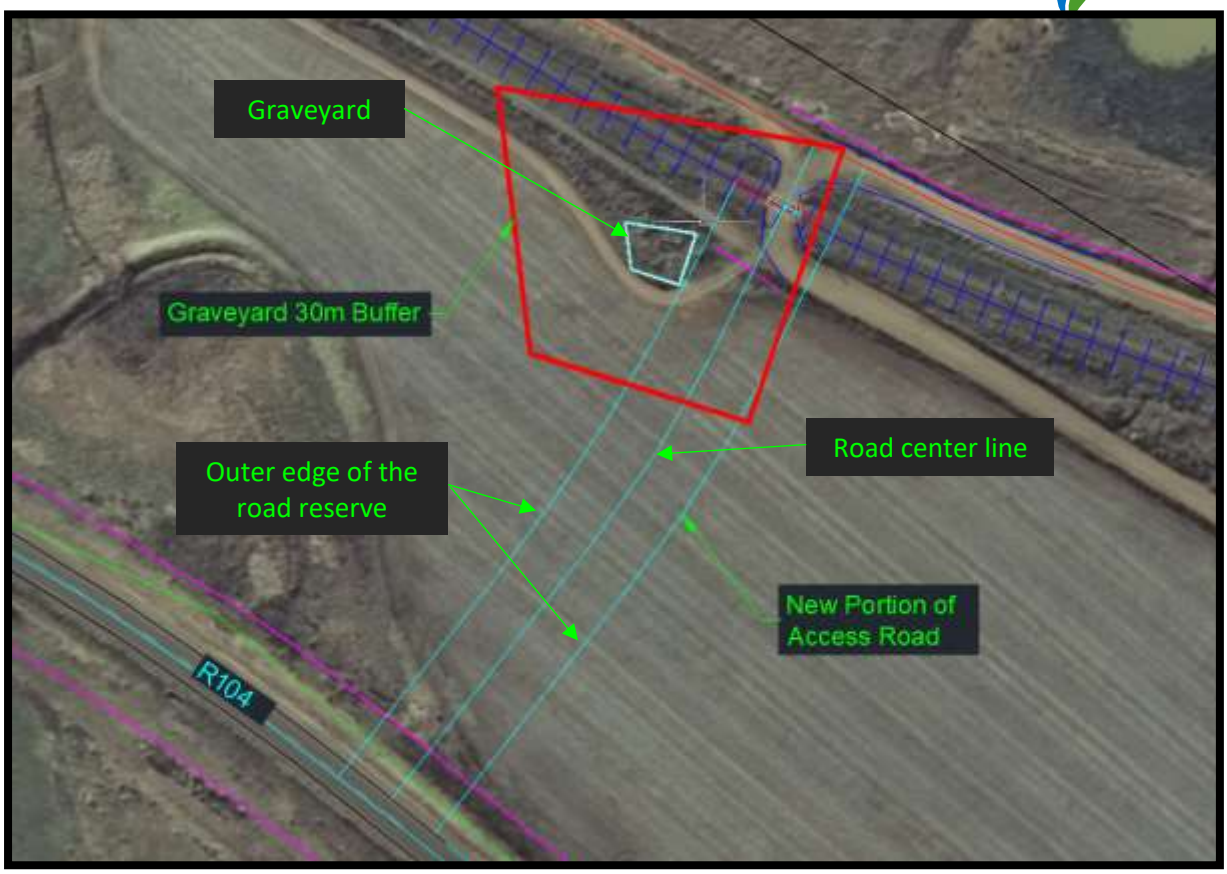
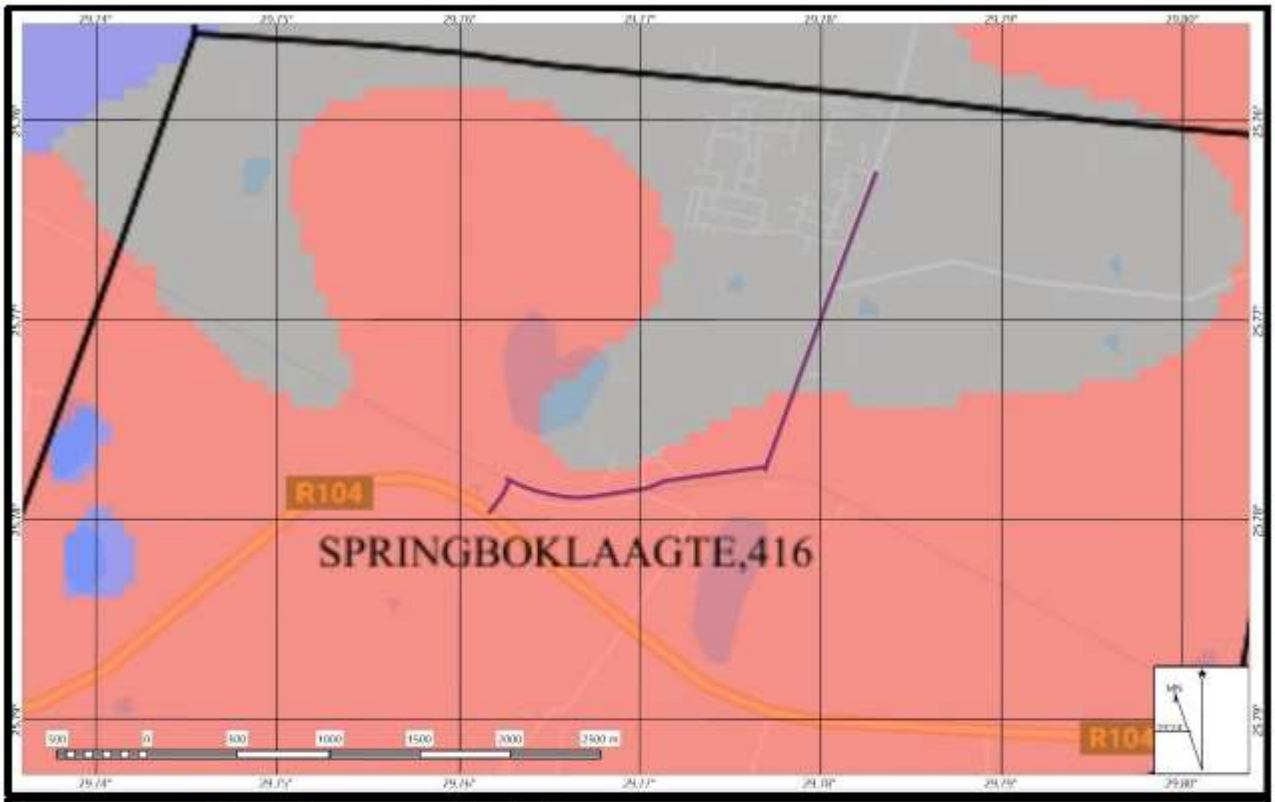


Figure 11: Graveyard buffer vs propped new section of road

8.2.7. Palaeontological

In terms of the Palaeontological Sensitivity Map as viewed on the SAHRIS website (http://www.sahra.org.za/sahris/map/palaeo), the southern section of the project area, as presented in Figure 12, has a very high sensitivity of fossil remains to be found. The northern section has an insignificant to zero sensitivity of fossil remains to be found.

A Palaeontological Impact Assessment: Phase 1 Field Study was undertaken by Dr Heidi Fourie. A summary of the Assessment undertaken by Dr Fourie is provided in Section 9.4 of this Report, and a copy of the full Report compiled by Dr Fourie is attached to Appendix D of this Basic Assessment Report.



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 12: Palaeontological sensitivity of the project area

9. FINDINGS OF SPECIALIST INVESTIGATIONS

The specialist investigation that was undertaken as part of the Basic Assessment Report is discussed on Sections 9.1 – 9.5 of this Basic Assessment Report.

9.1. Surface Water Ecosystems Ecological, Delineation and Impact Surveys

A Surface Water Ecosystems Ecological, Delineation and Impact Survey was undertaken by EnviRoss CC in May 2021. A summary of the survey, including the findings and recommendations as provided in the Report compiled by Enviross is provided in Section 9.1.1. A copy of the Surface Water Ecosystems Ecological, Delineation and Impact Survey Report is attached to Appendix D of this Report.

EnviRoss CC also undertook the DWS Risk Assessment as part of their investigations. The DWS Risk Matrix as completed by EnviRoss CC is attached to Appendix D of this Report.

9.1.1. Methods and Materials

(a) Desktop Survey

"Prior to the field survey, the desktop survey was undertaken to gather relevant ecological processes data for the survey area. Sources included available online data, Geographic Information Systems (GIS) databases, aerial imagery, and topographical maps. Biodiversity data was sourced from available online sources, as well as publications, field guides, and the databases developed by EnviRoss CC from field surveys undertaken within the same vicinity."

(b) Field Survey

"Wetland delineations were undertaken according to methods outlined in the Department of Water Affair and Sanitation (DWS) Updated Manual for the Identification and Delineation of Wetlands and Riparian Areas, 2008. These guidelines make use of four indicators of wetland habitats that enable the identification of a wetland. This does not necessarily mean that all four indicators are utilised, but rather that there are four indicators available to be utilised. Aspects such as severely degraded vegetation structures often lead to this indicator not being utilised. In this case, more emphasis is then placed on the other indicators. The four available indicators commonly used are:

- *Terrain Unit Indicators (TUI)*
- *Soil Wetness Indicators (SWI)*
- *Soil Form Indicators (SFI)*
- *Vegetation Unit Indicators (VUI)*

Consultation of various available mapping (1:50,000 topographical maps, databases), aerial photographs and catchment reviews formed part of reiterative data collection for the survey. The field survey concentrated on identifying the various wetland indicators by making use of samples taken with a soil auger, the digging of inspection pits, wetland floral species identification and the confirmation of topographical features that would support wetland formation and the observations of any saturated soils and surface water.

The outer edges of the temporary zones of the wetlands were then identified and mapped using a handheld GPS unit. These data sets were then transformed into GIS shapefiles that can be incorporated into the construction and layout plans of the proposed development activities.

Wetland ecological integrity was assessed by making use of the Wetland Index of Habitat Integrity (WETLAND-IHI) (DWAF, 2007) as well as the Wetland EcoServices (Kotze, et al., 2007) models.

The output scores of the WETLAND-IHI model are presented in the standard Department of Human Settlements, Water and Sanitation DHSWS A-F ecological categories (Table 11) and

provide a score of the Present Ecological State (PES) of the habitat integrity of the wetland system being examined.

Table 11: Description of the A-F ecological categories (after Kleynhans, 1996; 1999) from DWS, 2007.

Ecological Category	PES % Score	Description
A	90-100%	Unmodified, natural.
B	80-90%	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.
C	60-80%	Moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.
D	40-60%	Largely modified. A large loss of habitat, biota and basic ecosystem functions has occurred.
E	20-40%	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.
F	0-20%	Critically/Extremely modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.

The model is composed of four modules (shown in Figure 13). The Hydrology, Geomorphology and Water Quality modules all assess the contemporary driving processes behind the wetland formation and maintenance. The Vegetation Alteration module provides an indication of the intensity of human land-use activities on the wetland surface itself and how these have modified the condition of the wetland. The integration of the scores from these four modules provides and overall PES score for the wetland system being examined (DWS, 2007).

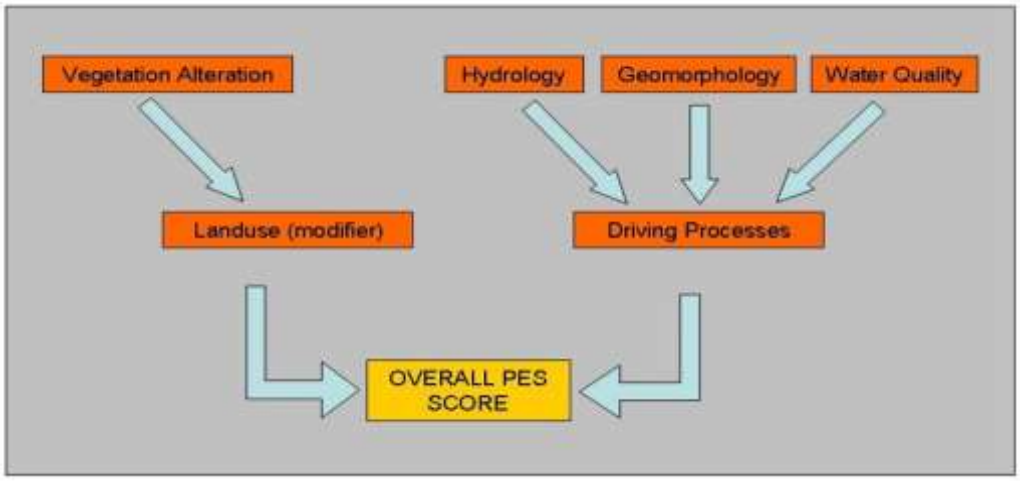


Figure 13: The four modules of the WETLAND-IHI model, and their relationship to the overall PES score, which is derived from them (from DWA, 2007).

WET-Ecoservices (Kotze et al, 2007) was used to assess the goods and services that individual the wetlands within each zone provide. This is taken as a combination of both ecological services and provision of services and resources to users. Through a series of scoring matrices for 15 different goods and service characteristics of a particular wetland, a rating score (out of 4) is provided. This is then compared to the class categories presented in Table 12.

Table 12: Recommended ecological importance and sensitivity categories (adapted from WCS, 2007). Interpretation of the median values and categories is also provided.

Ecological Importance and Sensitivity Category (EIS)	Range of Median	Recommended Ecological Management Class
Very high Wetlands that are considered ecologically important and sensitive on a national or even international level. The biodiversity of these wetlands is usually very sensitive to flow and habitat modifications. They play a major role in moderating the quantity and quality of water of major rivers.	>3 and ≤4	A
High Wetlands that are considered to be ecologically important and sensitive. The biodiversity of these wetlands may be sensitive to flow and habitat modifications. They play a role in moderating the quantity and quality of water of major rivers.	>2 and ≤3	B

Ecological Importance and Sensitivity Category (EIS)	Range of Median	Recommended Ecological Management Class
Moderate Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water of major rivers.	>1 and ≤2	C
Low/marginal Wetlands that are not ecologically important and sensitive at any scale. The biodiversity of these wetlands is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.	>0 and ≤1	D

Impact significance ratings were then applied to pertinent ecological features that are then a function of evaluating the expected impacts associated with a development of this nature and how that would be expected to impact the habitat units that it is associated with. Screening of the impacts of existing infrastructure within the area forms part of this process."

(c) Results and Discussions

"The survey area falls within the Olifants (North) (B) Primary catchment and the Upper Olifants River water management area (WMA). The project area falls within the B12C quaternary catchment, which is drained toward the northwest by the Klein Olifants River. The Klein Olifants River continues in a north-westerly direction to confluence with the Olifants River, which is the main watercourse of the primary catchment area. The watershed associated with the project area is drained in a westerly direction by a minor watercourse toward the Klein Olifants River. The major watercourses within the region tend to be classified within the Present Ecological State (PES) C (moderately transformed) and D (largely transformed) categories (Nel et al, 2011) (Figure 14). The major wetland units within the region are largely categorised within a C (moderately modified) PES (Nel et al, 2011) (Figure 15).

The desktop review indicated the land use within the area to be dominated by formal cultivation and mining. The ecological functionality of the wetland units had been historically altered through transformation of the natural surface water drainage, which was altered through earth berms, excavated trenches and linear foundations associated with railways, roads, and other infrastructure. This has led to a comparatively diminished wetland functional area than what would have historically existed.

Due to the dominant land use and the associated pressures and drivers of ecological change, the general Present Ecological State (PES) of the wetland units calculated to represent a C to C/D category, which is largely in line with the PES of the major wetland units throughout the

catchment area (as noted by Nel et al [2011]). The Ecological Importance and Sensitivity ratings (EIS) of the wetland systems calculated to a moderate value. This is largely due to the wetland units not providing resources that are relied on by surrounding communities, but it did show the wetland units to be important to water quality maintenance as well as biodiversity support within the area. The most dominant pressures and drivers of ecological change were shown to be from agriculture (active cultivation) and infrastructure development within the wetland areas. Wetland areas adjacent to the village also were shown to suffer a degraded PES due to land use pressures.

The application of the DWS Risk Assessment Matrix indicated that a moderate risk to the wetland units could be expected for the construction of culverts within the functional wetland zones. This could be lowered to an overall low risk with the implementation of proposed mitigation measures. Further activities associated with the project were noted to score a low risk to the surrounding wetland areas. This is largely due to the proposed development being largely confined to the existing road and road reserves, the relatively low association that the project has with wetland habitat and the relatively transformed status of the wetland units that would be impacted."

(d) Conclusions and Recommendations

"Following the field survey of the proposed development area, the following salient recommendations can be proposed to aid in the conservation of the overall ecological integrity of the surface water ecosystems within the region:

- *Wetland habitat units were noted to be associated with the proposed development. The units were delineated and are presented in Figure 16.*
- *The development is associated with an existing roadway. Minimal impact significance is expected to occur as the road rehabilitation procedures couple to an existing road.*
- *The proposed new road section was shown to have an association with a wetland unit (Figure 17). Although not considered a fatal flaw due to the wetland unit having already suffered a major loss of ecological functionality, the overall ecological integrity of the immediate area would benefit from a minor alignment shift within this area to accommodate the wetland unit and its associated buffer zone. Figure 17 presents a more detailed account of the interaction that the proposed new section of road (showing the 30 m road reserve) has with the wetland features identified at the site. Although overall ecological functionality would benefit from a shift of the alignment to outside of the wetland features and associated buffers, the extent to which the wetland unit has lost ecological function due to historical land use and infrastructure development means that the development of the new road within this area would impose an impact of little significance to the feature.*
- *The impact significance of the potential impacting features showed medium to low overall significance, with many impacts rendered insignificant with the application of the proposed mitigation measures.*
- *The wetland units were shown to fall within a C to C/D PES class, with the major pressure and driver of ecological change being the existing infrastructure development, and agricultural activities within the catchment areas.*

- *Erosion control measures and avoidance of indiscriminate habitat destruction outside of the ultimate construction footprint are regarded as the most pertinent mitigation measures.*
- *Culvert development sites must be suitably reinstated and landscaped to avoid erosion formation.*
- *Culverts should be spread over the width of the watercourse so that the surface water flows are not constricted. Designing of culvert placement, numbers and capacities must take into consideration flood flow volumes. Constriction of the watercourse will result in erosion within the channel at the downstream side of the culvert and will also reduce the lateral extent of the associated wetland.*
- *The overall ecological impact significance of the proposed development activities is expected to be low and therefore no justifiable reasons for opposing the development can be offered.*

It should be noted that, to conserve the ecological structures within the region, a holistic habitat conservation approach should be adopted. This includes keeping general habitat destruction and construction footprints to an absolute minimum within the terrestrial habitat as well. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival. This can only be achieved by the efforts of the contractor during the various processes of the construction phase."

"Preferred Alternative:

No alignment alternatives were presented for analysis at the time of the survey. As the new road section has been shown to impinge on a wetland unit (as shown in Figure 17), the ecological functionality of the wetland unit would benefit from a slight shift in alignment to accommodate this feature. The alignment as presented does not, however, constitute a fatal flaw as the wetland unit has suffered a considerable loss of function due to historical land use and infrastructure development."

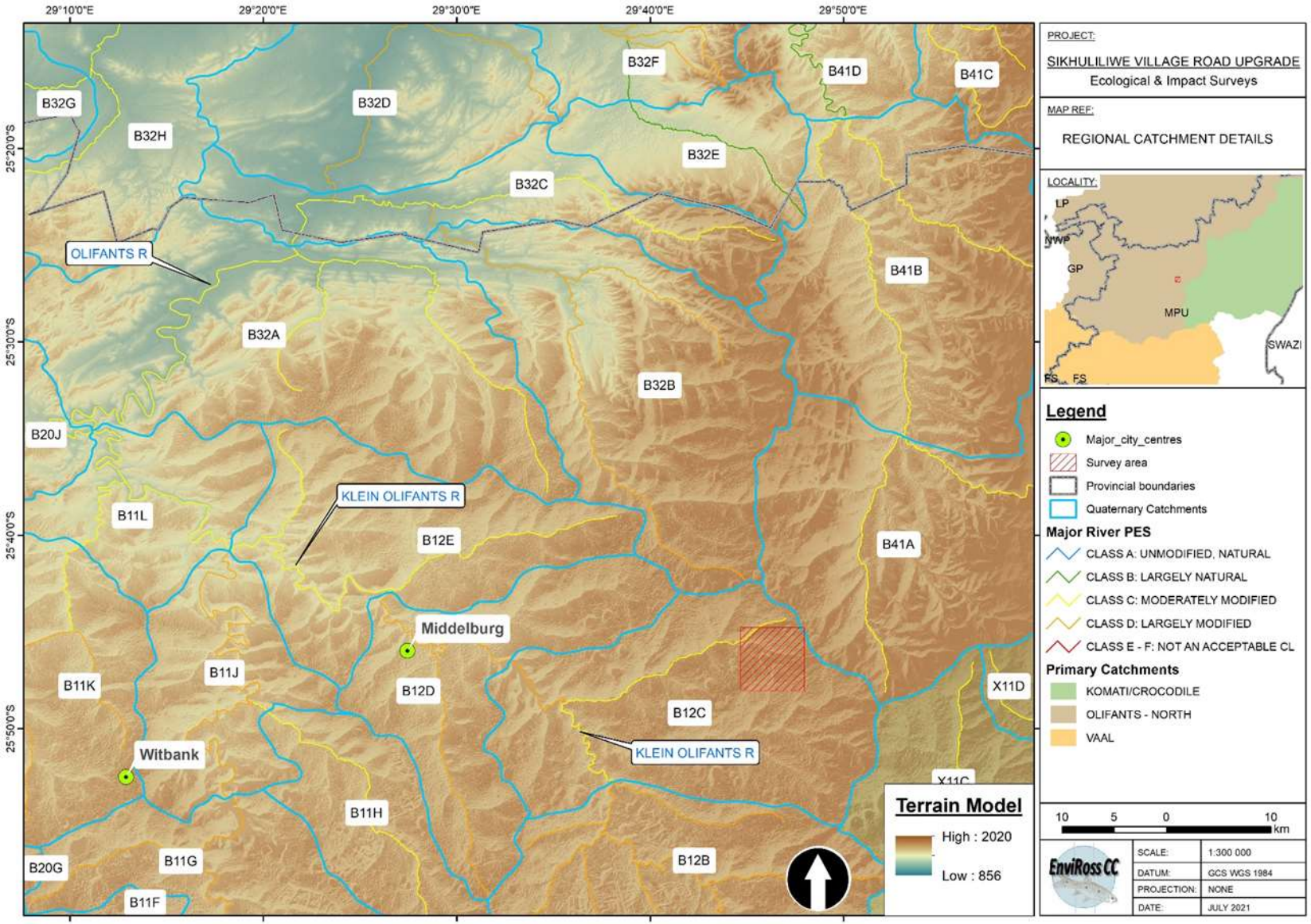


Figure 14: Regional catchment details, showing the major rivers and their relative PES categories within the region

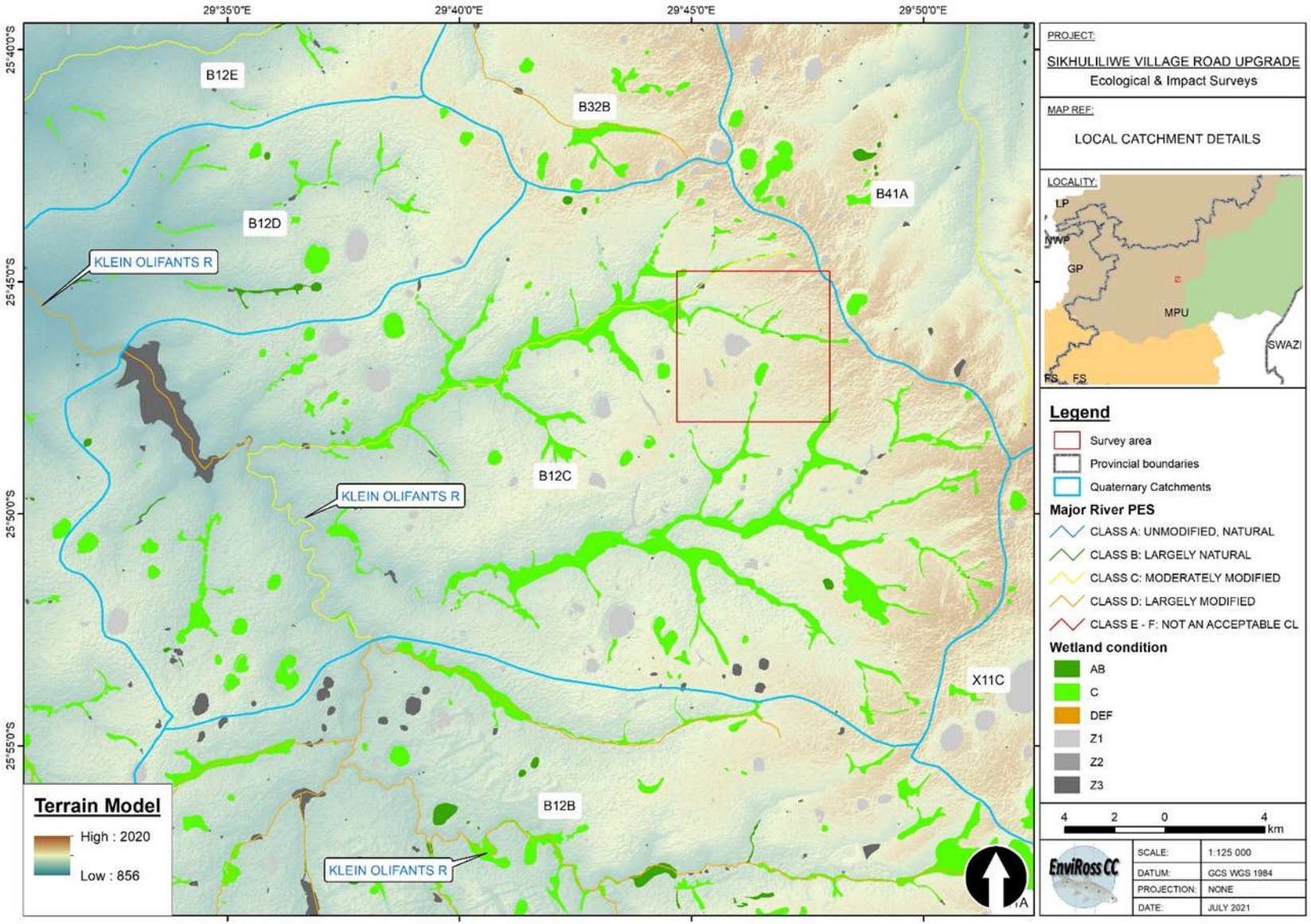


Figure 15: Local catchment details, showing the major rivers and wetland units

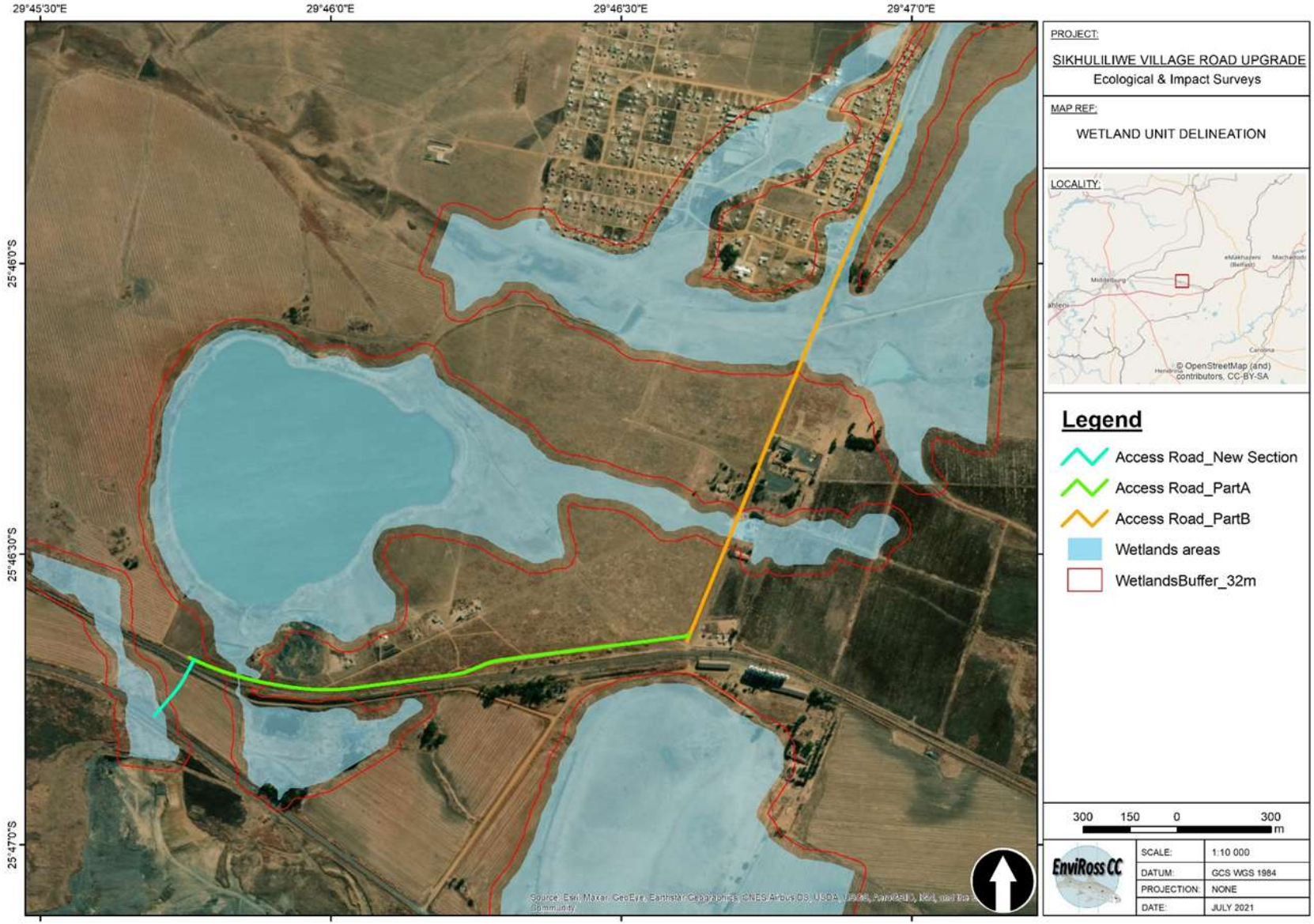


Figure 16: Wetland Habitat Units

Figure 17: Details of the proposed new section of road and how it interacts with the wetland features identified within the immediate area.

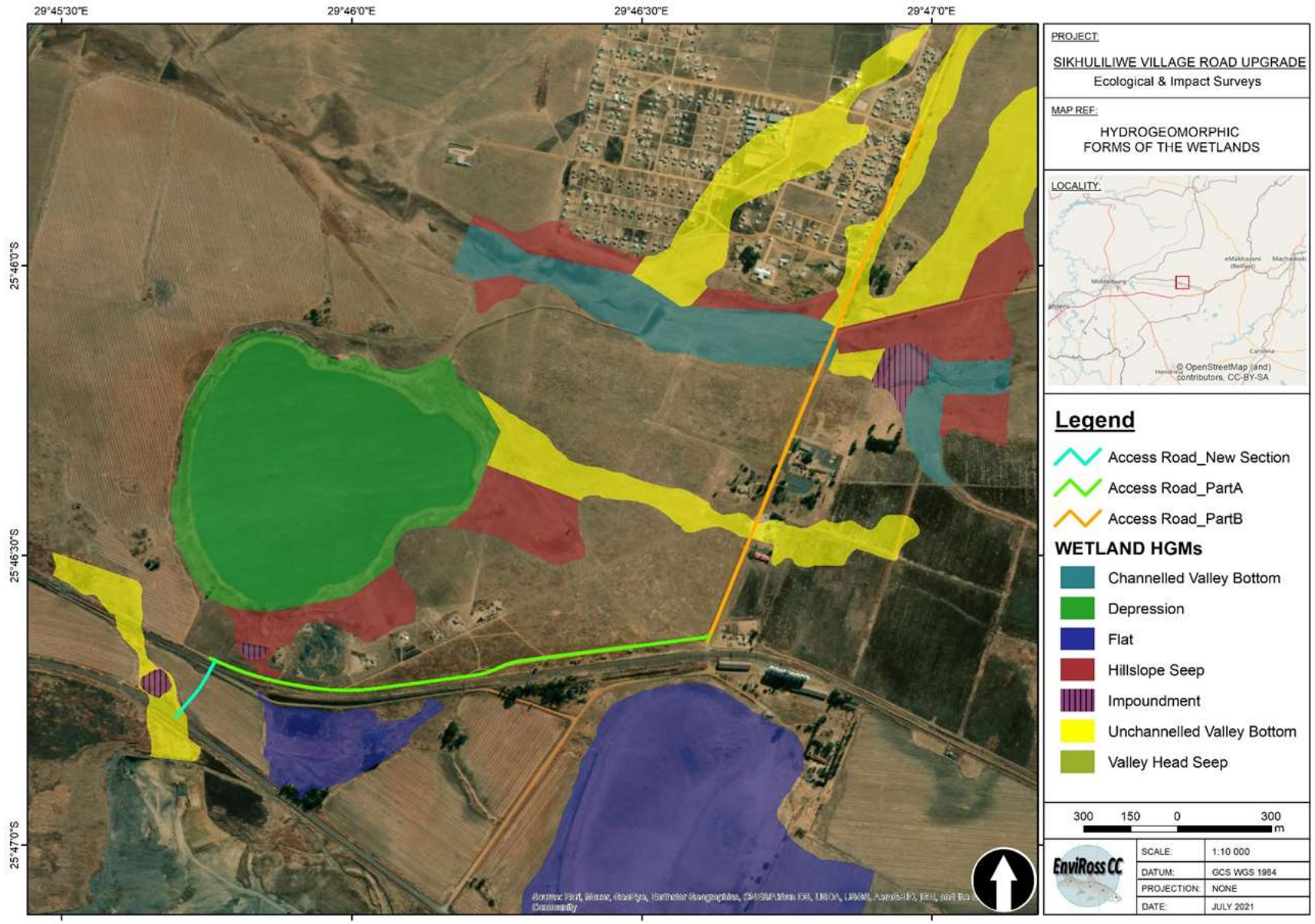


Figure 18: The hydrogeomorphic forms of the wetland units within the scope of the survey area

9.2. Terrestrial Biodiversity Ecological and Impact Surveys

A Terrestrial Biodiversity Ecological and Impact Survey was undertaken by EnviRoss CC in May 2021. A summary of the survey, including the findings and recommendations as provided in the Report compiled by Enviross is provided in Section 9.2.1. A copy of the Terrestrial Biodiversity Ecological and Impact Survey Report is attached to Appendix D of this Report.

9.2.1. Methods and Materials

(a) Desktop Survey

"Prior to the field survey, the desktop survey was undertaken to gather relevant ecological processes data for the survey area. Sources included available online data, Geographic Information Systems (GIS) databases, aerial imagery, and topographical maps. Biodiversity data was sourced from available online sources, as well as publications, field guides, and the databases developed by EnviRoss CC from field surveys undertaken within the same vicinity."

(b) Field Survey

"A walk through of the survey area, with focus being on areas that may support high levels of biodiversity, was undertaken. Observations on habitat type, quality and the identification of pressures and drivers of ecological change throughout the project area allowed for the refinement of the data that were formulated during the desktop review process.

Impact significance ratings were then applied to pertinent ecological features that are then a function of evaluating the expected impacts associated with a development of this nature and how that would be expected to impact the habitat units that it is associated with. Screening of the impacts of existing infrastructure within the area forms part of this process."

(c) Results and Discussions

"The dominant vegetation unit associated with the project area is Eastern Highveld Grassland, which forms part of the Mesic Highveld Grassland bioregion within the Grassland biome. Established wetland units within the region support an azonal freshwater wetlands vegetation type typically found embedded within the Highveld grasslands, namely Eastern Temperate Freshwater Wetlands of the Freshwater Wetlands biome (Figure 19). Eastern Highveld Grasslands, as a vegetation unit, is regarded as conservationally Endangered, with the main drivers being identified as transformation of the unit to accommodate cultivation and mining and the lack of substantial areas representing primary vegetation features within protected areas. Eastern Temperate Freshwater Wetland is regarded as conservationally Least Concern (SANBI, 2006).

The desktop review indicated the land use within the area to be dominated by formal cultivation and mining. Wetland units do occur within the project area, but the ecological functionality of the wetland units had been historically altered through transformation of the natural surface water drainage, which was altered through earth berms, excavated trenches

and linear foundations associated with railways, roads, and other infrastructure. This has led to a comparatively diminished wetland functional area than what would have historically existed. This would be an important habitat feature that would support a high level of biodiversity. The loss of ecological function of the wetland units has led to the decline of biodiversity richness within the area.

Cross-referencing the distribution records of faunal and floral species with the habitat type, availability and ecological status resulted in the project area offering support to a limited level of biodiversity. The proposed project activities are to be largely confined to the existing road footprint and associated road reserves. Limited destruction of natural habitat is therefore envisioned. This therefore has limited relevance to the ongoing support of biodiversity within the area.

No RDL faunal or floral species were noted to occur within the proposed development's expected impact area. Habitat features within this area were also noted to be unsuitable for supporting RDL species."

(d) Conclusions and Recommendations

"The proposed project is the rehabilitation procedure of an existing road as well as the establishment of a small section of a new link road. The existing road and the associated road reserves and the zones abutting the road reserves do not support any zones that remain representative of primary and/or natural vegetation features that are identified as Eastern Highveld Grassland. The proposed new section of road also moves through an existing cultivated area, making for total transformation of the vegetation unit. An analysis of the vegetation structures is therefore deemed of little value in an assessment of the ecological status of the vegetation unit.

Representative vegetation features tend to only be encountered within the larger established wetland areas that have not been transformed for cultivation. These are generally isolated in occurrence as these wetland units are largely surrounded by roads or other delineating features. Excepting for one point where the existing road crosses over a valley bottom wetland unit, these features tend to occur some distance from the road and therefore, again, are thought to have limited relevance to the project.

Following the field survey of the proposed development area, the following salient recommendations can be proposed to aid in the conservation of the overall ecological integrity of the terrestrial habitat ecosystems within the region:

- *Wetland habitat units were noted to be associated with the proposed development. An indication of the extent of the wetland habitat features associated with the project is presented in Figure 16.*
- *The proposed new road section was shown to have an association with a wetland unit (*
- *Figure 17). Although not considered a fatal flaw due to the wetland unit having already suffered a major loss of ecological functionality, the overall ecological integrity of the immediate area would benefit from a minor alignment shift within this area to*

accommodate the wetland unit and its associated buffer zone. Figure 17 presents a more detailed account of the interaction that the proposed new section of road (showing the 30 m road reserve) has with the wetland features identified at the site. Although overall ecological functionality would benefit from a shift of the alignment to outside of the wetland features and associated buffers, the extent to which the wetland unit has lost ecological function due to historical land use and infrastructure development means that the development of the new road within this area would impose an impact of little significance to the feature.

- *The development is associated with an existing roadway and therefore construction activities will be largely confined to existing impact areas. Minimal impact significance is expected to occur as the road rehabilitation procedures couple to an existing road.*
- *The impact significance of the potential impacting features showed low overall significance, with many impacts rendered insignificant with the application of the proposed mitigation measures.*
- *No Red Data Listed (RDL) faunal or floral species were noted during the survey. The development is not thought to impact on RDL species conservation within the region in any significant way.*
- *Erosion control measures and avoidance of indiscriminate habitat destruction outside of the ultimate construction footprint are regarded as the most pertinent mitigation measures.*
- *Culvert development sites must be suitably reinstated and landscaped to avoid erosion formation.*
- *Culverts should be spread over the width of the watercourse so that the surface water flows are not constricted. Designing of culvert placement, numbers and capacities must take into consideration flood flow volumes. Constriction of the watercourse will result in erosion within the channel at the downstream side of the culvert and will also reduce the lateral extent of the associated wetland. As the wetland areas are considered to have the greatest potential of supporting the greatest levels of biodiversity, it is essential that the project activities do not impact on the functionality of the wetland features.*
- *The overall ecological impact significance of the proposed development activities is expected to be low and therefore no justifiable reasons for opposing the development can be offered.*

It should be noted that, to conserve the ecological structures within the region, a holistic habitat conservation approach should be adopted. This includes keeping general habitat destruction and construction footprints to an absolute minimum within the terrestrial habitat as well. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival. This can only be achieved by the efforts of the contractor during the various processes of the construction phase.

Preferred Alternative:

No alignment alternatives were presented for analysis at the time of the survey. As the new road section has been shown to impinge on a wetland unit (as shown in Figure 17), the ecological functionality of the wetland unit would benefit from a slight shift in alignment to accommodate this feature. The alignment as presented does not, however, constitute a fatal

flaw as the wetland unit has suffered a considerable loss of function due to historical land use and infrastructure development.

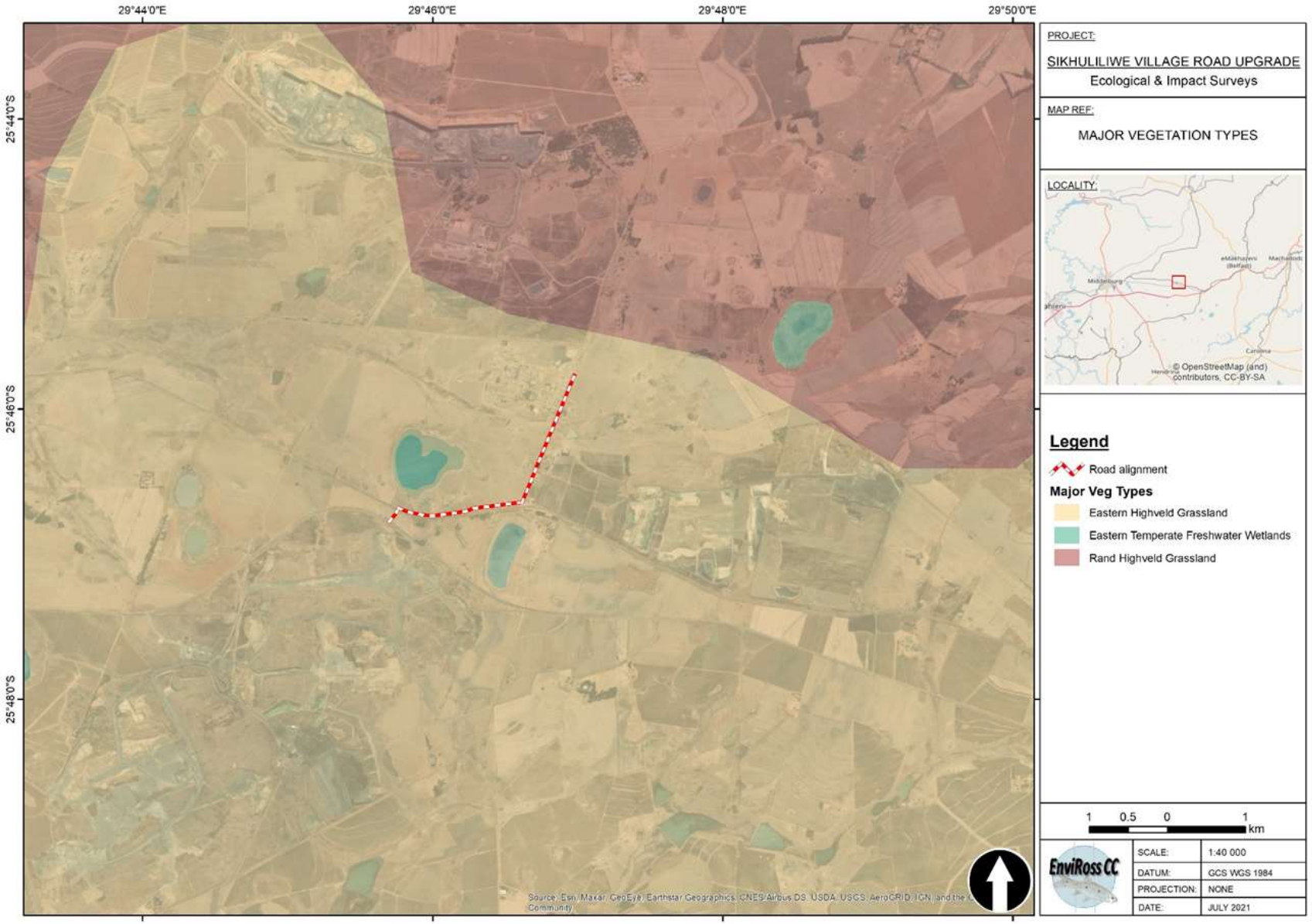


Figure 19: Vegetation mapping of the region associated with the project area

9.3. Phase 1 Cultural Heritage Impact Assessment

A Phase 1 Cultural Heritage Impact Assessment was undertaken by Dr Johnny van Schalkwyk in May 2021. A summary of the assessment, including the findings and recommendations as provided in the Report compiled by Dr van Schalkwyk is provided in Section 9.3.1. A copy of the Phase 1 Cultural Heritage Impact Assessment Report is attached to Appendix D of this Report.

9.3.1. Methods and Materials

(a) Pre-feasibility Assessment

"The objectives of this review were to:

- *Gain an understanding of the cultural landscape within which the project is located.*
- *Inform the field survey."*

(i) Survey of the Literature

"A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. In this regard, various anthropological, archaeological, and historical sources were consulted.

- *Information on events, sites and features in the larger region were obtained from these sources."*

(ii) Survey of heritage impact assessments (HIAs)

"A survey of HIAs done for projects in the region by various heritage consultants was conducted with the aim of determining the heritage potential of the area.

- *Information on sites and features in the larger region were obtained from these sources."*

(iii) Data bases

"The Heritage Atlas Database, various SAHRA databases, the Environmental Potential Atlas, the Chief Surveyor General, the Heritage register, and the National Archives of South Africa were consulted.

- *Database surveys produced a number of sites located in the larger region of the proposed development."*

(iv) Other sources

"Aerial photographs and topographic and other maps were also studied - see the list of references below.

- *Information of a very general nature were obtained from these sources."*

(b) Field Survey

"The field survey was done according to generally accepted archaeological practices, and was aimed at locating all possible heritage sites, objects and structures. The area that had to be investigated was identified by JG Afrika by means of maps and .kml files indicating the project area. This was loaded onto a Samsung digital device and used in Google Earth during the field survey to access the project area.

The site was visited on 25 May 2021 and was investigated by walking the entire length of the road.

(c) Results and Discussions

"The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer) component. The latter eventually gave rise to an industrial landscape, consisting of various mines, power stations and railway lines."

(i) Identified sites

"During the survey the following sites, features or objects of cultural significance were identified.

- *An informal burial site with at least 35 graves. Most are only marked with stone cairns. In many cases the inscriptions on those with headstones are illegible. The death dates range between 1958 and 2003. Surnames such as Sibanyoni, Mahlangu and Mashiane could be determined. Significantly, according to the inscription on one grave, Adam Maloyi was born on 29 August 1801 and died 11 April 1865. Although the burial site is mostly overgrown with grass and weeds, some graves have recently been cleaned. In addition, the site is properly fenced-off."*

(ii) Impact assessment and proposed mitigation measures

The South African Heritage Resources Association (SAHRA) developed guidelines for development near cemeteries. A copy of this guideline document was requested from SAHRA in order to properly reference it in this Report. During the time of the compilation of this Basic Assessment Report, the guideline document was still outstanding, and the guidelines presented in this Report is based on the outcome of telephonic discussions held with the SAHRA Burial Grounds and Graves Unit. This unit mentioned that the following buffer zones are applicable to developments near cemeteries, burial grounds, or even just a single grave:

- A 100m buffer is required between a mine and a cemetery or single grave; and
- A 30m buffer is required between any other development and a cemetery or single grave.

As mentioned in Section 9.3.1 (ii) there is a burial ground associated with the study area. An image showing the burial ground and the proposed new section of road is presented in Figure 20.

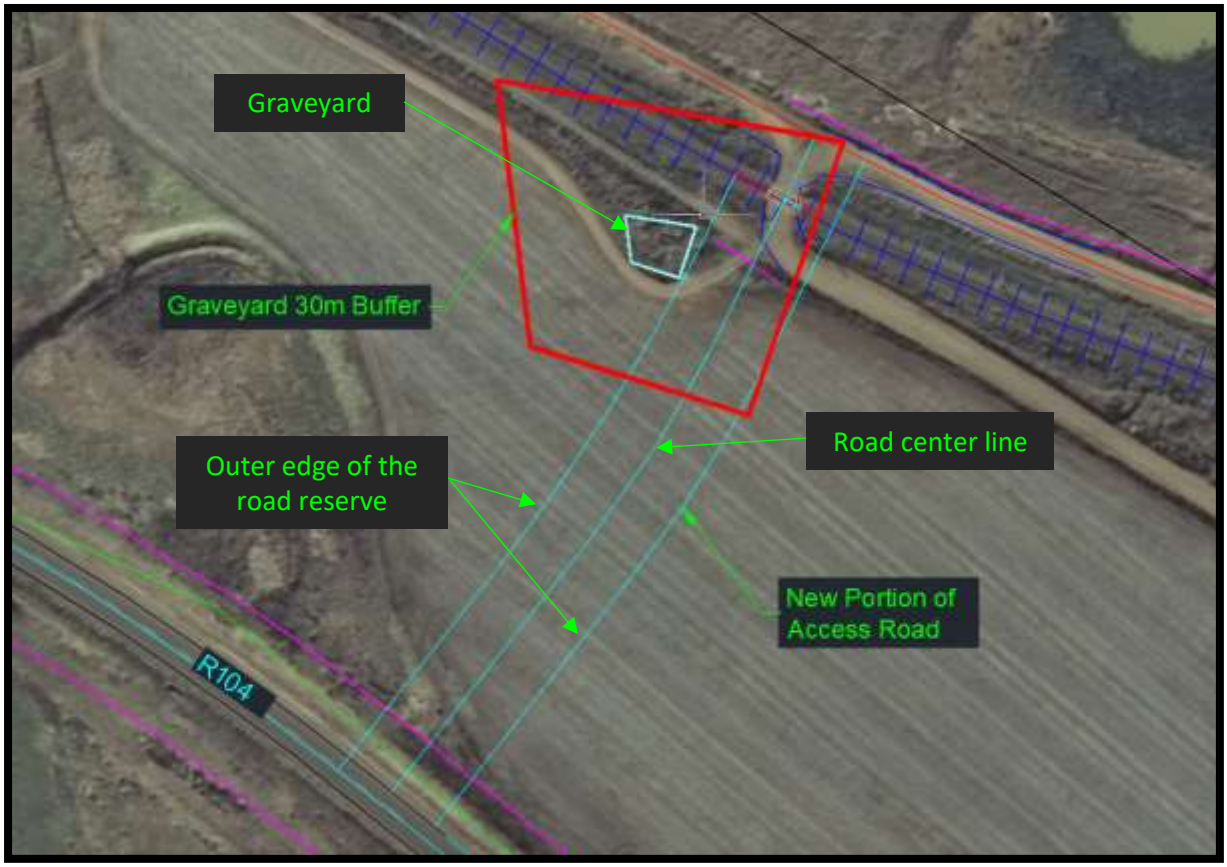


Figure 20: Graveyard buffer vs propped new section of road

"Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development. When considering the design specifications of the proposed access road, a buffer zone around the cemetery would not be feasible for the following reasons:

- *It is located at the current railway crossing and Transnet is unwilling to create a new crossing.*
- *Due to the curvature of the railway line and the location of shunting lines (related to the grain silos at Arnot Station), finding an alternative crossing would be very difficult.*
- *For safety purposes the railroad and road should have a 90° crossing.*

As Mafube mine is expanding to the east of Sikhululiwe Village, some roads will have to be closed, presenting problems of access for the villagers. Two alternatives were presented - one located to the west of the village, the second being the existing, more direct route:

- *The local community, Sikhululiwe Village, accepted the latter route as the shortest and most convenient for their use to travel to urban centres.*
- *They also requested that this road be upgraded.*

It is therefore proposed that the buffer zone on the eastern side of the burial site, i.e., closest to the road, is foregone and that instead a brick wall is erected in the place of the wire fence. This wall can then also serve as a billboard where a site notice can be added cautioning drivers to be careful when passing the site.

- *It should also be noted that it is only the road reserve that will encroach on the burial site and not the road or gravel shoulder of the road.*
- *Should impact on the burial site prove inevitable, full grave relocation is recommended for this site. This measure should be undertaken by a qualified archaeologist, and in accordance with relevant legislation, permitting, statutory permissions and subject to any local and regional provisions and laws and by-laws pertaining to human remains (as outlined in Addendum 12.4 of the attached Phase 1 Cultural Heritage Impact Assessment Report is attached to Appendix D of this Report).*

(iii) Legal requirements

"The legal requirements related to heritage specifically are specified in Section 3 of the attached Phase 1 Cultural Heritage Impact Assessment Report is attached to Appendix D of this Basic Assessment Report.

- *For this proposed project, the assessment has determined that sites, features, or objects of cultural heritage significance occur in the project area, therefore permits might be required from SAHRA or the PHRA.*
- *If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.*

(iv) Reasoned opinion as to whether the proposed activity should be authorised

- *From a heritage point of view, it is recommended that the Proposed Project be allowed to continue on acceptance of the mitigation measures presented above and the conditions proposed below.*

(v) Conditions for inclusion in the environmental authorisation:

- *The Palaeontological Sensitivity Map (http://www.sahra.org.za/sahris/map/palaeo) indicate that the southern section of the project area has a very high sensitivity of fossil remains to be found and therefore a palaeontological assessment and protocol for*

finds is required. The northern section has an insignificant to zero sensitivity of fossil remains to be found and therefore no palaeontological studies are required.

- *Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in Section 9 of the report, as well as in the **Management Plan: Burial Grounds and Graves**, with reference to general heritage sites, in the Addendum, Section 12.4. of the attached Phase 1 Cultural Heritage Impact Assessment Report is attached to Appendix D of this Report."*

9.4. Palaeontological Impact Assessment: Phase 1 Field Study

A Palaeontological Impact Assessment: Phase 1 Field Study was undertaken by Dr Heidi Fourie in May 2021. A summary of the assessment, including the findings and recommendations as provided in the Report compiled by Dr Fourie is provided in Section 9.4.1. A copy of the Palaeontological Impact Assessment: Phase 1 Field Study Report is attached to Appendix D of this Report.

9.4.1. Methods and Materials

(a) Desktop Survey and Literature Review

"The palaeontological impact assessment field study was undertaken in June and July 2021. A Phase 1: Field Study of the affected portion includes photographs (in 7.1 mega pixels) taken of the site with a digital camera (Canon PowerShot A470). Additionally, Google Maps are accessed on a cellular phone/ipad for navigation. A Global Positioning System (GPS) (Garmin eTrex 10) are used to record fossiliferous finds and outcrops (bedrock) when the area is not covered with topsoil, subsoil, overburden, vegetation, grassland, trees, or waste. The survey did identify the Karoo Supergroup. A literature survey is included, and the study relied heavily on geological maps.

SAHRA document 7/6/9/2/1 (SAHRA 2012) requires track records/logs from archaeologists not palaeontologists as palaeontologists concentrate on outcrops which may be recorded with a GPS. Isolated occurrences of rocks usually do not constitute an outcrop. Fossils can occur in dongas, as nodules, in fresh rock exposures, and in riverbeds. Finding fossils require the experience and technical knowledge of the professional palaeontologist, but that does not mean that an amateur can't find fossils. The geology of the region is used to predict what type of fossil and zone will be found in any region. Archaeozoologists concentrate on more recent fossils in the quaternary and tertiary deposits."

(i) Assumptions and Limitations:

*"The accuracy and reliability of Palaeontological Impact Assessment: Phase 1 Field Study Report **may be** limited by the following constraints:*

1. *Most development areas have never been surveyed by a palaeontologist or geophysicist.*

2. *Variable accuracy of geological maps and associated information.*
3. *Poor locality information on sheet explanations for geological maps.*
4. *Lack of published data.*
5. *Lack of rocky outcrops.*
6. *Inaccessibility of site.*
7. *Insufficient data from developer and exact lay-out plan for all structures."*

(b) Results and Discussions

"The geology was obtained from map 1:100 000, Geology of the Republic of South Africa (Visser 1984) and 2528 Pretoria (Walraven 1978), 1:250 000 geological maps."

Figure 21: The geology of the development area

Legend to Figure and short explanation.	
Pe	Sandstone, shale and grit with coal and oil-shale beds (grey). Vryheid Formation, Ecca Group, Karoo Supergroup. Permian
Mr	Granophyre, pseudogranophyre. Rashoop Granophyre Suite, Bushveld Complex. Mokolian.
……	(black) Lineament (Possible dyke)
--f	Fault
⊥10˚	Strike and dip
▬	Approximate position of application

"The Vryheid Formation is named after the type area of Vryheid-Volksrust. In the north-eastern part of the basin the Vryheid Formation thins and eventually wedges out towards the south, southwest, and west with increasing distance from its source area to the east and northeast (Johnson 2009). The Vryheid Formation consists essentially of sandstone, shale, and subordinate coal beds, and has a maximum total thickness of 500 m. It forms part of the Middle Ecca (Kent 1980). This formation has the largest coal reserves in South Africa. The pro-delta sediments are characterised by trace and plants fossils (Snyman 1996).

The Rashoop Granophyre Suite is characterised by sills that occurs throughout the Bushveld Complex. Three formal units are part of the Rashoop Granophyre Suite, namely Stavoren granophyre, Rooikop granophyreporphyri and Zwartbank pseudogranophyre (Kent 1980, Visser 1989). The Stavoren granophyre occurs in the central, western, southern, and eastern part of the basin and is by far the largest and hence the oldest. Sills of the Rooikop granophyreporhyri occurs as intrusion in the Loskop Formation and Rooiberg Group. The Zwartbank pseudogranophyre is present north-east of Rustenburg and north-west of Mokopani. An age for this Suite is estimated at 2,090 ± 40 ma. (Visser 1989). There is a presence of mining past and present.

*Palaeontology – Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity can generally be **LOW** to **VERY HIGH**, and here locally **VERY HIGH** for the Vryheid Formation and **VERY LOW** for the Bushveld rocks (SG 2.2 SAHRA APMHOB, 2012).*

The Ecca Group, Vryheid Formation (Pe) may contain fossils of diverse non-marine trace, Glossopteris flora, mesosaurid reptiles, palaeoniscid fish, marine invertebrates, insects, and crustaceans (Johnson 2009). Glossopteris trees rapidly colonised the large deltas along the northern margin of the Karoo Sea. Dead vegetation accumulated faster than it could decay, and thick accumulations of peat formed, which were ultimately converted to coal. It is only in the northern part of the Karoo Basin that the glossopterids and cordaitales, ferns, clubmosses and horsetails thrived (McCarthy and Rubidge 2005).

The Bushveld rocks do not contain fossils."

(ii) Summary of findings

"The Phase 1: Field Study was undertaken in June and July 2021 in the winter in dry and mild conditions during the official Covid-19 Level 3 and 4 lockdowns, and the following is reported:

Field Observation: This project is not large, and the entire property is accessible, the Vryheid Formation and Bushveld Complex are present. A maize field is present where the proposed new section of road will be constructed, the existing road is a gravel road. There are several areas with good sandstone and granophyre outcrops. No fossils were found as they are usually not present in the sandstone or granophyre. A cemetery is present. The Project includes one locality Option partly present on the Vryheid Formation in the south."

(iii) Recommendation:

*"The potential impact of the development on fossil heritage is **VERY HIGH** and therefore a field survey was necessary for this development (according to SAHRA protocol). A Phase 1 Palaeontological Impact Assessment: Field Study was done. A Phase 2: Mitigation will be recommended if the Phase 1: Field Study finds fossils or if fossils are found during the development."*

- *Concerns/threats to be added to EMPr:*

1) *"Threats are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in, disturbance, damage or destruction of the fossils by development, vehicle traffic, and human disturbance."*
2) *"Special care must be taken during the digging, drilling, blasting and excavating of foundations, trenches, channels and footings and removal of overburden not to intrude fossiliferous layers."*

(iv) The recommendations are:

1) *Mitigation will be needed if fossils are found during the construction.*
2) *No consultation with parties was necessary. The Environmental Control Officer must familiarise him- or herself with the formations present and its fossils.*
3) *The development may go ahead with caution.*
4) *The ECO must survey for fossils before and or after clearing, blasting, drilling, or excavating.*
5) *The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance fossil find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.*

9.5. Geotechnical Assessment

A Geotechnical Assessment was undertaken by JG Afrika (Pty) Ltd for detail design purposes.

The impact of the geology on the proposed road upgrade is considered low. The rock formations are common and extensive in the area and there are no ridges or dolomites encountered.

10. PUBLIC CONSULTATION PROCESS

10.1. Newspaper Notice

A Notice will be placed in the Middelburg Observer and will be published sometime during the week of 13 – 17 March 2023. A copy of the Newspaper Tearsheet will be attached to the Final Basic Assessment Report. A copy of the notice to be placed in the Middelburg Observer is attached to Appendix E of this Draft Basic Assessment Report.

10.2. Site Notice

Site notices were placed as part of an initial Public Participation Phase on 7 March 2022 at the following locations (Table 12.1). A copy of the site notice that placed is attached to Appendix E of this Draft Basic Assessment Report.

Table 12.1: Proof of Placement of Site Notices

PROOF OF SITE NOTICES PLACED DURING AND INITIAL COMMUNITY PARTICIPATION PHASE	
	
Site Notice 1: Placed at the entrance to the Sikhululiwe Clinic	

PROOF OF SITE NOTICES PLACED DURING AND INITIAL COMMUNITY PARTICIPATION PHASE	
	
Site Notice 2: Placed at the Sikhululiwe Village Shop	
	
Site Notice 3: Placed along the existing D684	
	
Site Notice 4: Placed at the Mafube Lifex Building	

PROOF OF SITE NOTICES PLACED DURING AND INITIAL COMMUNITY PARTICIPATION PHASE	
	
Site Notice 5: Placed at the pedestrian railway crossing along the D684.	
	
Site Notice 6: Placed along the D684.	

Site Notices to announce the review of the Draft Basic Assessment Report will be placed during the week of 13 – 17 March 2023. Proof of placement will be included in the Final Basic Assessment Report.

10.3. Fliers & Other Methods of Communication

Fliers were handed to the Ward Councillor, Cllr Iddy Mahlangu on 7 March 2022. Two ladies from the Local Community assisted with the Distribution of the Fliers. Cllr Mahlangu also distributed an electronic copy of the flier on his community WhatsApp group. A copy of the flier, a WhatsApp Communication Screenshot, and Proof of Appointment of the two local ladies are attached to Appendix E of this Draft Basic Assessment Report.

Comments boxes were placed at the Sikhululiwe Clinic and at the Local Shop where local community members could submit their issues, concerns, or comments. No submissions were made to these comments' boxes.

10.4. Interested and Affected Party Register

A Register of Interested and Affected Parties are attached to Appendix E of this Draft Basic Assessment Report.

10.5. Review of Draft Basic Assessment Report

The Draft Basic Assessment Report will be available for Public and Commentary Authority review from 10 March 2023 until 10 April 2023. A copy of the Draft Basic Assessment Report will be available for review at the Sikhululiwe Clinic. Electronic copies of the Report will be sent to Interested and Affected Parties upon request.

All comment obtained on the Draft Basic Assessment Report will be included in the Final Basic Assessment Report.

10.6. Comments Received from Registered Interested and Affected Parties

No comments have been received to date. All comment obtained on the Draft Basic Assessment Report will be included in the Final Basic Assessment Report.

11. COMMENTARY AUTHORITY CONSULTATION PROCESS

SAHRA requires a 30m buffer between a burial site and any other development (excluding mines which requires a 100m buffer). When considering the design specifications of the proposed new section of road, a buffer zone around the burial site would not be feasible due to the following reasons:

- It is located at the current railway crossing and Transnet is unwilling to create a new crossing.
- Due to the curvature of the railway line and the location of shunting lines (related to the grain silos at Arnot Station), finding an alternative crossing would be very difficult.
- For safety purposes the railroad and road should have a 90° crossing.

Based on the above, the Heritage Specialist made the following recommendation:

- *It is proposed that the buffer zone on the eastern side of the burial site, i.e., closest to the road, is foregone and that instead a brick wall is erected in the place of the wire fence. This wall can then also serve as a billboard where a site notice can be added cautioning drivers to be careful when passing the site.*

An Application was submitted to SAHRA to have the 30m buffer relaxed, which included the recommendations made by the Heritage Specialist. SAHRA issued an official letter (Attached

to Appendix C of this Basic Assessment Report), in which they have indicated that they will only decide on the relaxation of the buffer based on the review of the Draft Basic Assessment Report.

All comments received from Commentary Authorities will be included in the Final Basic Assessment Report.

12. IMPACT ASSESSMENT

12.1. Impact Assessment Methodology

The EIA Regulations, 2014, as amended, prescribe requirements to be adhered to and objectives to be reached when undertaking Impact Assessments. These are noted in the following sections contained within the EIA Regulations, 2014, as amended:

- Regulation 326, Appendix 1, Section 2 and Section 3 – Basic Assessment Impact Requirements; and
- Regulation 326, Appendix 2 and Appendix 3 – Environmental Impact Assessment Requirements.

In terms of these Regulations, the following should be considered when undertaking an Impact Assessment:

- A description and assessment of the significance of any environmental impact including:
  - Cumulative impacts that may occur because of the undertaking of the activity during the project life cycle.
  - Nature of the impact.
  - Extent and duration of the impact.
  - The probability of the impact occurring.
  - The degree to which the impact can be reversed.
  - The degree to which the impact may cause irreplaceable loss of resources; and
  - The degree to which the impact can be mitigated.

The overall significance of an impact / effect has been ascertained by attributing numerical ratings to each identified impact. The numerical scores obtained for each identified impact have been multiplied by the probability of the impact occurring before and after mitigation. High values suggest that a predicted impact / effect is more significant, whilst low values suggest that a predicted impact / effect is less significant. The formula used to determine the impact significance is provided below:

((Spatial Extent + Severity + Duration + Resource Lost + Reversibility) * Probability) = Significance

The interpretation of the overall significance of impacts is presented in Table 13.

Table 13: Interpretation of the significance scoring of a negative impact / effect1

SCORING VALUE	SIGNIFICANCE
>35	High - **The impact is total / consuming / eliminating** - In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt. Mitigation may not be possible / practical. Consider a potential fatal flaw in the project.
25 - 35	High - **The impact is profound** - In the case of adverse impacts, there are few opportunities for mitigation that could offset the impact, or mitigation has a limited effect on the impact. Social, cultural, and economic activities of communities are disrupted to such an extent that their operation is severely impeded. Mitigation may not be possible / practical. Consider a potential fatal flaw in the project.
20 – 25	Medium - **The impact is considerable / substantial** - The impact is of great importance. Failure to mitigate with the objective of reducing the impact to acceptable levels could render the entire project option or entire project proposal unacceptable. Mitigation is therefore essential.
7 – 20	Medium - **The impact is material / important to investigate** - The impact is of importance and is therefore considered to have a substantial impact. Mitigation is required to reduce the negative impacts and such impacts need to be evaluated carefully.
4 – 7	Low - **The impact is marginal / slight / minor** - The impact is of little importance but may require limited mitigation; or it may be rendered acceptable considering proposed mitigation.
0 – 4	Low - **The impact is unimportant / inconsequential / indiscernible** – no mitigation required, or it may be rendered acceptable considering proposed mitigation.

The significance rating of each identified impact / effect was further reviewed by the Environmental Assessment Practitioner (EAP) by applying professional judgement.

For the purpose of this assessment, the impact significance for each identified impact was evaluated according to the following key criteria outlined in the sub-sections below.

NATURE OF IMPACT

The environmental impacts of a project are those resultant changes in environmental parameters, in space and time, compared with what would have happened had the project not been undertaken. It is an appraisal of the type of effect the activity would have on the affected environmental parameter. Its description includes what is being affected, and how.

[1] Source: adapted from Glasson J, Therivel R & Chadwick A. Introduction to Environmental Impact Assessment, 2nd Edition. 1999. pp 258. Spoon Press, United Kingdom.

SPATIAL EXTENT

This addresses the physical and spatial scale of the impact. A series of standard terms and ratings used in this assessment relating to the spatial extent of an impact / effect are outlined in Table 14.

Table 14: Rating scale for the assessment of the spatial extent of a predicted effect / impact

RATING	SPATIAL DESCRIPTOR
7	**International** - The impacted area extends beyond national boundaries.
6	**National** - The impacted area extends beyond provincial boundaries.
5	**Ecosystem** - The impact could affect areas essentially linked to the site in terms of significantly impacting ecosystem functioning.
4	**Regional** - The impact could affect the site including the neighbouring areas, transport routes and surrounding towns etc.
3	**Landscape** - The impact could affect all areas generally visible to the naked eye, as well as those areas essentially linked to the site in terms of ecosystem functioning.
2	**Local** - The impacted area extends slightly further than the actual physical disturbance footprint and could affect the whole, or a measurable portion of adjacent areas.
1	**Site Related** - The impacted area extends only as far as the activity e.g., the footprint; the loss is considered inconsequential in terms of the spatial context of the relevant environmental or social aspect.

SEVERITY / INTENSITY / MAGNITUDE

This provides a qualitative assessment of the severity of a predicted impact / effect. A series of standard terms and ratings used in this assessment which relate to the magnitude of an impact / effect are outlined in Table 15.

Table 15: Rating scale for the assessment of the severity / magnitude of a predicted effect / impact

RATING	MAGNITUDE DESCRIPTOR
7	**Total / consuming / eliminating / Severe** - Function or process of the affected environment is altered to the extent that it is permanently changed. In terms of Social or Economic related impacts, the impact will be severe.
6	**Profound / considerable / substantial** - Function or process of the affected environment is altered to the extent where it is permanently modified to a sub-optimal state. In terms of Social or Economic related impacts, the impact will be substantial.
5	**Material / important** - The affected environment is altered, but function and process continue, albeit in a modified way.

RATING	MAGNITUDE DESCRIPTOR
4	**Discernible / noticeable** - Function or process of the affected environment is altered to the extent where it is temporarily altered, be it in a positive or negative manner.
3	**Marginal / slight / minor** - The affected environment is altered, but natural function and process continue.
2	**Unimportant / inconsequential / indiscernible** - The impact temporarily alters the affected environment in such a way that the natural processes or functions are negligibly affected.
1	**No effect / not applicable**

DURATION

This describes the predicted lifetime / temporal scale of the predicted impact. A series of standard terms and ratings used in this assessment are included in Table 16.

Table 16: Rating scale for the assessment of the temporal scale of a predicted effect / impact

RATING	TEMPORAL DESCRIPTOR
7	**Long term** – Permanent or more than 15 years post decommissioning. The impact remains beyond decommissioning and cannot be negated.
3	**Medium term** – Lifespan of the project. Reversible between 5 to 15 years post decommissioning.
1	**Short term** – Quickly reversible. Less than the project lifespan. The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the project phases or within 0 -5 years.

IRREPLACEABLE LOSS OF RESOURCES

Environmental resources cannot always be replaced; once destroyed, some may be lost forever. It may be possible to replace, compensate for or reconstruct a lost resource in some cases, but substitutions are rarely ideal. The loss of a resource may become more serious later, and the assessment must take this into account. A series of standard terms and ratings used in this assessment are included in Table 17.

Table 17: Rating scale for the assessment of loss of resources due to a predicted effect / impact

RATING	RESOURCE LOSS DESCRIPTOR
7	**Permanent** – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, or by artificial means. In terms of Social or Economic related impacts, the impact will be irreplaceable, as decrease in property value, loss of income, or loss of lives cannot be replaced.
5	**Long term** – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15

	years but can be mitigated by other means. In terms of Social or Economic related impacts, the impact will be long terms.
4	**Loss of an 'at risk' resource** - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria, but cumulative effects may render such loss as significant.
3	**Medium term** – The resource can be recovered within the lifespan of the project. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span between 5 and 15 years.
2	**Loss of an 'expendable' resource** - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria.
1	**Short-term** – Quickly recoverable. Less than the project lifespan. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span shorter than any of the project phases, or in a time span of 0 to 5 years.

REVERSIBILITY / POTENTIAL FOR REHABILITATION

The distinction between reversible and irreversible impacts is a very important one and the irreversible impacts not susceptible to mitigation can constitute significant impacts in an EIA (Glasson et al, 1999). The potential for rehabilitation is the major determinant factor when considering the temporal scale of most predicted impacts. A series of standard terms and ratings used in this assessment are included in Table 18.

Table 18: Rating scale for the assessment of reversibility of a predicted effect / impact

RATING	REVERSIBILITY DESCRIPTOR
7	**Long term** – The impact / effect will never be returned to its benchmark state.
3	**Medium term** – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than the lifetime of the project, or in a time span between 5 and 15 years.
1	**Short term** – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than any of the phases of the project, or in a time span of 0 to 5 years.

PROBABILITY

The assessment of the probability / likelihood of an impact / effect has been undertaken in accordance with ratings and descriptors provided in Table 19.

Table 19: Rating scale for the assessment of the probability of a predicted effect / impact

RATING	PROBABILITY DESCRIPTOR
1.0	Absolute certainty / will occur
0.9	Near certainty / very high probability
0.7 – 0.8	High probability / to be expected
0.4 - 0.6	Medium probability / strongly anticipated

0.3	Low probability / anticipated
0.2	Possibility
0.0 - 0.1	Remote possibility / unlikely

12.2. Mitigation

In terms of the assessment process, the potential to mitigate the negative impacts is determined and rated for each identified impact and mitigation objectives that would result in a measurable reduction, or enhancement of the impact, are considered. The significance of environmental impacts has therefore been assessed considering any proposed mitigation measures. The significance of the impact "without mitigation" is therefore the prime determinant of the nature and degree of mitigation required.

12.3. Impact Management Hierarchy

The NEMA and the EIA Regulations (2014, as amended) also call for a hierarchical approach to impact management when considering impact assessment. The mitigation of negative impacts that a proposed development may have on the receiving environment must take on different forms depending on the significance of the impact and the area which may be affected. Therefore, mitigation requires proactive planning which is enabled by following the impact mitigation hierarchy. In this regard, during the assessment of alternatives it is preferable to investigate alternatives that avoid negative impacts in their entirety, and if this is not feasible, then alternatives which will reduce an unavoidable negative impact must be assessed through the adoption of mitigation and management measures. Progressing down the impact mitigation hierarchy, the rehabilitation of the negative impact must be considered and lastly, should the unavoidable impact remain post-mitigation and remediation, options to offset the negative impacts must be investigated. An illustration of the impact mitigation hierarchy is provided in Figure 22.

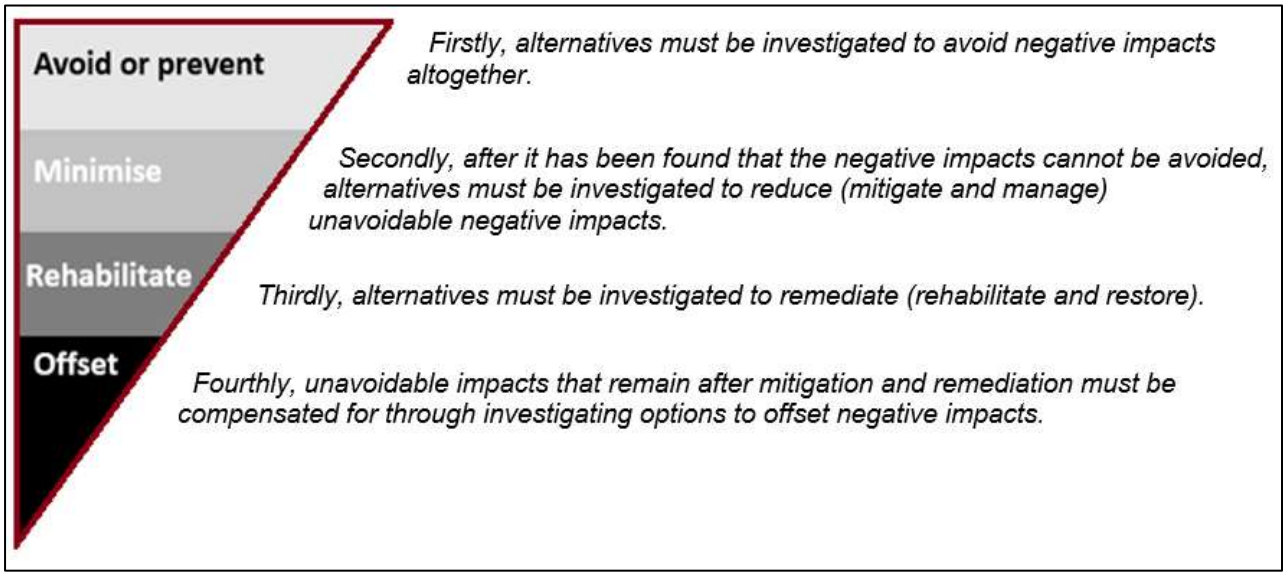


Figure 22: Impact Mitigation Hierarchy

12.4. Pre-Construction and Construction Phase Impacts

Table 20: Pre-Construction phase impacts identified and associated mitigation measures

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
Geology	• The underlying Geology may be impacted during the construction phase, depending on the soil depth.	• Impact on geology is unavoidable. • No blasting will be required.
Soil	• Potential disturbances include compaction, physical removal, and pollution: – Soil erosion will take affect any unprotected soils that have suffered disturbances, including unprotected stockpiles of stored topsoil. – Drainage features established within the road reserve areas will also induce erosion impacts. – Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses. – The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of soil and vegetation. – Potential loss of stockpiled topsoil and other materials if not protected properly. – The additional hardened surfaces created during construction will increase the amount of stormwater runoff which has the potential to cause erosion. – Soil contamination through hydrocarbon spillages on site. – Physical disturbance of soil and plant removal may result in soil erosion/loss; and	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions, etc. This is especially pertinent within areas of steeper gradients. • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, Gabions, etc. • The site must be monitored weekly for any signs of off-site siltation and erosion. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. All exposed earth must be rehabilitated promptly with suitable vegetation to stabilise the soil. • Topsoil should be excavated and stockpiled separately from the subsoils to be used during the rehabilitation of the road verges. Drip trays shall be provided in construction areas for stationary plant and for "parked" plant; Drip trays, sumps and bunds must be emptied regularly, especially before a known rain event and after a rain event, and the contents disposed of at a licensed disposal facility. • All vehicles and equipment shall be kept in good working order and serviced regularly; Leaking equipment shall be repaired immediately or removed from the Site. • Should cement be mixed on site, mixing will take place within a demarcated fenced off concrete batching area at the Contractors Camp. Cement must be mixed on an impervious surface, and water from the cement mixing area should be channelled to a conservancy tank for removal from the site to a licensed disposal facility.

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
	– Erosion and potential soil loss from cut and fill activities (*if any*).	• A specific area will be demarcated for the coating and storage of stone chippings. Coating of stone chippings with pre-coating fluid should be undertaken on an impervious surface to avoid soil contamination. The coated stone chippings should be stored on an impervious surface, and stormwater from this storage area should be channelled to a conservancy tank for removal from the site to a licensed disposal facility. • All areas disturbed during the construction phase (such as road verges etc) shall be rehabilitated as soon as construction activities are completed to prevent erosion issues. • The removal of vegetation must be kept to a minimum where possible. The time that soil is exposed must be limited and re-vegetation or another covering method must be applied during the construction and post construction phase. • The establishment of exotic plants must be avoided. • Where possible the area where construction will take place should be demarcated. Demarcation of the construction areas will ensure that only the required area is cleared of vegetation
Flora and fauna	• Wetland units that have retained natural vegetation are considered sensitive and ecologically important habitat features. Destruction of ecologically sensitive habitat units will lead to undue destruction of natural biodiversity, impact on water quality and impact on the resource. • Destruction of natural areas will lead to displacement and destruction of natural biodiversity, and overall ecological degradation. • This is of limited relevance as the prosed development is to remain largely within the confines of the existing road surface and road reserves and therefore limited impacts to natural areas are expected take place. • No faunal or floral species of conservational significance were noted to occur within the project impact area.	• The ecologically sensitive features have been delineated and mapped. • Conservation buffer zones have also been designated to these areas. • Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • The ecological integrity of the wetland unit associated with the proposed new road section would benefit from a minor shift in the road alignment to accommodate the feature and associated buffer zones. The alignment as presented does not, however, constitute a fatal flaw as the wetland unit has suffered a considerable loss of function due to historical land use and infrastructure development. • Site personnel must undergo Environmental Training and be educated on keeping any vegetation disturbance to a minimum.

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
		• No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been rehabilitated. • All construction areas should be demarcated prior to construction to ensure that the footprint of the impacts is limited (including areas where vehicles may traverse). • No animal, reptile or bird of any sort found on site may be killed. This specifically includes snakes or other animals considered potentially dangerous discovered on site. If such an animal is discovered on site an appropriately skilled person should be summoned to remove the animal from the site. Consideration should be given to selection and nomination of such a person prior to site establishment. If no-one is available, training should be provided to at least two site staff members. • No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been rehabilitated.
Water Resources	• Impacts to water quality include accidental fuel/oil spills from poorly maintained equipment, accidents, or container failure, and poorly managed and/or non-bunded fuelling stations. • Water quality impacts will also occur because of unabated soil erosion.	• Sensitive areas including watercourses and drainage lines must be demarcated prior to commencement of construction activities on site. • The construction camp should be positioned on previously disturbed areas (if possible) and outside of the wetland areas and the associated 32m buffer areas. • Indiscriminate destruction of wetland habitat must be avoided and the construction footprint, which includes the service areas used to facilitate the construction process, must be kept to an absolute minimum. • No fuel to be stored at or near watercourses or waterbodies; Equipment to be properly maintained and serviced; Fuel storage and pump areas to be bunded to avoid accidental leakage. • No refuelling should be done within the riparian zones (exceptions are made for stationery motors i.e., pumps). • Accidental spills must be reported and cleaned immediately. Contaminated soils must be removed and disposed of at a registered disposal site.

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
		• Hazardous material and chemicals should not be kept or handled within wetland areas. Hazardous substances must be kept in a demarcated area on an impervious surface. Any spillages from hazardous materials should be cleaned immediately and transported to a landfill site that accepts hazardous materials. • Movement of contractors and vehicles within wetland areas should be minimised to avoid compaction of sediment and water pollution. • Soil erosion must be managed as an ongoing concern throughout the development process. • Appropriate stormwater / surface water management measures must be put in place before construction commences. The measures implemented must be maintained. • An appropriate number of chemical, portable, toilets (1 toilet for every 20 workers) must be provided for labourers during the construction phase. These must be maintained in a satisfactory condition and be located outside of the wetland areas and the associated 32m buffer areas. • Hydrocarbons should be stored in a bunded storage area; Spill-sorb or similar type product must be used to absorb hydrocarbon spills if such spills should occur. • Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums and must not be allowed to enter watercourses. • The construction camp should be positioned on previously disturbed areas (if possible) and outside of the wetland areas and the associated 32m buffer areas. • Vehicles should be serviced on a regular basis to avoid leaks and spills. • Re-vegetation must be completed using the appropriate wetland/endemic plants. Where possible, the vegetation must be removed intact to ensure that it can be planted again during rehabilitation.

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
		• Where vegetation is removed, the compaction of wetland soils must be minimised to avoid an increase in surface runoff speeds.
Air quality and noise pollution	• In terms of the Screening Report, the study area is situated within the "Air Quality Highveld Priority" area. • Potential dust generation from soil stripping, excavations, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality. • Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; and • Dust and noise will be created during the construction phase, which may impact on the local community.	• The Sikhululiwe Village access road will improve current dust pollution generated by the D684 gravel road, as the road will be surfaced. The road will therefore not contribute to additional Air Quality issues already experienced in the study area. The study area is very dusty. Currently mine vehicles are travelling along the D684 gravel road and causes excessive dust pollution. The adjacent landowners and the resident of the Village are currently exposed to excessive dust pollution. • All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust, and possible leaks to a minimum, as per the requirements of the EMPr (Appendix C). • Road dampening should be undertaken to prevent excess dust during construction. • Operational Hours: No works shall be executed between sunset and sunrise and on the non-working and special non-working days as stated in the Contract Data unless otherwise agreed between the Engineer and Contractor; and • Construction personnel should be made aware of the need to prevent unnecessary noise such as hooting and shouting. • Equipment should be operated within its specifications and capacity and should not be overloaded. • No amplified music will be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. will not be permitted unless at a level that does not serve as an intrusion to adjacent landowners. • The Contractor will take preventative measures (e.g., screening, muffling, timing, pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools. • Heavy vehicles and machinery should be serviced regularly to minimise exhaust fume pollution.

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
		• Soil stockpiles will be located in sheltered areas to limit the erosive effects of the wind. • Removal of vegetation will be avoided until such time as soil stripping is required. • Limit vehicle speeds on dirt road deviations to 40km/h.
Traffic	• During the construction phase, construction vehicles will travel to and from the site delivering construction materials. This will have an impact on traffic volumes in the area. • Road deviations and "stop and go" points will have an impact on traffic as it will slow down normal traffic flows. • Non-construction related heavy vehicles using the road deviations could cause traffic hazards when not abiding to temporary road signage for construction purposes	• Provide enough heavy vehicle storage areas in the proposed construction camp. • Ensure that all road diversions and closures are clearly marked, and appropriate road signage displayed. • Ensure that vehicle traffic which may obstruct traffic flow is scheduled outside of peak travelling time in the morning or afternoon. • Ensure that heavy / large load traffic is appropriately routed, and appropriate safety precautions are taken to prohibit road collisions and traffic incidences. • Ensure that vehicle operators are suitably licensed, have had appropriate environmental and safety induction, are aware of specific site procedures, and are well rested and cognisant when operating heavy or unsafe vehicles / machinery • The proposed new section of road will also cross a Transnet Railway line, at an existing level crossing. Traffic calming measures will be implemented to improve the existing traffic and pedestrian safety measures.
Visual	• The removal of vegetation, construction equipment, stockpiles and activities undertaken during the construction phase may have a negative visual impact on the adjacent residential area	• Advertising and lighting will be in accordance with the Mpumalanga Department: Public Works, Roads and Transport requirements and will not constitute an eyesore / hazard to users of the road. • Lighting will be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas. • The site will be shielded from the adjacent landowners to minimise the visual impact where this is feasibly possible.
Waste	• There is potential for the site and surrounding areas to become polluted if construction activities are not properly	• An appropriate number of chemical, portable, toilets (1 toilet for every 20 workers) must be provided for labourers during the construction

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
	managed (e.g., oil / bitumen spills, litter from personnel on-site, sewage from ablutions etc.); and • Waste generation could be created by the following: ○ Solid waste - plastics, metal, wood, concrete, stone, asphalt. ○ Chemical waste- petrochemicals, resins, and paints; and ○ Sewage generated by employees.	phase. These must be maintained in a satisfactory condition and be located outside of the wetland areas and the associated 32m buffer areas. • All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is encouraged. • All solid waste must be disposed of at a registered landfill site and records maintained to confirm safe disposal. • Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site. • It must be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction. • Chemical waste must be stored in appropriate containers and disposed of at a licensed disposal facility. • Portable sanitation facilities must be erected for construction personnel. Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and serviced regularly to prevent contamination of the wetlands. • The construction site must be inspected for litter daily. Extra care should be taken on windy days. Precautions must be taken to avoid litter from entering the wetland areas. • Soil that is contaminated with, e.g., cement, petrochemicals, or paint, must be disposed of at a registered waste disposal site and is NOT to be deposited into the wetland areas. • It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within the wetland areas or the associated 32m buffer areas.

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
		• Any significant spills on-site must be reported to the relevant Authority (e.g., Department of Water and Sanitation / DARDLEA etc.) and must be remediated as per the EMPr (Appendix C).
Socio-Economic	• The local community requested new access road to the Sikhululiwe Village, and they have the made this request a long time ago. This project is very important to them. • Creation of job opportunities for skilled personnel (e.g., engineers, specialists etc.) and non-skilled personnel (e.g., labourers). • Skills development of the local community through employment opportunities. • Possible economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase. • The existing Provincial Road D684 is a gravel road, which is in a poor condition, especially in wet weather. Access to the Sikhululiwe Village is currently obtained via the D684, with no direct access between the D684 and the R104. The existing D684 currently takes an indirect route to the Village. By upgrading the D684, a surfaced road will be provided which will help with the accessibility to the Village during rainy weather. A more direct route is also proposed to decrease travel time to the village, with the establishment of a 210m new road link between the existing R104 and the D684.	• Local people should be employed where possible. • A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community. The Local Ward Councillor, Cllr Johan Matshiane is very involved with the Local Community, and he will act as the Community Liaison Officer.
Existing infrastructure disturbance	• In terms of the DFFE Screening Assessment the project is situated within Strategic Gas Pipeline Corridors Phase 8: Rompco (Republic of Mozambique Pipeline Company) Pipeline Corridor. • The proposed new section of road will cross a Transnet Railway line, at an existing level crossing. Suitable traffic	• It will be investigated during the Public Consultation Phase whether the project will have an impact on the Gas Pipeline, and the necessary mitigation measures will be discussed with Rompco. • Avoid damage or disturbance to all existing structures and infrastructures where possible

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
	measures will be implemented to improve the existing traffic and pedestrian safety measures. • Damage to fences, or other existing structures or infrastructure could occur during the construction phase.	• Notify appropriate stakeholders as soon as possible, e.g., Eskom, Telkom and Transnet of any disturbances that may occur during the construction phase. Wayleaves must be obtained for the undertaking of construction activities within servitudes. • No-go areas must be demarcated prior to construction commencing. • Cognisance must be taken of existing infrastructure and services. • Any affected persons must be notified of construction progress, intention, and duration at least one week prior to the construction activities being undertaken at any affected premises.
Safety and security	• There is potential for construction labour to trespass onto neighbouring properties. • Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users and residents. There are many pedestrians that walks along the D684. • Cattle were observed along the D684 during the day of the audit. It is assumed that the cattle are owned by residents staying in the village, and their cattle graze the vacant land adjacent to the village.	• Any construction personnel found to be trespassing must be subjected to a disciplinary hearing. • Construction worker's / construction vehicles must take heed of normal road safety regulations; thus, all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual. • A designated speed limit must be set by the developer to limit possible road collisions. • Traffic calming measures should be provided where necessary to ensure pedestrian safety. • Signage should be displayed to warn road users of the grazing cattle.
Heritage & Palaeontological	• The potential impact of the development on fossil heritage is VERY HIGH and therefore a field survey was necessary for this development (according to SAHRA protocol). A Phase 1 Palaeontological Impact Assessment: Field Study was done. A Phase 2: Mitigation will be recommended if the Phase 1: Field Study finds fossils or if fossils are found during the development. • Threats are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in, disturbance,	• Mitigation will be needed if fossils are found during the construction. • No consultation with parties was necessary. The Environmental Control Officer must familiarise him- or herself with the formations present and its fossils. • The development may go ahead with caution. • The ECO must survey for fossils before and or after clearing, blasting, drilling, or excavating. • The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance

CONSTRUCTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
	damage or destruction of the fossils by development, vehicle traffic, and human disturbance." • "Special care must be taken during the digging, drilling, blasting, and excavating of foundations, trenches, channels and footings and removal of overburden not to intrude fossiliferous layers. • There is a burial site located near new road to be constructed. The burial site can be damaged during the construction phase.	fossil find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation. • SAHRA requires a 30m buffer between a burial site and any other development (excluding mines which requires a 100m buffer). When considering the design specifications of the proposed new section of road, a buffer zone around the burial site would not be feasible due to the following reasons: o It is located at the current railway crossing and Transnet is unwilling to create a new crossing. o Due to the curvature of the railway line and the location of shunting lines (related to the grain silos at Arnot Station), finding an alternative crossing would be very difficult. o For safety purposes the railroad and road should have a 90° crossing. Based on the above, the Heritage Specialist made the following recommendation: o It is proposed that the buffer zone on the eastern side of the burial site, i.e., closest to the road, is foregone and that instead a brick wall is erected in the place of the wire fence. This wall can then also serve as a billboard where a site notice can be added cautioning drivers to be careful when passing the site. An Application was submitted to SAHRA to have the 30m buffer relaxed, which included the recommendations made by the Heritage Specialist. SAHRA issued an official letter (Attached to Appendix C of this Basic Assessment Report), in which they have indicated that they will only decide on the relaxation of the buffer based on the review of the Draft Basic Assessment Report.

Table 21: Assessment of the Pre-Construction and Construction Phase Impacts

	Nature of project impact	Spatial extent		Severity / intensity /		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation	Positive or Negative Impact
		Without	With	Without	With	Without	With		Without	With	Without	With			
CONSTRUCTION PHASE IMPACTS	Soil impacts	3	2	5	2	3	1	5	3	1	1	0.2	19	2.2	Negative
	Vegetation and fauna impacts	3	1	4	2	3	1	5	3	1	1	0.2	18	2	Negative
	Water resource impacts	4	2	4	2	3	1	6	3	1	1	0.2	20	2.4	Negative
	Air quality and noise pollution impacts	2	1	5	1	1	1	1	1	1	0.7	0.3	7	1.5	Negative
	Traffic impacts	4	2	6	3	3	1	1	1	1	0.9	0.3	13.5	2.4	Negative
	Visual impacts	3	2	6	3	3	1	1	1	1	0.9	0.3	12.6	2.4	Negative
	Waste impacts	3	1	5	1	3	1	3	1	1	0.9	0.2	13.5	1.4	Negative
	Socio-economic impacts	4	2	6	6	3	3	1	1	1	0.9	0.2	13.5	2.6	Low negative, but highly Positive
	Existing infrastructure disturbance	4	1	5	2	3	1	2	1	1	0.6	0.1	9	0.7	Negative
	Safety and security impacts	1	1	5	2	3	1	3	3	1	1	0.2	15	1.6	Negative
	Heritage & Palaeontological impacts	2	1	6	2	7	1	7	7	7	1	0.4	29	7.2	High Negative Negative
												Overall impact significance	**15 MEDIUM**	**2 LOW**	

Significance: Based on the outcome of the significance scoring noted in Table 21, the overall significance impact expected during the construction phase without mitigation, is considered to be MEDIUM, with a score of 15. With mitigation, the overall significance impact is considered to be LOW, with a score of 2.

The greatest impacts of significance are damage to heritage and palaeontological resources, followed by impacts on the wetlands impacts. However, with the correct mitigation measures employed as noted in Table 20 and as per the EMPr (Appendix C), these impacts can be significantly reduced.

12.5. Operational Phase Impacts

Table 22: Operational phase impacts identified and associated mitigation measures

OPERATIONAL RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
Soil	• Road maintenance activities will be undertaken during the operational phase • Soil erosion will impact any unprotected soils that have suffered disturbances, including unprotected stockpiles of stored topsoil. • Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses. • Accidental hydrocarbon or oil leaks or spillages from maintenance vehicles or equipment may contaminate the soils within the road reserve. • Maintenance vehicles may also compact soils within the road reserve any may cause vegetation destruction. This will lead to soil erosion. • Blocked culverts during rainfall events could lead to soil erosion	• Erosion must be strictly controlled through the utilization of silt traps, silt fencing, Gabions, etc. This is especially pertinent within areas of steeper gradients. • Topsoil stockpiles should be protected from erosion through the utilization of silt traps, silt fencing, etc. • Care should be taken to avoid accidental leaks and spillages during the operational phase. • Road maintenance should be undertaken in line with the Mpumalanga Department: Public Works, Roads and Transport's Standard Road Maintenance Plan. • Regular maintenance of stormwater infrastructure should be undertaken to avoid erosional impacts.
Flora and fauna	• Possible disturbance of vegetation and habitat during the undertaking of road maintenance activities. • Exotic vegetation encroachment following soil disturbances during the undertaking of maintenance activities. • Blocked culverts during rainfall events could have a negative impact on	• Road maintenance should be undertaken in line with the Mpumalanga Department: Public Works, Roads and Transport's Standard Road Maintenance Plan. • Construction phase mitigation measures are applicable. • The operational phase of the development should include follow-up surveys to control the encroachment of exotic floral species.
Water Resources	• Impacts to water quality include accidental fuel/oil spills from poorly maintained equipment, accidents, or container failure, and poorly managed and/or non- bunded fuelling stations.	• No fuel to be stored at or near watercourses or waterbodies; Equipment to be properly maintained and serviced; Fuel storage and pump areas to be bunded to avoid accidental leakage;

OPERATIONAL RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
	• Water quality impacts will also occur because of unabated soil erosion during the undertaking of maintenance activities.	No refuelling should be done within the riparian zones (exceptions are made for stationery motors i.e., pumps). • Accidental spills must be reported and cleaned immediately. Contaminated soils must be removed and disposed of at a registered disposal site. • Soil erosion must be managed as an ongoing concern throughout the development process.
Waste	• There is potential for the site and surrounding areas to become polluted if maintenance activities are not properly managed (e.g., oil / bitumen spills, litter from personnel on-site, sewage from ablutions etc.); and • Waste generation could be created by the following: ○ Solid waste - plastics, metal, wood, concrete, stone, asphalt. ○ Chemical waste- petrochemicals, resins, and paints; and • Sewage generated by maintenance teams.	• All waste generated on-site during maintenance must be adequately managed. Separation and recycling of different waste materials is encouraged. • All solid waste must be disposed of at a registered landfill site and records maintained to confirm safe disposal. • Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site during the undertaking of maintenance activities. • Chemical waste must be stored in appropriate containers and disposed of at a licensed disposal facility. • Portable sanitation facilities must be erected for maintenance personnel. Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and serviced regularly to prevent contamination of the wetlands. • The maintenance site must be inspected for litter daily. Extra care should be taken on windy days. Precautions must be taken to avoid litter from entering the wetland areas. • Soil that is contaminated with, e.g., cement, petrochemicals, or paint, must be disposed of at a registered waste disposal site and is NOT to be deposited into the wetland areas. • It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical

OPERATIONAL RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
		contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within the wetland areas or the associated 32m buffer areas. • Any significant spills on-site must be reported to the relevant Authority (e.g., Department of Water and Sanitation / DARDLEA etc.) and must be remediated as per the EMPr (Appendix C).
Road and Pedestrian Safety	• There are many pedestrians that walks along the D684. • Cattle were observed along the D684 during the day of the audit. It is assumed that the cattle are owned by residents staying in the village, and their cattle graze the vacant land adjacent to the village.	• A designated speed limit must be set by the developer to limit possible road collisions. • Traffic calming measures should be provided where necessary to ensure pedestrian safety. • Signage should be displayed to warn road users of the grazing cattle.
Heritage & Palaeontological	• It is unlikely that maintenance earthworks will extend beyond the road construction earthworks, and it is therefore not anticipated that any fossils will be uncovered during the undertaking of maintenance activities, however, the impacts listed under the construction phase may be applicable. • There is a burial site located near the new road to be constructed. The burial site can be damaged during the operational phase by maintenance activities, or by road accidents.	• Mitigation will be needed if fossils are found during the maintenance phase. • The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities. For a chance fossil find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation • The Heritage Specialist suggested that a brick wall be constructed along the cemetery boundary to better protect the site, and to serve as a billboard where a site notice can be added cautioning drivers to be careful when passing the site. This wall should be maintained throughout the life of the project to ensure that the burial site is protected.

Table 23: Assessment of the Operational Phase Impacts

	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation	Positive or Negative Impact
		Without	With	Without	With	Without	With		Without	With	Without	With			
OPERATIONAL PHASE IMPACTS	Soil impacts	1	1	5	2	1	1	5	2	1	1	0.2	14	2	Negative
	Vegetation and fauna impacts	1	1	4	2	1	1	5	2	1	1	0.2	13	2	Negative
	Water resource impacts	4	2	4	2	1	1	6	2	1	1	0.2	17	2.4	Negative
	Waste impacts	3	1	5	1	1	1	3	2	1	0.9	0.2	12.6	1.4	Negative
	Road and Pedestrian Safety Impacts	1	1	5	2	1	1	3	2	1	1	0.2	12	1.6	Negative
	Heritage & Palaeontological impacts	1	1	6	2	7	1	7	7	2	1	0.2	28	2.6	High Negative
												Overall impact significance	**16 MEDIUM**	**2 LOW**	

Significance: Based on the outcome of the significance scoring noted in Table 23, the overall significance impact expected during the operational phase without mitigation, is considered to be MEDIUM, with a score of 16. With mitigation, the overall significance impact is considered to be LOW, with a score of 23.

The greatest impacts of significance are considered to be damage to heritage and palaeontological resources, followed by impacts on the wetlands. However, with the correct mitigation measures employed as noted in Table 22 and as per the EMPr (Appendix C), these impacts can be significantly reduced.

12.6. No-Go Option

Table 24: No-Go impacts identified and associated mitigation measures

NO-GO OPTION RELATED IMPACTS		
IMPACT	**DESCRIPTION**	**MITIGATION**
Road and Pedestrian Safety	• There are many pedestrians that walks along the D684. The current conditions of the D684 are such that the route is not safe. • Cattle were observed along the D684 during the day of the audit. It is assumed that the cattle are owned by residents staying in the village, and their cattle graze the vacant land adjacent to the village. • The existing Provincial Road D684 is a gravel road, which is in a poor condition, especially in wet weather. • Access to the Sikhululiwe Village is currently obtained via the D684, however, there is currently no direct access between the D684 and the R104. The existing D684 takes an indirect route to the Village. • Should the project not proceed, current conditions in site will remain. Only one impact is applicable to the no-go alternative, and this is the impact with regards to Public and Road Safety. The impact is assessed, and a significance score was applied.	• By upgrading the D684, a surfaced road will be provided which will help with the accessibility to the Village during rainy weather. A more direct route is also proposed to decrease travel time to the village, with the establishment of a link between the existing R104 and the D684. • A designated speed limit must be set by the developer to limit possible road collisions. • Traffic calming measures should be provided where necessary to ensure pedestrian safety. • Signage should be displayed to warn road users of the grazing cattle.

Table 25: Assessment of the No-Go Option

NO-GO OPTION IMPACTS	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation	Positive or Negative Impact
		Without	With	Without	With	Without	With		Without	With	Without	With			
	Road and Pedestrian Safety Impacts	4	1	6	2	7	1	7	7	1	1	0.2	31	2.4	High Negative
												Overall impact significance	HIGH	LOW	

Significance: Based on the outcome of the significance scoring noted in Table 25, the overall significance of the impact on road and pedestrian safety for the No-Go Option is expected to be HIGH, with a score of 31. With mitigation, the overall significance impact is considered to be LOW, with a score of 2.4.

12.7. Decommissioning Phase

The existing access road will not be decommissioned in the foreseeable future. These roads will become part of the Mpumalanga Road network and will remain in operation for many years to come.

13. ENVIRONMENTAL IMPACT STATEMENT AND RECOMMENDATIONS OF THE EAP

Based on the outcome of the Specialist investigations, as well as the Impact Assessment, all negative impacts associated with this project will be of low significance with the implementation of mitigation measures as provided in the Impact Assessment and the EMPr (Appendix C). With the implementation of mitigation measures, none of the impacts will have adverse or long-term environmental impact on the surrounding environment.

It should be noted that the outcome of the Public and Commentary Authority Consultation Phase are not yet included in this Draft Basic Assessment Report, as this Report will be made available for Public and Commentary Authority review at the same time as this Draft Report is reviewed by DARDLEA. The outcome of the Public and Commentary Authority Consultation Phase may alter the Environmental Impact Statement, as comments may have an impact on the outcome of the Impact Assessment.

The informal cemetery must be preserved. A brick wall must be constructed around the perimeter of the cemetery to protect it during the construction and operational phase, as was suggested by Dr Johnny van Schalkwyk, the Heritage Specialist.

SAHRA requested the Draft Basic Assessment report before they decide on the relaxation of the standard buffer zone. It is not known at this stage whether SAHRA will relax the 30m development buffer required between the cemetery and the proposed new section of road. Should SAHRA not completely relax this buffer, the alignment of the proposed new road section will have to be amended, and this may have an impact on the Impact Assessment, and potentially may affect additional landowners, which means that the outcome of the Public Consultation Phase may also change.

The study area falls within a highly sensitive palaeontological area, which means that fossils may occur. Special precaution must be taken during the construction phase to ensure that fossils that may be uncovered are not damaged or destroyed, and the necessary steps must be taken to preserve these fossils.

The following was mentioned in the Surface Water Ecosystems Ecological, Delineation and Impact Survey Report:

- *No alignment alternatives were presented for analysis at the time of the survey. As the new road section has been shown to impinge on a wetland unit (as shown in Figure 17), the ecological functionality of the wetland unit would benefit from a slight shift in alignment to accommodate this feature. The alignment as presented does not, however, constitute a fatal flaw as the wetland unit has suffered a considerable loss of function due to historical land use and infrastructure development."*

As the alignment of the proposed new section of road is not fatally flawed, and as the wetland was already altered, a change in the route alignment is not required at this stage. The outcome Geotechnical Investigation may suggest an amendment to the alignment as construction in the wetland may impose additional construction costs. Again, the SAHRA 30m development buffer may have an impact on the alignment of the proposed new road section.

In terms of the DFFE Screening Assessment the project is situated within Strategic Gas Pipeline Corridors Phase 8: Rompco (Republic of Mozambique Pipeline Company) Pipeline Corridor. It will be investigated during the Public Consultation Phase whether the project will have an impact on the Gas Pipeline, and the necessary mitigation measures will be discussed with Rompco.

In terms of the Screening Report, the study area is situated within the "Air Quality Highveld Priority" area. The Sikhululiwe Village access road will improve current dust pollution generated by the D684 gravel road, as the road will be surfaced. The road will therefore not contribute to additional Air Quality issues already experienced in the study area.

Positive impacts associated with construction include:

- Skills development and knowledge transfer in the surrounding area through job creation during the construction phase; and
- Provision of a safe access road to the Sikhululiwe Village vehicles and pedestrians.
- The local residents will have the new safer and direct access route which they have been requesting for a very long time.

It is perceived that these positive impacts identified will be long term and will have sustainable benefits.

Rehabilitation of the D684 and the proposed new section of road should be undertaken in line with the requirements of the EMPr as well as the conditions of the Environmental and Water Use Authorisation, should the outcome of these application processes be favourable. The Environmental Manager (either the contractor's Environmental Manager, or an Environmental Manager appointed by the MDPWRT must be on site fill time during the construction phase to monitor construction within the wetland areas, and chance fossil finds, etc.

After the construction phase of the project, the contractors must ensure that all hazardous materials are removed from the site and that rehabilitation of land is undertaken according to the requirements of the EMPr (Appendix C).

14. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED (CONSIDER WHEN THE ACTIVITY IS EXPECTED TO BE CONCLUDED)

The Environmental Authorisation Application was completed and ready for submission in March 2022. However, to date, consent from Transnet as affected landowner have not been received. Although this is a linear project, which do not require Landowner Consent, the project involved the upgrading of an existing road for which a road reserve does not exist.

The Wayleave Application to Transnet was already submitted in 2021, but no Wayleave was issued to date. Construction needs to commence urgently, and the client requested JG Afrika (Pty) Ltd to submit the application.

JG Afrika (Pty) Ltd and the client will liaise with the assigned case officer regarding a shortened review timeframe of the Final Basic Assessment Report. If a shorter review period is possible and allowed, construction will commence at the end of May 2023. This is however dependent on an Environmental Authorisation being issued or not.

15. UNDERTAKING

JG Afrika (Pty) Ltd hereby confirms that the information provided in this report is correct at the time of compilation.

JG Afrika (Pty) Ltd further confirms that all comments received from Stakeholders and IAPs will be included in the Final BA Report submitted to the DARDLEA. Should substantial comment be received on the Draft Basic Assessment Report from Stakeholders and IAPs, the Final Basic Assessment Report will also be made available for a 30-day review period prior to submission of the Final Report to DARDLEA.

For JG Afrika (Pty) Ltd:

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SNR ENVIRONMENTAL SCIENTIST	**SNR ENVIRONMENTAL SCIENTIST**
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16. REFERENCES

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APPENDIX A:

PROJECT MAPS

APPENDIX B:

PRELIMINARY ROAD DESIGN AND CONSTRUCTION METHODOLOGY

APPENDIX C:

EMPR

APPENDIX D:

SPECIALIST REPORTS

APPENDIX E:

PUBLIC PARTICIPATION INFORMATION

APPENDIX F:

WATER USE LICENSE(S) AUTHORISATION, SAHRA INFORMATION, SERVICE LETTERS FROM MUNICIPALITIES, WATER SUPPLY INFORMATION

APPENDIX G:

EAP CV AND QUALIFICATIONS

APPENDIX H:

OTHER INFORMATION