

FINAL BASIC ASSESSMENT
REPORT

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**THE UPGRADE OF THE R37 FROM
MODIKWA MINE TO
BURGERSFORT**

**Prepared for the South African
National Roads Agency Soc
Limited**

1 March 2018



THE UPGRADE OF THE R37 FROM MODIKWA MINE TO BURGERSFORT

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1. DETAILS OF EAP AND EXPERTISE

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a. The qualifications of the EAP

Dr Josephine Bothma has a PhD in Environmental Management. Please find a CV of the EAP and proof of qualification included in Appendix A.

b. Summary of the EAP's past experience

The Environmental Assessment Practitioner (EAP) has the appropriate skills and experience to undertake the required studies for the proposed project. Dr Bothma has:

- Experience in environmental studies for linear project and borrow pits and quarries.
- The EAP is registered as an Environmental Assessment Practitioner with EAPSA with registration number 0082/06.
- Proven ability to timeously produce thorough, readable and informative documents.
- Adequate recording and reporting systems to ensure the preservation of all data gathered.
- A good working knowledge of all relevant and applicable policies, legislation, guidelines, norms and standards.
- The EAP does not have any links to engineering firms, construction companies, or financial institutions, and would be able sign the required declarations of independence to be submitted to the relevant environmental authorities.

Dr Bothma has a PhD in Environmental Management with extensive experience in the environmental field. Dr Bothma is a founder member of Chameleon Environmental since August 2006, a specialist environmental consulting company based in Pretoria, South Africa but operates nationwide. The company provides a broad range of environmental consulting services to the public and private sectors.

She has:

- » Twenty-seven (27) years' experience in the environmental field
- » Sixteen (16) years' experience in Project Management
- » Project management of large environmental assessment and environmental management projects.

2. LOCATION OF THE ACTIVITY

The project entails the upgrade of the National Route R37 between km 117.0 and km 143.87 from Modikwa Mine to Burgersfort. The total extent of the project is 25.87 km. The project is located in the Mpumalanga Province within the Tubatse Local Municipality.

The upgrade of the road will be within the R37 road reserve. The coordinates for the boundary of the project are the following:

	Latitude (S):		Longitude (E):	
• Starting point of the activity	24°	31' 04.52"	30°	08'51.89"
• Middle point of the activity	24°	37' 26.62"	30°	11'49.70"
• End point of the activity	24°	39' 55.33"	30°	18'59.27"

Please see locality plan of the project attached as Appendix B.

3. DESCRIPTION OF THE SCOPE OF THE PROPOSED ACTIVITY

It is the intention of the South African National Roads Agency Limited (SANRAL) to upgrade the National Route R37 between km 117.0 and km 142.87 from Modikwa Mine to Burgersfort. The total extent of the project is 25.87 km.

The scope of work includes the following items:

- Construct storm water drains and sub-surface drains;
- Widen the road at appropriate locations. The road is currently 7.4 m wide (3.7 + 3.7m) and will be widened with 11.8 m on both sides;
- Improve the capacity of intersections;
- Adding 2 lanes from km 117.00 to km 142.87 (4 lanes undivided);
- Widening the bridge over the Steelpoort river within the current road reserve.
- Extending or replacing 133 culverts as part of the project.

A water use licence was received from the Department of Water and Sanitation for the widening of the Steelpoort river and extension of culverts (please see Appendix F).

3.1 Technical Details

Current Road Width	Proposed Road Width	Culverts extended or replaced	Bridge widened	Upgrade km
(3.7 + 3.7m) = 7.4 m	(3.7 + 3.7m) + 11.8 m + 11.8 m = 31m	133	1 over Steelpoort river	From km 117.0 and km 142.87

4. LISTED ACTIVITIES

The following listed activities are applicable to this project:

Table 1: Listed activities applicable to project

Listed activity triggered	Reason
<p>GN R. 983, Item 19 (as amended):</p> <p>The infilling or depositing of any material of more than 10 cubic metres into, or removal or moving of soil from a watercourse.</p>	<p>The material that will be required for infilling or depositing will be approximately 3000 m³ in total.</p>
<p>GN R. 983, Item 56 (as amended):</p> <p>The widening of a road by more than 6 m where existing reserve is wider than 13.5m</p>	<p>The road will be widened by approximately 11.8 m on both sides and the reserve is 40 m wide.</p>
<p>GN R. 985, Item 10 (as amended)</p> <p>The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres</p> <p>e. Limpopo i. All areas</p>	<p>The appointed contractor could store more than 30 cubic metres of diesel at the site.</p>
<p>GN R. 985, Item 18 (as amended):</p> <p>The widening of a road by more than 4 metres, or the lengthening of road by more than 1 km</p> <p>e. Limpopo Outside urban areas (hh) Areas within a watercourse, or within 100 m of the edge of a watercourse</p>	<p>The road will be widened by 11.8 m on both sides and is within 100 of the Steelpoort river.</p>

5. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

The following legislation, policies and/or guidelines are applicable to the application:

Table 2: Legislation, policies and/or guidelines are applicable to the application

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
<p>EIA Regulations 2014 as amended GN R. 983 as amended in GN R. 327 Activities 19 and 56.</p>	<p>Listed activities triggered in terms of the EIA Regulations, 2014 as amended</p>	<p>Department of Environmental Affairs</p>	<p>4 December 2014</p>

<p>Department of Environmental Affairs Departmental Guidelines under www.environment.gov.za</p>	<p>Guidance with regard to the execution of the Basic Assessment process</p>	<p>Department of Environmental Affairs</p>	<p>2010</p>
<p>National Environmental Management Act, 1998 (Act No. 107 of 1998)</p> <p>The National Environmental Management Act, 1998 (Act No. 107 of 1998): [NEMA] was enacted in November 1998. NEMA provides for cooperative governance by establishing principles for decision-making on matters affected the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions, public participation and sustainable development.</p>	<p>General objectives of Integrated Environmental Management as set out in section 23 of NEMA taken into account</p>	<p>The National Department of Environmental Affairs</p>	<p>27 November 1998</p>
<p>Notice 509 of 2016 General Authorisations in terms of section 39 of the National Water Act (Act No. 36 of 1998) for water uses as defined in section 21 (c) and section 21 (i).</p> <p>The application for a General Authorisation in terms of the National Water Act, 1998.</p>	<p>Stream crossings and application of a general authorisation at the Department of Water and Sanitation</p>	<p>Department of Water and Sanitation</p>	<p>27 July 2016</p>

<p>National Heritage Resource Act 1999 (Act No. 25 of 1999)</p> <p>In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) comment will be obtained from SAHRA.</p>	<p>Any linear activity that exceeds 300 m in extent requires input from SAHRA.</p>	<p>South African Heritage Resources Agency (SAHRA)</p>	<p>1999</p>
<p>Regulation 15 of the Conservation Act of Agricultural Resources Act, 1983 (Act 43 of 1983)</p>	<p>Ecological study Alien vegetation identification on site</p>	<p>Department of Agriculture</p>	<p>1983</p>

6. NEED AND DESIRABILITY OF PROJECT

The following provide a motivation for the need and desirability of the activity:

<p>1. Is the activity permitted in terms of the property's existing land use rights?</p>	<p>YES x</p>	<p>NO</p>	<p>Please explain</p>
<p>The upgrade of the R37 is undertaken in terms of the South African National Roads Agency Soc Limited (SANRAL's) mandate in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The declaration of the R37 as a national road under section 40(1) of the Act creates the land use right within the declared road reserve.</p>			
<p>2. Will the activity be in line with the following?</p>			
<p>(a) Provincial Spatial Development Framework (PSDF)</p>	<p>YES x</p>	<p>NO</p>	<p>Please explain</p>
<p>The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL and the development is not bound by the Municipality's PSDF in order to continue.</p>			
<p>(b) Urban edge / Edge of Built environment for the area</p>	<p>YES x</p>	<p>NO</p>	<p>Please explain</p>
<p>The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL and the development is not bound by the Municipality's urban edge in order to continue as it is not a residential development or municipal road development.</p>			

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES x	NO	Please explain
The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL and the development is not bound by the Municipality's IDP in order to continue as it is not a residential development or municipal roads development.			
(d) Approved Structure Plan of the Municipality	YES x	NO	Please explain
The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL and the development is not bound by the Municipality's approved structure plan in order to continue as it is not a residential development or municipal roads development.			
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO x	Please explain
The approval of this application will not compromise the integrity of the existing environmental management priorities for the area and it can it be justified in terms of sustainability considerations. No significant long term impact is foreseen as a result of the rehabilitation of the road.			
(f) Any other Plans (e.g. Guide Plan)	YES	NO x	Please explain
No significant long term impact is foreseen as a result of the upgrade of the R37.			
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES x	NO	Please explain
The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL. The development is not bound by the Municipality's approved SDF in order to continue as it is not a residential development or municipal roads development.			

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES x	NO	Please explain
The area is in dire need of this project and it is a societal priority as numerous accidents occur on the R37 in this area every year with associated loss of lives.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	YES x	NO	Please explain
The contractor, once appointed through the tender process with SANRAL, will decide on the water, sewage and waste disposal services during the time of construction. The relevant contractor will negotiate with the relevant local Municipality for provision of these services.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	YES x	NO	Please explain
The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL. The development is not bound by the Municipality's infrastructure planning in order to continue.			
7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO x	Please explain
The upgrade of the R37 became important as a result of the deterioration of the road and the numerous accidents that occur in this area every year with associated loss of lives.			
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES x	NO	Please explain
The R37 is an existing national road and will be widened in terms of SANRAL's mandate in terms of the South African National Roads Agency Limited and National Roads Act, 1998.			
9. Is the development the best practicable environmental option for this land/site?	YES x	NO	Please explain
The upgrade of the R37 will be conducted within the R37 road reserve. The potential impacts related to the activity were assessed together with specialist engineering and environmental input and the best practicable environmental option and mitigation measures recommended in the report.			

10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES <input checked="" type="checkbox"/>	NO	Please explain
The benefits of the proposed development will outweigh the negative impacts as the local communities and road users are in dire need of this project as a result of the severe safety risk if the R37 is not widened with associated loss of lives. The R37 will, therefore, be widened with a low impact to the environment but a high positive impact to the community and traveling public.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO <input checked="" type="checkbox"/>	Please explain
The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL. This development will therefore not set a precedent for similar activities as it is not bound by the Municipality's infrastructure planning in order to continue.			
12. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO <input checked="" type="checkbox"/>	Please explain
It is not foreseen that any person's rights will be negatively affected by the proposed activity as no community displacement will take place. A public participation process was followed and the comments and concerns taken into account during the environmental process.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	YES	NO <input checked="" type="checkbox"/>	Please explain
The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa in terms of the South African National Roads Agency Limited and National Roads Act, 1998. The R37 is a national road and falls within the jurisdiction of the SANRAL and the development is not bound by the Municipality's urban edge in order to continue as it is not a residential development or municipal road development.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	YES	NO <input checked="" type="checkbox"/>	Please explain
This project is not included in any of the SIP projects.			
15. What will the benefits be to society in general and to the local communities?			Please explain
<p>The upgrade of the R37 offer several benefits to society in general, including:</p> <ul style="list-style-type: none"> • Decrease accidents due to narrow road being widened and at grade intersection safety enhancement; • Safer driving conditions for the road users as the extended road surface will provide opportunities to pass heavy vehicles. Turn movements and safety at the intersections will improve; • With the upgrade of the road, less maintenance on vehicles are anticipated; • Improved traffic flow, particularly during peak periods; • Reduced congestion; • Improved drainage and other services. 			

16. Any other need and desirability considerations related to the proposed activity?	Please explain
<ul style="list-style-type: none"> • Employment opportunities for the local residents during construction. • Less accidents and associated loss of lives. • Improved drainage and other services. • Drainage channels will be improved. 	
17. How does the project fit into the National Development Plan for 2030?	Please explain
<p>The SANRAL is given the power to perform all strategic planning, as well as the planning, design, construction, operation, management, control, maintenance and rehabilitation of all national roads in South Africa. The R37 is a national road and falls within the jurisdiction of the SANRAL in terms of the South African National Roads Agency Limited and National Roads Act, 1998.</p>	
18. Description of how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	
<p>The following general objectives of integrated environmental management have been taken into account:</p> <ul style="list-style-type: none"> a) Identified, predicted and evaluated the actual and potential impact on the environment as a result of the upgrade of the R37 as well as the socio-economic conditions and cultural heritage, b) Investigated alternatives and options for mitigation of activities, with a view to minimizing negative impacts. c) Maximizing benefits to the environment as a result of the upgrade of the R37; d) Ensured that the effects of activities on the environment received adequate consideration before actions are taken in connection with them; e) Ensured adequate and appropriate opportunity for public participation in decisions that may affect the environment; f) Ensured the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment; and g) Identified and employed the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2 of the NEMA. 	

19. Description of how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The following have been taken into account:

- Identified all potential activities and associated environmental risks associated with the proposed project;
- Consideration of all relevant ecological, social and economic factors in development;
- Minimised adverse environmental impacts, pollution or degradation of the environment;
- Avoiding or minimising the disturbance to ecosystems;
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- That the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- That waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- That the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
- That the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions;
- That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.
- Promotion of community participation through an extensive and open public participation process with I&APs;
- Delivery of high quality information to government and other decision-makers in order to enable them to make informed decisions regarding the project and avoid unnecessary project delays.

7. ALTERNATIVES CONSIDERED

Motivation for preferred site: The R37 is an existing single carriage way national road and will be upgraded to a 4 lane dual carriageway from km 117.0 to km 143.87.

This is an existing road that will be widened and no other site alternative is applicable to this project.

Activity alternative were considered for this project.

- a. **Preferred activity alternative:** Two lanes will be added to the existing lanes from km 117.0 to km 142.87 and the base and sub base will be repaired by means of deep in-situ recycling (200 mm) with a 35 mm Asphalt overlay and a UTFC cover.
- b. **Activity Alternative 1:** The existing 2 lanes from km 117.0 to km 142.87 will be overlaid with a 30 mm asphalt overlay on 150 mm G1 material.

No-go Alternative

Should the road not be upgraded, the traffic on the R37 could experience increasingly unsafe driving conditions. The road pavement is already in a very poor condition and the vertical and horizontal alignments of the road need to be upgraded to ensure the safety of the traveling public. This will also accommodate the predicted increase in traffic volume and avoid high driver frustration. The cost of maintenance will be very high with this alternative.

The current high volumes of heavy vehicle traffic between Polokwane and Burgersfort is a major safety and capacity concern. The volume of heavy vehicles is expected to increase significantly over the next 20 years. Traffic volumes and design principals determine that the road needs to be upgraded to ensure the safety of the traveling public. If this is not done, it is anticipated that accidents on this road will increase in future.

Please see facility illustrations in Appendix C.

7.1 Details of Public Participation Process Followed

A public participation process was undertaken in accordance with the EIA Regulations, 2014, as amended.

The public participation and communication process aims to identify issues in order to maximise the social and environmental benefits, and to minimise the social and environmental costs of the proposed project.

Interested and affected parties (I&APs) were consulted and afforded the opportunity to participate. The I&APs were informed and involved in the project from the outset in order to promote participation and transparency.

The aim of this public participation process is to achieve the following broad goals:

- identification of all key I&APs and stakeholders;
- the active involvement of all I&APs with respect to decision making;
- an exchange of information relevant to the proposed project through Background Information Documents (BID), consultations and newspaper advertisements.
- the development of an understanding with regards to the broader project objectives and goals and knowledge of the project; and
- the identification of issues and concerns with regards to all potential alternatives associated with the proposed development.

The following approach was followed in undertaking the public participation process:

a. Identification of and Consultation with I&APs

The first step in the public participation process was to identify the key I&APs. A list of the registered I&APs is attached as Appendix D.

b. Advertising

In accordance with the EIA Regulations, 2014, as amended an advertisement was placed requesting I&APs to register their interest in the project. An advertisement was placed in the Capricorn Voice of 9 August 2017. A copy of the advertisement is included in Appendix D.

c. Site Notice

Site notifications in English in A2 format requesting comments or objections were placed on site on 2 August 2017 and at the Municipal office in Burgersfort. Photographs of the site notices are included in Appendix G.

d. Notification Letter and Background Information Document

Notification letters about the project and a Background Information Document were sent out to the particular Ward Councillors, Government Departments that would be relevant to this project and the affected landowners are included in Appendix D.

e. Comments and Response Report

A comments and response report was drafted that included all the issues raised by the Interested and/or Affected Parties as well as the responses to the issues raised. The Comments and Response report is included in Appendix D.

f. Local Authority Involvement

Letters were forwarded to the Tubatse Local Municipality. The letters are included in Appendix D.

g. Review of Draft Basic Assessment Report

The Draft Basic Assessment Report was made available to the public for review and comment, within an allocated 30-day period. A copy of the report was available to I&APs at the following venue:

- a. Burgersfort public library, Cnr Kort and Sedibe roads.

7.2 Summary of issues raised by I&APs

Table 3: Summary of Issues raised by I&APs

Interested and Affected Parties	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and Paragraph Reference in This report Where the Issues and or Responses were incorporated.
<u>AFFECTED PARTIES</u>				
Landowner/s				
The South African National Roads Agency Soc Limited	No comments received	No issues raised	No response necessary	None required
Lawful occupier/s of the land				
There are no lawful occupiers of the R37 road reserve	No comments received	No issues raised	No response necessary	None required
Landowners or lawful occupiers on adjacent properties				
Legaiseng community next to R37 Garagopola community next to R37	Meetings with Ward	Meetings were held with the communities adjacent to the	<ul style="list-style-type: none"> The PLO will source local labour once construction 	None required

	Councillors 15, 29 and 30 October 2017	R37 project. The following issues were raised: <ul style="list-style-type: none"> • The project is supported as it will create work opportunities; • The illegal houses in the road reserve will be removed by the chiefs. 	commences. <ul style="list-style-type: none"> • Noted. The construction will not go beyond the existing road reserve boundary. 	
Municipal councillors				
Cllr MR Riba Ward 7	No comments received	No issues raised	No response necessary	None required
Cllr F Mamogale Ward 4	No comments received	No issues raised	No response necessary	None required
Cllr TT Maupa Ward 5	10 August 2017 By phone	I received the notification letter about the proposed project. Please explain the project to me.	The project entails the upgrade of the R37 from Modikwa mine to Burgersfort. The single carriageway will be upgraded to a dual carriageway.	None required
Cllr T. Maganne Ward 11	No comments received	No issues raised	No response necessary	None required
Cllr K.H Malomane Ward 19	No comments received	No issues raised	No response necessary	None required
Cllr S.E. Mosoma Ward 25	No comments received	No issues raised	No response necessary	None required

Municipality				
Mrs NP Busane Acting Municipal Manager Tubatse Municipality	No comments received	No issues raised	No response necessary	None required
Organs of state				
Ms Portia Munyai Department of Water and Sanitation	No comments received	No issues raised	No response necessary	None required
Shirley Tshamano Lithole Chief Forester: Forestry Regulation & Support (NFA) Mopani District Department of Agriculture, Forestry and Fisheries	No comments received	No issues raised	No response necessary	None required
Mr. TG Kotsedi The Interim Chief Executive Officer The Limpopo Tourism and Parks Board	14 August 2017	The Limpopo Agency has no objection to the proposed project, therefore the initiative is supported.	No response necessary	None required,
Communities				
Legaiseng community next to R37 Garagopola community next to R37	Meetings with Ward Councillors 15, 29 and 30 October 2017	Meetings were held with the communities adjacent to the R37 project. The following issues were raised: <ul style="list-style-type: none"> The project is supported as it will create work opportunities; The illegal houses in the road reserve will be removed by the chiefs. 	<ul style="list-style-type: none"> The PLO will source local labour once construction commences. Noted. The construction will not go beyond the existing road reserve boundary. 	None required

7.3 The Environmental Attributes Associated With Alternatives

The environmental attributes described below include socio-economic, social, heritage, cultural, geographical, physical and biological aspects.

a. Baseline Environment

- Topography

The topography of the study area is flat to moderately undulating plains, with some low hills and small streams scattered throughout the landscape. The average elevation is mostly between 700m to 1100m above sea level.

- Geology and Soils

The soils of the area are a complex geology with rocks mainly mafic and ultramafic intrusive rocks of the main to lower zones of the Rustenburg Layered Suite on the eastern lobe of the Bushveld Igneous Complex (Vaalian). The zones (subsuites) are dominated by concentric belts of norite, gabbro, anorthosite and pyroxenite, with localized protrusions of magnetite, chromitite, serpentinised harzburgite, olivine diorite, shale, dolomite and quartzite. Most of the area consists of red apedal soil. Deep loamy Valsriver soils are characteristic of the plains and shallow Glenrosa soils are found on the low lying, rocky hills. Patches of erodible black, melanic structured horizons are common around small mountains. Some Steendal soils are underlain by gypsum. Land types mainly Ae, Ib, Ea and Ia (Mucina and Rutherford, (eds), 2006).

- Climate

The study area is situated within a summer rainfall area with very dry winters. The mean annual rainfall for the area is approximately 400mm – 600mm per annum. Frost very frequent. Mean monthly maximum and minimum temperatures 37.3°C and -0.9°C for January and June respectively (Mucina and Rutherford, (eds), 2006).

- Land cover

The landcover or landuse of the region is predominantly agriculture and urban centres, with infrastructure such as roads and power lines. Mining is also a prominent land use in the region. The site is within an area of low-level urbanisation (agricultural holdings) with levels of cultivation and grazing.

- Vegetation

South Africa is divided up into nine Biomes. The study area and the surrounding region fall within the Savanna Biome, which is also known as the Bushveld Biome. Savanna vegetation types tend to have a mix of a lower grassy layer, middle shrub layer and an upper woody layer. The mix and ratio of the three layers varies from veldtype to veldtype within the Savanna Biome.

The Savanna Biome is subdivided into six bioregions, namely, Central Bushveld, Mopane, Lowveld, Sub-Escarpment Savanna, Eastern Kalahari Bushveld and Kalahari Duneveld (Mucina & Rutherford, 2006). The study area is found within the Central Bushveld Bioregion of the Savanna Biome. According to Mucina & Rutherford (2006) the study area is situated within a single veldtype, namely Sekhukhune Plains Bushveld.

- **Vegetation of the study area**

The vegetation of the region and study area is characteristic of Sekhukhune Plains Bushveld. The vegetation and associated landscape features of the region is that of semi-arid plains and open valleys between chains of hills and small mountains running parallel to the escarpment. Predominantly short, open to closed thornveld with an abundance of Aloe Species and other succulents. Heavily degraded in places and overexploited by man for cultivation, mining and urbanization. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous (small, compound-leaves) trees and invasion by alien species is common throughout the area (Mucina and Rutherford, (eds), 2006).

A number of Marula trees (*Sclerocarya birrea*) occur within the road reserve that will need to be relocated. A permit was obtained from the Department of Agriculture, Forestry and Fisheries for the removal of the trees. Please see the permit attached in Appendix F.

- **Air Quality**

The region is considered rural and the air quality good. The R37 could affect the air quality negatively.

- **Noise**

The current noise levels are high due to the presence of heavy traffic on the R37 to and from Polokwane.

- **Visual**

The area within the current road reserve is heavily degraded with alien species prevalent.

- **Sites of Archaeological and Cultural Interests**

There is a large community cemetery with approximately 200 graves next to the road reserve at coordinates -24.63121, 30.23357 on the right hand side of the road travelling to Polokwane. The grave site will not be affected at the widening of the road will not take place outside of the existing road reserve.

- **Socio-Economic Aspects**

The project would have a positive impact on the regional socio-economic structure through its support of the development industry, profit generation contributing to tax revenue, job creation and the skills development of its employees.

- **Sensitive Landscapes**

The following are considered sensitive landscapes associated with the project:

- The Steelpoort river.

- Large community cemetery at coordinates -24.63121, 30.23357 next to the road reserve on the right hand side of the road travelling to Polokwane.

Please find a sensitivity plan included in Appendix B.

- Cumulative Impacts

The cumulative impacts associated with the upgrade of the road could be the following (based on experience with regard to other major road upgrade projects in the Limpopo province):

- Additional traffic on the local roads during construction;
- Possible time delays as a result of construction period;
- Possible influx of people searching for employment opportunities in the area during construction.

7.4 Impacts and Risks Identified

The **potential** impacts associated with the project and the degree to which these impacts can be reversed, may cause irreplaceable loss of resource and can be avoided, managed or mitigated are the following:

Table 4: Potential Impacts

Potential Impact	Reversed Y/N	Irreplaceable loss	Avoided, Managed, Mitigated
Dust Nuisance	Yes	No	Mitigated
Soil Erosion	Yes	No	Avoided, Mitigated
Loss of topsoil	No	Yes	Avoided
Noise Impact	Yes	No	Avoided, Mitigated
Water Pollution	Yes	No	Avoided, Mitigated
Visual Impact	Yes	No	Avoided, Mitigated
Clearing of protected trees	No	No	Managed, Mitigated
Mammals and snakes in road reserve	No	No	Managed, Mitigated
Uncovered heritage sites and graves	Yes	No	Managed, Mitigated
Contamination of site due to hydrocarbon spillage	Yes	No	Avoided, Managed
Emissions from heavy vehicles	Yes	No	Avoided, Managed
Infestation of weeds and alien vegetation	Yes	No	Managed, Mitigated
Possible pollution of solid waste	Yes	No	Managed, Mitigated
Possible sewage	Yes	No	Managed, Mitigated

pollution			
Possible pollution of fuels and gas as a result of inadequate storage	Yes	No	Managed, Mitigated
Possible pollution by cement or concrete	Yes	No	Managed, Mitigated

7.5 Methodology Used in Determining Impacts

Potential environmental impacts on the environment will be determined in terms of the following in order to determine the significance of each impact:

Nature:

A brief description of the environmental aspect being impacted upon by a particular action or activity is presented. Also:

- Probability (how likely is it that the impact will occur?)
- Magnitude (how severe will the impact be?)
- Duration (how long will the impact last?)
- Scale of the impact (what size of the area will be affected?)

Thereafter, mitigation measures will be proposed in order to reduce or eliminate negative impacts and enhance positive impacts. The impact of the proposed activity on the environment will be considered for the pre- construction, construction and operational phases. The necessary mitigation measures will be consolidated in the form of an Environmental Management Programme (EMPr).

Assessment of significance – method:

The significance of every environmental impact identified will be determined using the following approach:

In assessing the potential significance of an impact two aspects will be considered:

- i) Occurrence
- ii) Severity
 - Occurrence will be sub-divided into:
 - Probability of occurrence
 - Duration of occurrence
 - Severity will be sub-divided into:
 - Magnitude (severity) of impact
 - Scale/extent of impact

In order to assess each of these factors for each impact, ranking scales were employed as follows:

Probability:
5 - Definite/don't know
4 - Highly probable
3 - Medium probability
2 - Low probability
1 - Improbable
0 - None

Duration:
5 - Permanent
4 - Long-term*
3 - Medium-term (5-15 years)
2 - Short-term (0-5 years)
1 - Immediate
0 - None

Scale:
5 - International
4 - National
3 - Regional
2 - Local
1 - Site only
0 - None

Magnitude:
10 - Very high/don't know
8 - High
6 - Moderate
4 - Low
2 - Minor
0 - None

*impact ceases after operational life of the activity

Once the above factors had been ranked for each impact, the overall risk (environmental significance) of each impact will be assessed using the following formula: $SP = (M + D + S) \times P$. The maximum value is 100 significance points (SP). Environmental impacts will be rated as either of High, Moderate or Low significance on the following basis:

SP greater or the same as 60 indicates high environmental significance;
SP 31 greater or the same as 59 indicates moderate environmental significance;
SP \leq 30 indicates low environmental significance.

Risks associated with alternatives: The risks associated with the alternatives are deemed to be low.

7.6 Positive and Negative Impacts and Assessment

The following table provides the positive and negative impacts associated with the project and the impact assessment undertaken. The mitigation measures are also included in the table.

Table 5: Positive and Negative Impacts and Assessment

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
AIR AND DUST POLLUTION														
Possible air and dust pollution	<p>Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p>Operational Phase: Excavations, Stockpiling and Transporting of gravel material</p> <p>Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	2	2	4	40	M	<ul style="list-style-type: none"> Dust will be suppressed through a watering management programme, especially during windy conditions. Dust generated will be carefully monitored by the OHS&E and should be suppressed by means of watering regularly. Access roads will be watered regularly, especially in the dry winter months and in periods of high wind. Vegetation will not be unnecessary stripped. Domestic fires will be prohibited on site. Heavy vehicle will be serviced regularly to ensure emission control. 	2	2	3	1	8	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION						
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	S P	
								<ul style="list-style-type: none"> All heavy vehicles, excavators and generators used for the mining will be in good working condition and will be serviced regularly. Should a vehicle have a break down, it will be serviced immediately. 							
SOIL EROSION															
Possible soil erosion	<p>Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p>Operational Phase: Excavations, Stockpiling and Transporting of gravel material</p> <p>Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	4	2	2	2	16	L	<ul style="list-style-type: none"> Topsoil will be removed over the whole mining area and stored in a perimeter berm. The height of the topsoil berm will not exceed 3m. The topsoil berm will be inspected for erosion daily. Minimal amounts of topsoil shall be lost due to erosion, either by wind or water. This can be facilitated through the grassing of topsoil stockpiles. Condition of soil in walk or drive areas should be checked daily for erosion. Access road condition will be checked daily. 	2	2	2	2	12	L	

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	S P
								<ul style="list-style-type: none"> If erosion is noted at walk and drive areas, access road or topsoil berms, the erosion channel will be fixed by placing cut vegetation, sandbags or rocks within the erosion channel and the cause of the erosion will be mitigated through the creation of runoff channels. 						
NOISE														
Possible Noise Impact	<p>Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p>Operational Phase: Excavations, Stockpiling and Transporting of gravel material</p> <p>Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	2	2	5	50	M	<ul style="list-style-type: none"> The working hours shall be limited to between 07:00 hrs and 18:00 hrs on weekdays, and 07:00 hrs and 16:00 hrs on Saturdays, or as per contract documentation. Vehicles must be driven at a moderate speed (50 kph) on private roads. Noise generated from the trucks that transport the material and the excavator that is used to mine the material shall only be carried out during normal working hours. Extended working hours will be in 	2	2	2	5	30	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<p>accordance with contract documentation.</p> <ul style="list-style-type: none"> SANRAL shall be obligated to maintain vehicles used at the mining area in a good condition; SANRAL will be obliged to ensure that all personnel on site apply occupational health and safety requirements with respect to hearing protection. 						
VISUAL														
Possible visual impacts	<p>Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p>Operational Phase: Excavations, Stockpiling and Transporting of gravel material</p> <p>Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the</p>							<ul style="list-style-type: none"> Concurrent rehabilitation of the mining area will take place. Slopes will be rehabilitated to 1:3 to prevent dangerous vertical walls and the borrow pit will be free draining. The stockpiles shall be vegetated with an indigenous grass seed to maintain fertility. All unused material would be levelled to ensure that the mining area blends back into the existing landscape fabric. 						
		2	2	2	3	18	L		2	2	2	2	12	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
	disturbed area							<ul style="list-style-type: none"> No stockpiled material is to be retained on site. The mining area will be shaped to ensure no stockpiled heaps and that the area blends in with the existing landscape. All stockpiled topsoil and vegetative material will be spread over the bottom of the mining area to ensure proper seed bed for the re-establishment of vegetative growth. Placing a berm of topsoil along the perimeter of the mining site to obscure the visual impact of the excavation. Re-vegetation of the mining area after mining operation has ceased. Access road to be rehabilitated. 						
AQUATIC AND TERRESTRIAL ECOLOGY														
Possible impacts on terrestrial ecology	Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil,	6	2	2	4	40	M	Construction & Operation Phase • Flow continuity has already been	4	2	2	2	16	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
	subsoil, overburden and spoil Operational Phase: Excavations, Stockpiling and Transporting of gravel material Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area							affected due to channel and bed modifications from the existing R37 roadway. It is considered essential that flow continuity not be further altered in the aquatic systems present during the construction phase of the proposed development. This is necessary to ensure the on-going viability of the aquatic communities downstream of the proposed R37 expansion, which are dependent on the fair levels of flow in the system. <ul style="list-style-type: none"> • The bridge design must ensure that the creation of turbulent flow in the system is minimised, in order to prevent downstream erosion. No support pillars should be constructed within the active channel. • The duration of impacts on the stream should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will 						

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	S P
								<p>take place is minimised.</p> <ul style="list-style-type: none"> • During construction, erosion berms should be installed to prevent gully formation and siltation of the aquatic systems present. This is necessary to ensure the on-going viability of the aquatic communities downstream of the proposed expansion. • The following points should serve to guide the placement of erosion berms during the construction phase of the R37 expansion: <ul style="list-style-type: none"> o Where the track has slope of less than 2%, berms every 50m should be installed. o Where the track slopes between 2% and 10%, berms every 25m should be installed. o Where the track slopes between 10%-15%, berms every 20m should be installed. o Where the track has slope greater than 15%, berms every 10m should be installed. 						

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<ul style="list-style-type: none"> • All areas affected by construction should be rehabilitated upon completion of the construction phase of the development. Areas should be reseeded with indigenous grasses as required. • During the construction phase, no vehicles should be allowed to indiscriminately drive through the riparian areas. • No dumping of waste should take place within the riparian zone. • No fires should be permitted near the bridge construction area. • If any spills occur, they should be immediately cleaned up. • The characteristics of the stream bed are likely to be altered locally. In particular, the rock and rubble created during the construction process is likely to have sharp edges, and not the smooth surfaces that are typically associated with river rocks and pebbles. All rock and rubble must 						

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<p>be removed from the active stream channel once construction has been completed.</p> <ul style="list-style-type: none"> All alien vegetation in the riparian zone should be removed upon completion of construction. <p>Impact minimisation pertaining to ecology:</p> <ul style="list-style-type: none"> The Marula trees in the road reserve are protected tree species and permits need to be obtained for their removal. Please see permit obtained from DAFF in Appendix F. The Marula trees removed should be replaced with two new trees for every tree removed within the road reserve. The existing integrity of flora surrounding the study area should be upheld and no activities should be carried out outside the footprint of the construction areas. 						

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<ul style="list-style-type: none"> In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998, landowners are legally responsible for the control of invasive alien plants on their properties and it is therefore recommended that the declared weed and invader species be removed. Construction vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities. No fires whatsoever should be lit on the study area. No animal trapping should be allowed during construction. 						

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<ul style="list-style-type: none"> All areas of disturbed and compacted soils need to be ripped and re-profiled. <p>All areas affected by construction should be rehabilitated upon completion of construction activities. Areas should be reseeded with indigenous grasses as required. All rehabilitated areas should be rehabilitated to a point where natural processes will allow the pre-development ecological functioning and biodiversity of the area to be reinstated.</p> <p>Maintenance phase (to be implemented in defect liability period for 1 year)</p> <ul style="list-style-type: none"> Any areas where bank failure is observed should be immediately repaired by reducing the gradient of the banks to a 1:3 slope. Bank vegetation cover should be monitored to ensure that sufficient 						

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	S P
								<p>vegetation is present to bind the bankside soils and prevent further bankside erosion.</p> <ul style="list-style-type: none"> For a minimum period of three years after the proposed upgrade, active management of the upgraded section of the road should take place to remove any recruited alien vegetation. 						
HYDROCARBON SPILLAGES														
Hydrocarbon spillage	<p>Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p>Operational Phase: Excavations, Stockpiling and Transporting of gravel material</p> <p>Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	3	2	3	27	L	<ul style="list-style-type: none"> All heavy vehicles, excavators and generators used for the mining will be in good working condition. A drip tray will be available to place underneath haul vehicles while the vehicles are parked at night. Should a vehicle have a break down, it will be serviced immediately. If soil contamination with diesel and oils occurred, the spill will be cleared up promptly. If the spill is small, it will be cleaned with a spill kit. if the spill is large, a 	2	3	2	2	14	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION						
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	S P	
								<ul style="list-style-type: none"> spill clean-up company will be used to clean-up the spill; Proper functioning of heavy vehicles will be ensured. 							
ALIEN VEGETATION															
Possible alien vegetation infestation	<p>Construction Phase: Vegetation, stripping, stripping and stockpiling of topsoil, subsoil, overburden and spoil</p> <p>Operational Phase: Excavations, Stockpiling and Transporting of gravel material</p> <p>Decommissioning Phase: Sloping and Landscaping during rehabilitation, Replacing the topsoil and revegetating the disturbed area</p>	6	2	2	4	40	M	<ul style="list-style-type: none"> Every 3 months casual labour will be employed to circumnavigate the site to hand pull out known alien vegetation that may have established in the disturbed area. Special attention will be given to the perimeter topsoil berm. Casual labour will be provided with photographs of the alien vegetation that could establish. 	4	2	2	2	16	L	

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	S P
SANITATION FACILITIES														
Provision and management of sanitation facilities	All phases	8	2	2	4	48	M	<ul style="list-style-type: none"> Chemical toilet facilities shall preferably be used on site. The toilets shall be services every second week by a service provider. 	4	2	2	3	24	L
HERITAGE, ARCHAEOLOGICAL AND PALEONTOLOGICAL ISSUES														
Possible archaeological sites and graves to be affected	Construction phase	6	5	1	5	60	H	<ul style="list-style-type: none"> The large community cemetery next to the road reserve with probably more than 200 graves at coordinates -24.63121, 30.23357 on the right hand side travelling to Polokwane should be avoided. A buffer zone of 5 metres that demarcates the site with danger tape should be maintained. If an artefact or grave on-site is uncovered, work in the immediate vicinity shall be stopped immediately and it should immediately be reported to a 	6	5	1	2	24	L

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION						RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION					
		M	D	S	P	TOTAL	SP		M	D	S	P	TOTAL	SP
								<p>heritage consultant so that an investigation and evaluation of the finds can be made. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article.</p> <ul style="list-style-type: none"> The South African Heritage Resources Agency (SAHRA) shall be contacted such that an archaeological/heritage resources consultant can be appointed to record the site and excavate if necessary. Work may only resume once clearance is given in writing by the archaeologist/heritage resources consultant. 						
SAFETY														
Safety of sloped areas and safety of employees	All phases – employees Decommissioning phase – sloped areas	6	5	1	5	60	H	<ul style="list-style-type: none"> Appropriate safety clothing will be worn at all times i.e. head gear, shoes, ear plugs. 	6	5	1	2	24	L

7.7 Site Selection Matrix

The following table provides a site selection matrix of the alternatives considered:

Table 6: Site Selection Matrix

Criteria	Alternative 1	Alternative 2
Improve safety to traveling public	Yes	No
Decrease traffic accidents	Yes	No
Less maintenance of vehicles	Yes	No
Improve traffic flow	Yes	No
Reduce congestion	Yes	No
Improve drainage	Yes	No

7.8 Advantages and Disadvantages of Alternatives Considered

Preferred activity alternative: Two lanes will be added to the existing lanes on National Route R37 from km 117.0 to km 142.87 and the base and sub base will be repaired by means of deep in-situ recycling (200 mm) with a 35 mm Asphalt overlay and a UTFC cover.

- a. The advantages of Alternative 1 are the following:
 - The safety to the traveling public will be significantly improved with the 4 lane carriageway.
 - This option drastically lowers the possibilities of head-on collisions.
 - Decrease accidents are foreseen due to the narrow road being widened.
 - The safety at at-grade intersections will be enhanced.
 - This option will ensure safer driving conditions for the road users as the extended road surface will provide opportunities to pass heavy vehicles. Turn movements and safety at the intersections will improve;
 - With the upgrade of the road, less maintenance on vehicles are anticipated;
 - Improved traffic flow, particularly during peak periods;
 - Reduced congestion;
 - Improved drainage and other services.
 - It is anticipated that the road upgrade will cater for future traffic demand and will support economic growth. This will benefit the communities in the area including local residents, motorists, the road freight industry and its customers. The upgrade of the road will, therefore, ensure safer driving conditions for the traveling public by enabling vehicles to travel more efficiently and smoothly with less congestion.
 - The road reserve in this area is very degraded and the environmental impact for adding two additional lanes is deemed to be low.

- b. The Disadvantages of Alternative 1 is the following:
 - Traffic will be temporarily interrupted during the construction period.

Activity Alternative 1: The existing 2 lanes from km 117.0 to km 142.87 will be overlaid with a 30 mm asphalt overlay on 150 mm G1 material.

- a. The advantages of Alternative 2 are the following:

This option is not as expensive as the preferred Alternative as two lanes will not be added.

- b. The disadvantages of this option are the following:

- The safety to the traveling public will not be significantly improved and it is anticipated that the traffic accidents that occur on this road will not be reduced with this option.
- The possibility of head-on collisions will not be reduced with this option.
- The road will remain narrow and the number of traffic accidents is, therefore, anticipated to increase.
- The at-grade intersections will still be very unsafe for the travelling public as the turn movements and safety at the intersections will not improve.
- This option does not cater for the road surface to be extended and therefore will not provide opportunities to pass heavy vehicles.
- The traffic flow will not improve with this alternative.
- The drainage will not be improved.
- The road reserve in this area is very degraded and the environmental impact for this option is deemed to be low.

7.9 Sustainable Development

It will be attempted to implement the following:

- Compact fluorescent lights will be installed in the site offices;
- All solid waste will be separated in different containers to make recycling possible;
- Where new toilets will be installed dual flush device toilets will be installed;
- Storm water will be managed and improved to reduce erosion by installing gabion boxes;
- Where new grassing is done, it will be done by using locally indigenous vegetation;
- Training of staff will be done to implement good housekeeping. This will be done during toolbox talks.
- An ECO will address the staff on good housekeeping actions.

8. SUMMARY OF SPECIALIST REPORTS

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X Where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
<p>Phase 1 Cultural Heritage Impact Assessment: The proposed upgrade of a section of the R37 road between Modikwe mine and Burgersfort, Limpopo Province by Dr J van Schalkwyk</p>	<p>Identified heritage sites:</p> <ul style="list-style-type: none"> The large community cemetery next to the road reserve with probably more than 200 graves at coordinates -24.63121, 30.23357 on the right hand side travelling to Polokwane, should be avoided. It is still in use as new graves were noticed during the site visit. <p>Mitigation: Avoid site, maintain buffer zone of 5 metres demarcated with danger tape.</p> <p><u>Reasoned opinion as to whether the proposed activity should be authorised:</u></p> <p>From a heritage point of view it is recommended that the proposed development be allowed to continue on acceptance of the proposed mitigation measures.</p>	<p>X (all were included)</p>	<p>EMPr</p>

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X Where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	<p><u>Conditions for inclusion in the environmental authorisation:</u> 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.</p>		

9. ENVIRONMENTAL IMPACT STATEMENT

The following presents a summary of the key findings of the environmental impact assessment:

The area is severely degraded and the environmental impact is deemed to be low. The two most important environmental impacts as a result of the upgrade of the road pertain to the possible impacts to the aquatic resources, in particular the Steelpoort river and the Marula trees that are situated in the road reserve. Mitigation measures are included in the EMP to minimise the impact.

The essence of the Basic Assessment process is aimed at ensuring informed decision-making and environmental accountability, and to assist in achieving environmentally sound and sustainable development. The environmental impacts associated with the upgrade of the R37 from km 117.0 to km 142.87 are deemed to be low. No long-term environmental impact should arise. We believe that the urgency to complete the upgrade of National Road R37 due to safety concerns and no objections by Interested and Affected parties, warrants the request for urgent Authorization of this project.

The preferred alternative is favoured for the following reasons:

- The safety to the traveling public will be significantly improved with the 4 lane carriageway.
- This option drastically lowers the possibilities of head-on collisions.
- Decrease accidents are foreseen due to the narrow road being widened.
- The safety at at-grade intersections will be enhanced.
- This option will ensure safer driving conditions for the road users as the extended road surface will provide opportunities to pass heavy vehicles. Turn movements and safety at the intersections will improve;
- With the upgrade of the road, less maintenance on vehicles are anticipated;
- Improved traffic flow, particularly during peak periods;
- Reduced congestion;
- Improved drainage and other services.
- It is anticipated that the road upgrade will cater for future traffic demand and will support economic growth. This will benefit the communities in the area including local residents, motorists, the road freight industry and its customers. The upgrade of the road will, therefore, ensure safer driving conditions for the traveling public by enabling vehicles to travel more efficiently and smoothly with less congestion.
- The road reserve in this area is very degraded and the environmental impact for adding two additional lanes is deemed to be low.

9.1 Final Site Map

Please see the final site maps included in Appendix C.

9.2 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

The possible negative impacts related to the project are associated with the construction phase i.e.

- a. Dust Pollution
- b. Soil Erosion
- c. Noise Impact
- d. Visual impact
- e. Impact on terrestrial ecology (removal of Marula Trees);
- f. Impact on uncovered heritage aspects
- g. Contamination of site due to hydrocarbon spillage
- h. Emissions from heavy vehicles
- i. Water pollution

These negative impacts have a low significance and can be mitigated during the construction period.

The positive impacts associated with the project are the following:

- The safety to the traveling public will be significantly improved with the 4 lane carriageway.
- Decrease accidents due to narrow road being widened and at grade intersection safety enhancement;
- Safer driving conditions for the road users as the extended road surface will provide opportunities to pass heavy vehicles. Turn movements and safety at the intersections will improve;
- With the upgrade of the road, less maintenance on vehicles are anticipated;
- Improved traffic flow, particularly during peak periods;
- Reduced congestion;
- Improved drainage and other services.
- It is anticipated that the road upgrade will cater for future traffic demand and will support economic growth. This will benefit the communities in the area including local residents, motorists, the road freight industry and its customers. The upgrade of the road will, therefore, ensure safer driving conditions for the traveling public by enabling vehicles to travel more efficiently and smoothly with less congestion.

10. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

The following impact management measures will be implemented by SANRAL to prevent or remedy any possible pollution or degradation of the environment:

a. Possible dust and air pollution

- Dust will be suppressed through a watering management programme, especially during windy conditions.
- Dust generated will be carefully monitored by the OHS&E and should be suppressed by means of water regularly.
- The access road will be watered regularly, especially in the dry winter months and in periods of high wind.

- Vegetation will not be unnecessary stripped.
- Domestic fires will be prohibited on site.
- Heavy vehicle will be serviced regularly to ensure emission control.

b. Soil Erosion

- Topsoil will be removed over the whole mining area and stored in a perimeter berm. The height of the topsoil berm will not exceed 3m.
- The topsoil berm will be inspected for erosion daily.
- Minimal amounts of topsoil shall be lost due to erosion, either by wind or water.
- Condition of soil in walk or drive areas should be checked daily for erosion.
- Access road condition will be checked daily.
- If erosion is noted at walk and drive areas, access road or topsoil berms, the erosion channel will be fixed by placing cut vegetation, sandbags or rocks within the erosion channel and the cause of the erosion will be mitigated through the creation of runoff channels.

c. Possible Noise Pollution

- The working hours shall be limited to between 07:00 hrs and 18:00 hrs on weekdays, and 07:00 hrs and 17:00 hrs on Saturdays, or as per contract documentation.
- Vehicles must be driven at a moderate speed (50 kph) on private roads.
- Noise generated from the trucks that transport the material and the excavator that is used to mine the material shall only be carried out during normal working hours.
- Extended working hours will be in accordance with contract documentation.
- SANRAL shall be obligated to maintain vehicles used at the mining area in a good condition;
- SANRAL will be obliged to ensure that all personnel on site apply occupational health and safety requirements with respect to hearing protection.

d. Possible Visual impact

- Concurrent rehabilitation of the mining area will take place.
- The borrow pit will be rehabilitated to a 1:3 slope and the area will be free draining.
- The stockpiles shall be vegetated with an indigenous grass seed to maintain fertility.
- All unused material would be levelled to ensure that the mining area blends back into the existing landscape fabric.
- No stockpiled material is to be retained on site.
- The mining area will be shaped to ensure no stockpiled heaps and that the area blends in with the existing landscape.
- All stockpiled topsoil and vegetative material will be spread over the bottom of the mining area to ensure proper seed bed for the re-establishment of vegetative growth. Placing a berm of topsoil along the perimeter of the mining site to obscure the visual impact of the excavation.
- Re-vegetation of the mining area after mining operation has ceased.
- The access gravel road to the borrow pit will be rehabilitated and the borrow pit will be fenced following the mining of the area.

e. Aquatic and Terrestrial Ecology

The points below serve to summarise the measures deemed necessary in order to ensure protection of the aquatic resources and to ensure environmental protection during the construction phase of the proposed R37 expansion:

- Flow continuity has already been affected due to channel and bed modifications from the existing R37 roadway. It is considered essential that flow continuity not be further altered in the aquatic systems present during the construction phase of the proposed development. This is necessary to ensure the on-going viability of the aquatic communities downstream of the proposed R37 expansion, which are dependent on the fair levels of flow in the system.
- The bridge design must ensure that the creation of turbulent flow in the system is minimised, in order to prevent downstream erosion. No support pillars should be constructed within the active channel.
- The duration of impacts on the stream should be minimised as far as possible by ensuring that the duration of time in which flow alteration and sedimentation will take place is minimised.
- During construction, erosion berms should be installed to prevent gully formation and siltation of the aquatic systems present. This is necessary to ensure the on-going viability of the aquatic communities downstream of the proposed expansion.
- The following points should serve to guide the placement of erosion berms during the construction phase of the R37 expansion:
 - Where the track has slope of less than 2%, berms every 50m should be installed.
 - Where the track slopes between 2% and 10%, berms every 25m should be installed.
 - Where the track slopes between 10%-15%, berms every 20m should be installed.
 - Where the track has slope greater than 15%, berms every 10m should be installed.
- All areas affected by construction should be rehabilitated upon completion of the construction phase of the development. Areas should be reseeded with indigenous grasses as required.
- During the construction phase, no vehicles should be allowed to indiscriminately drive through the riparian areas.
- No dumping of waste should take place within the riparian zone.
- No fires should be permitted near the bridge construction area.
- If any spills occur, they should be immediately cleaned up.
- The characteristics of the stream bed are likely to be altered locally. In particular, the rock and rubble created during the construction process is likely to have sharp edges, and not the smooth surfaces that are typically associated with river rocks and pebbles. All rock and rubble must be removed from the active stream channel once construction has been completed.

- All alien vegetation in the riparian zone should be removed upon completion of construction.

The points below serve to summarise the measures deemed necessary in order to ensure protection of the aquatic resources and to ensure environmental protection during the operational phase of the proposed development.

- Any areas where bank failure is observed should be immediately repaired by reducing the gradient of the banks to a 1:3 slope.
- Bank vegetation cover should be monitored to ensure that sufficient vegetation is present to bind the bankside soils and prevent further bankside erosion.
- For a minimum period of three years after the proposed upgrade, active management of the upgraded section of the road should take place to remove any recruited alien vegetation.

Impact minimisation pertaining to ecology:

- The Marula trees in the road reserve are protected tree species and permits need to be obtained for their removal. Please see permit obtained from DAFF in Appendix F.
- The Marula trees removed should be replaced with two new trees for every trees removed within the road reserve.
- The existing integrity of flora surrounding the study area should be upheld and no activities should be carried out outside the footprint of the construction areas.
- In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998, landowners are legally responsible for the control of invasive alien plants on their properties and it is therefore recommended that the declared weed and invader species be removed.
- Construction vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities.
- No fires whatsoever should be lit on the study area.
- No animal trapping should be allowed during construction.
- All areas of disturbed and compacted soils need to be ripped and re-profiled.

All areas affected by construction should be rehabilitated upon completion of construction activities. Areas should be reseeded with indigenous grasses as required. All rehabilitated areas should be rehabilitated to a point where natural processes will allow the pre-development ecological functioning and biodiversity of the area to be reinstated.

f. Possible Impact on Uncovered Cultural or Archaeological site

- The large community cemetery with probably more than 200 graves at coordinates - 24.63121, 30.23357 should be avoided. A buffer zone of 5 metres that demarcates the site with danger tape should be maintained.
- If an artefact or grave on-site is uncovered, work in the immediate vicinity shall be stopped immediately and it should immediately be reported to a heritage consultant so that an investigation and evaluation of the finds can be made. The Contractor shall take reasonable precautions to prevent any person from removing or damaging any such article.
- The South African Heritage Resources Agency (SAHRA) shall be contacted such that an archaeological/heritage resources consultant can be appointed to record the site and excavate if necessary. Work may only resume once clearance is given in writing by the archaeologist/heritage resources consultant.

g. Possible contamination of site due to hydrocarbons spillage

- All heavy vehicles, excavators and generators used for the mining will be in good working condition.
- A drip tray will be available to place underneath haul vehicles while the vehicles are parked at night.
- Should a vehicle have a break down, it will be serviced immediately. If soil contamination with diesel and oils occurred, the spill will be cleared up promptly. If the spill is small, it will be cleaned with a spill kit. if the spill is large, a spill clean-up company will be used to clean-up the spill;
- Proper functioning of heavy vehicles will be ensured.

h. Possible establishment and spread of alien vegetation

- Every 3 months casual labour will be employed to circumnavigate the site to hand pull out known alien vegetation that may have established in the disturbed area. Special attention will be given to the perimeter topsoil berm.
- Casual labour will be provided with photographs of the alien vegetation that could establish.

i. Sanitation Facilities

- Chemical toilet facilities shall preferably be used on site. The toilets shall be serviced every second week by a service provider.

j. Emissions from heavy vehicles, excavator and generators

- All heavy vehicles, excavators and generators used for the mining will be in good working condition and will be serviced regularly.
- Should a vehicle have a break down, it will be serviced immediately.

k. Unsafe working conditions for employees

- Appropriate safety clothing will be worn at all times i.e. head gear, shoes, ear plugs.

11. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

- a. A Site Environmental Control Officer must be on site for implementation of the EMPr;
- b. All activities must take place in accordance with the approved EMPr;
- c. Should any archaeological artefact be exposed during construction activities, construction must be stopped. Under no circumstances shall any artefact be destroyed. The area must be fenced off and the South African Heritage Agency must be contacted as soon as possible.

12. DESCRIPTION OF ANY ASSUMPTION, UNCERTAINTIES AND GAPS IN KNOWLEDGE

- a. The following assumptions have been made for the purposes of this report:
 - All information received from sources contributing to this project is correct;
 - That SANRAL will consider the recommendations derived from this study, and
 - The National Department of Environmental Affairs would be the decision making authority with regard to this application.
- b. Limitations

None.
- c. Knowledge Gaps

None

13. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

i) Reasons why the activity should be authorized or not.

The activity should be authorised by the Department of Environmental Affairs as the significance of the environmental impacts identified is low while there are positive impacts that will benefit the community as a whole.

ii) Conditions that must be included in the authorisation

- a. A Site Environmental Control Officer (SECO) must be on site for implementation of the EMPr;
- b. All activities must take place in accordance with the approved EMPr;
- c. Should any archaeological artefact be exposed during construction activities, construction must be stopped. Under no circumstances shall any artefact be

destroyed. The area must be fenced off and the South African Heritage Agency must be contacted as soon as possible.

14. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The period for which the environmental authorisation is required is 5 years. The date on which the activity will be concluded is unclear at this stage.

15. UNDERTAKING

I, Josephine Bothma, declare that –

- I act as the independent environmental practitioner in this application.
- The information contained in the report is correct.
- All comments and inputs from stakeholders and I&APs are included in the report.
- The inputs and recommendations from specialist reports are included in the report.
- All information provided to I&APs are included in the report.
- Responses to I&APs to comments or inputs made by I&APs are included in the report.

Signature of the environmental assessment practitioner:

Chameleon Environmental

Name of company:

Date:

Commissioner of Oaths

LIST OF APPENDICES

Appendix A – CV and qualification certificate of EAP

Appendix B – Locality Plan, Sensitivity Plan

Appendix C – Facility Illustrations/site map

Appendix D – Public Participation Process

Appendix E – Specialist studies

Appendix F – Licenses/Permits received

Appendix G – Photographs

Appendix H - EMPr