



**Royal
HaskoningDHV**
Enhancing Society Together

The Proposed Ntatshana Road Draft Basic Assessment Report

DAEA REF NO: DC21/0026/2013
NEAS REF: KZN/EIA/0001256/2013

11.11.2013

Prepared for: The Umzumbe Local Municipality

Document title: The Proposed Ntatshana Road Basic Assessment Report

Status: Draft

Date: 2013.11.08

Project number: T01.DUR.000201

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Date / initials check: 29.10.2013 H.B

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Date / initials approval: 30.10.2013 BG



agriculture & environmental affairs

Department:
Agriculture
& Environmental Affairs
PROVINCE OF KWAZULU-NATAL

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EIA File Reference Number:
NEAS Reference Number:
Waste Management Licence Number:
(if applicable)
Date Received:

DC/
KZN/EIA/

BASIC ASSESSMENT REPORT

Submitted in terms of the Environmental Impact Assessment Regulations, 2010 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

This template may be used for the following applications:

- **Environmental Authorization** subject to basic assessment for an activity that is listed in Listing Notices 1 or 3, 2010 (Government Notices No. R 544 or No. R 546 dated 18 June 2010); or
- **Waste Management Licence** for an activity that is listed in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) for which a basic assessment process as stipulated in the EIA Regulations must be conducted as part of the application (refer to the schedule of waste management activities in Category A of Government Notice No. 718 dated 03 July 2009).

Kindly note that:

1. This **basic assessment report** meets the requirements of the EIA Regulations, 2010 and is meant to streamline applications. This report is the format prescribed by the KZN Department of Agriculture & Environmental Affairs. Please make sure that this is the latest version.
2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with text.
3. Where required, place a cross in the box you select.
4. An incomplete report will be returned to the applicant for revision.
5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it will result in the rejection of the application as provided for in the regulations.
6. No faxed or e-mailed reports will be accepted.
7. The report must be compiled by an independent environmental assessment practitioner ("EAP").
8. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

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9. The KZN Department of Agriculture & Environmental Affairs may require that for specified types of activities in defined situations only parts of this report need to be completed.
10. The EAP must submit this basic assessment report for comment to all relevant State departments that administer a law relating to a matter affecting the environment. This provision is in accordance with Section 24 O (2) of the National Environmental Management Act 1998 (Act 107 of 1998) and such comments must be submitted within 40 days of such a request.
11. **Please note that this report must be handed in or posted to the District Office of the KZN Department of Agriculture & Environmental Affairs to which the application has been allocated (please refer to the details provided in the letter of acknowledgement for this application).**

DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	DC21/0026/2013
NEAS REF:	KZN/EIA/00001256/2013

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1. SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

Name and contact details of environmental assessment practitioner (EAP)

Name and contact details of the EAP who prepared this report:

Business name of EAP:	Royal HaskoningDHV		
Physical address:	6 Payne Street, Pinetown, 3610		
Postal address:	P. O. Box 55, Pinetown		
Postal code:	3600	Cell:	083 642 7077
Telephone:	031 719 5500	Fax:	031 719 5505
E-mail:	Humayrah.bassa@rhdhv.com		

Names and expertise of representatives of the EAP

Names and details of the expertise of each representative of the EAP involved in the preparation of this report:

Name of representative of the EAP	Education qualifications	Professional affiliations	Experience at environmental assessments (yrs)
Humayrah Bassa	MSc Environmental Science	IAIAsa	4
Novashni Moodley	BSc (Hons) Environmental Management	IAIAsa	4

Names and expertise of specialists

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Education qualifications	Field of expertise	Section/s contributed to in this basic assessment report	Title of specialist report/s as attached in Appendix D
eThembeni Cultural	MA	Heritage and Cultural	Heritage Impact	Phase 1 Heritage Impact

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Name of specialist	Education qualifications	Field of expertise	Section/s contributed to in this basic assessment report	Title of specialist report/s as attached in Appendix D
Heritage	Archaeology	Assessments	Assessment	Assessment Report: Proposed Construction of Road, Umzumbe Local Municipality Ugu District, KwaZulu-Natal
Clayton Cook	MSc. Zoology	Ecology	Ecological and Riparian Assessment	Preliminary Ecological Habitat Assessment & Management Recommendations for the Proposed Road; KwaZulu-Natal
PGA Consulting	Civil Engineering	Civil Engineering	Project description and design	Design report, Ntatshana access road, Ward 08, Umzumbe district
Drennan Maude and Associates	Civil Engineering	Geotechnical Engineering	Geotechnical Assessment	Centreline Survey and Geotechnical Survey: Ntatshana Access Road and Bridge, uMzumbe Local Municipality

2. SECTION B: ACTIVITY INFORMATION

Project title

Describe the project title as provided on the application form for environmental authorization:

Basic Assessment for the Proposed Establishment of the Ntatshana Road

Project description

Provide a detailed description of the project:

The proposed Ntatshana road is located in the rural area under a village called Maqhikizana within Umzumbe Local Municipality in Ward 08 on the Lower South Coast within the Ugu District Municipality Area in KwaZulu-Natal. There is no current access road between the D1050 and the D20 to the east and the site is currently accessed via the R612 and the D20. The Umzumbe Local Municipality proposes to develop the Ntatshana Road to be 2.2 km in length and 5 m in width. For the establishment of this gravel top road, the scope of work includes construction of the access road linking Maqhikizana and Mtwalume by means of a low level bridge to a high level bridge serving as a river crossing structure for residence and vehicles for flood 1:50 year return period. Two alternatives have been proposed, Figure 1 below depicts the locality of the proposed Ntatshana Road alternatives.

The objective of the proposed construction of the Ntatshana Road is to achieve minimum vertical grades where possible, on the gravel section of the road. It has thus been proposed that the horizontal alignment is kept to the natural contours so as to avoid excessive earthworks. Where it is not possible to align the road to the natural contours, and thus design against the contours is undertaken, it should take into consideration the minimum vehicular turning area required for vehicles at a given speed of 40 km/hr. Due to the rolling topography of this specific area, and especially for the access road (both route alignments), it is only feasible to construct approximately 1.0 km of gravel access road as assessed on the preferred route alignment. Approximately 1.5 km of the total extent is designed to be concrete, paved on the existing sub-grade.

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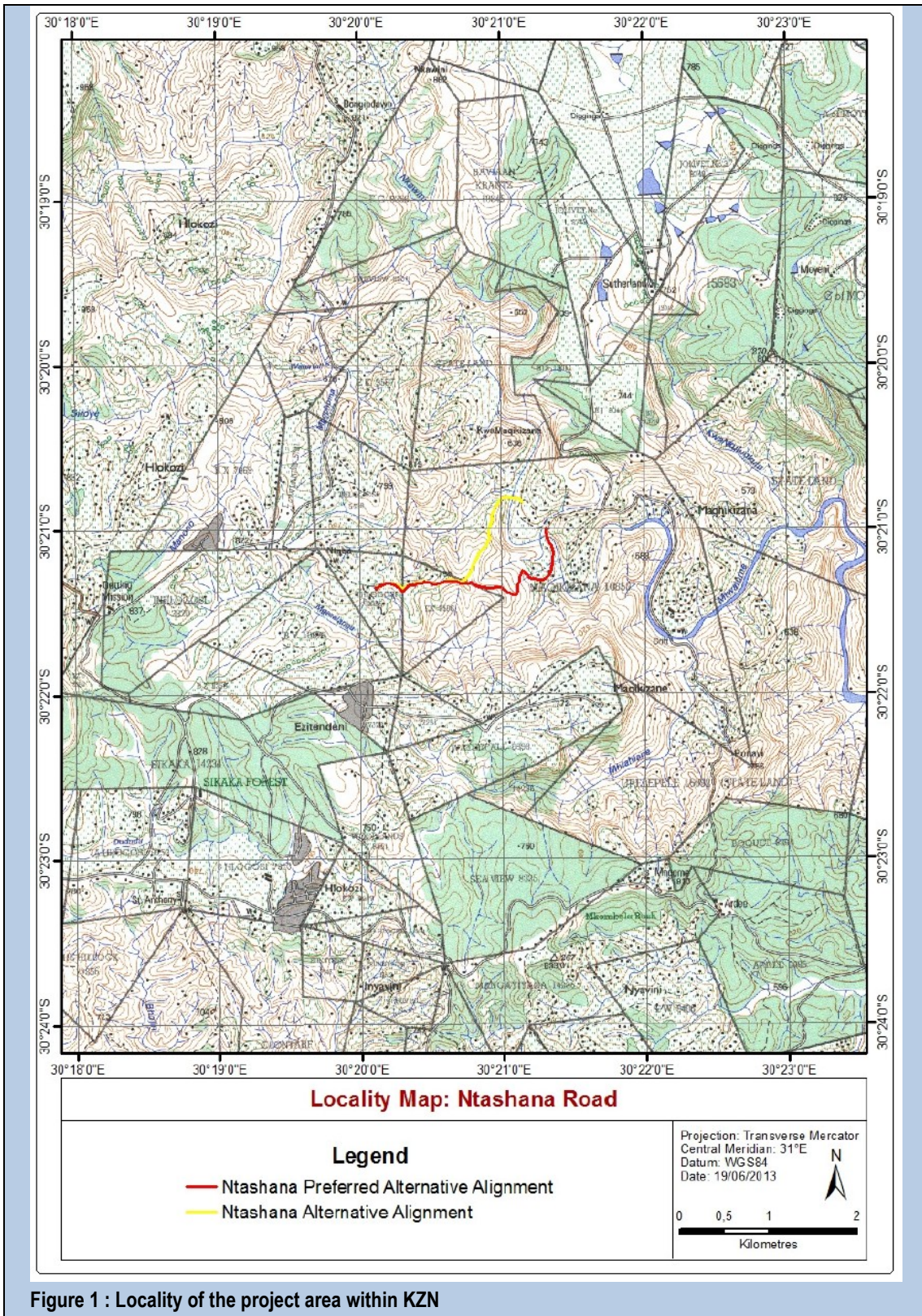




Figure 2: Photograph of the layout of the site at present

Maqhikizana village in the Ward 8 area is a medium size rural area which is approximately 120 km from Hibberdene, which is 25 km north of Port Shepstone. Hibberdene is the nearest major centre within this major regional node. The Ward 08 population is estimated to 36 624 as projected from the 2011 census report and approximately 80% of this population is unemployed and has no personal income. Essentially the road serves both villages on either side of the Mtwalume River.

The climate of the study areas sees it being a summer rainfall area but with some rain during winter. Mean Annual Precipitation (MAP) is around 700 – 1, 100 mm. Some valleys are sheltered and may show weak rain-shadow effects. The occurrence of frost is infrequent, occurring mainly when cold air becomes trapped in the valleys.

The majority of habitats adjacent to the proposed alignment have already been completely transformed during the construction of rural-residential housing platforms and adjacent rural and agricultural activities (i.e. kraals, small scale agricultural lands), as well as extensive overgrazing by livestock. The vegetation is completely transformed and dominated by weedy pioneer plants (“rurals”), as well as alien invasive species.

As the site is situated around rural homesteads as well as agricultural areas the majority of natural vegetation consisting of KwaZulu-Natal Coastal Belt (CB 3) and Ngongoni Veld (SVs 4) has been historically transformed into terraced small-scale agricultural lands, in-cut residential platforms, as well as livestock enclosures (i.e. kraals).

The majority of the preferred proposed new access road is situated within moist *Aristida junciformis* hill slopes. However, the majority of hill slope characterised by *Aristida junciformis* grassland has been historically transformed in the area. Several terraced agricultural fields as well as old livestock enclosures occur on the lower slopes. The preferred proposed new access road bisects a remnant patch of scattered low-lying rocky extrusions / outcrops adjacent to an incised non-perennial drainage line.

Activity Description

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June 2010), Listing Notice 3 (GNR 546, 18 June 2010) or Category A of GN 718, 3 July 2009 (Waste Management Activities) which is being applied for as per the project description:

Listing Notice Details	Description	Applicability to this proposed project
GNR.544 of June 2010 Listing Notice 1 Listed Activity: 11	<p>The construction of:</p> <ul style="list-style-type: none"> (i) Canals; (ii) Channels; (iii) Bridges; (iv) Bulk stormwater outlet structures; (v) Buildings exceeding 50 square metres in size; or (vi) Infrastructure or structures covering 50 square metres or more. <p>Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of the watercourse, excluding where such development occurs behind the development setback line.</p>	<p>The road will require the construction of a bridge; which crosses a watercourse.</p> <p>Furthermore, portions of route alignment 1 either fall within 32m of wetlands or traverses <i>Aristida junciformis</i> hillslope seepage wetlands.</p>
GNR.544 of June 2010 Listing Notice 1 Listed Activity: 18	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil more than 5 cubic metres from</p> <ul style="list-style-type: none"> (i) A watercourse <p>But excluding where such infilling, depositing, dredging, excavation, removal or moving is</p> <ul style="list-style-type: none"> (a) For maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; (b) Occurs behind the development setback line. 	<p>The construction of the road will require infilling or depositing of any material of more than 5 cubic metres or the dredging, excavation, removal or moving of soil, sand or rock more than 5 cubic metres from the wetlands identified on site as well as the Mtwalume River.</p>
GNR.546 of June 2010 Listing Notice 3 Listed Activity: 4	<p>The construction of a road wider than 4 metres with a reserve less than 13.5 metres</p> <ul style="list-style-type: none"> (a) In KwaZulu-Natal (i) Outside urban areas, in: <ul style="list-style-type: none"> (aa) A protected area identified in terms of 	<p>The road is proposed to be wider than 4 metres with a reserve less than 13.5 metres, outside of an urban area.</p>

	<p>NEMPAA, excluding conservancies;</p> <p>(cc) sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ii) In urban areas:</p> <p>(aa) areas zoned as public open space;</p> <p>(bb) areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.</p>	
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Feasible and reasonable alternatives

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this report. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Two route alignments are assessed. In addition, the “no-go” alternative has been assessed.

Sections B 5 – 15 below should be completed for each alternative.

Activity position

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. List alternative sites were applicable.

	Latitude (S):	Longitude (E):
Alternative:		
Alternative S1 ¹ (preferred or only site alternative)		
Alternative S2 (if any)		
Alternative S3 (if any)		

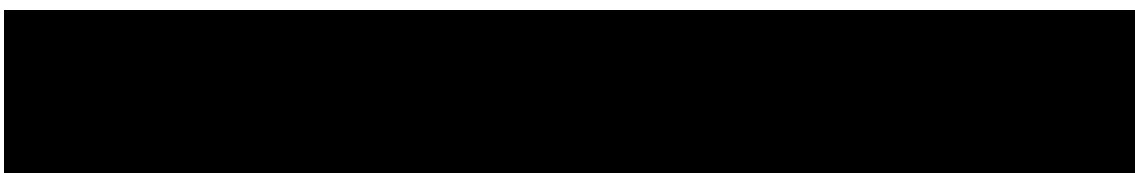
In the case of linear activities:

Alternative:	Latitude (S):			Longitude (E):		
Alternative S1 (preferred or only route alternative)						
• Starting point of the activity	30°	21'	20.79"	30°	20'	06.36"
• Middle point of the activity	30°	21'	20.79"	30°	20'	50.51"
• End point of the activity	30°	20'	59.37"	30°	21'	18.72"

Alternative S2 (if any)

• Starting point of the activity	30°	21'	20.79"	30°	20'	06.36"
• Middle point of the activity	30°	21'	12.11"	30°	20'	48.74"
• End point of the activity	30°	20'	50.04"	30°	21'	08.81"

Alternative S3 (if any)



For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 500m along the route for each alternative alignment.

¹ "Alternative S.." refer to site alternatives.

Physical size of the activity

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

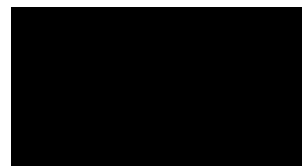
Alternative:

Alternative A1² (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Size of the activity:



Or, for linear activities:

Alternative:

Alternative S1 (preferred activity alternative)

Alternative S2 (if any)

Alternative S3 (if any)

Length of the activity:

Alternative S1 (preferred activity alternative)	2,200 m
Alternative S2 (if any)	2,200 m
Alternative S3 (if any)	

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

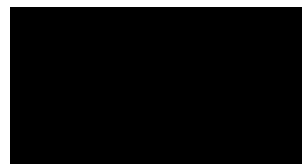
Alternative:

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Size of the site / servitude:



Site Access

Does ready access to the site exist?

YES

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

The site can be accessed via the N2 Port Shepstone. The site is situated approximately 50 km to the east of Umzinto and is accessed via the R612 and the D20.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

² "Alternative A.." refer to activity, process, technology or other alternatives.

Site or route plan

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this report.

The site or route plans must indicate the following:

- 1.1. the scale of the plan which must be at least a scale of 1:500;
- 1.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site;
- 1.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 1.4. the exact position of each element of the application as well as any other structures on the site;
- 1.5. the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
- 1.6. walls and fencing including details of the height and construction material;
- 1.7. servitudes indicating the purpose of the servitude;
- 1.8. sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
 - rivers, streams, drainage lines or wetlands;
 - the 1:100 year flood line (where available or where it is required by DWA);
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation including protected plant species (even if it is degraded or infested with alien species);
- 1.9. for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
- 1.10. the positions from where photographs of the site were taken.

Site photographs

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

Facility illustration

A detailed illustration of the facility must be provided at a scale of 1:200 and attached to this report as Appendix C. The illustrations must be to scale and must represent a realistic image of the planned activity/ies.

Activity motivation

Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R 18,465, 537.60
What is the expected yearly income that will be generated by or as a result of the activity?	N/A
Will the activity contribute to service infrastructure?	YES
Is the activity a public amenity?	YES
How many new employment opportunities will be created in the <u>development</u> phase of the activity?	40
What is the expected value of the employment opportunities during the development phase? <i>* However, the road will have a strong economic cascade in terms of allowing access to the specific area, which will increase over time.</i>	30%
What percentage of this will accrue to previously disadvantaged individuals?	75%
How many permanent new employment opportunities will be created during the operational phase of the activity?	N/A. Duties of maintenance lie with municipality.
What is the expected current value of the employment opportunities during the first 10 years?	N/A
What percentage of this will accrue to previously disadvantaged individuals?	N/A

Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

Accessibility to the Maqhikizana farm is limited to a dirt road. The establishment of the Ntatshana Road will enable ease of accessibility to this area and the easy movement and safety of vehicles commuting into and out of the area. Currently, the dirt road is unstable and unsafe terrain. Furthermore, the road will link the communities on either side of the Mtwalume River.

Indicate any benefits that the activity will have for society in general:

In light of the fact that this is a disadvantaged and indigent area, socio-economic upliftment is highly needed. The establishment of access roads lays the foundation for further and knock-on development, thereby leading to the upliftment of the society. While the 2.2km Ntatshana Road may not have benefits as far reaching as to society in general, it is paving the way for upliftment of disadvantaged societies.

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The majority of the population in Ward 08 have no formal education and are illiterate. Most people earn a living from governmental social grants, pensions and others from informal trading. Development of this area is therefore paramount and the establishment of this road can be considered the first step in this direction toward upliftment of the community. The establishment of the Ntatshana Road will enable ease of accessibility to this area. The road will also allow for public transport modes to cater to the local community. At present the surrounding community have to walk extremely long distances to access public transport. The road will provide for a link between both wards on either side of the Mtwalume River where no links currently exists between 2 communities (wards) thereby providing easier access to high flats and Mzinto shopping Mall as well as the Hospital etc.

Construction of Ntatshana Road would contribute to the community in the following ways:

- Vehicles would not have to endure rugged terrain.
- Communities will have easier access to public and governmental transportation.
- Travelling route distances would be decreased.
- Will increase the safety of the people within the community as there will be no need to walk through dense vegetation to get to their destination.
- Response and delivery time would be increased for public and emergency services.
- Easier travelling routes for basic needs, schools and medical centers.
- The bridge will link both communities and enhance activity between the communities.

Applicable legislation, policies and/or guidelines

List all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
2010 EIA Regulations under NEMA	National & Provincial	August 2010
Constitution of the Republic of South Africa (108 of 1966)	National, Provincial and Local Government	1996
National Environmental Management Act (No 107 of 1998 (as amended))	National and Provincial	1998
National Water Act (No 36 of 1998) and regulations	Department of Water Affairs	1998
National Environmental Management: Air Quality Act (No 39 of 2004)	Department of Environmental Affairs	2004
National Environmental Management: Biodiversity Act (10 of 2004)	National & Provincial	2004
Occupational Health and Safety Act (No 85 of 1973)	National & Provincial	1993
Hazardous Substances Act (No 15 of 1973)	National & Provincial	1973

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National Environmental Management: Waste Act (Act 59 of 2008)	National & Provincial	2008
National Heritage Resource Act	National & Provincial	1999
KZN Nature Conservation Ordinance (15 of 1974)	Provincial	1974
Minerals and Petroleum Resources Development Act, (Act 28 of 2002, MPRDA)	National & Regional	2002

Waste, effluent, emission and noise management

Solid waste management

Will the activity produce solid construction waste during the construction / initiation phase? YES

If yes, what estimated quantity will be produced per month?

Unknown m³

How will the construction solid waste be disposed of? (describe)

Waste skips/bins will be provided throughout the construction site with separate skips/bins made available for road construction debris and solid waste. Solid waste that is unsuitable for re-use for construction will be transported to a registered landfill site to avoid the pollution of surrounding areas and roads, as well as to minimize nuisance impacts such as dust and odours.

Where will the construction solid waste be disposed of? (provide details of landfill site)

All waste will be collected and disposed off at an approved waste disposal and/or recycling facilities.

Will the activity produce solid waste during its operational phase? NO

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of? (provide details of landfill site)

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine the further requirements of the application.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation? NO

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Is the activity that is being applied for a solid waste handling or treatment facility? NO

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If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system? NO

If yes, what estimated quantity will be produced per month?

Will the activity produce any effluent that will be treated and/or disposed of on site? NO

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

Will the activity produce effluent that will be treated and/or disposed of at another facility? NO

If yes, provide the particulars of the facility:

Facility name:

Contact person:

Postal address:

Postal code:

Telephone:

Cell:

E-mail:

Fax:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Emissions into the atmosphere

Will the activity release emissions into the atmosphere? YES

If yes, is it controlled by any legislation of any sphere of government? YES

If yes, contact the KZN Department of Agriculture & Environmental Affairs to obtain clarity regarding the process requirements for your application.

If no, describe the emissions in terms of type and concentration:

It is not expected that an Air Quality Emissions Licence will be required for this activity as there will only be limited dust liberation and emissions during construction phase due to the off loading of construction material such as sand and cement and movement of construction vehicles. Mitigation measures for this dust liberation are provided for in section E of this report and carried through to the EMPr.

Generation of noise

Will the activity generate noise?

YES

If yes, is it controlled by any legislation of any sphere of government?

YES

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

Noise levels should be regulated by local municipal by-laws. Noise generation will be forthcoming as a result of the construction phase and thereafter limited to noise generated by traffic on the road. Construction phase noise will be limited to working hours (07h00 to 17h00) and will comprise of excavators and other machinery. Ambient noise levels are unlikely to exceed 75 dB for extended periods. Mitigation measures for noise are provided for in section E of this report and carried through to the EMPr.

Water use

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

municipal		river, stream, dam or lake	other	
-----------	--	----------------------------	-------	--

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

YES

Does the activity require a water use permit from the Department of Water Affairs?

YES

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The concurrent water use licence application is for Section 21 (c) and (i) water uses as highlighted in the table below, and not for abstraction of water from the Mtwalume River or any other watercourses:

Relevant water use	Description
Section 21 (a)	Taking water from a water resource
Section 21 (b)	Storing water
Section 21 (c)	Impeding or diverting the flow of water in a watercourse
Section 21 (d)	Engaging in a stream flow reduction activity contemplated in section 36
Section 21 (e)	Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
Section 21 (f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit
Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource
Section 21 (h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process
Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse
Section 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
Section 21 (k)	Using water for recreational purposes

A pre-application meeting was held with the Department of Water Affairs: KwaZulu-Natal Regional Office on the 23rd October 2013. The Water Use Licence Application is expected to be submitted in the coming months.

Energy efficiency

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The contractor will be advised to transport all construction materials on site at the same time where possible and the collection of waste material conducted simultaneous with other activities to reduce the amount fuel usage for such transportation.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

No activities are anticipated that will lend themselves to design measures for alternative energy sources during the construction or operational phase of the project.

3. SECTION C: SITE/ AREA/ PROPERTY DESCRIPTION

Important notes:

- For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. [REDACTED]
(e.g. A):

- Subsections 1 - 6 below must be completed for each alternative.

Gradient of the site

Indicate the general gradient of the site.

The site mainly comprises of several steep slopes. This is particularly the case for alternative S2.

Alternative S1:

	1:20 1:15	–	1:15 – 1:10	1:10 1:7,5	–	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (if any):

	1:20 1:15	–	1:15 – 1:10	1:10 1:7,5	–	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any):

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Location in landscape

Indicate the landform(s) that best describes the site (Please cross the appropriate box).

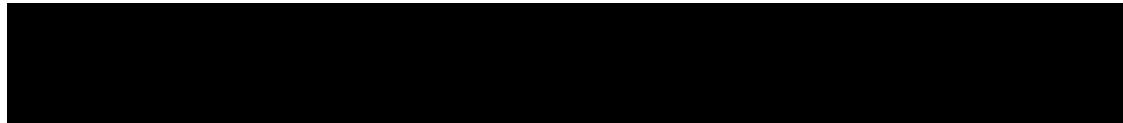
Alternative S1 (preferred site):

Ridgeline		Side slope of hill / mountain		Plain	Undulating plain / low hills	
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Alternative S2 (if any):

Ridgeline		Side slope of hill / mountain		Plain	Undulating plain / low hills	
-----------	--	-------------------------------	--	-------	------------------------------	--

Alternative S3 (if any):



Groundwater, Soil and Geological stability of the site

Acid, leached, heavy soils are derived from the Karoo Supergroup sediments (including significant Dwyka tillites) and intrusive dolerites. The soils supported by the above-mentioned rocks are shallow over hard sandstones and deeper over younger, softer rocks. Soil form includes Glenrosa and Mispah soils.

Hydric indicators (mottling) of permanent, seasonal and temporary inundation or wetness were observed within the soil augers and increased in number within the lower-lying areas adjacent to the Mtwalume River. Hydric soils of permanent inundation were observed within the Mtwalume River, gleyed clays with high organic layer and extensive mottling and rhizospheres was observed within the macro-channel banks of the lower-lying seepage wetlands.

Sandy soils with temporary inundation were observed within the mid and upper slopes adjacent to the drainage lines.

Land types Fa, Ab, Ac and Aa. Clear yellow-orange iron concretions (mottling) were observed within the top 5 – 20 cm of auger samples taken from the temporary wet zones of the mid and upper hill slope seepage wetlands and drainage lines.



Figure 3: Shallow Orthic A layer with an underlying hard lithocutanic B horizon typical of the Glenrosa Form. The shallow soil layer is prone to erosion especially along the perennial and non-perennial drainage lines.

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Along the riparian zones of drainage lines as well as Mtwalume River the predominant soil form is a deep, well weathered, light-brown/grey coloured alluvium.

The soils on the hill slope seeps surrounding the site are as shallow top soil situated on a shallow (0-30 cm) Orthic A layer with an underlying hard lithocutanic B horizon typical of the Glenrosa Form. The shallow soil layer is prone to erosion especially along the perennial and non-perennial drainage lines.

Soils are sandy to organic rich clays within the lower lying foot slope seepage wetlands.

The hill slopes are between 5-40° with conditions becoming moister towards the lower lying Mtwalume. Rocks are generally absent within the hill slopes, except for scattered low-lying extrusions or outcrops of the Natal Group Sandstone occurring adjacent to the non-perennial drainage lines which feed into the Mtwalume River. The non-perennial drainage lines active channels are incised and have eroded to the bedrock base in certain areas.

Has a specialist been consulted for the completion of this section?	YES	
Clayton Cook was appointed to conduct a River and Riparian Assessment as well as an Ecological Assessment.		

If YES, please complete the following:

Name of the specialist:	Clayton Cook		
Qualification(s) of the specialist:	MSc. Zoology and Pr. Sci. Nat. 400084/08		
Postal address:	226 Girdwood Street, Munster		
Postal code:	4273		
Telephone:		Cell:	082 688 9585
E-mail:	giant.bullfrog@gmail.com	Fax:	

Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?	YES	
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If YES, specify and explain:

KwaZulu-Natal Coastal Belt (CB 3) is an Endangered vegetation unit with only a small part statutorily conserve in Ngoye, Mbumazi and Vernon Crookes Nature Reserves. About 50% is transformed for cultivation, urban sprawl and road-building. The conservation target is 25% conserved.

Ngongoni Veld (SVs 4) is classified as a Vulnerable vegetation unit with only a small part statutorily conserved (1%) in the Ophathe and Vernon Crookes Nature Reserves. About 39% is transformed for cultivation, urban sprawl and plantations. The conservation target is 25% conserved. Alien invasive vegetation includes *Chromolaena odorata*, *Lantana camara*, *Melia azedarach* and *Solanum mauritianum* (Mucina & Rutherford 2006).

No red data plant species were observed during the brief field survey although suitable habitat remains within these protected pockets for certain red listed plant and tree species. More intensive surveys are required in order to ascertain the current conservation status of threatened plant and tree species in the area.

Three red listed frog species are known from the 3030 BB Quarter Degree Grid Cell (QDGC) in which the Ntatshana Road is situated in. These included the Critically Endangered Pickersgill's Reed Frog (*Hyperolius pickersgilli*); the Endangered Natal Kloof Frog (*Natalobatrachus bonebergi*) and the near-

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threatened Natal Leaf-Folding Frog (*Afrixalus spinifrons*). However, none of these amphibians were recorded during the field investigations. No suitable habitat occurs for both Pickersgill's Reed Frog (*Hyperolius pickersgilli*) and Kloof Frog (*Notalobtarchus bonebergi*) within and around the proposed Ntatshana access road. Marginally suitable habitat remains to the north of the site for Natal Leaf-folding Frog (*Afrixalus spinifrons*) in the dense sedge beds and inundated grassy valley bottom wetlands with abundant surface vegetation. At higher altitudes it inhabits marshes, dams, floodplains and riverbanks (Lambiris 1989; Pickersgill 1996). During the day Leaf-folding frogs are often found in the leaf axils of grasses, rushes and arum lilies; particularly those standing in or immediately adjacent to water. No suitable habitat remains within the proposed bridge crossing site for Natal Leaf-Folding Frog.

No threatened reptile species are likely to occur on the site or the immediate open areas surrounding the site due to extensive habitat transformation and degradation. Low reptile diversity is expected around the majority of the proposed upgraded Ntatshana access road alignment due to extensive habitat destruction and low diversity within the degraded *Aristida junciformis* hill slopes.

Several threatened bird species have been recorded in the grid square within which the study area is situated including Crowned Eagle, Half-collared Kingfisher, Spotted Ground Thrush and Grey Crowned Crane. One red listed bird species has been recorded from the 3020_3020 pentad in which the proposed road is situated namely a single sighting of a Grey Crowned Crane. No threatened bird species were recorded during the brief survey or are likely to occur around the proposed upgraded Ntatshana access road alignment due to high levels of habitat transformation and degradation as well as human disturbances.

No endangered faunal species were recorded since high numbers of domesticated animals generally causes displacement of game, as there is less suitable habitat available.

Are there any special or sensitive habitats or other natural features present on any of the alternative sites?	YES
--	-----

If YES, specify and explain:	<p>There are existing <i>Aristida junciformis</i> hillslopes which the proposed road will traverse.</p> <p>Situated along the lower-lying drainage lines are remnant patches of indigenous riparian vegetation although large sections have become degraded due to extensive wood harvesting activities as well as medium-high infestations of alien invasive vegetation.</p> <p>Furthermore, situated along the macro-channel banks of the Mtwalume River are patches of seasonally inundated hygrophilous sedge and grass dominated seepage wetlands.</p>
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Are any further specialist studies recommended by the specialist?	NO
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If YES, specify:	
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If YES, is such a report(s) attached in <u>Appendix D</u> ?	
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Signature of specialist: _____

Date: 4 August 2013

Is the site(s) located on any of the following (cross the appropriate boxes)?

	Alternative S1:	Alternative S2 (if any):	Alternative S3 (if any):
Shallow water table (less than 1.5m deep)	NO	NO	
Dolomite, sinkhole or doline areas	NO	NO	
Seasonally wet soils (often close to water bodies)	YES	YES	
Unstable rocky slopes or steep slopes with loose soil	YES	YES	
Dispersive soils (soils that dissolve in water)	NO	NO	
Soils with high clay content (clay fraction more than 40%)	YES	YES	
Any other unstable soil or geological feature	NO	NO	
An area sensitive to erosion	YES	YES	

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

Groundcover

Has a specialist been consulted for the completion of this section?		YES	
If YES, please complete the following:			
Name of the specialist:	Clayton Cook		
Qualification(s) of the specialist:	MSc. Zoology and Pr. Sci. Nat. 400084/08		
Postal address:	226 Girdwood Street, Munster		
Postal code:	4273		
Telephone:		Cell:	082 688 9585
E-mail:	giant.bullfrog@gmail.com	Fax:	
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?		YES	

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If YES, specify and explain:

KwaZulu-Natal Coastal Belt (CB 3) is an Endangered vegetation unit with only a small part statutorily conserve in Ngoye, Mbumazi and Vernon Crookes Nature Reserves. About 50% is transformed for cultivation, urban sprawl and road-building. The conservation target is 25% conserved.

Ngongoni Veld (SVs 4) is classified as a Vulnerable vegetation unit with only a small part statutorily conserved (1%) in the Ophathe and Vernon Crookes Nature Reserves. About 39% is transformed for cultivation, urban sprawl and plantations. Conservation target is 25% conserved. Alien invasive vegetation includes *Chromolaena odorata*, *Lantana camara*, *Melia azedarach* and *Solanum mauritianum* (Mucina & Rutherford 2006).

No threatened plants were recorded within the moist hill slope seepage wetlands as well as seasonally inundated foot-slope seepage wetlands.

No red data plant species were observed during the brief field survey although suitable habitat remains within these protected pockets for certain red listed plant and tree species. More intensive surveys are required in order to ascertain the current conservation status of threatened plant and tree species in the area.

Three red listed frog species are known from the 3030 BB Quarter Degree Grid Cell (QDGC) in which the Ntatshana Road is situated in. These included the Critically Endangered Pickersgill's Reed Frog (*Hyperolius pickersgilli*); the Endangered Natal Kloof Frog (*Natalobatrachus bonebergi*) and the near-threatened Natal Leaf-Folding Frog (*Afrixalus spinifrons*). However, none of these amphibians were recorded during the field investigations. No suitable habitat occurs for both Pickersgill's Reed Frog (*Hyperolius pickersgilli*) and Kloof Frog (*Notalobtarchus bonebergi*) within and around the proposed Ntatshana access road. Marginally suitable habitat remains to the north of the site for Natal Leaf-folding Frog (*Afrixalus spinifrons*) in the dense sedge beds and inundated grassy valley bottom wetlands with abundant surface vegetation. At higher altitudes it inhabits marshes, dams, floodplains and riverbanks (Lambiris 1989; Pickersgill 1996). During the day Leaf-folding frogs are often found in the leaf axils of grasses, rushes and arum lilies; particularly those standing in or immediately adjacent to water. No suitable habitat remains within the proposed bridge crossing site for Natal Leaf-Folding Frog.

No endangered faunal species were recorded since high numbers of domesticated animals generally causes a displacement of game, as there is less suitable habitat available.

Are there any special or sensitive habitats or other natural features present on any of the alternative sites?

YES

If YES, specify and explain:

There are existing *Aristida junciformis* hill slopes which the proposed road will traverse. Various human and livestock footpaths and informal two-spoor roads are present in these areas. No rare or threatened plants were recorded within this transformed vegetation unit or are likely to occur within the hill slopes immediately adjacent to the proposed road alignment.

Situated along the lower-lying drainage lines are remnant patches of indigenous riparian vegetation although large sections have become degraded due to extensive wood harvesting activities as well as medium-high infestations of alien invasive vegetation.

There also exist hill slope and foot slope Seepage Wetlands. No threatened

plants were recorded within the moist hill slope seepage wetlands as well as seasonally inundated foot-slope seepage wetlands.

Furthermore, situated along the macro-channel banks of the Mtwalume River are patches of seasonally inundated hygrophilous sedge and grass dominated seepage wetlands.

The majority of hill slope *Aristida junciformis* grassland has been historically transformed around the proposed Ntashana access road. Several terraced agricultural fields as well as old livestock enclosures occur on the lower slopes. The proposed new access road bisects a remnant patch of scattered low-lying rocky extrusions/ outcrops adjacent to an incised non-perennial drainage line. The grasslands have been extensively utilised for livestock grazing activities as well as old terraced agricultural lands.

Three drainage lines ranging from small perennial streams to non-perennial or seasonal drainage lines occur adjacent to the proposed alignment. However, uncontrolled livestock grazing, trampling and compaction of hydric soils along the drainage lines have resulted in severe gully erosion and invasion of alien invasive vegetation.

Depicts the areas of sensitivity in relation to the proposed routes.

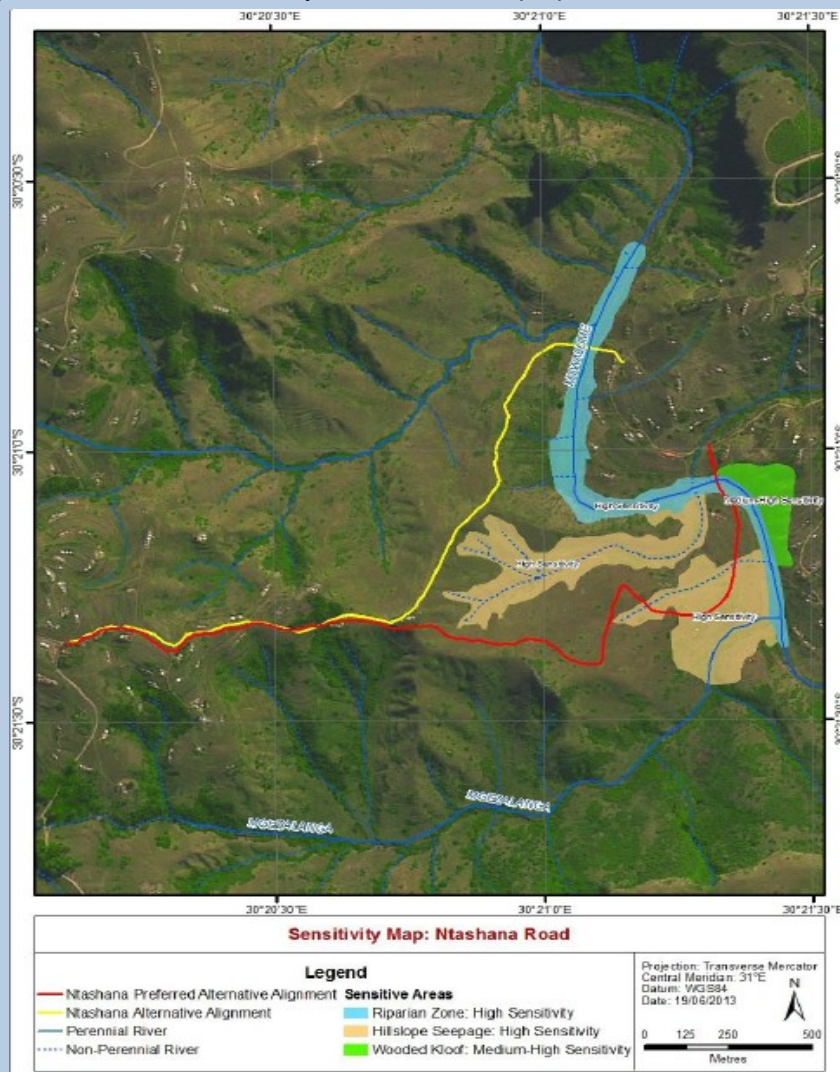


Figure 4: Preliminary Sensitivity Map (Cook, 2013)

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Are any further specialist studies recommended by the specialist?

NO

If YES,
specify:

If YES, is such a report(s) attached in Appendix D?

Signature of specialist:



Date:

4 August 2013



Figure 5: A collage of photographs displaying the major vegetation units observed within and around the proposed Ntatshana road. A: The majority of the proposed new access road is situated within moist *Aristida junciformis* hillslopes. B: Situated along the lower-lying drainage lines are remnant patches of indigenous riparian vegetation although large sections have become degraded due to extensive wood harvesting activities as well as medium-high infestations of alien invasive vegetation. C: The lower slopes have historically been ploughed and terraced for small scale-agricultural activities, residential platforms, and livestock enclosures and comprises transformed or secondary succession grasslands. D: Situated along the macro-channel banks of the Mtwalume River are patches of seasonally inundated hygrophilous sedge and grass dominated seepage wetlands.

Kwazulu-Natal Coastal Belt (CB 3)

Highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forests (Northern Coastal Forest). Some primary grassland dominated by Red Grass (*Themeda triandra*) still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevailed. At present the KwaZulu-Natal Coastal Belt is affected by an intricate mosaic of very extensive sugar cane fields, banana plantations, timber plantations and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld (Mucina *et al.* 2006).

Ngongoni Veld (SVs 4)

Dense, tall grassland overwhelmingly dominated by unpalatable, wiry Ngongoni Grass (*Aristida junciformis*), with this mono-dominance associated with low species diversity. Wooded areas (thornveld) are found in the valleys at lower altitudes, where this vegetation unit grades into KwaZulu-Natal Hinterland Thornveld (Svs 3). *Termitaria* support bush clumps with *Acacia* species, *Cussonia spicata*, *Ziziphus mucronata*, *Coddia rudis* and *Ehretia rigida* (Mucina et al. 2006).

The vegetation along the road comprises completely transformed road reserves dominated by pioneer weedy and alien invasive vegetation of which specific names are provided in the detailed ecological assessment attached as Appendix D1. Extensive alien invasive vegetation observed adjacent to the proposed Ntatshana road mainly within the riparian zone of the Mtwalume River and adjacent drainage lines.



Figure 6: A conglomerate of photographs displaying plant species observed around the proposed Ntatshana road. A: Wild Dagga (*Leonotis leonorus*), B: Invading Ageratum (*Ageratum conyzoides*) Category 1 Weed, C: Lemon Bush (*Lippia javanica*); D: Mexican Sunflower (*Tithonia diversifolia*) Category 1 Weed and E: A Poor Man's or Ground Cycad (*Encephalartos villosus*) has been planted adjacent to a homestead. All Cycads are protected plant species and permits are required for their removal as well as possession. The single Cycad will not be impacted on by the current road alignment.

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

	Natural veldt with heavy alien infestation	Veldt dominated by alien species	Gardens
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Cultivated land	Bare soil
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If any of the boxes marked with an “E” is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn’t have the necessary expertise.

Figure 7 below depicts the vegetation cover of the study area:

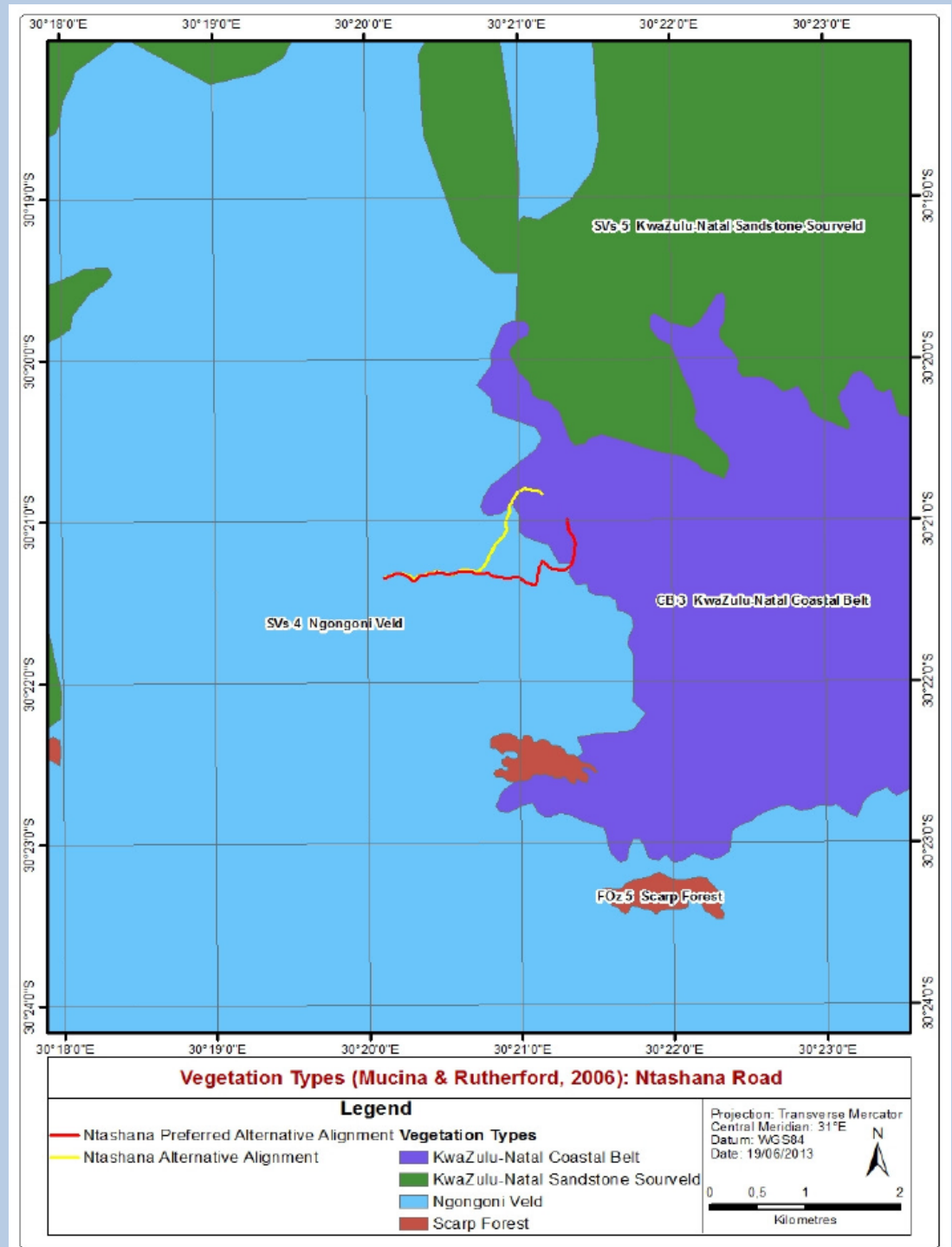


Figure 7: Vegetation Types prevalent in the study area

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The proposed Ntatshana road which falls in the transitional zone between KwaZulu-Natal Coastal Belt (CB 3) and Ngongoni Veld (SVs 4) vegetation units (adapted from Mucina & Rutherford 2006).

The north-eastern section of the alignment around the mid and lower foot-slopes stretching towards the Mtwalume River comprises KwaZulu-Natal Coastal Belt (CB 3) vegetation unit (Mucina & Rutherford 2006). This vegetation unit is distributed along the coastal strip of KwaZulu-Natal from near Mtunzini in the north, via Durban to Margate and just short of Port Edward in the south. Altitude ranges from 20 – 450 m, with the altitude at the site being 255 m.

The south-western section situated within the summit of the hillslopes including the upgraded section of the Ntatshana Road vegetation unit comprises Ngongoni Veld (SVs 4) which occurs in KwaZulu-Natal and Eastern Cape Provinces from Melmoth in the north to near Libode in the former Transkei and includes Eshowe, New Hanover, Camperdown, Eston, Richmond, Dumisa, Harding, Lusiksiki and the Lobode area. Altitude ranges from 20 – 450 m, with the altitude at the site being 255 m.

Land use character of surrounding area

Cross the land uses and/or prominent features that currently occur within a 500m radius of the site and give a description of how this influences the application or may be impacted upon by the application:

Land use character			Description
Natural area	YES		Some areas remain undeveloped.
Low density residential		NO	
Medium density residential		NO	
High density residential		NO	
Informal residential	YES		Informal housing such as Kraals are dominant.
Retail commercial & warehousing		NO	
Light industrial		NO	
Medium industrial		NO	
Heavy industrial		NO	
Power station		NO	
Office/consulting room		NO	
Military or police base/station/compound		NO	
Spoil heap or slimes dam		NO	
Quarry, sand or borrow pit		NO	
Dam or reservoir		NO	
Hospital/medical centre		NO	
School/ creche		NO	

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Land use character			Description
Tertiary education facility		NO	
Church	YES		There is a church nearby.
Old age home		NO	
Sewage treatment plant		NO	
Train station or shunting yard		NO	
Railway line		NO	
Major road (4 lanes or more)		NO	
Airport		NO	
Harbour		NO	
Sport facilities		NO	
Golf course		NO	
Polo fields		NO	
Filling station		NO	
Landfill or waste treatment site		NO	
Plantation		NO	
Agriculture	YES		Small-scale subsistence farming
River, stream or wetland	YES		The Mtwalume River and associated riparian zone including wetland borders the site.
Nature conservation area		NO	
Mountain, hill or ridge		NO	
Museum		NO	
Historical building		NO	
Protected Area		NO	
Graveyard		NO	
Archaeological site		NO	
Other land uses (describe)		NO	

The area is zoned for agriculture, whereby all land adjacent to the road routing is rural residential use with domestic agriculture for self sustenance. It is anticipated that the current land use will not be affected by the upgrading of this access road. The Communities of these households are reliant on the Umzumbe Town for their economic trading activities.

Cultural/ Historical Features

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act		NO
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No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?

If YES, contact a specialist recommended by AMAFA to conduct a heritage impact assessment. The heritage impact assessment must be attached as an appendix to this report.

eThembeni Cultural Heritage conducted a Phase 1 heritage impact assessment as the proposed development is a linear development of a length greater than 1 km. However, no significant elements were recorded on site. Nonetheless, should any artefacts or graves be discovered during construction and earthworks, all work will be halted and AMAFA will be contacted.

Briefly explain the recommendations of the specialist:

Will any building or structure older than 60 years be affected in any way?

NO

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

NO

If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.

4. SECTION D: PUBLIC PARTICIPATION

Advertisement

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

- (a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- (b) giving written notice to—
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the local and district municipality which has jurisdiction in the area;

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- (vi) any organ of state having jurisdiction in respect of any aspect of the activity (as identified in the application form for the environmental authorization of this project); and
- (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
 - (i) one local newspaper; or
 - (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
- (d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
- (e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
 - (i) illiteracy;
 - (ii) disability; or
 - (iii) any other disadvantage.

Content of advertisements and notices

A notice board, advertisement or notices must:

- (a) indicate the details of the application which is subjected to public participation; and
- (b) state—
 - (i) that an application for environmental authorization has been submitted to the KZN Department of Agriculture & Environmental Affairs in terms of the EIA Regulations, 2010;(ii)
 - (ii) a brief project description that includes the nature and location of the activity to which the application relates;
 - (iii) where further information on the application can be obtained; and
 - (iv) the manner in which and the person to whom representations in respect of the application may be made.

Placement of advertisements and notices

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

Determination of appropriate process

The EAP must ensure that the public participation process is according to that prescribed in regulation 54 of the EIA Regulations, 2010, but may deviate from the requirements of subregulation 54(2) in the manner agreed by the KZN Department of Agriculture & Environmental Affairs as appropriate for this application. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate.

Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

Comments and response report

The practitioner must record all comments and respond to each comment of the public before this application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations (regulation 57 in the EIA Regulations, 2010) and be attached as Appendix E to this report.

Participation by District, Local and Traditional Authorities

District, local and traditional authorities (where applicable) are all key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of this application and provided with an opportunity to comment.

Has any comment been received from the district municipality?

YES

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Ugu District Municipality requested at the Focus Group Meeting held and in writing in the comment form provided that the preferred route must be re-aligned to bypass the two Umdoni trees. Furthermore, it was requested that an alien invasive eradication programme be implemented.

Has any comment been received from the local municipality?

YES

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

No formal comment has been received, however, general satisfaction and acceptance of the application and the Basic Assessment process was expressed at the Focus Group Meeting.

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Has any comment been received from a traditional authority?

YES

If "YES", briefly describe the feedback below (also attach any correspondence to and from this authority with regard to this application):

Prior to the Focus Group Meeting, consultation was held at a council meeting of the local *Inkosis*. There was unanimous support for the project communicated to the EAP. Further it was requested that the local communities are informed when construction commences so that they are aware and can adequately prepare (for safety and convenience of mobility).

Consultation with other stakeholders

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

NO

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

A detailed issues trail outlining all correspondence between all stakeholders is appended to this report.

5. SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

Issues raised by interested and affected parties

List the main issues raised by interested and affected parties.

No issues have been brought to the attention of the EAP to date, however, it is envisaged that comments will be received during the mandatory review and comment period availed for this draft report.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached as Appendix E to this report):

Impact Ratings

The following parameters are used to describe the impact/issues in this assessment:

1. Nature

This is a brief written statement of the environmental aspect being impacted upon by a particular action or activity.

2. Extent (E)

Extent refers to the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact.

- Site (1) – Within the construction site.
- Local (2) – Within a radius of 2 km of the construction site.
- Regional (3) – the scale applies to impacts on a provincial level and parts of neighbouring provinces.
- National (4) – the scale applies to impacts that will affect the whole South Africa.

3. Duration (D)

Duration indicates what the lifetime of the impact will be.

- Short-term (1) – less than 5 years.
- Medium-term (2) – between 5 and 15 years.
- Long-term (3) – between 15 and 30 years.
- Permanent (4) – over 30 years and resulting in a permanent and lasting change that will always be there.

4. Intensity (I)

Intensity describes whether an impact is destructive or benign.

- Very High (4) - Natural, cultural and social functions and processes are altered to extent that they permanently cease.
- High (3) - Natural, cultural and social functions and processes are altered to extent that they temporarily cease.
- Moderate (2) - Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way.
- Low (1) - Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.

5. Probability (P)

Probability describes the likelihood of an impact actually occurring.

- Improbable (1) - Likelihood of the impact materialising is very low.
- Possible (2) - The impact may occur.

- Highly Probable (3) - Most likely that the impact will occur.
- Definite (4) - Impact will certainly occur.

6. Cumulative (C)

In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

7. Significance (S)

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

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Score		Elaboration
- (13 - 16 points)	NEGATIVE VERY HIGH	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a “very high impact” is likely to be a fatal flaw.
- (10 - 12 points)	NEGATIVE HIGH	These are impacts which individually or combined pose a significantly high negative risk to the environment. These impacts pose a high risk to the quality of the receiving environment. The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
- (7 - 9 points)	NEGATIVE MODERATE	These are impacts which individually or combined pose a moderate negative risk to the quality of health of the receiving environment. These systems would not generally require immediate action but the deficiencies should be rectified to avoid future problems and associated cost to rectify once in HIGH risk. Aesthetically and/or physically non-compliance can be expected over a medium term. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable. Mitigation is possible with additional design and construction inputs.
- (4 - 6 points)	NEGATIVE LOW	These are impacts which individually or combined pose a deleterious or adverse impact and low negative risk to the quality of the receiving environment, and may lead to potential health, safety and environmental concerns. Aesthetically and/or physical non-compliance can be expected for short periods. In this case the impact is short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
0	NEUTRAL	Impact is neither beneficial nor adverse. These are impacts which cannot be classified as either positive or negative or classified and null and void in the case of a negative impact being adequately mitigated to a state where it no longer renders a risk.
+(4 - 6 points)	POSITIVE LOW	These are impacts which individually or combined pose a low positive impact to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is short term, local in extent, not intense in its effect and may not be likely to occur. A low impact has no permanent impact of significance.
+(7 - 9 points)	POSITIVE MODERATE	These are impacts which individually or combined pose a moderate positive effect to the quality of health of the receiving environment. In this case the impact is medium term, moderate in extent, mildly intense in its effect and probable.
+(10 - 12 points)	POSITIVE HIGH	These are impacts which individually or combined pose a significantly high positive impact on the environment. These impacts pose a high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is longer term, greater in extent, intense in its effect and highly likely to occur. The effects of the impact may affect the broader environment.
+ (13 - 16 points)	POSITIVE VERY HIGH	These are permanent and important beneficial impacts which may arise. Individually or combined, these pose a significantly high positive impact on the environment. These impacts pose a very high benefit to the quality of the receiving environment and health, and may lead to potential health, safety and environmental benefits. In this case the impact is long term, greater in extent, intense in its effect and highly likely or definite to occur. The effects of the impact may affect the broader environment.

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IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Impacts that may result from the planning and design phase

a. Site alternatives

Due to this being a linear development proposing a road for a determined site, the only alternative assessed is that of layout or route alternative. Therefore only section B of each phase is completed and not section A which pertains to site alternatives.

b. Process, technology, layout or other alternatives

List the impacts associated with any process, technology, layout or other alternatives that are likely to occur during the planning and design phase (please list impacts associated with each alternative separately):

Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
<i>Direct impacts</i>			
Removal of invader plants through proper identification and recommendations. This could potentially lead to the restoration of indigenous vegetation in the area.	Extent: Local +2 Duration: Short term +1 Intensity: High +3 Probability: Possible +2 Significance: Positive Moderate +8	As a requirement of the EMP, and alien plant eradication must be ensured.	Extent: Local +2 Duration: Short term +1 Intensity: High +3 Probability: Possible +2 Significance: Positive Moderate +8
Adequate provision of services and infrastructure.	Extent: Local +2 Duration: Permanent +4 Intensity: Moderate +2	N/A	Extent: Local +2 Duration: Permanent +4 Intensity: Moderate +2

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
	Probability: Definite +4 Significance: Positive High +12		Probability: Definite +4 Significance: Positive High +12
Improved safety e.g. stabilisation of eroded surfaces.	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8	N/A	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8
Appropriate planning of exclusion of sensitive vegetation and steep areas.	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8	N/A	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8
Incorrect design may have detrimental effects or failure to the implementation of the development.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative Moderate -9	Ensure correct, peer and supervisor (Pr Tech. Eng.) reviewed designs are developed. Furthermore, it is paramount that the findings of this Basic Assessment and the associated specialist studies are incorporated into the design to avoid sensitive areas.	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Low -5
Highly undulating topography and the impacts thereof on design and safety, where the latter refers to steep roads.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	Geotechnical design must ensure that the road follows the least steep areas.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative Moderate -7
The cost (high) of implementation of the road and the design aspects in such an undulating area.	Extent: Site -1 Duration: Short term -1 Intensity: Low -1 Probability: Improbable -1	N/A	Extent: Site -1 Duration: Short term -1 Intensity: Low -1 Probability: Improbable -1

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
	Significance: Negative low -4		Significance: Negative low -4
Indirect impacts			
The permeability of the development area will be decreased which requires careful stormwater management.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative Moderate -9	Adequate stormwater management must be planned for. The respective institutions should include green technologies in their designs. Ensure effective stormwater management will be exercised to limit negative impacts on the environment and enhance the positive impacts, and ensure catering for the hydraulic needs of the development while minimising the associated negative environmental impacts. Ensure stormwater management planning allows for the opportunity to conserve water and make it available to the public for beneficial use. Ensure the planning undertaken by engineers appointed takes cognisance of the responsibility to preserve the natural environment.	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Low -5
The opportunity exists for correct and cautionary planning for pedestrians.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11	If correctly planned for, such as designing with pedestrian pavements of greater width and crossing areas, the safety of pedestrians can be ensured.	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Definite +4 Significance: Positive Very High +13
Provision of labour opportunities.	Extent: Local +2 Duration: Long term +3 Intensity: High +3	Labour opportunities for previously disadvantaged persons and local communities can be ensured.	Extent: Local +2 Duration: Long term +3 Intensity: High +3

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
	Probability: Highly probable +3 Significance: Positive High +11		Probability: Highly probable +3 Significance: Positive High +11
Designs may require the relocation of homesteads or disturbance to such.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative moderate -9	Designs must be re-aligned to bypass the homesteads as much as possible and the time must be taken to reach agreements regarding land with the occupants.	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative low -5
<i>Cumulative impacts</i>			
The establishment of the road could lead to the division of communities on either side of the road due to the possibility of increased risk through higher speed of traffic.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative High -11	Connectivity must be maintained in the road design by increasing safety through implementation of speed humps and making the road a feature of the community by planting trees along the road and providing benches.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Moderate -7
Increased accessibility to the area could result in mushroomed development.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11	This may have positive and negative connotations which if managed correctly in terms of planning for the communities' culture can be a positive impact.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11
Increased storm water run-off from reduced permeability of the gravel road surface may result in erosion.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative High -11	Stormwater management must be carefully designed.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Moderate -7
Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
<i>Direct impacts</i>			
Removal of invader plants through proper identification and recommendations. This could potentially lead to the restoration of indigenous vegetation in the area.	Extent: Local +2 Duration: Short term +1 Intensity: High +3 Probability: Possible +2 Significance: Positive Moderate +8	Alien plant eradication must be ensured.	Extent: Local +2 Duration: Short term +1 Intensity: High +3 Probability: Possible +2 Significance: Positive Moderate +8
Adequate provision of services and infrastructure.	Extent: Local +2 Duration: Permanent +4 Intensity: Moderate +2 Probability: Definite +4 Significance: Positive High +12	N/A	Extent: Local +2 Duration: Permanent +4 Intensity: Moderate +2 Probability: Definite +4 Significance: Positive High +12
Improved safety e.g. stabilisation of eroded surfaces.	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8	N/A	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8
Appropriate planning of exclusion of sensitive vegetation and steep areas.	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8	N/A	Extent: Site +1 Duration: Long term +3 Intensity: Moderate +2 Probability: highly probable +3 Significance: Positive Moderate +8
Incorrect design may have detrimental effects or failure to the implementation of the development.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative Moderate -9	Ensure correct, peer and supervisor (Pr. Eng) reviewed designs are developed. Furthermore, it is paramount that the findings of this Basic Assessment and the associated specialist studies are incorporated into	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Low -5

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
		the design to avoid sensitive areas.	
Highly undulating topography and the impacts thereof on design and safety, where the latter refers to steep roads.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	Geotechnical design must ensure that the road follows the least steep areas.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative Moderate -7
The cost of implementation of the road and the design aspects in such an undulating area.	Extent: Site -1 Duration: Short term -1 Intensity: Very high -4 Probability: Definite -4 Significance: Negative high -10	N/A	Extent: Site -1 Duration: Short term -1 Intensity: Very high -4 Probability: Definite -4 Significance: Negative high -10
Indirect impacts			
The permeability of the development area will be decreased which requires careful stormwater management.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative Moderate -9	<ul style="list-style-type: none"> Adequate stormwater management must be planned for. The respective institutions should include green technologies in their designs. Ensure effective stormwater management will be exercised to limit negative impacts on the environment and enhance the positive impacts, and ensure catering for the hydraulic needs of the development while minimising the associated negative environmental impacts. Ensure stormwater management planning allows for the opportunity to conserve water and make it available to the public for beneficial use. 	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Low -5

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
		<ul style="list-style-type: none"> ▪ Ensure the planning undertaken by engineers appointed takes cognisance of the responsibility to preserve the natural environment. 	
The opportunity exists for correct and cautionary planning for pedestrians.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11	If correctly planned for, such as designing with pedestrian pavements of greater width and crossing areas, the safety of pedestrians can be ensured.	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Definite +4 Significance: Positive High +13
Provision of labour opportunities.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11	Labour opportunities for previously disadvantaged persons and local communities can be ensured.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11
Designs may require the relocation of homesteads or disturbance to such.	Extent: Local -2 Duration: Permanent -4 Intensity: Very high -4 Probability: Highly probable -3 Significance: Negative Very High -13	Designs must be re-aligned to bypass the homesteads as much as possible and the time must be taken to reach agreements regarding land with the occupants.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative high -12
Cumulative impacts			
The establishment of the road could lead to the division of communities on either side of the road due to the possibility of increased risk through higher speed of traffic.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative High -11	Connectivity must be maintained in the road design by increasing safety through implementation of speed humps and making the road a feature of the community by planting trees along the road and providing benches.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Moderate -7
Increased accessibility to the area	Extent: Local +2	This may have positive and negative	Extent: Local +2

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation / Enhancement Measure	Risk Rating post mitigation
could result in mushroomed development.	Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11	connotations which if managed correctly in terms of planning for the communities' culture can be a positive impact.	Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive High +11
Increased storm water run-off from reduced permeability of the gravel road surface may result in erosion.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative High -11	Stormwater management must be carefully designed.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Improbable -1 Significance: Negative Moderate -7

No-Go Alternative			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
Direct impacts			
Loss of development opportunity.	Extent: Local -2 Duration: Permanent -4 Intensity: High -3 Probability: Definite -4 Significance: Negative Very High -13	Motivation for this development has been adequately provided, providing evidence that this road is needed for the betterment of the community. It is therefore regarded that implementation of the development is a mitigation measure for this impact.	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Improbable +1 Significance: Positive High +10
Indirect impacts			
Status Quo remains. In this regard this refers to the continued on-foot transport mode and lack of accessibility.	Extent: Local -2 Duration: Long Term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative Very High -11	Motivation for this development has been adequately provided, providing evidence that this road is needed for the betterment of the community. It is therefore regarded that implementation of the development is a mitigation measure for this impact.	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Improbable +1 Significance: Positive High +10

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<i>Cumulative impacts</i>			
None.		None	

Summary of impact ratings for the planning and design phase per alternative:

IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
Removal of invader plants through proper identification and recommendations. This could potentially lead to the restoration of indigenous vegetation in the area.	8	8	8	8	N/A	N/A
Adequate provision of services and infrastructure.	12	12	12	12	N/A	N/A
Improved safety e.g. stabilisation of eroded surfaces.	8	8	8	8	N/A	N/A
Appropriate planning of exclusion of sensitive vegetation and steep areas.	8	8	8	8	N/A	N/A
Incompetent design may lead may have detrimental effects or failure to the implementation of the development.	-9	-5	-9	-5	N/A	N/A
Highly undulating topography and the impacts thereof on design and safety, where the latter refers to steep roads.	-10	-7	-10	-7	N/A	N/A
The cost of implementation of the road and the design aspects in such an undulating area.	-4	-4	-10	-10	N/A	N/A
The permeability of the development area will be decreased which requires careful stormwater management	-9	-5	-9	-5	N/A	N/A

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IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
The opportunity exists for correct and cautionary planning for pedestrians.	11	13	11	13	N/A	N/A
Provision of labour opportunities.	11	11	11	11	N/A	N/A
Designs may require the relocation of homesteads or disturbance to such.	-9	-5	-13	-12	N/A	N/A
The establishment of the road could lead to the division of communities on either side of the road.	-11	-7	-11	-7	N/A	N/A
Increased accessibility to the area could result in mushroomed development.	11	11	11	11	N/A	N/A
Increased storm water run-off from reduced permeability of the gravel surface may result in erosion.	-11	-7	-11	-7	N/A	N/A
Total	2	2.21	-0.89	1.29	0	0
Loss of development opportunity.	N/A	N/A	N/A	N/A	-13	+10
Status Quo remains. In this regard this refers to the continued on-foot transport mode and lack of accessibility.	N/A	N/A	N/A	N/A	-11	+10
Total	0	0	0	0	-12	5

In light of these score above it can be seen that route alignment one emerges as having less of an impact and therefore is preferred.

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Impacts that may result from the construction phase

a. Site alternatives

Due to this being a linear development proposing a road for a determined site, the only alternative assessed is that of layout or route alternative. Therefore only section B of each phase is completed and note section A which pertains to site alternatives.

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the construction phase (please list impacts associated with each alternative separately):

Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
<i>Direct impacts</i>			
Pollution emanating from construction.	Extent: Local -2 Duration: Short term -1 Intensity: High -3 Probability: Definite -4 Significance: Negative moderate -10	<ul style="list-style-type: none"> ▪ All construction activities should be strictly limited to the construction servitude area. Vegetation clearance should be restricted to the actual road servitude especially within the drainage line and Mtwalume River crossings. ▪ Sufficient chemical toilets and waste bins must be provided in all areas where construction is taking place. These toilets and bins must furthermore be emptied regularly. ▪ Sanitation facilities shall be located within 100 m from any point of work, but not closer than 50 m from the Mtwalume River and drainage lines / 	Extent: Local -2 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -8

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>streams.</p> <ul style="list-style-type: none"> It is recommended that the construction programme preferably commence during the dry winter months, when the Mtwalume River's base flow is lower and the risk of soil and bank erosion is lowest. All earthworks shall be undertaken in such a manner so as to minimize the extent of any impacts. Construction activities are to be restricted to business hours in order to limit disturbance of surrounding land owners in terms of inter alia noise. All vehicles associated with the construction activities should be in a serviced condition to prevent oil leaks etc and the possible contamination of the River and drainage lines. 	
<p>Soil impacts. Extensive gully erosion is evident around the entire area. The road itself may have negative soil erosion impacts during construction but positive impacts thereafter as it may stabilise erosion.</p>	<p>Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Definite -4 Significance: Negative moderate -9</p>	<ul style="list-style-type: none"> Soil removed from the new road reserve is to be appropriately stored for later use in back-filling. Sub-soil and topsoil (the top +/- 30-50 cm of the soil) should be stored separately. Soil stockpiles are to be protected from possible erosion, e.g. through covering of the stockpiles with tarpaulin, and limiting the height and angle of the stockpile. Soil stockpiles should not exceed 1 m in height. Soil stockpiling areas must be sufficiently situated away from the drainage areas towards the lower lying 	<p>Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -7</p>

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>Mtwalume River and drainage areas.</p> <ul style="list-style-type: none"> Any erosion channels developed during the construction period or during the vegetation establishment period should be backfilled and compacted, and the areas restored to a proper condition. The Contractor should ensure that cleared areas are effectively stabilised to prevent and control erosion. This is especially pertinent within steep hillslopes which are situated on a shallow soil layer. 	
<p>The route traverses in some part through or near homesteads, in which case relocations or disturbances to these households could occur if not re-aligned.</p>	<p>Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative moderate -9</p>	<p>The route should be realigned where possible to bypass as many homesteads as possible, and at the least, the people of the homesteads targeted for expropriation or construction through their land must be adequately consulted with the intention to reach a resolution which is mutually satisfactory and beneficial. This route does however; traverse fewer homesteads than alternative 2.</p>	<p>Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative low -5</p>
<p>Negative biophysical impacts associated with the southern non-perennial drainage line crossings and Mtwalume River crossing.</p>	<p>Extent: Local -2 Duration: Long term -3 Intensity: Very high -4 Probability: Highly probable -3 Significance: Negative high -12</p>	<ul style="list-style-type: none"> Construction activities of the Mtwalume River bridge as well as southern non-perennial drainage line should be scheduled to take place during low flow periods of the stream (winter months); when as little of the construction area and exposed sediment is in contact with the flow as possible. The non-perennial or seasonal stream is poorly defined and narrow. 	<p>Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -7</p>

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>Adequate culverts or concrete pipes must be installed in order to maintain the current hydrological patterns.</p> <ul style="list-style-type: none"> ▪ The original geometry, topography and geomorphology in both cross-sectional and longitudinal profile should be reinstated, above and below the stream and river crossing. ▪ Appropriate mitigatory measures for controlling sediment input into the stream and drainage areas will be required during the construction phase. The use of hay bales packed in rows across diversions and active flow areas during construction may be one way of limiting sediment inputs. They also help to buffer the pH. The bales will need to be removed and disposed of after construction. Other alternative methods of controlling sediment should also be considered such as sediment fences etc. ▪ All coffer dams, causeway and construction materials should be removed from the stream immediately after construction at the site is completed. ▪ Where necessary and according to risks in terms of bank erosion, gabions or storm water control structures should be used to disperse storm water flows and prevent further bank erosion. Appropriate gabion structures or gabion mattresses should be 	

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>installed to prevent further bank erosion.</p> <ul style="list-style-type: none"> Where necessary and according to slope and risks in terms of bank erosion, disturbed areas should be re-vegetated using either a specified seed mix and/or appropriate indigenous trees (see list provided in the specialist study attached as appendix D). Where appropriate, large individual indigenous trees (<i>Syzgium cordatum</i>) should be avoided during construction and should be marked on site. The existing environmental management programme, should be audited during construction, and monitored for a period thereafter, until full rehabilitation is assured and stability demonstrated. Ideally the proposed bridge should span the entire active channel of the Mtwalume River and the bridge supports should be situated outside the macro-channel banks. 	
<p>During the construction phase of the proposed Ntatshana road upgrading, some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of the road servitudes. These activities will have an impact on the associated fauna especially ground</p>	<p>Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10</p>	<ul style="list-style-type: none"> Prior to construction and vegetation clearance a suitably qualified ecologist/botanist should conduct a final walk down of the entire alignment and adopt a rescue and recovery programmes for any remaining geophytes, Aloes etc. These can be planted in suitable habitat away from 	<p>Extent: Local -2 Duration: Short term -1 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7</p>

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
living and fossorial species occurring along or in close proximity of the servitude, both through modification of habitat and disturbance caused by human activity.		<p>the proposed road alignment.</p> <ul style="list-style-type: none"> ▪ Prior to construction and vegetation clearance a suitably qualified ecologist/zoologist should closely examine the proposed construction areas (road alignment) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the road. ▪ If the road alignment does not follow existing tracks and pathways within the wooded gorges as well as stream a suitably qualified botanist/ecologist must closely examine the proposed road alignment through these sensitive areas as well as provide site specific environmental management measures for potential impacts. ▪ Close site supervision must be maintained during construction. ▪ During the construction phase workers must be limited to areas under construction within the road servitude and access to the undeveloped areas, especially the surrounding hills and woodlands, Mtwalume and valley bottom wetlands must be strictly regulated (“no-go” areas during construction as well as operational activities). ▪ Provision of adequate toilet facilities 	

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>must be implemented to prevent the possible contamination of ground (borehole) and surface water in the area.</p> <ul style="list-style-type: none"> ▪ Mobile toilets must be provided in order to minimize un-authorized traffic of construction workers outside of the designated areas. No toilet must be placed within 50 m of the Mtwalume as well as adjacent drainage lines. ▪ All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction. All alien invasive plant should be removed from the road servitude to prevent further invasion. ▪ Firearms or any other hunting weapons must be prohibited on site. ▪ Contract employees must be educated about the value of wild animals and the importance of their conservation. ▪ Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harm remaining faunal species. ▪ No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. 	

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
The proposed road bisects a non-perennial drainage line including two large Umdoni (<i>Syzigium cordatum</i>).	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -9	The route must be realigned to negate this impact and employ the mitigation measures above for the non-perennial drainage line.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6
This proposed route bisects temporary inundated or moist <i>Aristida juncioformis</i> hill slope seepage wetlands adjacent to the southern non-perennial drainage line. The Ntatshana road bisects a narrow poorly defined non-perennial drainage line as well as degraded foot slope seepage wetlands. These areas have been heavily impacted on by surrounding anthropogenic activities including sand harvesting; ploughing of soils for small scale terraced agricultural lands as well as extensive rill erosion from livestock pathways and alien vegetation invasion. The impact is therefore expected to be minor.	Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -7	The route must be realigned wherever possible albeit short distances to bypass the wetlands and where this is not possible, rehabilitation of remaining wetlands should be considered could be considered.	Extent: Site -1 Duration: Short term -1 Intensity: Low -1 Probability: Possible -2 Significance: Negative low -5
The current road alignment bisects a small patch of degraded woodland (wood harvesting) adjacent to the Mtwalume River.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -8	Ideally the road should be situated away from any densely vegetated areas or alternatively restricted to the existing livestock and human pathways. This will result in minimal vegetation clearance and disturbance.	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2 Significance: Negative low -6

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
Noise impacts.	Extent: Site -1 Duration: Short term -1 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -8	<ul style="list-style-type: none"> ▪ All construction activities should be undertaken according to daylight working hours between the hours of 07:00 – 17:00 on weekdays and 7:30 – 13:00 on Saturdays. ▪ No construction activities may be undertaken on Sunday. ▪ All earth-moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. ▪ Employees must have the appropriate Personal Protective Equipment (PPE) as indicated in the Draft EMPr. ▪ A complaints register must be made available and should any complaints be received, these should be logged in the complaints register and reported to the responsible person on site. ▪ All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). 	Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -7
Opportunities from socio-economic perspectives.	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive moderate +10	The socio-economic activities can be enhanced by careful planning and optimum use of the accessibility and mobility that this road will provide.	Extent: Local +2 Duration: Long term +3 Intensity: Very high +4 Probability: Highly probable +3 Significance: Positive moderate +12
Possible pollution of the Mtwalume River due to ill-managed construction	Extent: Local -2	<ul style="list-style-type: none"> ▪ Ensure the establishment of storm water diversion berms around the 	Extent: Local -2

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
activities.	Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -11	contractor laydown area and other potential contaminated areas (e.g. diesel storage tanks or refuelling station). <ul style="list-style-type: none"> ▪ All contaminated standing water should be immediately removed and treated or disposed of appropriately. ▪ All incidents must be reported to the responsible site officer as soon as it occurs. ▪ Ensure effective storm water management will be exercised to limit negative impacts on the environment and enhance the positive impacts, and ensure catering for the hydraulic needs of the development while minimising the associated negative environmental impacts. ▪ Current depressions in the area should be raised to prevent stormwater ponding. ▪ Surfaces and conduits should be constructed to drain the run off more efficiently. ▪ All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. ▪ Sheet runoff from paved surfaces and access roads needs to be curtailed. Runoff from paved surfaces should be slowed down by the strategic 	Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>placement of berms.</p> <ul style="list-style-type: none"> ▪ No surface storm water generated as a result of the development may be directed directly into the Mtwalume River or non-perennial drainage lines but towards carefully planned storm water attenuation/retention ponds. Ideally the ponds or dams should be seasonally inundated and be appropriately vegetated providing potential increased habitat diversity on the site. ▪ Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mtwalume River. In order to prevent erosion, mechanisms are required for dissipating water energy. ▪ No activity such as temporary housing, temporary ablution, disturbance of natural habitat, storing of equipment or any other use of the buffer/flood zone whatsoever, may be permitted during the construction phase. The demarcated buffer and riparian zone should be fenced during the construction phase to prevent any misinterpretation of the demarcated no-go zone. ▪ Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface 	

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		(Mtwalume River) and ground water in the area.	
The route follows existing cattle tracks which have as a result of this been highly transformed, therefore being a suitable route to follow.	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	It must be ensured that the alignment of the route follows these transformed tracks to the greatest extent.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Definite +4 Significance: Positive high +12
Indirect impacts			
Increased traffic and heavy vehicles and machinery on roads, leading to poorer road conditions and potential accidents and pedestrians and commuters.	Extent: Local -2 Duration: Short term -1 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -9	<ul style="list-style-type: none"> ▪ Necessary precautions must be taken during the construction phase such as proper signage and notification to the locals. ▪ Speeds of truck and heavy vehicles transporting materials must be regulated. 	Extent: Local -2 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -8
Vegetation destruction and general impacts to flora and fauna.	Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	<ul style="list-style-type: none"> ▪ No cutting down of indigenous vegetation is permitted because it encourages wildlife to reside in the area. ▪ Weeds and alien vegetation should be removed and prevented from spreading. ▪ No cutting down of trees for firewood. ▪ Training of contractors on environmental awareness and the importance of flora and fauna. ▪ All site disturbances must be limited to the areas where structure will be constructed. 	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<ul style="list-style-type: none"> ▪ Ensure that contractors and staff are well managed and adhere to the mitigation and management measures. ▪ Training of contractors on environmental awareness and the importance of flora and fauna. ▪ The riparian buffer zones should be left undisturbed to allow the climax terrestrial grassland and bushveld community to establish in these areas. In this regard special mention is made of the need to use indigenous (to the area) vegetation species as the first choice during landscaping. ▪ Severe contractual fines must be imposed and immediate dismissal of any contract employee who is found attempting to snare or otherwise harms remaining faunal species. ▪ The Contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. All animals captured must be released in appropriate habitat away from the development. ▪ Fences should have low impact to surrounding vegetation as well as allow for the natural migratory movements onto and away from the site. Ideally palisade fencing with a minimum 15 cm wide gap should be 	

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		erected around the site. A concrete palisade fence is currently erected but requires some restoration.	
The permeability of the development area will be decreased through the introduction of impervious areas.	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	Proper stormwater management can mitigate the loss of permeability due to the introduction of impervious substrates.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7
Artificial lighting will most likely result in an impact on all nocturnal animal species. Numerous species will be attracted towards the light sources and this will result in the disruption of natural cycles, such as the reproductive cycle and foraging behaviour.	Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	Artificial lighting must be restricted to areas under construction and not directed towards the Mtwalume River or non-perennial drainage lines in order to minimize the potential negative effects of the lights on the natural nocturnal activities. Where lighting is required for safety or security reasons, this should be targeted at the areas requiring attention. Yellow sodium lights should be prescribed as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife. Sodium lamps require a third less energy than conventional light bulbs.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
Frogs can become confined to a small area subject to urbanisation, habitat fragmentation, afforestation, and drainage for agricultural and urban development. Some breeding sites are being polluted by DDT, which is used for controlling malarial mosquitoes. The spread of alien vegetation, in particular Eucalyptus species, is responsible for the drying out of some breeding sites.	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	Ideally a detailed herpetological survey should be conducted prior to construction in order to ascertain the direct impact the proposed Ntatshana Road could have on the frog habitats. The survey should furthermore prescribe mitigation measures applicable. As a minimum, the use of DDT should be limited and alien vegetation should be controlled to nurture a habitat suitable for the frogs indigenous to the Ntatshana and Makhiqizana Farms.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7
Air Quality could be compromised through construction activities causing air pollution.	Extent: Site -1 Duration: Short term -1 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -8	<ul style="list-style-type: none"> ▪ Dust suppression measures need to be implemented on site to reduce the liberation of dust it is recommended that water be sprayed on the road when and where applicable. ▪ There should be strict speed limits on dusty roads to prevent the liberation of dust into the atmosphere. ▪ Adequate communication and education of personnel of the need to mitigate against dust. 	Extent: Site -1 Duration: Short term -1 Intensity: Low -1 Probability: Highly probable -3 Significance: Negative low -6
Spillages and the associated impacts they have on the environment.	Extent: Site -1 Duration: Medium term -2 Intensity: Very high -4 Probability: Possible -2 Significance: Negative moderate -9	<ul style="list-style-type: none"> ▪ All hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain 110% of the total volume of materials stored at any given time. ▪ The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report. 	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<ul style="list-style-type: none"> ▪ Provide proper warning signage to make people aware of the activities within designated areas. ▪ Employees should be provided with absorbent spill kits and disposal containers to handle spillages. ▪ Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimise potential spillages. ▪ All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be undertaken beyond the contractor laydown area. ▪ Employees should record and report any spillages to the responsible person. ▪ An Emergency Preparedness and Response Plan will be developed and implemented should an incident occur. ▪ Access to storage areas on site must be restricted to authorised employees only. ▪ Contractors will be held liable for any environmental damages caused by spillages. 	
Waste issues - the lack of waste management could have detrimental	Extent: Site -1 Duration: Medium term -2	<u>General Waste:</u> <ul style="list-style-type: none"> ▪ General waste disposal bins will be 	Extent: Site -1 Duration: Medium term -2

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
impacts on the receiving environment.	Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	<p>made available for employees to use throughout the project area.</p> <ul style="list-style-type: none"> ▪ Where possible waste should be recycled or sold to the community. ▪ Waste will be temporarily stored on site (less than 90 days) before being disposed off appropriately. ▪ General waste will be disposed of an approved waste disposal facility. ▪ Waste being taken off site must be recorded and kept as evidence. ▪ Evidence of correct disposal must be kept. ▪ Building rubble will be used, where possible, in construction or buried with the necessary town planning approvals. Where this is not possible, the rubble will be disposed of at an appropriate site. ▪ All temporary soil stockpiles litter and rubble must be removed on completion of construction activities. No dumping of waste material in surrounding open areas. 	Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6
Potential of causing groundwater and surface water contamination from hazardous wastes on site.	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	<ul style="list-style-type: none"> ▪ Hazardous materials will be generated if there are spillages during construction and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site. ▪ Absorbent materials used to clean up 	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		spillages should be disposed of in a separate hazardous waste bin. <ul style="list-style-type: none"> ▪ The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated. ▪ Provide employees with appropriate PPE for handling hazardous materials. ▪ All hazardous waste will be disposed of in a registered hazardous waste disposal facility. ▪ Records of all waste being taken off site must be recorded and kept as evidence. 	
Potential of causing groundwater and surface water contamination from sewage waste on site.	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	<ul style="list-style-type: none"> ▪ On-site chemical toilets will be provided for domestic purposes during construction phase. ▪ The contractors will be responsible for the maintenance of the chemical toilets. ▪ Should any spills or incidents occur; the material will be cleaned up immediately and disposed off appropriately. ▪ All incidents must be reported to the responsible site officer as soon as it occurs. ▪ During the construction phase chemical toilets will be provided for use on site. The chemical toilets will be cleaned and maintained on a 	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		weekly basis, minimising the potential for the generation of odours on site.	
Safety of the local communities may be compromised during the construction period.	Extent: Site -1 Duration: Short term -1 Intensity: Very high -4 Probability: Highly probable -3 Significance: Negative moderate -9	<ul style="list-style-type: none"> ▪ Ensure that there are flag men and signs at access points to the construction site; ▪ Implement proper road signs to warn motorists of construction activities ahead; ▪ Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction. ▪ All construction staff must have the appropriate PPE. ▪ The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. ▪ Report and record any environmental, health and safety incidents to the responsible person. ▪ Firearms or any other hunting weapons must be prohibited on site. ▪ Contractors must be educated about the value of wild animals and the importance of their conservation. ▪ Members of the public adjacent to the construction site should be notified of construction activities in order to limit unnecessary disturbance or 	Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative low -6

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		interference; <ul style="list-style-type: none"> ▪ Construction activities will be undertaken during daylight hours and not on Sundays; ▪ Consult with local communities regarding the location of construction camps, access and hauling routes and other likely disturbance during and after construction. ▪ Provide clear and realistic information regarding employment opportunities and other benefits for local communities. 	
Cumulative impacts			
Development of an access road could lead to mushroomed development or the planning and enquiry of such during the construction phase. Furthermore there could be unrealistic expectation created for job seekers in the area.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative high -10	Development in the area could be a positive spin off from the road if properly managed. It is also important that the local community is properly informed of facts and not made false promises. In this regard the impact becomes positive.	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Possible +2 Significance: Positive moderate +9

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
<i>Direct impacts</i>			
Pollution emanating from construction.	<p>Extent: Local -2 Duration: Short term -1 Intensity: High -3 Probability: Definite -4 Significance: Negative moderate -10</p>	<ul style="list-style-type: none"> ▪ All construction activities should be strictly limited to the construction servitude area. Vegetation clearance should be restricted to the actual road servitude especially within the drainage line and Mtwalume River crossings. ▪ Sufficient chemical toilets and waste bins must be provided in all areas where construction is taking place. These toilets and bins must furthermore be emptied regularly. ▪ Sanitation facilities shall be located within 100 m from any point of work, but not closer than 50 m from the Mtwalume River and drainage lines/streams. ▪ It is recommended that the construction programme preferably commence during the dry winter months, when the Mtwalume River's base flow is lower and the risk of soil and bank erosion is lowest. All earthworks shall be undertaken in such a manner so as to minimize the extent of any impacts. ▪ Construction activities are to be restricted to business hours in order to limit disturbance of surrounding land owners in terms 	<p>Extent: Local -2 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -8</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>of inter alia noise.</p> <ul style="list-style-type: none"> All vehicles associated with the construction activities should be in a serviced condition to prevent oil leaks etc and the possible contamination of the Mtwalume River and drainage lines. 	
<p>Soil impacts. Extensive gully erosion is evident around the entire area. The road itself may have negative soil erosion impacts during construction but positive impacts thereafter as it may stabilise erosion.</p>	<p>Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Definite -4 Significance: Negative moderate -9</p>	<ul style="list-style-type: none"> Soil removed from the new road reserve is to be appropriately stored for later use in back-filling. Sub-soil and topsoil (the top +/- 30-50 cm of the soil) should be stored separately. Soil stockpiles are to be protected from possible erosion, e.g. through covering of the stockpiles with tarpaulin, and limiting the height and angle of the stockpile. Soil stockpiles should not exceed 1 m in height. Soil stockpiling areas must be sufficiently situated away from the drainage areas towards the lower lying Mtwalume River and drainage areas. Any erosion channels developed during the construction period or during the vegetation establishment period should be backfilled and compacted, and the areas restored to a proper condition. The Contractor should ensure that cleared areas are effectively stabilised to prevent and 	<p>Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -7</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		control erosion. This is especially pertinent within steep hill slopes which are situated on a shallow soil layer.	
The route traverses in some part through or near homesteads, in which case relocations or disturbances to these households could occur if not re-aligned.	Extent: Local -2 Duration: Permanent -4 Intensity: Very high -4 Probability: Highly probable -3 Significance: Negative Very High -13	The route should be realigned where possible to bypass as many homesteads as possible, and at the least, the people of the homesteads targeted for expropriation or construction through their land must be adequately consulted with the intention to reach a resolution which is mutually satisfactory and beneficial. This route does however; traverse more homesteads and alternative 1.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Possible -2 Significance: Negative high -12
Negative biophysical impacts associated with the southern non-perennial drainage line crossings and Mtwalume River crossing.	Extent: Local -2 Duration: Long term -3 Intensity: Very high -4 Probability: Highly probable -3 Significance: Negative high -12	<ul style="list-style-type: none"> ▪ Construction activities of the Mtwalume bridge as well as southern non-perennial drainage line should be scheduled to take place during low flow periods of the stream (winter months); when as little of the construction area and exposed sediment is in contact with the flow as possible. ▪ The non-perennial or seasonal stream is poorly defined and narrow. Adequate culverts or concrete pipes must be installed in order to maintain the current hydrological patterns. ▪ The original geometry, topography and geomorphology in both cross-sectional and longitudinal profile 	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -7

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>should be reinstated, above and below the stream and river crossing.</p> <ul style="list-style-type: none"> ▪ Appropriate mitigatory measures for controlling sediment input into the stream and drainage areas will be required during the construction phase. The use of hay bales packed in rows across diversions and active flow areas during construction may be one way of limiting sediment inputs. They also help to buffer the pH. The bales will need to be removed and disposed of after construction. Other alternative methods of controlling sediment should also be considered such as sediment fences etc. ▪ All coffer dams, causeway and construction materials should be removed from the stream immediately after construction at the site is completed. ▪ Where necessary and according to risks in terms of bank erosion, gabions or storm water control structures should be used to disperse storm water flows and prevent further bank erosion. Appropriate gabion structures or gabion mattresses should be installed to prevent further bank erosion. 	

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<ul style="list-style-type: none"> Where necessary and according to slope and risks in terms of bank erosion, disturbed areas should be re-vegetated using either a specified seed mix and/or appropriate indigenous trees (see list provided in the specialist study attached as appendix D). Where appropriate, large individual indigenous trees (<i>Syzigium cordatum</i>) should be avoided during construction and should be marked on site. The existing environmental management plan, should be audited during construction, and monitored for a period thereafter, until full rehabilitation is assured and stability demonstrated. Ideally the proposed bridge should span the entire active channel of the Mtwalume River and the bridge supports should be situated outside the macro-channel banks. 	
<p>During the construction phase of the proposed Ntatshana road upgrading, some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of the road servitudes. These activities will have an impact on the associated fauna especially ground living and fossorial species occurring along or in close proximity of the</p>	<p>Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10</p>	<ul style="list-style-type: none"> Prior to construction and vegetation clearance a suitably qualified ecologist/botanist should conduct a final walk down of the entire alignment and adopt a rescue and recovery programmes for any remaining geophytes, Aloes etc. These can be planted in suitable habitat away from the proposed road alignment. 	<p>Extent: Local -2 Duration: Short term -1 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
servitude, both through modification of habitat and disturbance caused by human activity..		<ul style="list-style-type: none"> ▪ Prior to construction and vegetation clearance a suitably qualified ecologist/zoologist should closely examine the proposed construction areas (road alignment) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the road. ▪ If the road alignment does not follow existing tracks and pathways within the wooded gorges as well as stream a suitably qualified botanist/ecologist must closely examine the proposed road alignment through these sensitive areas as well as provide site specific environmental management measures for potential impacts. ▪ Close site supervision must be maintained during construction. ▪ During the construction phase workers must be limited to areas under construction within the road servitude and access to the undeveloped areas, especially the surrounding hills and woodlands, Mtwalume River and valley bottom wetlands must be strictly regulated (“no-go” areas during construction 	

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>as well as operational activities).</p> <ul style="list-style-type: none"> ▪ Provision of adequate toilet facilities must be implemented to prevent the possible contamination of ground (borehole) and surface water in the area. ▪ Mobile toilets must be provided in order to minimize un-authorized traffic of construction workers outside of the designated areas. No toilet must be placed within 50 m of the Mtwalume River as well as adjacent drainage lines. ▪ All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction. All alien invasive plant should be removed from the road servitude to prevent further invasion. ▪ Firearms or any other hunting weapons must be prohibited on site. ▪ Contract employees must be educated about the value of wild animals and the importance of their conservation. ▪ Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harms remaining faunal 	

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		species. ▪ No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the site.	
The proposed road bisects woodlands in two areas north of the Mtwalume River.	Extent: Site -1 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	The route should be realigned to negate this impact.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7
This proposed route bisects temporary inundated or moist <i>Aristida juncioformis</i> hill slope seepage wetlands adjacent to the southern non-perennial drainage line. The Ntatshana road bisects a narrow poorly defined non-perennial drainage line as well as degraded foot slope seepage wetlands. These areas have been heavily impacted on by surrounding anthropogenic activities including sand harvesting; ploughing of soils for small scale terraced agricultural lands as well as extensive rill erosion from livestock pathways and alien vegetation invasion. The impact is therefore expected to be minor	Extent: 0 Duration: 0 Intensity: 0 Probability: 0 Significance: Neutral 0	The route must be realigned wherever possible albeit short distances to bypass the wetlands and where this is not possible, rehabilitation of remaining wetlands should be considered could be considered.	Extent: 0 Duration: 0 Intensity: 0 Probability: 0 Significance: Neutral 0
The current road alignment bisects a small patch of degraded woodland (wood harvesting) adjacent to the Mtwalume River.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Highly probable -3	Ideally the road should be situated away from any densely vegetated areas or alternatively restricted to the existing livestock and human pathways. This will result in minimal	Extent: Site -1 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
	Significance: Negative moderate -8	vegetation clearance and disturbance.	Significance: Negative low -6
Noise impacts.	Extent: Site -1 Duration: Short term -1 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -8	<ul style="list-style-type: none"> ▪ All construction activities should be undertaken according to daylight working hours between the hours of 07:00 – 17:00 on weekdays and 7:30 – 13:00 on Saturdays. ▪ No construction activities may be undertaken on Sunday. ▪ All earth-moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. ▪ Employees must have the appropriate Personal Protective Equipment (PPE) as indicated in the Draft EMPr. ▪ A complaints register must be made available and should any complaints be received, these should be logged in the complaints register and reported to the responsible person on site. ▪ All operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993). 	Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -7
Opportunities from socio-economic perspectives.	Extent: Local +2 Duration: Long term +3	The socio-economic activities can be enhanced by careful planning and	Extent: Local +2 Duration: Long term +3

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
	Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive moderate +10	optimum use of the accessibility and mobility that this road will provide.	Intensity: Very high +4 Probability: Highly probable +3 Significance: Positive moderate +12
Possible pollution of the Mtwalume River due to ill-managed construction activities.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -11	<ul style="list-style-type: none"> ▪ Ensure the establishment of storm water diversion berms around the contractor laydown area and other potential contaminated areas (e.g. diesel storage tanks or refuelling station). ▪ All contaminated standing water should be immediately removed and treated or disposed of appropriately. ▪ All incidents must be reported to the responsible site officer as soon as it occurs. ▪ Ensure effective storm water management will be exercised to limit negative impacts on the environment and enhance the positive impacts, and ensure catering for the hydraulic needs of the development while minimising the associated negative environmental impacts. ▪ Current depressions in the area should be raised to prevent stormwater ponding. ▪ Surfaces and conduits should be constructed to drain the run off more efficiently. 	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<ul style="list-style-type: none"> ▪ All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. ▪ Sheet runoff from paved surfaces and access roads needs to be curtailed. Runoff from paved surfaces should be slowed down by the strategic placement of berms. ▪ No surface storm water generated as a result of the development may be directed directly into the Mtwalume River or non-perennial drainage lines but towards carefully planned storm water attenuation/retention ponds. Ideally the ponds or dams should be seasonally inundated and be appropriately vegetated providing potential increased habitat diversity on the site. ▪ Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mtwalume River. In order to prevent erosion, mechanisms are required for dissipating water energy. ▪ No activity such as temporary housing, temporary ablution, 	

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>disturbance of natural habitat, storing of equipment or any other use of the buffer/flood zone whatsoever, may be permitted during the construction phase. The demarcated buffer and riparian zone should be fenced during the construction phase to prevent any misinterpretation of the demarcated no-go zone.</p> <ul style="list-style-type: none"> Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface (Mtwalume River) and ground water in the area. 	
The route follows to a certain extent existing cattle tracks which have as a result of this been highly transformed, therefore being a suitable route to follow.	<p>Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Possible +2 Significance: Positive moderate +9</p>	It must be ensured that the alignment of the route follows these transformed tracks to the greatest extent.	<p>Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Possible +2 Significance: Positive moderate +9</p>
Indirect impacts			
Increased traffic and heavy vehicles and machinery on roads, leading to poorer road conditions and potential accidents and pedestrians and commuters.	<p>Extent: Local -2 Duration: Short term -1 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -9</p>	<ul style="list-style-type: none"> Necessary precautions must be taken during the construction phase such as proper signage and notification to the locals. Speeds of truck and heavy vehicles transporting materials must be regulated. 	<p>Extent: Local -2 Duration: Short term -1 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative moderate -8</p>
Vegetation destruction and general impacts to flora and fauna.	<p>Extent: Local -2 Duration: Medium term -2</p>	<ul style="list-style-type: none"> No cutting down of indigenous vegetation is permitted because it encourages wildlife to reside in the 	<p>Extent: Local -2 Duration: Medium term -2</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
	Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	area. <ul style="list-style-type: none"> ▪ Weeds and alien vegetation should be removed and prevented from spreading. ▪ No cutting down of trees for firewood. ▪ Training of contractors on environmental awareness and the importance of flora and fauna. ▪ All site disturbances must be limited to the areas where structure will be constructed. ▪ Ensure that contractors and staff are well managed and adhere to the mitigation and management measures. ▪ Training of contractors on environmental awareness and the importance of flora and fauna. ▪ The riparian buffer zones should be left undisturbed to allow the climax terrestrial grassland and bushveld community to establish in these areas. In this regard special mention is made of the need to use indigenous (to the area) vegetation species as the first choice during landscaping. ▪ Severe contractual fines must be imposed and immediate dismissal of any contract employee who is found attempting to snare or 	Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>otherwise harms remaining faunal species.</p> <ul style="list-style-type: none"> ▪ The Contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. All animals captured must be released in appropriate habitat away from the development. ▪ Fences should have low impact to surrounding vegetation as well as allow for the natural migratory movements onto and away from the site. Ideally palisade fencing with a minimum 15cm wide gap should be erected around the site. A concrete palisade fence is currently erected but requires some restoration. 	
The permeability of the development area will be decreased through the introduction of hardened surfaces.	<p>Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9</p>	Proper stormwater management can mitigate the loss of permeability due to the introduction of impervious substrates.	<p>Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7</p>
Artificial lighting will most likely result in an impact on all nocturnal animal species. Numerous species will be attracted towards the light sources and this will result in the disruption of natural cycles, such as the reproductive cycle and foraging behaviour.	<p>Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10</p>	Artificial lighting must be restricted to areas under construction and not directed towards the Mtwalume River or non-perennial drainage lines in order to minimize the potential negative effects of the lights on the natural nocturnal activities. Where lighting is required for safety or security reasons,	<p>Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		this should be targeted at the areas requiring attention. Yellow sodium lights should be prescribed as they do not attract as many invertebrates (insects) at night and will not disturb the existing wildlife. Sodium lamps require a third less energy than conventional light bulbs.	
Frogs can become confined to a small area subject to urbanisation, habitat fragmentation, afforestation, and drainage for agricultural and urban development. Some breeding sites are being polluted by DDT, which is used for controlling malarial mosquitoes. The spread of alien vegetation, in particular Eucalyptus species, is responsible for the drying out of some breeding sites.	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	Ideally a detailed herpetological survey should be conducted prior to construction in order to ascertain the direct impact the proposed Ntatshana Road could have on the frog habitats. The survey should furthermore prescribe mitigation measures applicable. As a minimum, the use of DDT should be limited and alien vegetation should be controlled to nurture a habitat suitable for the frogs indigenous to the Ntatshana and Makhizana Farms.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -7
Air Quality could be compromised through construction activities causing air pollution.	Extent: Site -1 Duration: Short term -1 Intensity: High -3 Probability: Highly probable -3 Significance: Negative moderate -8	<ul style="list-style-type: none"> ▪ Dust suppression measures need to be implemented on site to reduce the liberation of dust it is recommended that water be sprayed on the road when and where applicable. ▪ There should be strict speed limits on dusty roads to prevent the liberation of dust into the atmosphere. ▪ Adequate communication and education of personnel of the need 	Extent: Site -1 Duration: Short term -1 Intensity: Low -1 Probability: Highly probable -3 Significance: Negative low -6

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
Spillages and the associated impacts they have on the environment.	Extent: Site -1 Duration: Medium term -2 Intensity: Very high -4 Probability: Possible -2 Significance: Negative moderate -9	to mitigate against dust.	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6
		<ul style="list-style-type: none"> ▪ All hazardous substances must be stored on an impervious surface in a designated bunded area, able to contain 110% of the total volume of materials stored at any given time. ▪ The integrity of the impervious surface and bunded area must be inspected regularly and any maintenance work conducted must be recorded in a maintenance report. ▪ Provide proper warning signage to make people aware of the activities within designated areas. ▪ Employees should be provided with absorbent spill kits and disposal containers to handle spillages. ▪ Train employees and contractors on the correct handling of spillages and precautionary measures that need to be implemented to minimise potential spillages. ▪ All earth moving vehicles and equipment must be regularly maintained to ensure their integrity and reliability. No repairs may be undertaken beyond the contractor laydown area. ▪ Employees should record and 	

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>report any spillages to the responsible person.</p> <ul style="list-style-type: none"> ▪ An Emergency Preparedness and Response Plan will be developed and implemented should an incident occur. ▪ Access to storage areas on site must be restricted to authorised employees only. ▪ Contractors will be held liable for any environmental damages caused by spillages. 	
Waste issues - the lack of waste management could have detrimental impacts on the receiving environment.	<p>Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9</p>	<p><u>General Waste:</u></p> <ul style="list-style-type: none"> ▪ General waste disposal bins will be made available for employees to use throughout the project area. ▪ Where possible waste should be recycled or sold to the community. ▪ Waste will be temporarily stored on site (less than 90 days) before being disposed off appropriately. ▪ General waste will be disposed of an approved waste disposal facility. ▪ Waste being taken off site must be recorded and kept as evidence. ▪ Evidence of correct disposal must be kept. ▪ Building rubble will be used, where possible, in construction or buried 	<p>Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>with the necessary town planning approvals. Where this is not possible, the rubble will be disposed of at an appropriate site.</p> <ul style="list-style-type: none"> All temporary soil stockpiles, litter and rubble must be removed on completion of construction activities. No dumping of waste material in surrounding open areas. 	
<p>Potential of causing groundwater and surface water contamination from hazardous wastes on site.</p>	<p>Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9</p>	<ul style="list-style-type: none"> Hazardous materials will be generated if there are spillages during construction and maintenance periods. This waste should be cleaned up using absorbent material provided in spill kits on site. Absorbent materials used to clean up spillages should be disposed of in a separate hazardous waste bin. The storage area for hazardous material must be concreted, bunded, covered, labelled and well ventilated. Provide employees with appropriate PPE for handling hazardous materials. All hazardous waste will be disposed of in a registered hazardous waste disposal facility. Records of all waste being taken off site must be recorded and kept 	<p>Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6</p>

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		as evidence.	
Potential of causing groundwater and surface water contamination from sewage waste on site.	Extent: Site -1 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -9	<ul style="list-style-type: none"> ▪ On-site chemical toilets will be provided for domestic purposes during construction phase. ▪ The contractors will be responsible for the maintenance of the chemical toilets. ▪ Should any spills or incidents occur; the material will be cleaned up immediately and disposed off appropriately. ▪ All incidents must be reported to the responsible site officer as soon as it occurs. ▪ During the construction phase chemical toilets will be provided for use on site. The chemical toilets will be cleaned and maintained on a weekly basis, minimising the potential for the generation of odours on site. 	Extent: Site -1 Duration: Medium term -2 Intensity: Moderate -2 Probability: Improbable -1 Significance: Negative low -6
Safety of the local communities may be compromised during the construction period.	Extent: Site -1 Duration: Short term -1 Intensity: Very high -4 Probability: Highly probable -3 Significance: Negative moderate -9	<ul style="list-style-type: none"> ▪ Ensure that there are flag men and signs at access points to the construction site; ▪ Implement proper road signs to warn motorists of construction activities ahead; ▪ Ensure the appointment of a Safety Officer to continuously monitor the safety conditions 	Extent: Site -1 Duration: Short term -1 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative low -6

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		<p>during construction.</p> <ul style="list-style-type: none"> ▪ All construction staff must have the appropriate PPE. ▪ The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. ▪ Report and record any environmental, health and safety incidents to the responsible person. ▪ Firearms or any other hunting weapons must be prohibited on site. ▪ Contractors must be educated about the value of wild animals and the importance of their conservation. ▪ Members of the public adjacent to the construction site should be notified of construction activities in order to limit unnecessary disturbance or interference; ▪ Construction activities will be undertaken during daylight hours and not on Sundays; ▪ Consult with local communities regarding the location of construction camps, access and hauling routes and other likely 	

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
		disturbance during and after construction. <ul style="list-style-type: none"> Provide clear and realistic information regarding employment opportunities and other benefits for local communities. 	
Cumulative impacts			
Development of an access road could lead to mushroomed development or the planning and enquiry of such during the construction phase. Furthermore there could be unrealistic expectation created for job seekers in the area.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative high -10	Development in the area could be a positive spin off from the road if properly managed. It is also important that the local community is properly informed of facts and not made false promises. In this regard the impact becomes positive.	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Possible +2 Significance: Positive moderate +9

No –Go Alternative			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
Direct impacts			
Status Quo Remains and there is a loss of an opportunity.	Extent: Local -2 Duration: Permanent -4 Intensity: High -3 Probability: Definite -4 Significance: Negative Very High -13	Motivation for this development has been adequately provided, providing evidence that this road is needed for the betterment of the community. It is therefore regarded that implementation of the development is a mitigation measure for this impact	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Improbable +1 Significance: Positive High +10
None of the negative impacts stated above will occur.	Significance: Neutral 0		Significance: Neutral 0
Indirect impacts			

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No –Go Alternative			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
None			
Cumulative impacts			
None			

Summary of impact ratings for the construction phase per alternative:

IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
Pollution emanating from construction.	-10	-8	-10	-8	N/A	N/A
Soil impacts. Extensive gully erosion is evident around the entire area. The road itself may have negative soil erosion impacts during construction but positive impacts thereafter as it may stabilise erosion.	-9	-7	-9	-7	N/A	N/A
The route traverses in some part through or near homesteads, in which case relocations or disturbances to these households could occur if not re-aligned.	-9	-5	-13	-12	N/A	N/A
Negative biophysical impacts associated with the southern non-perennial drainage line crossings and Mtwalume River crossing.	-12	-7	-12	-7	N/A	N/A
During the construction phase of the proposed Ntatshana road upgrading, some habitat destruction and alteration inevitably takes place. This happens with the	-10	-7	-10	-7	N/A	N/A

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IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
<p>construction of access roads, and the clearing of the road servitudes.</p> <p>These activities will have an impact on the associated fauna especially ground living and fossorial species occurring along or in close proximity of the servitude, both through modification of habitat and disturbance caused by human activity.</p>						
<p>The proposed road bisects a non-perennial drainage line including two large Umdoni (<i>Syzgium cordatum</i>) woodland</p>	-9	-6	-10	-7	N/A	N/A
<p>This proposed route bisects temporary inundated or moist <i>Aristida juncioformis</i> hill slope seepage wetlands adjacent to the southern non-perennial drainage line. The Ntatshana road bisects a narrow poorly defined non-perennial drainage line as well as degraded foot slope seepage wetlands.</p> <p>These areas have been heavily impacted on by surrounding anthropogenic activities including sand harvesting; ploughing of soils for small scale terraced agricultural lands as well as extensive rill erosion from livestock pathways and alien vegetation invasion. The impact is therefore expected to be minor</p>	-7	-5	0	0	N/A	N/A
<p>The current road alignment bisects a small patch of degraded woodland (wood harvesting) adjacent to the Mtwalume River.</p>	-8	6	-8	-6	N/A	N/A

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IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
Noise impacts.	-8	-7	-8	-7	N/A	N/A
Opportunities from socio-economic perspectives.	10	12	10	12	N/A	N/A
Possible pollution of the Mtwalume River due to ill-managed construction activities.	-11	9	-11	-9	N/A	N/A
The route follows existing cattle tracks which have as a result of this been highly transformed, therefore being a suitable route to follow.	10	12	9	9	N/A	N/A
Increased traffic and heavy vehicles and machinery on roads, leading to poorer road conditions and potential accidents and pedestrians and commuters.	-9	-8	-9	-8	N/A	N/A
Vegetation destruction and general impacts to flora and fauna.	-10	-8	-10	-8	N/A	N/A
The permeability of the development area will be decreased through the introduction of impervious areas.	-9	-7	-9	-7	N/A	N/A
Artificial lighting will most likely result in an impact on all nocturnal animal species. Numerous species will be attracted towards the light sources and this will result in the disruption of natural cycles, such as the reproductive cycle and foraging behaviour.	-10	-8	-10	-8	N/A	N/A
Frogs can become confined to a small area subject to urbanisation, habitat fragmentation, afforestation, and drainage	-9	-7	-9	-7	N/A	N/A

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IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
for agricultural and urban development. Some breeding sites are being polluted by DDT, which is used for controlling malarial mosquitoes. The spread of alien vegetation, in particular Eucalyptus species, is responsible for the drying out of some breeding sites.						
Air Quality could be compromised through construction activities causing air pollution.	-8	-6	-8	-6	N/A	N/A
Spillages and the associated impacts they have on the environment.	-9	-6	-9	-6	N/A	N/A
Waste issues - the lack of waste management could have detrimental impacts on the receiving environment.	-9	-6	-9	-6	N/A	N/A
Potential of causing groundwater and surface water contamination from hazardous wastes on site.	-9	-6	-9	-6	N/A	N/A
Potential of causing groundwater and surface water contamination from sewage waste on site.	-9	-6	-9	-6	N/A	N/A
Safety of the local communities may be compromised during the construction period.	-9	-6	-9	-6	N/A	N/A
Development of an access road could lead to mushroomed development or the planning and enquiry of such during the construction phase. Furthermore there could be unrealistic expectation created for	-10	9	-10	9	N/A	N/A

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IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
job seekers in the area.						
Total	-6.3	-3.25	-7.58	-4.75	0	0
Status Quo Remains and there is a loss of an opportunity.	N/A	N/A	N/A	N/A	-13	+10
None of the negative impacts stated above will occur.	N/A	N/A	N/A	N/A	0	0
Total	0	0	0	0	-6.5	+5

In light of these score above it can be seen that route alignment one emerges as having less of an impact and therefore is preferred.

Impacts that may result from the operational phase

a. Site alternatives

Due to this being a linear development proposing a road for a determined site, the only alternative assessed is that of layout or route alternative. Therefore only section B of each phase is completed and note section A which pertains to site alternatives.

b. Process, technology, layout or other alternatives

List the impacts associated with process, technology, layout or other alternatives that are likely to occur during the operational phase (please list impacts associated with each alternative separately):

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation/ Enhancement Measure	Risk Rating post mitigation
<i>Direct impacts</i>			
Accessibility and mobility	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	N/A	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10
Possible public transport networks	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	N/A	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10
Increased traffic in the area	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9	Traffic can be controlled should it become a hindrance.	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative low -6
Increased vehicular fumes contributing to air pollution	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9	Planting of trees along the road reserve will help to absorb the Carbon Dioxide and vehicular emissions.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -8
A road can possibly lead to the division of communities where the road is perceived to be divisional corridor.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2	Permeability and connectivity must be maintained on either side of the road while maintaining safety. This can be done through designated crossing strips.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Improbable -1

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation/ Enhancement Measure	Risk Rating post mitigation
	Significance: Negative moderate -9		Significance: Negative moderate -7
Direct alteration to faunal habitat	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -11	Permeability must be maintained to allow for the cattle and other fauna to remain in the habitat. To the greatest extent, the safety of animals on the road must be maintained.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9
Indirect impacts			
Need for fauna to adapt to change in habitat.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -11	Fauna in the area will inevitably learn to adapt, more so due to the fact that the road will follow current tracks.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9
Possible safety issues associated with increased traffic.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative high -10	Local communities must exercise caution on the road and educate children to do the same.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -8
Increased levels of noise in the local area due to increased traffic.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8	Responsible driving and use of vehicles must be practiced.	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -7
Impact on flora and fauna, including the possible establishment / re-establishment of invader weeds and plant species through lack of management.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2	<ul style="list-style-type: none"> ▪ An alien species eradication programme should be established and maintained beyond the scope of this project. ▪ Weeds and alien vegetation should 	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2

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Alternative Route 1			
Impact	Risk Rating prior to mitigation	Mitigation/ Enhancement Measure	Risk Rating post mitigation
	Significance: Negative moderate -8	be removed and prevented from spreading. <ul style="list-style-type: none"> ▪ No cutting down of trees for firewood. ▪ All alien invasive plant and tree species should be removed from the site especially along the Mtwalume River and non-perennial drainage lines; preventing further invasion. 	Significance: Negative moderate -7
General Safety of pedestrians may be compromised.	Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	Speed regulations must be exercise and signage of such must be erected.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8
Cumulative impacts			
Increased socio-economic benefits due to greater accessibility and mobility.	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	This can be enhanced through proper planning.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive high +11

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation/ Enhancement Measure	Risk Rating post mitigation
Direct impacts			
Accessibility and mobility	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	N/A	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10
Possible public transport networks	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	N/A	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10
Increased traffic in the area	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9	Traffic can be controlled should it become a hindrance.	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Improbable -1 Significance: Negative low -6
Increased vehicular fumes contributing to air pollution	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9	Planting of trees along the road reserve will help to absorb the Carbon Dioxide and vehicular emissions.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -8
A road can possibly lead to the division of communities where the road is perceived to be divisional corridor.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2	Permeability and connectivity must be maintained on either side of the road while maintaining safety. This can be done through designated crossing strips.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Improbable -1

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation/ Enhancement Measure	Risk Rating post mitigation
	Significance: Negative moderate -9		Significance: Negative moderate -7
Direct alteration to faunal habitat	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -11	Permeability must be maintained to allow for the cattle and other fauna to remain in the habitat. To the greatest extent, the safety of animals on the road must be maintained.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9
Indirect impacts			
Need for fauna to adapt to change in habitat.	Extent: Local -2 Duration: Long term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -11	Fauna in the area will inevitably learn to adapt, more so due to the fact that the road will follow current tracks.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -9
Possible safety issues associated with increased traffic.	Extent: Local -2 Duration: Long term -3 Intensity: Moderate -2 Probability: Highly probable -3 Significance: Negative high -10	Local communities must exercise caution on the road and educate children to do the same.	Extent: Local -2 Duration: Long term -3 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -8
Increased levels of noise in the local area due to increased traffic.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8	Responsible driving and use of vehicles must be practiced.	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2 Significance: Negative moderate -7
Impact on flora and fauna, including the possible establishment / re-establishment of invader weeds and plant species through lack of management.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2	<ul style="list-style-type: none"> ▪ An alien species eradication programme should be established and maintained beyond the scope of this project. ▪ Weeds and alien vegetation should 	Extent: Local -2 Duration: Medium term -2 Intensity: Low -1 Probability: Possible -2

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Alternative Route 2			
Impact	Risk Rating prior to mitigation	Mitigation/ Enhancement Measure	Risk Rating post mitigation
	Significance: Negative moderate -8	be removed and prevented from spreading. <ul style="list-style-type: none"> ▪ No cutting down of trees for firewood. ▪ All alien invasive plant and tree species should be removed from the site especially along the Mtwalume River and non-perennial drainage lines; preventing further invasion. 	Significance: Negative moderate -7
General Safety of pedestrians may be compromised.	Extent: Local -2 Duration: Medium term -2 Intensity: High -3 Probability: Highly probable -3 Significance: Negative high -10	Speed regulations must be exercise and signage of such must be erected.	Extent: Local -2 Duration: Medium term -2 Intensity: Moderate -2 Probability: Possible -2 Significance: Negative moderate -8
Cumulative impacts			
Increased socio-economic benefits due to greater accessibility and mobility.	Extent: Local +2 Duration: Long term +3 Intensity: Moderate +2 Probability: Highly probable +3 Significance: Positive high +10	This can be enhanced through proper planning.	Extent: Local +2 Duration: Long term +3 Intensity: High +3 Probability: Highly probable +3 Significance: Positive high +11

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No- Go Alternative			
Impact	Risk Rating prior to mitigation	Mitigation Measure	Risk Rating post mitigation
Direct impacts			
Loss of development opportunity.	Extent: Local -2 Duration: Permanent -4 Intensity: High -3 Probability: Definite -4 Significance: Negative Very High -13	Motivation for this development has been adequately provided, providing evidence that this road is needed for the betterment of the community. It is therefore regarded that implementation of the development is a mitigation measure for this impact.	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Improbable +1 Significance: Positive High +10
Indirect impacts			
Status Quo remains. In this regard this refers to the continued on-foot transport mode and lack of accessibility.	Extent: Local -2 Duration: Long Term -3 Intensity: High -3 Probability: Highly probable -3 Significance: Negative Very High -11	Motivation for this development has been adequately provided, providing evidence that this road is needed for the betterment of the community. It is therefore regarded that implementation of the development is a mitigation measure for this impact.	Extent: Local +2 Duration: Permanent +4 Intensity: High +3 Probability: Improbable +1 Significance: Positive High +10
Cumulative impacts			
None.		None	

Summary of impact ratings for the operational phase per alternative:

IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
Accessibility and mobility	+10	+10	+10	+10	N/A	N/A
Possible public transport networks	+10	+10	+10	+10	N/A	N/A
Increased traffic in the area	-9	-6	-9	-6	N/A	N/A
Increased vehicular fumes contributing to air pollution	-9	-8	-9	-8	N/A	N/A
A road can possibly lead to the division of communities where the road is perceived to be divisional corridor.	-9	-7	-9	-7	N/A	N/A
Direct alteration to faunal habitat	-11	-9	-11	-9	N/A	N/A
Need for fauna to adapt to change in habitat.	-11	-9	-11	-9	N/A	N/A
Possible safety issues associated with increased traffic.	-10	-8	-10	-8	N/A	N/A
Increased levels of noise in the local area due to increased traffic.	-8	-7	-8	-7	N/A	N/A
Impact on flora and fauna, including the possible establishment / re-establishment of invader weeds and plant species through lack of management.	-8	-7	-8	-7	N/A	N/A
General Safety of pedestrians may be compromised.	-10	-8	-10	-8	N/A	N/A
Increased socio-economic benefits due to greater accessibility and mobility.	+10	+11	+10	+11	N/A	N/A

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IMPACTS	ALTERNATIVE ROUTE 1		ALTERNATIVE ROUTE 2		NO-GO OPTION	
	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation	Rating without mitigation	Rating with mitigation
Total	-4.5	-3	-4.5	-3	0	0
Loss of development opportunity.	N/A	N/A	N/A	N/A	-13	+10
Status Quo remains. In this regard this refers to the continued on-foot transport mode and lack of accessibility.	N/A	N/A	N/A	N/A	-11	+10
Total	0	0	0	0	-12	10

Impacts that may result from the decommissioning or closure phase

No impacts have been assessed for this section as the closure phase is not envisaged for this development; however the section below provides mitigation measures for rehabilitation of the construction area once completed.

The traditional definition of rehabilitation aims at returning the land in a given area to some degree of its former state after a particular process has resulted in its damage. The rehabilitation of the gully erosion within the upper sections of the northern drainage line is beyond the scope of this project. Without improved livestock grazing practices on-going rill and gully erosion is going to occur within the steep hill slopes around the road. It is imperative that the entire Ntatshana road reserve is appropriately re-vegetated in order to prevent further erosion as well as alien vegetation invasion. Rehabilitation methods are detailed in the table below.

Recommended rehabilitation measures:

Method	Equipment
Remove all construction material from the area where construction has been completed.	To be undertaken by hand.
Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.	Topsoil must be applied from the topsoil stockpiled during construction.

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Method	Equipment
<p>The naked ground should be seeded with a stabilising grass mix, suited to the conditions. The quantity of seed used will depend on the slope, with a steeper slope requiring a heavier application of seed. For slopes:</p> <ul style="list-style-type: none"> • >15°: 25-50 kg/ha • <15°: 15-25 kg/ha <p>The natural seed bank in the topsoil will supplement the seed mix applied</p>	<p>The seed mix should consist of pioneer grass species of the area, and will also depend on what species are commercially available during the season required. A standard seed mix would consist of the following species (in decreasing order of proportion constituting the seed mix):</p> <ul style="list-style-type: none"> • <i>Andropogon chinensis</i> • <i>Aristida congesta</i> • <i>Cynodon dactylon</i> • <i>Cymbopogon plurinodes</i> • <i>Eragrostis curvula</i> • <i>Eragrostis gummiflua</i> • <i>Themeda triandra</i> • <i>Setaria spp.</i> • <i>Imperata cylindrica</i> • <i>Sporobolus fimbriatus</i> <p>and sedges such as <i>Schoenoplectus spp.</i> and <i>Juncus spp.</i> should be used</p>
<p>The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering is to be done in a manner that ensures that no erosion of the topsoil and seed mix takes place.</p>	<p>A hosepipe must be available on site.</p>
<p>If the grasses have not established after a period of two months after seeding, the areas should be reseeded. If necessary, another dressing of topsoil should be applied prior to seeding.</p>	<p>As above</p>
<p>Slope stabilisation measures may be necessary in places where grass has not been able to establish and there is an erosion risk. The measures implemented depend on the situation, and can be varied as necessary.</p>	<p>Various slope stabilisation measures are available and vary in effectiveness according to the situation including:</p> <ul style="list-style-type: none"> ▪ Logs/bark held in place with pegs ▪ Rows of <i>Cynodon dactylon</i>, <i>Panicum maximum</i>, <i>Imperata cylindrica</i>, <i>Hyparrhenia filipendula</i> held in place with pegs.

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Method	Equipment
<p>All alien vegetation is to be appropriately removed and disposed of. Alien species that have been encountered along the proposed route include Syringa <i>Melia azedarach</i>, Brazilian Glory Pea or Red Sesbania <i>Sesbania punicea</i>, Castor-Oil Plant (<i>Ricinus communis</i>), Lantana (<i>Lantana camara</i>), Giant Reed (<i>Arundo donax</i>), Bugweed (<i>Solanum mauritianum</i>), Peanut Butter Cassia (<i>Sennadiymobotrya</i>), Jacaranda <i>Jacaranda mimosifolia</i>*, Morning Glory (<i>Ipomoea purpurea</i>), Paraffin Bush (<i>Chromolaena odorata</i>), Yellow Oleander (<i>Thevetia peruviana</i>), Oleander (<i>Nerium oleander</i>), Montanoa (<i>Montanoa hibiscifolia</i>), Indian Shot (<i>Canna indica</i>), <i>Ageratum conyzoides</i>, <i>Caesalpinia decapetala</i>, <i>Campuloclinium macrocephalum</i>, <i>Chromolaena odorata</i>, <i>Ipomoea indica</i>, <i>Leucaena leucocephala</i>, <i>Psidium guajava</i>, <i>Melia azedarach</i>, <i>Mimosapigra</i>, <i>Tithonia diversifolia</i>.</p>	<p>Removal will to a large extent be done by hand. Saws may be necessary in certain cases and specific herbicides may be required (if used, the use of these must be strictly controlled)</p>
<p>The upgraded Ntatshana road servitude must be regularly inspected during the operational phase and alien vegetation that had re-emerged must be removed / follow-up treatment applied.</p>	<p>On-going alien vegetation removal programme (beyond the scope of the project)</p>

Proposed monitoring and auditing

For each phase of the project and for each alternative, please indicate how identified impacts and mitigation will be monitored and/or audited.

These monitoring and auditing recommendations are applicable to both route 1 and route 2:

Construction:

- All waste to be disposed at a registered landfill.
- Limit construction activities resulting in noise generation to day time only.
- Limit dust generation and implement dust suppression if required.
- Minimise usage of natural resources through prevention of wastage.
- Demarcate no-go sensitive areas.
- Demarcate construction sites / areas and prevent public access to these sites.
- Monitor complaints, investigate and implement rectifying measures.
- Monitor areas for pollution and degradation. Ensure implementation of identified rectifying measures.
- Compliance of EMPr and environmental authorisation by contractors.

Operation:

- Indigenous low water demand re-vegetation as per EMPr.
- Rehabilitation of any damage to sensitive areas, including potential erosion from construction activities or storm water run-off.
- Ensure appropriate annual budgets for maintenance and implement appropriate maintenance.
- Implement a process to capture & address public recommendations, complaints and / or requests.
- Ensure safety of pedestrians by education of commuters and pedestrians on road safety aspects.

Audit:

- An Environmental Control Officer (ECO) will be appointed to ensure the implementation of the measures outlined in the Basic Assessment Report, inclusive of plans and layouts and the comments contained in the EMPr.
- Site inspections and audits will be carried out as per frequency indicated in the EMPr by a suitably qualified person.
- During the construction phase, environmental incidents and complaints from I&AP's will be investigated, recommendations will be made to mitigate and prevent further impacts and the incidents reported, where relevant, to the Applicants and/or Authorities.

Environmental impact statement

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative S1 (preferred site)

There are no alternatives to the site listed as the intention is to provide formal road access to the existing properties within the study site.

No fatal flaws were identified during the Basic Assessment process, which included a comprehensive Public Participation Process with stakeholder consultation. Most of the impacts will occur during the construction phase, and will therefore be for a limited period and can be adequately mitigated to have a low or insignificant impact. Mitigation measures for the planning and design and operational phases also ensures that potential impacts can be mitigated to acceptable levels.

The EMPr (Appendix F) has been developed to provide adequate mitigation measures for all phases of the proposed development and include specialist recommendations and stakeholder requirements.

Alternative S2

Alternative A1 (preferred alternative)

The proposed route alignment has been carefully planned to cater to the substantiated needs and requirements of the community while being mindful of imposing the least negative environmental impacts. As the majority of the preferred alignment (route alignment 1) occurs within existing road servitudes as well as in transformed habitats (old and current agricultural lands) extremely limited vegetation clearance will be required during the construction and operational phase of the project. Vegetation clearance will be restricted to the alien invaded and secondary grassland road reserve. Despite this route traversing the hillslope wetlands, it remains the preferred alternative as it traverses through less homesteads and is also the more cost effective and practical alternative from an engineering perspective. Furthermore, the route follows existing anthropogenic and cattle tracks which have resulted in significant alteration of the natural habitat to the extent that the *Aristida junciformis* grasslands have been transformed. This significantly lowers the impact.

Alternative A2

Route alignment 2 also follows within existing road servitudes as well as in transformed habitats (old and current agricultural lands) but to a lesser extent than route 1. While the impact assessment above shows a deviation between the two alignments being minor, route 2 remains the less preferred option as it also traverses through more homesteads. Furthermore, from an engineering and design perspective, it would be more costly as well as complicated to construct this route due to the geotechnical design and applicability.

No-go alternative (compulsory)

No impacts identified (either positive or negative) will result should the status quo remain.

However, to state that this development is warranted is an understatement. From consultations with the communities during site investigations, it was noted that the locals walk up to 20 km for simple errands to be run. Oftentimes these are old people who rely on walking aides, yet the track used is unstable due to continuous erosion. The development of the road will enable smaller vehicles and public transport vehicles to reach areas further in and also provide a safer track for commute.

6. SECTION F. RECOMMENDATION OF EAP

Is the information contained in this report and the documentation attached hereto in the view of the EAP sufficient to make a decision in respect of this report?

YES

If "NO", please contact the KZN Department of Agriculture & Environmental Affairs regarding the further requirements for your report.

If "YES", please attach the draft EMP as Appendix F to this report and list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

To provide a status quo of the area:

- Extensive gully erosion exists along the drainage lines due to uncontrolled livestock grazing and trampling within the adjacent moist hill slope seepage wetlands.
- The moist hill slope vegetation around the present access road has been heavily impacted on by adjacent rural as well as agricultural activities including wood harvesting and extensive alien vegetation invasion.
- Pockets of indigenous, mostly closed woodland occurs within the ravines as well as northern embankments of the Mtwalume River.
- The majority of the vegetation adjacent to the proposed Ntatshana road is situated within transformed (old agricultural lands) and secondary succession *Aristida junciformis* grasslands.
- The majority of the study area is dominated by rural agricultural practices with current and *old terraced agricultural* lands. Ploughing along the contours as well as within the temporary wet zones of hill slope seeps and the adjacent valley bottom wetlands.
- Extensive soil erosion occurs within disturbed areas such as rill erosion or stormwater channels along existing livestock pathways as well as in-cut roads, residential platforms as well as gully erosion within certain degraded drainage lines.
- The gully erosion channels are heavily infested with alien invasive species.
- Dense alien invasive vegetation occurs within fire protected kloofs; as well as old livestock enclosures, road and existing pipeline reserves and fallow agricultural lands.
- While the secondary succession *Aristida junciformis* hill slope areas unit comprises the largest component of the study area. The area is dominated by rural homesteads and agricultural fields (old and current) that are mostly located on the hill slope seeps as well as seepage wetlands adjacent to the lower-lying Mtwalume River and valley bottom moist grasslands on loamy to clayey soil. These areas are utilised in various ways ranging from houses to ploughed lands, kraals to grassland used for grazing purposes. As a result the natural grassland vegetation has become degraded and is mostly transformed.

- The grassland areas used for grazing purposes are grazed to approximately 0.1 – 0.5 m above ground level and are dominated by the grasses *Aristida junciformis subsp.*
- The proposed Ntatshana access road bisects the upper degraded sections of the hill slope seeps and trampled and heavily overgrazed foot slope seepage wetlands.

Existing Impacts on the fauna on and surrounding the site included:

- The proposed upgraded Ntatshana access road is situated mainly within the reserves of a track which are dominated by completely transformed vegetation dominated by alien invasive thickets with limited habitat diversity or impoverished habitats.
- High levels of human disturbances associated with the existing homesteads and habitat degradation and transformation due to historic and present agricultural activities as well as wood harvesting. This has resulted in impoverished habitats with limited faunal diversity.
- Existing villages, agricultural as well as informal access roads and pedestrian and livestock pathways occur around the site.
- Previous terraced agricultural activities (old lands) have transformed the majority of grassland habitat on the hill slopes.
- Extensive overgrazing by livestock (especially cattle and goats) result in limited vegetative or grass cover or refuge habitat for remaining faunal species.
- Limited vegetative layer leads to accelerated erosion especially along the livestock pathways as well as along the drainage lines
- Frequent burning of remaining patches of grasslands severely restricts vegetative cover and potential refuge habitat for remaining faunal species.
- Hunting with dogs as well as feral cats around the villages. Dogs and cats have a high impact on remaining faunal species.
- Introduction of extensive stands of exotic and alien invasive vegetation especially along current road, bulk water servitudes as well as degraded drainage lines.

The present track is dominated by completely transformed habitats and surrounded by historic terraced agricultural lands dominated by *Aristida junciformis* secondary succession grasslands. The drainage lines are heavily degraded and dominated by anthropogenic grasses and pioneer weedy plant species and invaded by alien invasive plant species.

The secondary succession grasslands adjacent to the alignment provides limited suitable habitat for certain rodent species such as the Highveld Gerbil, House Rats (villages) as well as Multi-mammate Mouse. Rodents construct burrows in the sandy soils and attract other predators such as the Slender Mongoose.

Bird species around the alignment are restricted to granivorous or seed eating birds such as Laughing Dove, Cape Turtle Dove. The majority of bird species were observed in the remnant pockets of indigenous woodland patches away from the road alignment as well as along the Mtwalume River.

Reptile species are extremely sensitive to habitat destruction and transformation. Low reptile diversity is expected within the existing road reserve and proposed alignment.

Low amphibian diversity is expected along the drainage lines due to extremely limited habitat diversity (no seasonal pools) as well as habitat degradation. Limited suitable breeding habitat occurs within the affected section of the Mtwalume River bridge crossing site. The Mtwalume River and perennial drainage lines or streams offers suitable habitat for certain frog species including Common River Frogs (*Amietia angolensis*) and hence this impact and relative mitigation measures have been assessed in the impact assessment section of this draft BAR.

A comprehensive rehabilitation programme for the gully erosions adjacent to the access road as well as alien invasive plant removal programme along the current road reserve needs to be implemented immediately.

General EAP Statement and Recommendation of EAP:

All impacts identified during the planning and design, construction and operation can be adequately mitigated. Impacts identified and addressed through mitigation included: vegetation, waste management, traffic and emissions.

The proposed development site will have an impact of **low; short-long term significance** on the receiving environment (albeit extremely limited) if the majority of indigenous species are retained within the development. It is imperative that runoff from the proposed development is adequately managed and the sewerage and waste water do not result in deterioration of water quality for the adjacent Mtwalume River.

The development is designed at the planning stage to take cognisance of the river and to take environmentally sound measures which ensure well rounded sustainability.

In addition, the development of sound stormwater management structures should eliminate any run-off into the Mtwalume River reducing the risk of flood events.

Construction of Ntatshana Road would contribute to the community in the following ways:

- Vehicles would not have to endure rugged terrain.
- Communities will have easier access to public and governmental transportation.
- Travelling route distances would be decreased.
- Will increase the safety of the people within the community as there will be no need to walk through dense vegetation to get to their destination.
- Response and delivery time would be increased for public and emergency services.
- Easier travelling routes for basic needs, schools and medical centers.
- The bridge will link both communities and enhance activity between the communities.

Based on the status quo above and given the indigent nature of the communities affected it is the EAP's recommendation that route alignment one be authorised by the DAEA.

Furthermore, no concerns were raised by I&AP's (public and stakeholders) for the preferred layout and development, in contrary there was general consensus in support for the development.

The development is in keeping with the land use of the surrounding area and it is therefore the EAP's recommendation that the preferred option be approved for the proposed development.

The following may be considered for inclusion in the environmental authorisation:

- The EMPr and conditions thereto should be adhered to.
- An ECO must be appointed and all contractor staff to be trained on the EMPr and Environmental Authorisation requirements prior to commencement of activities.
- Alien weeds and invader species within vicinity of construction to be removed and indigenous vegetation, where appropriate, to be introduced and managed in accordance with the recommendation outlined in the preliminary ecological report.
- Monitoring re-establishment of alien weeds and invader plants and implement required maintenance.
- Environmental monitoring to be conducted during construction and incidents recorded and addressed accordingly.

7. SECTION G: APPENDICES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Public Participation Process

Appendix F: Draft Environmental Management Programme (EMPr)

Appendix G: Stormwater Management Plan