

# REPORT

## Amended Basic Assessment Report for the proposed Bulk Infrastructure Project in Nkandla, KwaZulu Natal Province (Version 3)

Client: Ingonyama Trust Board  
EIA Ref No DC28/0018/2012 & KZN/EIA/0000775  
Reference: T&PMD1278R001F0.3  
Revision: 0.3/Final  
Date: 19 0000 2017

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in Nkandla, KwaZulu Natal Province (Version 3)  
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Project name: MD1278  
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Author(s): Sibongile Gumbi

Drafted by: Sibongile Gumbi

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Approved by: Malcolm Roods

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Classification

Open



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## agriculture & environmental affairs

Department:  
Agriculture  
& Environmental Affairs  
**PROVINCE OF KWAZULU-NATAL**

(For official use only)

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.
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.

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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).

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## DEPARTMENTAL REFERENCE NUMBER(S)

File reference number (EIA):	DC28/0018/2012 KZN/EIA/0000775/2012
File reference number (Waste Management Licence):	N/A

## SECTION A: DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND SPECIALISTS

### 1. 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:	The Boulevard, 19 Park Lane, Umhlanga		
Postal address:	PO Box 1243, Umhlanga Rocks, KwaZulu-Natal, South Africa		
Postal code:	4320	<b>Cell:</b>	083 415 5166
Telephone:	011 798 6442	<b>Fax:</b>	N/A
E-mail:	malcolm.roods @rhdhv.com		

### 2. 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)
Mr Malcolm Roods	HeD, BA (Hons) Geography and Environmental Management, LLB	EAPSA	15

### 3. 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
Morton du Preez Aurecon	BSc Engineering, Agricultural	Civil Engineering Water Engineering Construction Management Project Management	Engineering Services and Reporting	Feasibility Report: Project Management for the Establishment of a Bulk Infrastructure Project In Nkandla: Engineering Services Supplementary Report.
Clayton Cook	MSc. Zoology	Ecology	Ecological and Riparian Assessment Groundwater Assessments.	Preliminary Ecological Habitat Assessment for the Nkandla-Umlalazi Bulk Infrastructure Project.
eThembeni	MA. Archaeology	Archaeology	Heritage	Phase 1 Heritage Impact Assessment Report:

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Cultural Heritage			Assessment.	Nkandla Bulk Infrastructure Project, Nkandla Local Municipality, King Cetshwayo District, KwaZulu-Nata
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## SCHEDULE OF AMENDMENTS:

BAR SCHEDULE OF AMENDMENTS				
Pages		Amendments	Markings on the Document	
1	Project Title changed	Nkandla Bulk Infrastructure Project	Red	changes
4	Section A:	Changed the project developer to "Ingonyama Trust Board"	Red	changes
5 to 8	Section B (1) and (2)	Rephrased the project description, changed project developer and added a new locality map	Underlined	rephrased
9 to 12	Section B (3)	Added 2017 EIA Regulations listed activities.	Yellow and Black	Addition
13 to 18	Section B (5)	Re-arranged the section for logic purposes	Red	Changes
20	Section B 11(1)	Added missing information on the table	Yellow and Black	Addition
20	Section B 11(2)	Rephrased the section	Underlined	rephrased
21	Section B 12 and 13	Rephrased the section	Underlined	rephrased
32	Section D (6) & SECTION E (1)	Changed as the PP Process on the amended report as it has not taken place.	Red	Changes
99	Section E (E)	Rephrased the section	Underlined	rephrased
100	Section E (2) and (2)	Re-arranged the section for logic purposes	Red	Changes
Removed the "Smart Growth" project reference and replaced it with "Bulk Infrastructure Project" in the entire document				

## SECTION B: ACTIVITY INFORMATION

### 1. PROJECT TITLE

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

Basic Assessment Process for the Proposed Nkandla Bulk Infrastructure Project, KwaZulu-Natal.

### 2. PROJECT DESCRIPTION

Provide a detailed description of the project:

#### 1. INTRODUCTION

The Ingonyama Trust Board is proposing to construct new Bulk Infrastructure between Nkandla and Eshowe in the KwaZulu Natal Province. The proposed project is located between the Lindela and Mamba areas under chieftainships of Inkosi Shange and Inkosi Nxamalala. These two areas fall in the Nkandla Local Municipality which is located within the King Cetshwayo District Municipality. The site is approximately 30km south of the town of Nkandla, approximately 30km north-east of the town of Kranskop, 30km west of Eshowe town and approximately 15 km east of the Tugela River (Refer to Figures 1 and 2 below). The installation of bulk infrastructure is intended to eventually support the establishment and access to structured precincts for community services, public facilities including government service Departments, health and safety, education facilities, retail as well as commercial developments. The installation of bulk infrastructure can also serve to stimulate agricultural activities. The bulk infrastructure project will comprises of the following components:

- Sewer network;
- Sewerage Pump station;
- Construction of various access roads;
- Construction of a stormwater network, including a Stormwater Management Facility;



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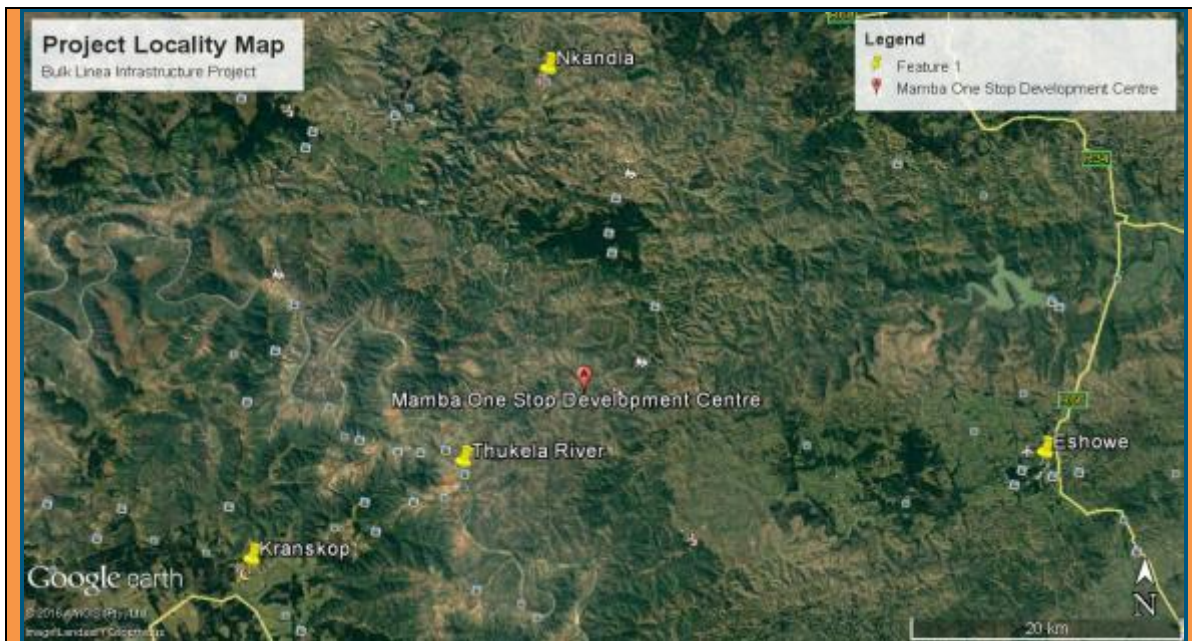


Figure 1: Broader Study Area

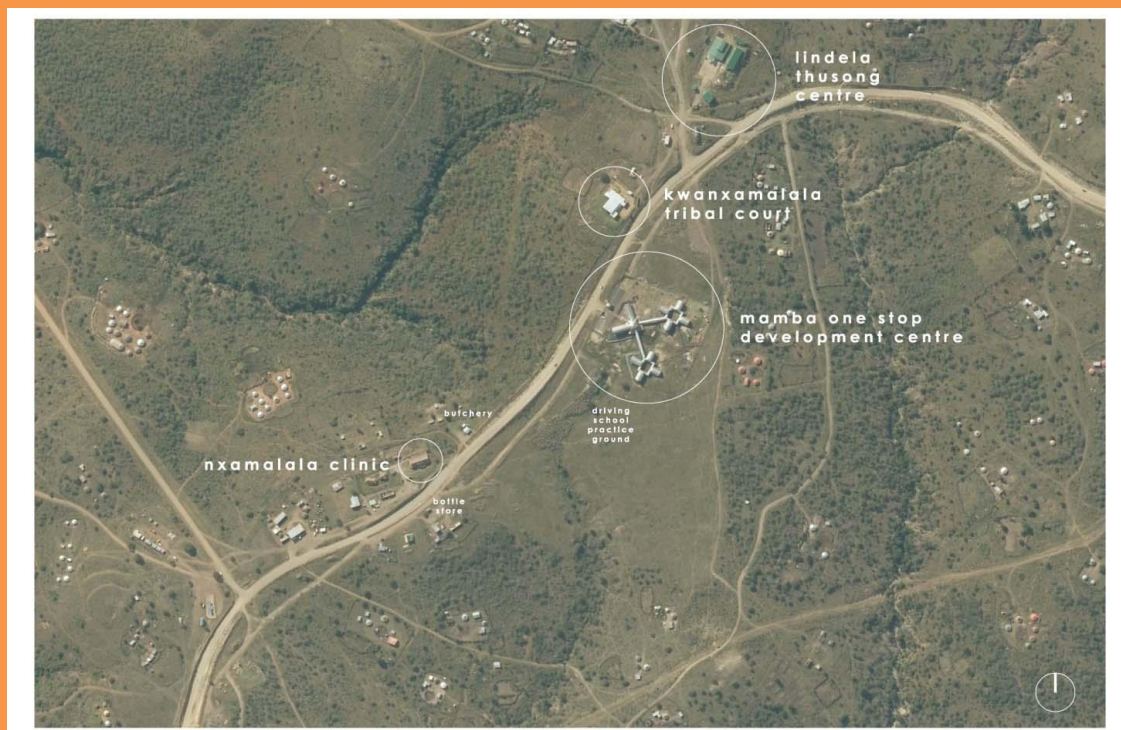


Figure 2: Proposed site in existing state at Umlalazi-Nkandla. (Feasibility Study Report, MRA, 2011).

The Lindela Thusong Centre, the Mamba Centre, Nxamalala Clinic, Traditional Court and Driving School are existing civic facilities clustered along the bend in the main road.

It must be noted, that given the preliminary stage that the project is currently at, this Basic Assessment (BA) applies only for the bulk infrastructure services and hence covers only planning requirements. This BA applies for linear bulk infrastructure to support further development in the area. Therefore, future individual developments within the project area will all be considered in respect of full engineering details at the time of definition of each of those developments. Any environmental triggers that may develop as a result associated with those developments will be subject to the relevant additional legislated processes, environmental applications and so forth which may be applicable.

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## 1.1. Technical Description

### 1.1.1. Sewer Network

The sewer network layout is largely dictated by the positions of buildings and roads. Two sewer network possibilities have been investigated for the proposed development. As a result of the prevailing topography, a portion of the outfall system will be fed to a pump station where effluent will be pumped to a point where it can again gravitate to a treatment plant. Effluent shall therefore be treated in a sewerage package plant, which does not form part of this Basic Assessment process. The preferred alternative has been chosen for lowest energy demand to pump sewage by a lower elevation difference and also to avoid impacting on the storm water attenuation pond.

Design criteria for the proposed sewer system have been taken from the Guidelines for Human Settlements Planning and Design, 'Redbook'. The total estimated demand once peak factors have been applied is approximately 54 l/s. Minimum pipe gradients will be 1:80 or 1.25%. It will be attempted to generally keep to maximum gradients of 1:20 or 5%. The minimum pipes sizes for reticulation networks (160 mm), whose capacity is more than the expected flow, have been chosen in line with Red Book recommendations. Refer to [Appendix C3 and C4](#).

The sewer network layout is approximately 3200m of 160 mm diameter uPVC pipe. **The construction servitude is estimated at 10m. This translates to a total area of 3.2ha.** The waste water treatment works as indicated above does not form part of this application and is not applied for in this Basic Assessment.

### 1.1.2. Water

An existing local pump station near Mkhazazi will supply water. The estimated average daily demand of water for the proposed development will be 1.6 Mega litres per day (Ml/day) once fully developed.

### 1.1.3. Roads

Access to the proposed development shall be *via* provincial road P15-2. **Additional access roads to the site** shall be Class 5a access collectors with a 6 m gravel surfaced width, while short access courts and cul-de-sacs shall have a reduced width of 5 m. The road reserve width shall be 26m. Road geometry shall be in accordance with accepted design standards such as the 'Guideline for Human Settlement Planning and Design (Redbook), or similar approved standard (Refer to Appendix C5).

Appropriate surface drainage in the form of open drains feeding into a pipe network shall be applied to intercept surface runoff and discharge this water in a controlled manner so as to reduce erosion. The pavement design for the proposed roads shall be determined from the anticipated fairly low traffic volumes. Generally they will comprise 450 mm layer work, with a 150 mm wearing course of approved gravel. Wherever possible road materials should be of local origin, ideally from the same location. Where the local material is not suitable for the road then imported material should be chosen for its cost and strength. Roads are upgradeable to bituminous surface once vehicle volumes justify. The table below provides a brief summary of the proposed road network, broken down to indicate road widths.

Table 3: Road design dimensions

ROAD	RESERVE SIZE (M)	LENGTH (M)	WIDTH (M)	MATERIAL DESCRIPTION
Road 1	26.0	590.0	6.0	Gravel
Road 2	26.0	484.0	6.0	Gravel
Road 3	26.0	309.0	6.0	Gravel
Road 4	26.0	341.0	6.0	Gravel
Road 5	26.0	292.0	6.0	Gravel
Road 6	26.0	485.0	6.0	Gravel
Road 7	26.0	75.0	6.0	Gravel
Road 8	26.0	355.0	6.0	Gravel



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Road 9	26.0	381.0	6.0	Gravel
Road 10	26.0	340.0	6.0	Gravel
Road 11	26.0	65.0	6.0	Gravel
Road 12	26.0	409.0	6.0	Gravel
Road 13	26.0	255.0	6.0	Gravel
Road 14	26.0	438.0	6.0	Gravel
Road 15	26.0	305.0	6.0	Gravel
Road 16	26.0	63.0	6.0	Gravel
Road 17	26.0	62.0	6.0	Gravel
Road 18	26.0	27.0	6.0	Gravel
<b>Subtotal: 6.0 m roads</b>		<b>5276.0</b>		

**Table 4: Road design and dimensions**

ROAD	RESERVE SIZE (M)	LENGTH (M)	WIDTH (M)	MATERIAL DESCRIPTION
Road 19	26.0	104.0	5.0	Gravel
Road 20	26.0	96.0	5.0	Gravel
Road 21	26.0	89.0	5.0	Gravel
Road 22	26.0	38.0	5.0	Gravel
Road 23	26.0	35.0	5.0	Gravel
Road 24	26.0	35.0	5.0	Gravel
Road 25	26.0	35.0	5.0	Gravel
<b>Subtotal: 5.0m wide</b>		<b>432.0</b>		
<b>Total: Roads</b>		<b>5708.0</b>		

The total area to be transformed by new access road construction is **3.38 ha** as per the above table.

#### 1.1.4. Stormwater

Prior to commencement of construction a detailed stormwater management plan shall be undertaken to accurately assess catchments and the associated runoff to confirm sizing of the various elements of the network determined during preliminary stages. Major systems shall be sized to accommodate flows generated by the 1:50 year event while minor systems shall accommodate the 1:10 year event.

The proposed stormwater network identified during the preliminary assessment comprises of a pipe network of approximately 4 400 m in length, with approximate construction servitude of 10m. This translates to a **4.4ha development footprint**. A minimum pipe diameter of 450 mm has been determined. Pipes shall be concrete spigot and socket. All piped systems shall be designed for self-cleaning flow velocities. Storm water runoff shall be intercepted and attenuated where possible. An attenuation pond will allow for controlled release of runoff and further act as a sediment trap. An attenuation pond can further be used for rainwater harvesting, if desired. The proposed Stormwater Management Facility is indicated in the drawing, with a capacity of 9 000 cubic metres, at a **maximum estimated footprint of 1.5ha Refer to Appendix C1**.

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## 3. ACTIVITY DESCRIPTION

Describe each listed activity in Listing Notice 1 (GNR 544, 18 June 2010), Listing Notice 3 (GNR 546, 18 June 2010) which is being applied for as per the project description:

### COMPARISON OF 2010 and 2017 REGULATIONS

EIA Regulations, GNR.544 of June 2010, Listing Notice 1 (Activity 9)	EIA Regulations (as amended in 2017), GNR.327 of April 2017, Listing Notice 1 (Activity 9)	Applicability
<p>The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water –</p> <p>(i) with an internal diameter of 0,36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more</p> <p><i>excluding where:</i></p> <p>a. <i>such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or</i></p> <p>b. <i>where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</i></p>	<p>The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water—</p> <p>(i) with an internal diameter of 0,36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more;</p> <p><i>excluding where—</i></p> <p>a) <i>such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or</i></p> <p>b) <i>where such development will occur within an urban area.</i></p>	<p>The proposed stormwater network comprises of a pipe network of approximately 4 400 m. A minimum pipe diameter of 450 mm has been determined.</p> <p>The estimated average daily demand of bulk water for the proposed development will be 1.6 Ml/day once fully developed. An existing local pump station near Mkhazazi will supply water. Bulk supply shall be provided through a 300 mm diameter uPVC line. Minimum pipe diameters will be 75mm in the reticulation to allow for both domestic use and fire demand.</p> <p>The sewer network layout is approximately 3200m of 160 mm diameter uPVC pipe.</p>
<p>EIA Regulations, GNR.544 of June 2010, Listing Notice 1 (Activity 11)</p>	<p>EIA Regulations (as amended in 2017), GNR.327 of April 2017, Listing Notice 1 (Activity 12)</p>	<p>Applicability</p>

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<p>The construction of</p> <ul style="list-style-type: none"> <li>(iv) Dams</li> <li>(vi) Bulk storm water outlet structures;</li> <li>(x) Buildings exceeding 50m<sup>2</sup> in size;</li> <li>(xi) Infrastructure or structures covering 50m<sup>2</sup> or more</li> </ul> <p>where such construction occurs within a water course or within 32 metres of a watercourse, measured from the edge of the watercourse, excluding where such development will occur behind the setback line.</p>	<p>The development of—</p> <ul style="list-style-type: none"> <li>i. dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</li> <li>ii. infrastructure or structures with a physical footprint of 100 square metres or more;</li> </ul> <p>where such development occurs—</p> <ul style="list-style-type: none"> <li>(a) within a watercourse;</li> <li>(b) in front of a development setback; or</li> <li>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;</li> </ul>	<p>The development will include an attenuation pond/dam and bulk infrastructure within 32 metres from tributaries and the Mbamba River. The development will include stormwater structures along roads and pipelines. The aforementioned will be within 32 m from the river. The expected size of the attenuation pond is expected to not exceed 1.5 hectares.</p>
<p><b>EIA Regulations, GNR.544 of June 2010, Listing Notice 1 (Activity 18)</b></p>	<p><b>EIA Regulations (as amended in 2017), GNR.327 of April 2017, Listing Notice 1 (Activity 19)</b></p>	<p><b>Applicability</b></p>
<p>The infilling or depositing of any material of more than 5m<sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5m<sup>3</sup> from:</p> <ul style="list-style-type: none"> <li>(i) a watercourse</li> </ul>	<p>The infilling or depositing of any material of more than 10 cubic meters or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.</p>	<p>For the construction of the linear infrastructure there will occur infilling or depositing of in-situ material, as well as dredging, excavation or removal of soil.</p>
<p><b>EIA Regulations, GNR.544 of June 2010, Listing Notice 1 (Activity 22)</b></p>	<p><b>EIA Regulations (as amended in 2017), GNR.327 of April 2017, Listing Notice 1 (Activity 24)</b></p>	<p><b>Applicability</b></p>
<p>The construction of a road outside urban areas</p> <ul style="list-style-type: none"> <li>(i) with a reserve wider than 13,5 meters or,</li> <li>(ii) where no reserve exists where the road is wider than 8 metres,</li> </ul>	<p>The development of a road—</p> <ul style="list-style-type: none"> <li>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</li> </ul>	<p>Access to the proposed development shall be <i>via</i> provincial road P15-2. Access roads shall be Class 5a access collectors with 6 m gravel surfaced width, while short access courts and cul-de-sacs shall have a reduced width of 5 m. The road reserve width shall be 26 m. In total 18 access roads will be constructed with a total length of 5276m.</p>
<p><b>EIA Regulations, GNR.546 of June 2010, Listing Notice 3 (Activity 4)</b></p>	<p><b>EIA Regulations (as amended in 2017), GNR.324 of April 2017, Listing Notice 3 (Activity 4)</b></p>	<p><b>Applicability</b></p>

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<p>The construction of a road wider than 4m with a road reserve less than 13.5m.</p> <p>(d) In KwaZulu-Natal</p> <p>(i) Outside Urban Areas, in:</p> <p>(aa) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</p>	<p>The development of a road wider than 4 metres with a reserve less than 13,5 metres.</p> <p>(d) In KwaZulu-Natal:</p> <p>(viii) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p> <p>xii. Outside urban areas:</p> <p>(aa) Areas within 10 kilometres from national parks.</p>	<p>Access to the proposed development shall be via provincial road P15-2. Access roads shall be Class 5a access collectors with a 6 m gravel surfaced width, while short access courts and cul-de-sac shall have a reduced width of 5 m. The maximum road reserve width shall be 26 m. The development will occur within the Eastern Valley Bushveld. The development falls within 9km from the protected Nkandla Forest Reserve.</p>
<p><b>2010 EIA Regulations, GNR.546 of June 2010, Listing Notice 3 (Activity 12)</b></p>	<p><b>EIA Regulations (as amended in 2017), GNR.324 of April 2017, Listing Notice 3 (Activity 12)</b></p>	<p><b>Applicability</b></p>
<p><u>The clearance of an area of 300 square meters or more of vegetation where 75% or more of vegetative cover constitutes indigenous vegetation.</u></p> <p>a) <u>Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</u></p> <p>b) <u>Within critical biodiversity areas identified in bioregional plans;</u></p> <p>c) <u>Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas.</u></p>	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of Indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan, in KZN</p> <p>iii. Biodiversity Stewardship Programme Biodiversity Agreement areas</p> <p>iv) A protected area identified in terms of NEMPAA, excluding conservancies</p> <p>v. World Heritage Sites;</p> <p>vi. Sites or areas identified in terms of an international convention;</p> <p>vii. Critical biodiversity areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>viii. 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><u>This is included as transformation of indigenous vegetation, more than 300m2 but less than 20ha will occur for the development. It should also be noted that the proposed bulk infrastructure development is mostly linear in nature</u></p>

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	<p>ix. Core areas in biosphere reserves;  x. Outside urban areas:  (aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p>	
<p><b>EIA Regulations, GNR.546 of June 2010, Listing Notice 3 (Activity 16)</b></p>	<p><b>EIA Regulations (as amended in 2017), GNR.324 of April 2017, Listing Notice 3 (Activity 14)</b></p>	<p><b>Applicability</b></p>
<p>The construction of  (iii) buildings with a footprint exceeding 10 square metres in size; or  (v) Infrastructure covering 10 square metres or more  where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> <p>(d) In KwaZulu-Natal:  (ii) Outside urban areas, in  (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;  (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p>	<p>The development of infrastructure or structures with a physical footprint of 10 square metres or more;  where such development occurs—  (d) In KwaZulu-Natal:  (vii) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p> <p>x. Outside urban areas:  (aa) Areas within 10 kilometres from national parks.</p>	<p>The development will include an attenuation pond/dam and bulk infrastructure within 32 metres from tributaries and the Mbamba River. The development will include stormwater structures along roads and pipelines. This will be within 32 m from the river. This will occur within the Eastern Valley Bushveld. The development falls within 9km from the protected Nkandla Forest Reserve.</p>



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## 4. 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.

There are no site alternatives. The planned bulk infrastructure development will spill around the Mamba One Stop Centre. This is an area identified as under-developed with the potential to give opportunities to the previously disadvantaged communities of South Africa, and has no fatal flaws associated with the area.

There have, however, been two design alternatives (stormwater and sewer reticulation designs) assessed as part of this basic assessment process. No alternatives were considered for the road.

Despite the change in scope of the project, the specialist studies undertaken are still relevant as the specialists have assessed the study area in its entirety, given the magnitude of the proposed development.

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

## 5. 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.

**In the case of linear activities:**

### STORMWATER MAIN LINE ALTERNATIVES

Alternative:	Latitude (S):			Longitude (E):		
Alternative S1 (preferred)						
• Starting point of the activity	28°	50'	02.12"	31°	06'	56.76"
• Middle/Additional point of the activity	28°	49'	51.93"	31°	07'	11.55"
• End point of the activity	28°	49'	41.26"	31°	07'	22.42"

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

There are two stormwater design alternatives assessed as part of this project. These alternatives are depicted in Figures 3 and 4 below. Alternatives 1 and 2 for stormwater reticulation are relatively similar. Alternative 1, the layout is determined to best suit the low and high points of the piece of land, **with a Stormwater Management Facility at the low point**. These alternatives can be differentiated by that Alternative 2 does not include the **Stormwater Management Facility**.



Figure 3: Stormwater layout Alternative 1 (depicted in blue) (preferred alternative) and associated infrastructure



Figure 4: Stormwater layout Alternative 2 and associated infrastructure (no stormwater attenuation pond)

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

## SEWER RETICULATION ALTERNATIVES

Alternative:	Latitude (S):			Longitude (E):		
Alternative S1 (preferred)						
• Starting point of the activity	28°	49'	46.53"	31°	06'	46.34"
• Middle/Additional point of the activity	28°	49'	59.78"	31°	07'	02.35"
• End point of the activity	28°	49'	44.45"	31°	07'	17.46"



# AMENDED BASIC ASSESSMENT REPORT (Version 3)

Two sewer reticulation alternatives have been identified and assessed. Alternative 1, the preferred alternative (refer to Figure 5 below), the pump station is located at the low point in the southeast point. Alternative 2, the second alternative (Figure 6) has the pump station which is located at the northwest point with a rising main to the pump station. Alternative 1 does not need a rising main.

It must be noted that the waste water treatment works does not form part of this development and is not applied for in this Basic Assessment process.

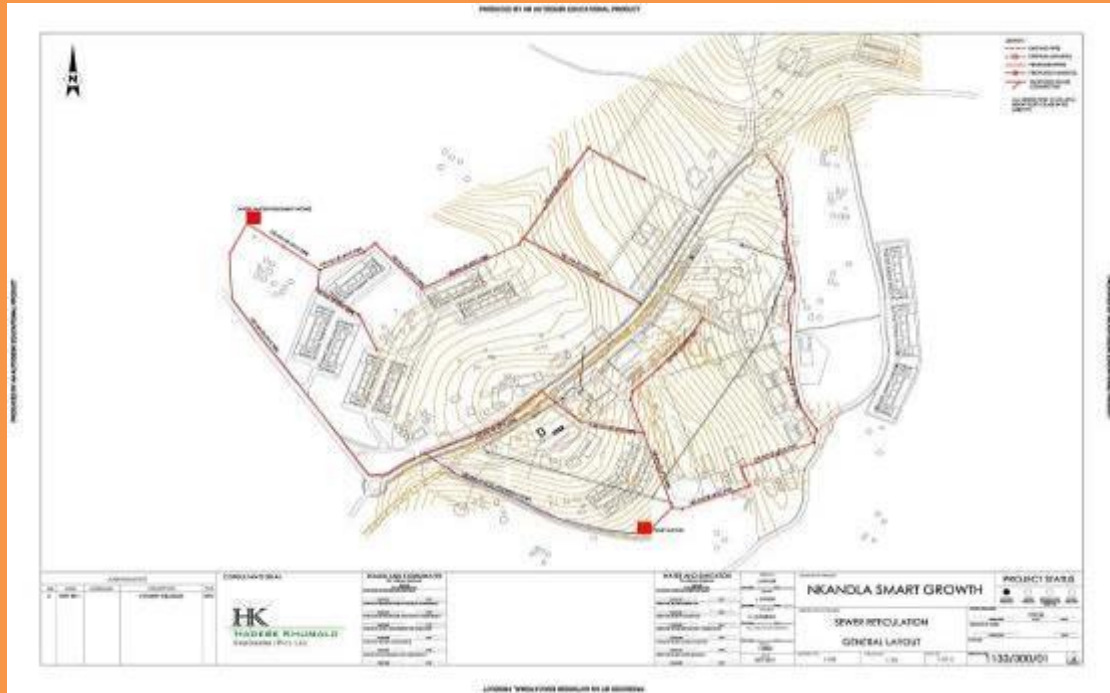


Figure 5: The sewer reticulation preferred Alternative 1



Figure 6: The sewer reticulation Alternative 2

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

## ROAD INFRASTRUCTURE – MAIN (ONLY ALTERNATIVE)

Alternative	Latitude (S)			Longitude (E)		
Alternative (S1) preferred	28°	50'	22.14"	31°	07'	00.07"
• Starting point of the activity	28°	50'	10.95"	31°	07'	29.20"
• Middle point of the activity	28°	49'	57.52"	31°	08'	10.89"
• End point of the activity	28°	50'	22.14"	31°	07'	00.07"



# AMENDED BASIC ASSESSMENT REPORT (Version 3)



Figure 7: Proposed access roads



# AMENDED BASIC ASSESSMENT REPORT (Version 3)

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.

## 6. PHYSICAL SIZE OF THE ACTIVITY

These sizes refer to the development at large and are not limited to the linear infrastructure alone.

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

### Alternative:

Alternative A1<sup>1</sup> (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

### Size of the activity:

Approximately 12.48 ha

or, for linear activities:

### Alternative:

Alternative 1 (Stormwater preferred)

Alternative 2 (Stormwater)

Alternative 1 (Sewer reticulation preferred)

Alternative 2 (Sewer)

Only Alternative (Roads)

### Length of the activity:

Approx. 4 400 m

Approx. 4 400 m

Approx. 3 200 m

Approx. 3 200 m

Approx. 5 708 m

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

### Alternative:

Alternative S1 (preferred activity alternative)

### Size of the site/servitude:

Approximately 12.48 ha

## 7. 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:

Access to the proposed development shall be via provincial road P15-2. In areas of the development where access roads are required, these will be Class 5a access collectors with a 6m gravel surfaced width, while short access courts and cul-de-sacs shall have a reduced width of 5m.

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.

## 8. 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:

- 8.1. the scale of the plan which must be at least a scale of 1:500;
- 8.2. the property boundaries and numbers/ erf/ farm numbers of all adjoining properties of the site;

<sup>1</sup> "Alternative A.." refer to activity, process, technology or other alternatives.

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

- 8.3. the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- 8.4. the exact position of each element of the application as well as any other structures on the site;
- 8.5. 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;
- 8.6. walls and fencing including details of the height and construction material;
- 8.7. servitudes indicating the purpose of the servitude;
- 8.8. 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);
- 8.9. 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
- 8.10. the positions from where photographs of the site were taken.

## 9. 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.

## 10. 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.

## 11. ACTIVITY MOTIVATION

### 11.1. Socio-economic value of the activity

While the socio-economic benefits of this project is difficult to demonstrate and quantify due to the fact this BA process applies for linear infrastructure, the provision of these basic services such as stormwater and sewer reticulation and roads will be laying the foundation for further developments which will lead to the source of income for the impoverished people of Lindela and Nkandla areas.

What is the expected capital value of the activity on completion?	R76 827 356.88
What is the expected yearly income that will be generated by or as a result of the activity?	R12 600 000.00
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 development phase of the activity?	100
What is the expected value of the employment opportunities during the development phase?	R10 Million
What percentage of this will accrue to previously disadvantaged individuals?	100%
How many permanent new employment opportunities will be created during the operational phase of the activity?	20
What is the expected current value of the employment opportunities during the first 10 years?	R126 000 000.00
What percentage of this will accrue to previously disadvantaged individuals?	N/A

### 11.2. Need and desirability of the activity

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

Inqonyama Trust Board has identified an opportunity for a Bulk Infrastructure development in the area of Lindela under the chieftainships of Inkosi Shange and Inkosi Nxamalala. The site is identified as indigent and therefore provides the ultimate opportunity for community development.

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

This development is intended to realise the establishment and access to structured bulk infrastructure facilities. In a previously disadvantaged community and undeveloped area, such development is needed in order to develop the community and provide basic amenities. The development is also flagged as a high priority project for integrated development of the Nkandla-Umlalazi sites. This application specifically is for the basic bulk infrastructure required as a prerequisite to realising the development of further land uses in the area.

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

The development will provide the community with basic amenities and services that are currently unavailable and needed for the development of the community. Such amenities include stormwater management, sewer reticulation and road infrastructure. Indigent areas such as these are in need of infrastructure which will initiate growth and stimulate the economy. In order for the development to occur, basic services and infrastructure are required.

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

The locals of the Nkandla and Umlalazi areas will be provided with basic infrastructure such as roads, stormwater and sewer reticulation which will at a later stage lead to the provision of amenities and services that are currently unavailable and needed for the development of the community.

## 12. 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 (and a consideration of subsequent EIA Regulations amendments in 2017).	National & Provincial Government	2010 and 2017
Constitution of the Republic of South Africa (1996)	National & Provincial Government	1996
National Environmental Management Act (No 107 of 1998 (as amended))	National & Provincial Government	1998
National Water Act (No 36 of 1998)(as amended)	National & Provincial Government	1998
Conservation of Agricultural Resources Act (Act No. 43 of 1983).	National & Provincial Government	1983
National Environmental Management: Air Quality Act (No 39 of 2004)	National & Provincial Government	2004
National Environmental Management: Waste Act (No 59 of 2008)(as amended)	National & Provincial Government	2008
The National Heritage Resources Act (Act No. 25 of 1999)	National & Provincial Government	1999

In addition to the above, a cross comparison exercise with the EIA Regulations (2017) was undertaken

## 13. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

A waste management license is not being applied for and no Waste Water Treatment works are proposed as part of this Basic Assessment process. A separate environmental authorization & waste license process will be undertaken for the waste water treatment facilities at a later stage with the competent Environmental Authority once relevant design and other information becomes available.

### 13.1. Solid waste management

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

YES    
Unknown m<sup>3</sup>

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

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 domestic related solid waste. Solid waste that is unsuitable for re-use by construction will be transported to a registered disposal facility 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)

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

All waste will be collected and disposed of at an approved waste disposal facility near the construction site.

Will the activity produce solid waste during its operational phase?

YES

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

Unknown m<sup>3</sup>

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

All waste will be collected and disposed off at an approved waste disposal facility near the construction site.

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

Not Applicable.

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

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

## 13.2. 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?

YES

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:

E-mail:

Cell:

Fax:

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

## 13.3. 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?

NO

**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:

There will be limited dust emissions during the construction phase due to the off-loading of construction material such as sand and cement as well as the movement of construction vehicles. Should a mobile asphalt plant be required, the necessary registration thereof will be undertaken

## 13.4. Generation of noise

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

Will the activity generate noise?

YES	
YES	

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

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:

The noise generated on site will be limited to working hours (07h00 to 17h00) and would comprise of excavators and other machinery. Construction noise levels are unlikely to exceed 75 decibels (dB) for extended periods.

## 14. WATER USE

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

Note that water from the Mamba River cannot be used for construction purposes unless a water use license in terms of section 21 [a] is applied for and obtained prior to construction. Section 21 (c) and (l) water use authorisations will also be obtained for any impacts on wetlands and watercourses at a later stage. All relevant studies in support of this WULA application will be undertaken in future prior to construction.

Municipal

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:

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

NO

If YES, please submit the necessary application to the Department of Water and Sanitation and attach proof thereof to this report.

## 15. ENERGY EFFICIENCY

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

There will not be any energy efficient methods or applications used for the proposed project.

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

Not Applicable.

## 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. (e.g. A):

- Subsections 1 - 6 below must be completed for each alternative.
- GRADIENT OF THE SITE

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

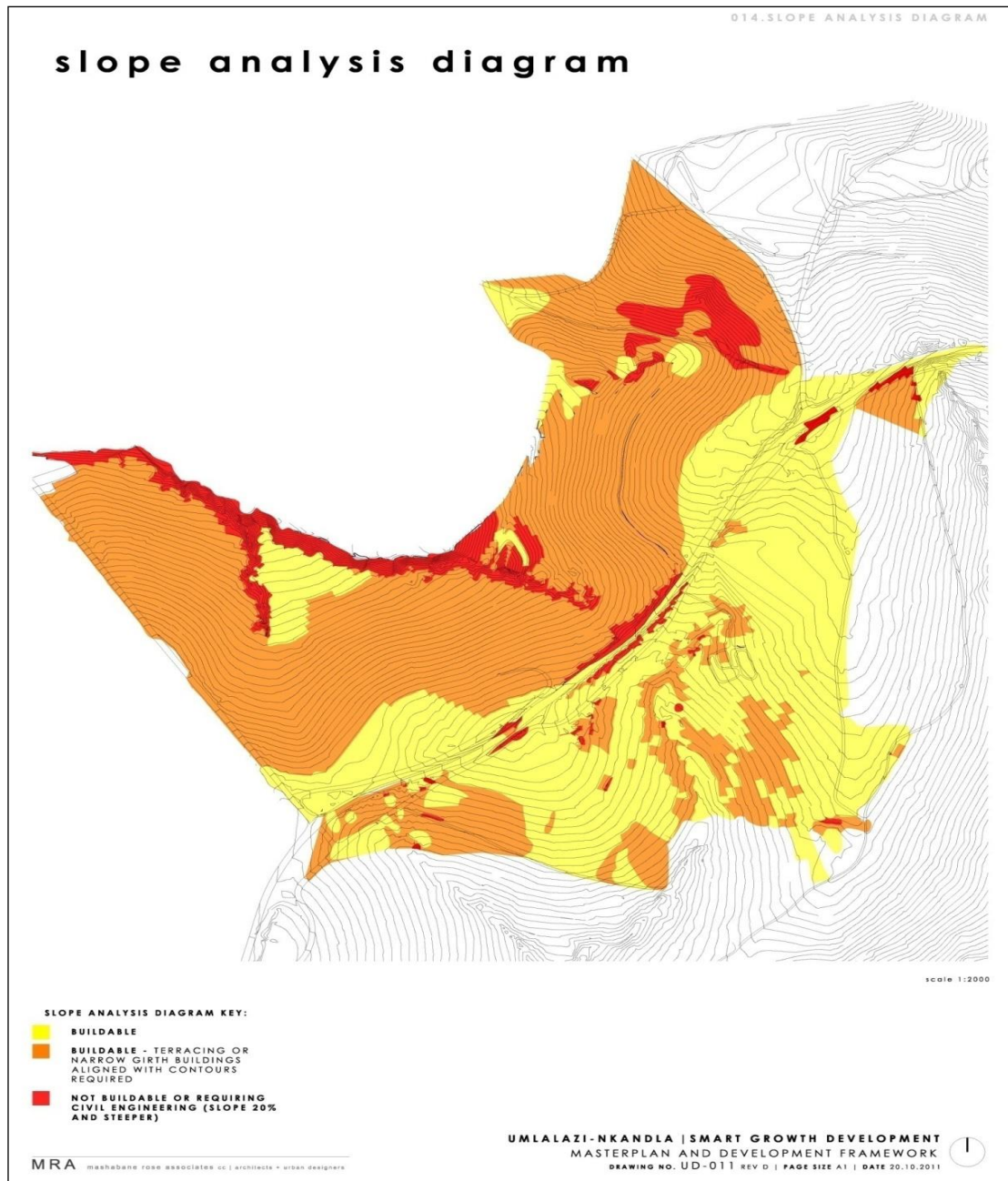


Figure 7: Indicate the general gradient of the site.

The site is undulating with extreme topographical variation between (3 - 25%). The northern non-perennial line is situated adjacent to a rocky slope (>20-25%). The highest point is situated on the north-eastern boundary and the lowest on the south-western boundary along the lower-lying Mamba River.

Alternative S1:

Steeper than 1:5

Alternative S2 (if any):

Alternative S3 (if any):



# AMENDED BASIC ASSESSMENT REPORT (Version 3)

## 2. LOCATION IN LANDSCAPE

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

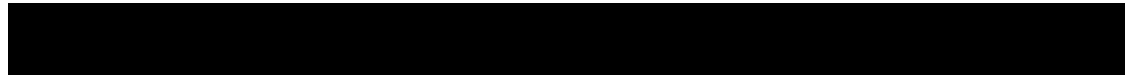
Alternative S1 (preferred site):

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

Alternative S2 (if any):



Alternative S3 (if any):



## 3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

The geology of the site is characterized by thin accumulations of colluvial and residual soils which are underlain by completely weathered granite gneiss and to lesser extent *amphibolites* of the Natal Metamorphic Province. Consequently, lab test results indicate that normal construction foundations (strip footing or slab on ground) are suitable as typical conditions prevail. Variations will be assessed on site as encountered. Furthermore good practice principles to ensure that in-situ moisture content of the founding horizons are maintained.



Figure 9: Aquatic resources observed within the proposed project site. Four non-perennial or seasonal drainage lines flow into the perennial Mamba River.

Has a specialist been consulted for the completion of this section?

Clayton Cook was appointed to conduct a River and Riparian Assessment as well as an Ecological Assessment. The data presented on soil and geological stability is sourced from the feasibility study specialist input and supporting studies.

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

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

Postal address:	226 Girdwood Street, Munster		
Postal code:	4273		
Telephone:	[REDACTED]	Cell:	082 688 9585
E-mail:	giant.bullfrog@gmail.com	Fax:	[REDACTED]
Are there any rare or endangered flora or fauna species (including red data species) present on any of the alternative sites?			NO
If YES, specify and explain:	[REDACTED]		
Are there any special or sensitive habitats or other natural features present on any of the alternative sites?			YES
If YES, specify and explain:	The majority of riparian trees are indigenous species and must be considered as a sensitive habitat.		
Are any further specialist studies recommended by the specialist?			NO
If YES, specify:	[REDACTED]		
If YES, is such a report(s) attached in <a href="#">Appendix D</a> ?	[REDACTED]		



Signature of specialist: \_\_\_\_\_ Date: 30 July 2012

NOTE: This assessment was revised in July 2015 and submitted with the Amended Final BAR in August 2015. It was confirmed by the specialist that while the study was done in the dry season, the recommendations offered would mitigate for the fact that the study was not done in summer. The specialist defends the seasonality of the assessment with the mitigations provided and confirms that it has been updated.

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		
Dolomite, sinkhole or doline areas	NO		
Seasonally wet soils (often close to water bodies)	YES		
Unstable rocky slopes or steep slopes with loose soil	NO		
Dispersive soils (soils that dissolve in water)	NO		
Soils with high clay content (clay fraction more than 40%)	NO		
Any other unstable soil or geological feature	NO		
An area sensitive to erosion	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).

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

## 4. 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?

NO

If YES, specify and explain:

No red data flora species were observed during the brief field survey although suitable habitat remains within these protected wooded pockets for certain red listed plant species. Two protected tree species were recorded namely several scattered Marula (*Sclerocarya birrea subsp. Caffra*) and Shepherd's Tree (*Boscia albitrunca*).

Possible existence of Southern African Python (*Python natalensis*) which has an SA Red Data and IUCN status of Vulnerable. However, It is unlikely that pythons will retain this threat classification when reassessed using the latest IUCN criteria, since it appears to be relatively common in certain areas and has a widespread distribution (Alexander and Marais; 2007). It is regarded as unlikely that study area comprises a critical habitat for Southern African Pythons, at a global or provincial scale, or that the proposed development of the transformed and degraded hill slopes of the site will have an impact of more than low significance on the conservation status of this species should it indeed occur (Cook, 2012).

Several threatened bird species have been recorded in the grid square within which the study area is situated. No threatened bird species were recorded during the brief survey within the proposed site area due to high levels of habitat transformation and degradation as well as human disturbances. The site may occasionally be utilised for temporary foraging areas for Lanner Falcons as well as Martial Eagles. The woodlands along the Mamba River form marginally suitable foraging habitat for African Crowned Eagles. All raptors that are perceived as a threat to chickens and livestock are killed. If however the unlikely occurrence of any threatened bird species it is highly unlikely that the transformed and heavily degraded areas of the proposed bulk infrastructure project will form critical habitat for any threatened bird species or negatively impact on any threatened bird species. The conservation and adequate rehabilitation of the Mamba River and the non-perennial drainage lines could potentially benefit remaining bird species .

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

YES

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If YES, specify and explain:

The majority of riparian trees are indigenous species and must be considered as a sensitive habitat. The perennial Mamba River as well as non-perennial drainage lines and associated riparian vegetation are considered to be of conservation importance for the following reasons: The indigenous riparian vegetation along rivers within Kwazulu-Natal and rivers in general throughout the Savanna Biome, is in danger of being completely replaced by alien invasive species. Any remaining areas of indigenous riparian vegetation within Kwazulu-Natal must therefore be regarded as sensitive and of high conservation importance.

Rivers and drainage lines are longitudinal ecosystems, and their condition at any point is a reflection of not only upstream activities, but also of those within adjacent and upstream parts of the catchment (O'Keefe; 1986). Any impact on the riverine area within the study area is therefore also likely to impact on upstream and downstream areas.

Riparian zones have the capacity to act as biological corridors connecting areas of suitable habitat in birds (Whitaker & Metevecchi, 1997), mammals (Cockle & Richardson; 2003) reptiles and amphibians (Maritz & Alexander; 2007). Riparian zones may act as potential *refugia* for certain fauna and could allow for possible re-colonisation of rehabilitated habitats. The riparian vegetation plays a vital role in the re-colonisation of aquatic macro-invertebrates as well as reptiles and amphibians (Maritz & Alexander; 2007). The riparian vegetation provides vital refuge, foraging and migratory passages for species migrating to and away from the rivers. The riparian zone comprises plant communities contiguous to and affected by surface and subsurface hydrological features of perennial or intermittent water bodies (rivers and streams).

The riparian vegetation is dependant on the river for a number of functions including growth, temperature control, seed dispersal, germination and nutrient enrichment. Riparian vegetation comprises a distinct composition of species, often different from that of the surrounding terrestrial vegetation. Tree species are positioned according to their dependence or affinity for water, with the more mesic species (water-loving) being located closest to the river channel, often with their roots in the water, and the less water-loving terrestrial species further away from the river.

Are any further specialist studies recommended by the specialist?  NO

If YES, specify:

If YES, is such a report(s) attached in [Appendix D](#)?  NO

Signature of specialist:  Date: 30 July 2012.

NOTE: This assessment was revised in July 2015 and submitted with the Amended Final BAR in August 2015. It was confirmed by the specialist that while the study was done in the dry season, the recommendations offered would mitigate for the fact that the study was not done in summer. The specialist defends the seasonality of the assessment with the mitigations provided and confirms that it has been updated.

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

<input type="checkbox"/>	Natural veld with scattered aliens <sup>E</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Cultivated land	<input type="checkbox"/>	Building or other structure	Bare soil

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.

## 5. 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:

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

Land use character			Description
Natural area	YES		Some areas remain undeveloped.
Low density residential	YES		Informal homesteads.
Medium density residential		NO	
High density residential		NO	
Informal residential	YES		Rural Nkandla and uMlalazi.
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	YES		Mamba Primary School.
Tertiary education facility		NO	
Church	YES		Nkandla Church.
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		NO	
River, stream or wetland		NO	
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	

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

## 6. CULTURAL/ HISTORICAL FEATURES

<p>Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or within 20m of the site?</p>	NO
<p>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.</p>	
<p>Briefly explain the recommendations of the specialist:</p>	<p>In the event that such indicator(s) of heritage resources are identified, the following actions should be taken immediately:</p> <ul style="list-style-type: none"> <li>• All construction within a radius of at least 20 m of the indicator should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource. This area must be marked using clearly visible means, such as barrier tape, and all personnel should be informed that it is a no-go area.</li> <li>• A guard should be appointed to enforce this no-go area if there is any possibility that it could be violated, whether intentionally or inadvertently, by construction staff or members of the public.</li> <li>• No measures should be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone or stone.</li> <li>• If a heritage practitioner has been appointed to monitor the project, s/he should be contacted and a site inspection arranged as soon as possible.</li> <li>• If no heritage practitioner has been appointed to monitor the project, the head of archaeology at Amafa's Pietermaritzburg office should be contacted; telephone 033 3946 543).</li> <li>• The South African Police Services should be notified by an Amafa staff member or an independent heritage practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not.</li> <li>• All parties concerned should respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.</li> <li>• Any extension of the project beyond its current footprint involving vegetation and/or earth clearance should be subject to prior assessment by a qualified heritage practitioner, taking into account all information gathered during this initial heritage impact assessment.</li> </ul>
<p>Will any building or structure older than 60 years be affected in any way?</p>	NO
<p>Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?</p>	NO
<p>If YES, please submit the necessary application to AMAFA and attach proof thereof to this report.</p>	

## SECTION D: PUBLIC PARTICIPATION

### 1. 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



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- (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;
  - (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.

### 2. 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.

### 3. 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.**

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## 4. 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.

## 5. 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.

## 6. 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?

NO

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

Has any comment been received from the local municipality?

NO

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

Has any comment been received from a traditional authority?

NO

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

## 7. 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):

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## 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.

### 1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

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):

### 2. 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

The impacts assessed are those impacts which could potentially arise from the impacts of linear infrastructure and the construction thereof. In order to allow for an objective assessment of the impacts directly associated with what is applied for as part of this development (i.e. bulk service infrastructure and transformation of land for development); the impacts pertinent only to this are assessed in this BAR.

The following methodology is used to assess the impacts:

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.

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- 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. The above scores are added to provide an overall significance score which has the following explanation assigned to the scores:

Score		Elaboration
<b>- (13 - 16 points)</b>	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.
<b>- (10 - 12 points)</b>	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.
<b>- (7 - 9 points)</b>	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.
<b>- (4 - 6 points)</b>	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.
<b>0</b>	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.
<b>+(4 - 6 points)</b>	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.
<b>+(7 - 9 points)</b>	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.
<b>+(10 - 12 points)</b>	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.

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<b>+ (13 - 16 points)</b>	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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## A. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN PHASE

### a. Site alternatives

N.B. There are no site alternatives as the development is proposed for the Nkandla-Umlalazi Bulk Infrastructure project and will spill around the Mamba One Stop Centre. This is an indigent area with the proposed development having the potential to present opportunities to the previously disadvantaged community/ies within the area. There are also no fatal flaws associated with the proposed project.

List the potential impacts associated with site alternatives that are likely to occur during the planning and design phase:

### Alternative S1 (Only Site)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Planning and Design Site Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
	Safety Risk in the form of stabilisation of eroded surfaces.	Alternative S1	Without Mitigation	1	4	3	3	11	Positive high
			With Mitigation	1	4	3	4	12	Positive high
1	<p>Mitigation: Proceeding with the said development. Assessment of run-off requirements / drainage patterns and adequate provision / design of storm water system. Evaluate designs and provide recommendations to limit and reduce potential negative environmental, social and economic impacts associated with the proposed activities. 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. Ensure storm water 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.</p> <p>The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998). Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the Department of Water and Sanitation.</p>								
2	Removal of invader plants through proper identification and recommendations.	Alternative S1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Proceeding with the said development in accordance with the specialist recommendations and the EMP. Evaluate designs and provide recommendations to limit and reduce potential negative environmental, social and economic impacts associated with the proposed activities. Ensure the planning undertaken by engineers appointed takes cognisance of the responsibility to preserve the natural environment.								
3	Inadequate provision of services and infrastructure	Alternative S1	Without Mitigation	2	3	3	3	11	Positive high
			With Mitigation	2	4	4	4	14	Positive very high
	Mitigation: Ensure the best option for the design and provision of bulk infrastructure is ensured. Proceeding with the said development. Assessment of run-off requirements / drainage patterns and adequate provision / design of storm water system. Evaluate designs and provide recommendations to limit and reduce potential negative environmental, social and economic impacts associated with the proposed activities. Provide mitigation measures to reduce effects of air emissions and pollution. 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. Ensure storm water 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.								
<b>Sub-phase: Indirect Impacts</b>									
4	Inadequate provision of labour opportunities.	Alternative S1	Without Mitigation	1	2	3	2	8	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high
	Mitigation: Implementation of the development to provide jobs to the communities. To the greatest possible extent, locals must be employed for all phases of the development.								
5	Poor storm water drainage from new development areas may impact on the stability of the development foundations.	Alternative S1	Without Mitigation	-1	-3	-3	-2	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	<p>Mitigation: Ensure adequate design and best practice options at the onset to prevent remedial and corrective actions at a later stage. Assessment of run-off requirements / drainage patterns and adequate provision / design of storm water system. 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. Ensure storm water 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.</p> <p>The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998). A geo-hydrological and geotechnical investigation must be conducted with respect to this development and the proposed sewage package plant in the detailed design and planning phase. Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the Department of Water and Sanitation.</p>								
	The permeability of the development area will be decreased through increased population densities and introduction of impervious areas such as surfaced streets, associated with the proposed developments.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
With Mitigation			-1	-1	-1	-1	-4	Negative low	
6	<p>Mitigation: Ensure adequate stormwater drainage and necessary attenuation according to the best practice design specifications. Ensure adequate design and best practice options at the onset to prevent remedial and corrective actions at a later stage. Proceeding with the said development. Assessment of run-off requirements / drainage patterns and adequate provision / design of storm water system. 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. Ensure storm water 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.</p>								
7	Incompetent planning could result in the implementation of development which will pose problems to the natural environment in the future.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
With Mitigation			-1	-1	-1	-1	-4	Negative low	

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Ensure adequate design and best practice options. Evaluate designs and provide recommendations to limit and reduce potential negative environmental, social and economic impacts associated with the proposed activities. Provide mitigation measures to reduce effects of air emissions and pollution. Ensure the planning undertaken by engineers appointed takes cognisance of the responsibility to preserve the natural environment. The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998). A geo-hydrological and geotechnical investigation must be conducted with respect to this development and the proposed sewage package plant in the detailed design and planning phase. Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the Department of Water and Sanitation.								
<b>Sub-phase: Cumulative Impacts</b>									
	Traffic congestion.	Alternative S1	Without Mitigation	-1	-1	-2	-2	-6	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
8	Mitigation: Ensure careful and adequate traffic planning which considers future growth capacities of the next 50 years. The traffic flows in the area are predicted to be relatively low and hence this is an impact unlikely to occur at a significant level.								
	Increased storm water run-off from impervious surface may result in erosion.	Alternative S1	Without Mitigation	-1	-1	-2	-2	-6	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
9	Mitigation: Ensure adequate stormwater drainage and necessary attenuation according to the best practice design specifications. Proceeding with the said development. Assessment of run-off requirements / drainage patterns and adequate provision / design of storm water system. 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. Ensure storm water 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.								
Average for Alternative S1 without mitigation								0.88	Positive low
Average for Alternative S1 with mitigation								3.33	Positive low

### 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):

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## Stormwater Alternatives 1 and 2

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Planning and Design Storm water Alternatives Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	The layout of stormwater infrastructure will ensure prevention of ongoing erosion through appropriate placement of infrastructure and choice of engineering options.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	4	3	3	12	Positive high
		Alternative 2	Without Mitigation	1	1	1	1	4	Positive low
			With Mitigation	2	2	2	2	8	Positive moderate
	Enhancement: Assessment of run-off requirements / drainage patterns and adequate provision / design of storm water system. Ensure effective storm water management will be exercised to limit negative impacts on the environment and enhance the positive impacts. Ensure catering for the hydraulic needs of the development while minimising the associated negative environmental impacts. The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998). The best design should be implemented in terms of least environmental impact.								
2	Implementation of technically sound design from an engineering perspective and hence will have less of a cost and environmental impact.	Alternative 1	Without Mitigation	1	3	2	2	8	Positive moderate
			With Mitigation	2	4	4	4	14	Positive very high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	2	2	2	7	Positive moderate
Enhancement: Evaluate designs and provide recommendations to limit and reduce potential negative environmental, social and economic impacts associated with the proposed activities. Ensure storm water management planning allows for the opportunity to conserve water and make it available to the public for beneficial use.									
3	Removal of alien and invasive species.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate



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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
		Alternative 2	With Mitigation	1	3	3	3	10	Positive high
			Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high
Enhancement: The implementation of an alien invasives management programme must be ensured.									
4	Optimisation of development opportunities and socio-economic integration and benefits associated with the provision of services and laying the foundation for future development.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	4	4	4	14	Positive very high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	3	4	4	13	Positive very high
Enhancement: The implementation of the project will realise this positive impact.									
5	Loss of habitat (albeit not pristine) and soil resources.	Alternative 1	Without Mitigation	-2	-4	-2	-3	-11	Negative high
			With Mitigation	-1	-2	-1	-2	-6	Negative low
		Alternative 2	Without Mitigation	-2	-4	-2	-3	-11	Negative high
			With Mitigation	-1	-2	-1	-2	-6	Negative low
Mitigation: The development must be undertaken in an environmentally responsible manner with the least socio-economic impact and duty of care for the natural environment. For further mitigation measures, refer to the EMP.									
6	Environmental pollution if facilities are not planned and designed according to specification and location.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
			Mitigation							
			With Mitigation	-1	-1	-2	-1	-5	Negative low	
Mitigation: Provide mitigation measures to reduce effects of air emissions and pollution. Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the Department of Water Affairs. A spill contingency or Emergency Response Plan must be drawn up and should include the following actions that need to be taken into account in the event of a spill: 1. Stop the source of the spill; 2. Contain the spill; 3. All significant spills must be reported to the DWA and other relevant authorities; 4. Remove the spilled product for treatment or authorised disposal; 5. Determine if there is any soil, groundwater or other environmental impact; 6. If necessary, remedial action must be taken in consultation with the DWS; 7. Incidents must be recorded.										
<b>Sub-phase: Indirect Impacts</b>										
7	Ecological degradation if not appropriately planned.	Alternative 1	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate	
			With Mitigation	-1	-2	-2	-1	-6	Negative low	
		Alternative 2	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate	
			With Mitigation	-1	-2	-2	-1	-6	Negative low	
		Mitigation: The development must be undertaken in an environmentally responsible manner with the least socio-economic impact and duty of care for the natural environment. For further mitigation measures, refer to the EMP.								
		<b>Sub-phase: Cumulative Impacts</b>								
8	Increased socio-economic benefits for communities.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high	
			With Mitigation	2	4	4	4	14	Positive very high	
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high	
			With Mitigation	2	4	4	4	14	Positive very high	
		Enhancement: Implementing the project will lead to the provision of basic services and infrastructure which can in turn create sustainable socio-economic opportunities for the indigent communities of the Nkandla area.								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
9	Long-term continued erosion and its resultant negative impacts.	Alternative 1	Without	-1	-1	-3	-2	-7	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without	-1	-2	-4	-3	-10	Negative high
			With	-1	-2	-2	-2	-7	Negative Moderate
Mitigation: Erosion control measures must be ensured through the best engineering design and the location of infrastructure along stable topography which avoids steep areas.									
Average for Alternative 1 without mitigation								0.67	Positive low
Average for Alternative 1 with mitigation								4.78	Positive low
Average for Alternative 2 without mitigation								-0.11	Negative low
Average for Alternative 2 with mitigation								3.11	Positive low

### Sewer Reticulation Alternatives 1 and 2

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Planning and Design Sewer Reticulation Alternatives Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	The layout of sewer reticulation will ensure prevention of ongoing erosion through appropriate placement of infrastructure and choice of engineering options.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	4	3	3	12	Positive high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	2	2	2	8	Positive moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Enhancement: Assessment of run-off requirements / drainage patterns and adequate provision / design of sewer system. Ensure effective sewer 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. The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998). The best design should be implemented in terms of least environmental impact and lowest cost.								
2	Implementation of technically sound design from an engineering perspective and hence will have less of a cost and environmental impact.	Alternative 1	Without Mitigation	1	3	2	2	8	Positive moderate
			With Mitigation	2	4	4	4	14	Positive very high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	2	2	2	7	Positive moderate
	Enhancement: Evaluate designs and provide recommendations to limit and reduce potential negative environmental, social and economic impacts associated with the proposed activities. Ensure sewer system management planning allows for the opportunity to conserve water and make it available to the public for beneficial use.								
3	Removal of alien and invasive species.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high
	Enhancement: The implementation of an alien invasives management programme must be ensured.								
4	Optimisation of development opportunities and socio-economic integration and benefits associated with the provision of services and laying the foundation for future development.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	4	4	4	14	Positive very high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	3	4	4	13	Positive very high

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
Enhancement: The implementation of the project will realise this positive impact.										
5	Loss of habitat (albeit not pristine) and soil resources.	Alternative 1	Without Mitigation	-2	-4	-2	-3	-11	Negative high	
			With Mitigation	-1	-2	-1	-2	-6	Negative low	
		Alternative 2	Without Mitigation	-2	-4	-2	-3	-11	Negative high	
			With Mitigation	-1	-2	-1	-2	-6	Negative low	
	Mitigation: The development must be undertaken in an environmentally responsible manner with the least socio-economic impact and duty of care for the natural environment. For further mitigation measures, refer to the EMPr.									
	6	Environmental pollution, should facilities be inadequately planned and designed according to specification and location.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
				With Mitigation	-1	-1	-2	-1	-5	Negative low
			Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
With Mitigation				-1	-1	-2	-1	-5	Negative low	
Mitigation: Provide mitigation measures to reduce effects of air emissions and pollution. Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the Department of Water Affairs. A spill contingency or Emergency Response Plan must be drawn up and should include the following actions that need to be taken into account in the event of a spill: 1. Stop the source of the spill; 2. Contain the spill; 3. All significant spills must be reported to the DWA and other relevant authorities; 4. Remove the spilled product for treatment or authorised disposal; 5. Determine if there is any soil, groundwater or other environmental impact; 6. If necessary, remedial action must be taken in consultation with the DWS; 7. Incidents must be recorded.										
<b>Sub-phase: Indirect Impacts</b>										
7	Ecological degradation if not competently planned.	Alternative 1	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate	
			With Mitigation	-1	-2	-2	-1	-6	Negative low	
		Alternative 2	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate	



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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
			With Mitigation	-1	-2	-2	-1	-6	Negative low	
Mitigation: The development must be undertaken in an environmentally responsible manner with the least socio-economic impact and duty of care for the natural environment. For further mitigation measures, refer to the EMPr.										
Sub-phase: Cumulative Impacts										
8	Increased socio-economic benefits for communities.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high	
			With Mitigation	2	4	4	4	14	Positive very high	
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high	
			With Mitigation	2	4	4	4	14	Positive very high	
	Enhancement: Implementing the project will lead to the provision of basic services and infrastructure which can in turn create sustainable socio-economic opportunities for the indigent communities of the Nkandla area.									
	9	Long-term continued erosion and its resultant negative impacts.	Alternative 1	Without Mitigation	-1	-1	-3	-2	-7	Negative Moderate
				With Mitigation	-1	-1	-1	-1	-4	Negative low
			Alternative 2	Without Mitigation	-1	-2	-4	-3	-10	Negative high
With Mitigation				-1	-2	-3	-2	-8	Negative Moderate	
Mitigation: Erosion control measures must be implemented through the best engineering design and the location of infrastructure along stable topography which avoids steep areas.										
Average for Alternative 1 without mitigation								0.67	Positive low	
Average for Alternative 1 with mitigation								4.78	Positive low	
Average for Alternative 2 without mitigation								0.22	Positive low	
Average for Alternative 2 with mitigation								3.00	Positive low	

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## No Go Alternative

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Planning and Design No Go Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	Lack of appropriate and needed amenities and facilities.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the said development will alleviate this.									
2	The area will remain under-developed with limiting opportunities for the community.	Alternative 1	Without Mitigation	-1	-3	-2	-3	-9	Negative Moderate
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the said development will alleviate this.									
<b>Sub-phase: Indirect Impacts</b>									
3	Loss of employment opportunities and socio-economic benefits thereby losing the opportunity to develop the region.	Alternative 1	Without Mitigation	-1	-3	-2	-4	-10	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the said development will alleviate these social problems.									
<b>Sub-phase: Cumulative Impacts</b>									
4	Overall not undertaking the project will have increased impacts on the natural environment as it is in a degraded state due to current practices.	Alternative 1	Without Mitigation	-1	-3	-2	-3	-9	Negative Moderate
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the said development will alleviate the environmental impacts.									
5	From a socio-economic perspective, the land will remain vacant and there will be a	Alternative 1	Without Mitigation	-1	-3	-2	-3	-9	Negative Moderate

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loss of development opportunities	With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the said development will alleviate this.							
Average for Alternative No-Go without mitigation						-9.6	Negative Moderate
Average for Alternative No-Go with mitigation						7.2	Positive Moderate

### B. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

#### a. Site alternatives

N.B. There are no site alternatives as the development is proposed for the Nkandla-Umlalazi Node and will spill around the Mamba One Stop Centre. This is an indigent area with the proposed development having the potential to prevent opportunities to the previously disadvantaged communities of South Africa, and the area has no fatal flaws associated with it.

List the potential impacts associated with site alternatives that are likely to occur during the Construction phase:

### Alternative S1 (Only Site)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Construction Site Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	The effects of the development on the vegetation could be positive provided the few indigenous trees and sensitive regions are not impacted on.	Alternative S1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	3	3	3	11	Positive high
Enhancement: The removal of any indigenous trees may need to be authorised by the Department of Agriculture, Forestry and Fisheries (DAFF). An alien invasive management programme should be implemented once all alien species are cleared out; no exotics are permitted to be introduced.									
2	Loss of vegetation for the clearing of developable areas.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
3	Mitigation: The impact is of a low significance due to the prevalence of alien species on the site. Strip topsoil prior to any construction activities. Reuse topsoil to rehabilitate disturbed areas. Topsoil must be kept separate from overburden and must not be used for road construction purposes or maintenance or access roads. Minimise the clearance of vegetation to avoid exposure of soil.									
	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.	Alternative S1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate	
			With Mitigation	-1	-1	-1	-2	-5	Negative low	
	Mitigation: 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.									
	Disturbance of surface geology for development foundations or trenches and road surfaces.	Alternative S1	Without Mitigation	-2	-2	-3	-3	-10	Negative high	
			With Mitigation	-1	-1	-2	-1	-5	Negative low	
Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding. In the event that significant groundwater is encountered during construction (high altitude and typically dry nature of the granitic materials make this unlikely) subsoil drains must be installed and designed in accordance with filter criteria of the in-situ soils to prevent piping to the Mamba River.										
4	Alteration of topography due to stockpiling of soil, building material and debris and waste material on site.	Alternative S1	Without Mitigation	-1	-4	-4	-3	-12	Negative high	
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate	
Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.										
5										
6	Erosion potential is anticipated to increase during the site clearance and construction	Alternative S1	Without Mitigation	-1	-3	-3	-3	-10	Negative high	

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
7	activities for the proposed project.		With Mitigation	-1	-2	-2	-1	-6	Negative low
	Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.								
	The erosion and compaction of soils due to construction activities.	Alternative S1	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-1	-6	Negative low
	Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.								
Disturbance of soils – possible excavation of stream embankments.	Alternative S1	Without Mitigation	-2	-2	-3	-3	-10	Negative high	
		With Mitigation	-1	-1	-3	-2	-7	Negative Moderate	
8	Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding. In the event that significant groundwater is encountered during construction (high altitude and typically dry nature of the granitic materials make this unlikely) subsoil drains must be installed and designed in accordance with filter criteria of the in-situ soils to prevent piping to the Mamba River.								
	Construction activities associated with urban development can lead to massive short-term erosion unless adequate measures are implemented to control surface run-off.	Alternative S1	Without Mitigation	-2	-4	-3	-3	-12	Negative high
With Mitigation			-1	-3	-2	-2	-8	Negative Moderate	
9									



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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
10	Mitigation: Adequate storm water management must be incorporated into the design of the <b>proposed bulk infrastructure project</b> in order to prevent further erosion of the sand soils and the associated sedimentation of the Mamba River. Soil stockpiling areas must be sufficiently situated away from the seepage zones. Erosion damage to soil stockpiles should be prevented with such soil conservation measures such as covering soil stockpiles with appropriate materials such as plastic sheeting, tarpaulins etc. No further loss of topsoil due to construction activities. Successful rehabilitation of all damaged areas within the riparian area. No visible erosion scars after completion of the re-vegetation. The eroded areas adjacent to the Mamba River as well as non-perennial drainage lines should be appropriately rehabilitated and re-vegetated (especially below stormwater discharge pipes and culverts) in order to prevent further erosion and siltation of downstream habitats.									
	Extensive siltation and sedimentation due to extensive overgrazing by livestock (poor vegetative cover and soil erosion) within the catchment. Extensive trampling by cattle has resulted in extensive macro-channel bank erosion.	Alternative S1	Without Mitigation	-1	-3	-2	-4	-10	Negative high	
			With Mitigation	1	4	3	3	11	Positive high	
	Mitigation: This impact is existing; therefore the proposed development will aid to lessen the impact.									
11	Increased consumption of surface water.	Alternative S1	Without Mitigation	-2	-3	-3	-3	-11	Negative high	
			With Mitigation	-2	-2	-2	-1	-7	Negative Moderate	
Mitigation: Adequate and competent design will ensure sustainability.										
12	The possible contamination of surface water run-off with contaminated standing surface water.	Alternative S1	Without Mitigation	-1	-3	-3	-3	-10	Negative high	
			With Mitigation	-1	-1	-2	-1	-5	Negative low	
Mitigation: 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 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. Temporary bunds must be constructed around chemical or fuel storage areas to contain possible spillages.										

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Change to the natural hydraulic properties of the area due to the proposed construction of the roads, buildings and all surrounding infrastructure.	Alternative S1	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-1	-6	Negative low
13	<p>Mitigation: A storm water management plan is required for the detailed planning and design phase. A 30 meter buffer on the Mamba River and riparian areas must be incorporated into the final layout of the development in an effort to protect fauna and flora species in and around the site. A 30m buffer zone along the outer edge of the riparian zones of the Mamba River and a 20m buffer zone along the non-perennial drainage lines must be implemented. No developments are to occur within the riparian areas as well as the 30m and 20m buffer zones. In addition, storm water must be released and dissipated outside of the riparian buffer. The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998). The construction and maintenance of any access roads must have no unacceptable effect on the quantity and quality of river water. There must be no unacceptable impact on the quality of both surface and groundwater in the area arising from the proposed project.</p>								
	The high levels of human disturbances and transformation and degradation of the riparian zones adjacent to the Mamba River and non-perennial drainage lines.	Alternative S1	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-1	-2	-1	-5	Negative low
14	<p>Mitigation: No cutting down of indigenous vegetation because it encourages wildlife to reside in the area. All site disturbances must be limited to the areas where structure will be constructed. Large excavations for the contractor laydown area, storage areas or waste areas are not permitted. Ensure that contractors and staff are well managed and adhere to the mitigation and management measures. 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. 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. All alien invasive plant and tree species should be removed from the site especially along the Mamba River and non-perennial drainage lines; preventing further invasion. Artificial lighting must be restricted to areas under construction and not directed to perennial drainage lines; this must be adhered to and maintained. No developments must be allowed within the riparian area as well as a 30m and 20m buffer zone from the outer edge of the riparian zone or macro channel bank. 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. An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation. No surface storm water generated as a result of the development may be directed into the Mamba 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. If pollution of any surface or groundwater occurs, it must be immediately reported and the appropriate mitigation measures must be employed. The storage of oils, materials, chemicals, fuels etc. to be used during the construction phase must not pose a risk to the surrounding environment. Such storage areas must be located out of the 1:100 year flood line of any river and</p>								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
15	unauthorised access to these areas must be controlled.									
	Possible pollution of the Mamba River due to improper management toilet facilities.	Alternative S1	Without Mitigation	-2	-3	-3	-3	-11	Negative high	
			With Mitigation	-1	-2	-2	-1	-6	Negative low	
	Mitigation: Water for domestic consumption will be provided at or near the contractor laydown area and from a licensed water source. 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. A buffer zone of 30m should be incorporated along the outer edge of the riparian zones of the Mamba River and an acceptable 20m buffer along. The use of temporary toilets during the construction phase of the development must not cause any pollution to water resources as well as pose a health hazard. In addition, these toilets must be situated out of the 1:100 year floodline of a watercourse; The servicing of these toilets must be carried out on a regular basis and the Nkandla Municipality must be contacted to discharge this waste into their sewer system. The DWS must be notified should there be any alteration to the bed, banks, course or characteristics of a watercourse or any impedence or diversion of flow of a watercourse as well as any abstraction and/or storage of water.									
Change to the natural hydraulic properties of the area due to the proposed construction of the roads, buildings and all surrounding infrastructure.	Alternative S1	Without Mitigation	-1	-2	-1	-2	-6	Negative low		
		With Mitigation	-1	-1	-1	-1	-4	Negative low		
16	Mitigation: In order to minimise artificially generated surface storm water runoff, total sealing of paved areas such as the parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.									
17	Possible contamination of the Mamba River due to the construction and maintenance of access roads.	Alternative S1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate	
			With Mitigation	-1	-1	-2	-1	-5	Negative low	

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
18	Mitigation: 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 (Mamba River and non-perennial drainage lines) and ground (borehole) water in the area. A 20m buffer zone must be created away from the temporary wet zone and any activity must be confined outside the buffer zone; Visible marking showing the appropriate 30m buffer zone along the Mamba River and the 20m buffer along the non-perennial drainage lines must be provided on site.									
	Noise disturbance towards the communities from contractors on site and construction activities, as well as noise from the hauling of construction trucks.	Alternative S1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate	
			With Mitigation	-1	-1	-2	-3	-7	Negative Moderate	
	Mitigation: 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 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). 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.									
19	Release of dust from the activity, equipment and construction vehicles into the atmosphere.	Alternative S1	Without Mitigation	-2	-2	-3	-3	-10	Negative high	
			With Mitigation	-1	-1	-2	-2	-6	Negative low	
20	Mitigation: Water trucks must be utilised to spray roads for dust suppressions. This must be done frequently. Use of water for spraying must obtain authorisation for such, i.e. a water use license must be applied for abstraction of water. For further mitigation measures, refer to the EMPr.									
	Contamination of soils, surface and groundwater due to spillage, leakage, incorrect storage and handling of oils, lubricants, fuels and other hazardous materials.	Alternative S1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate	
With Mitigation			-1	-1	-2	-1	-5	Negative low		

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	<p>Mitigation: 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 Personal Protective Equipment (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. 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 of 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. Spillages occurring at the filler point and dispensing area must be contained cleaned up. Any water containing waste (wastewater) generated as a result of the spillage and associated clean up, must be channelled to an oil/water separator prior to discharge; A spill contingency or Emergency Response Plan must be drawn up and should include the following actions that need to be taken into account in the event of a spill: 1. Stop the source of the spill; 2. Contain the spill; 3. Remove the spilled product for treatment or authorised disposal; 4. Determine if there is any soil, groundwater or other environmental impact; 5. If necessary, remedial action must be taken in consultation with the DWS; 6. Incidents must be recorded.</p>								
21	Generation and disposal of domestic and hazardous waste. In addition the generation and disposal of sewage waste from temporary construction toilets.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low
	<p>Mitigation: 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. 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. 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.</p>								
22	Construction staff safety could be compromised during construction. Possible encounters with the South African Python.	Alternative S1	Without Mitigation	-2	-2	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-1	-6	Negative low

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: 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. As a precautionary measure an educational programme on Southern African Pythons should be implemented for the community and all future property owners. If any pythons are discovered on the site the relevant conservation authorities should be informed and the python relocated in suitable habitat away from the site. Implement proper road signs to warn motorists of construction activities ahead; Ensure that there are flag men and signs at access points to the construction site.								
23	Alteration of existing visual perspective of the natural environment. However, due to the degradation of the site, this impact is thought to be insignificant.	Alternative S1	Without Mitigation	-1	-1	-2	-2	-6	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Development must be considerate of the natural landscape and ensure that it is not greatly and significantly altered.								
24	Possible littering and the spread of construction debris.	Alternative S1	Without Mitigation	-1	-1	-3	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: 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 (one working week) before being disposed off appropriately. General waste will be disposed of an approved waste disposal facility. Refer to the draft records of all 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. Waste generated during construction and operation phases should be disposed on Nkandla Landfill site or any other viable and registered disposal site.								
25	High-Mast Lighting could result in visual impacts on the Forest Reserve.	Alternative S1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Artificial lighting must be kept to a minimum.								
26	The development will result in job creation and provision of employment.	Alternative S1	Without Mitigation	1	2	3	3	9	Positive moderate



## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			With Mitigation	1	3	3	3	10	Positive high
	Enhancement: Provision of basic services and infrastructure will lead to development and socio-economic upliftment of the area.								
27	Job creation during the construction phase could result in the influx of people to the area.	Alternative S1	Without Mitigation	-1	-3	-1	-2	-7	Negative Moderate
			With Mitigation	1	2	3	2	8	Positive moderate
	Mitigation: If safety is ensured and jobs are created, this can be a positive impact for the area as it could lead to further growth and development								
28	Traffic disruptions and congestion during construction period.	Alternative S1	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-1	-2	-2	-6	Negative low
	Mitigation: Implement proper road signs to warn motorists of construction activities ahead; Ensure that there are flag men and signs at access points to the construction site.								
29	Contractors, the influx of people and potential job creation will result in the proliferation of social ills and issues such as crime, prostitution, the spread of HIV/AIDS, informal settlements etc.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Toolbox talks must take place weekly to educate the labour force. The labour force must be represented by an appointed Safety Officer and spokesperson / representative and there must also be an appointed Community Liaison Officer. For further measures, refer to the EMP.								
30	The safety of the construction staff and the public could be compromised unless adequate safety measures are implemented.	Alternative S1	Without Mitigation	-2	-2	-3	-2	-9	Negative Moderate
			With Mitigation	-1	-2	-2	-1	-6	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: 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 disturbance during and after construction. Provide clear and realistic information regarding employment opportunities and other benefits for local communities. The safety measures outlined in the EMPr must be adhered to during construction.								
<b>Sub-phase: Indirect Impacts</b>									
	Vehicular emissions during construction period.	Alternative S1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
31	Mitigation: To reduce the liberation of dust it is recommended that water be sprayed on access roads and areas that have been cleared. 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. The requirements of the Local Health Department concerning health matters relating to the operation must be strictly complied with at all times.								
	The current access road is in good condition and must be seen as the primary access for construction traffic. This road will need to be maintained during the construction period.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
32	Mitigation: This road must not be made redundant but rather maintained and used so that minimal additional roads are developed.								
	Graves could be affected by construction activities unless identified and protected.	Alternative S1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
33									

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Ideally, a minimum distance of 10 - 15 metres should be maintained between construction areas and any ancestral graves. If the distance between a grave and a construction area is 10 - 15 metres, the grave requires clear demarcation with barrier tape or similar material for the duration of construction. If the distance between a grave and a construction area is 5 - 10 metres, the grave requires permanent fencing as described below, at the cost of the developer, prior to the start of any construction activities. Preferred fencing materials are metal corner and straining posts and fencing wire, to a minimum height of 1.2 metres. The fence must be located at a minimum distance of 2 metres from the nearest grave and have an access gate. No construction may occur within a minimum distance of 3 metres from the edge of the fence. If graves are located close to one another, they should be fenced as a group rather than individually. If a grave is located within 5 metres of construction activities consideration should first be given to alteration of the site layout plan to allow the grave to remain in situ, at a distance of 5 - 15 metres from any construction areas, and fenced as described above. A heritage practitioner should consult with the project manager and engineers in this regard. If the site layout plan cannot be amended and physical impact on a grave is unavoidable, it should be exhumed and reinterred, with permission from the next-of-kin and a permit from Amafa.								
<b>Sub-phase: Cumulative Impacts</b>									
34	Possible contamination of watercourses within the project site will lead to a loss in ecosystem functioning such as providing suitable habitat for important biota and enhancing water resources, which subsequently is of high benefit to society.	Alternative S1	Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Construction activities must not impede on the natural ecosystems and all staff must be trained to respect the site's flora and fauna. Refer to EMPr for further mitigation measures.								
Average for Alternative S1 without mitigation								-8.08	Negative Moderate
Average for Alternative S1 with mitigation								-2.67	Negative low

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## 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):

### Stormwater Alternatives 1 and 2

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Construction Stormwater Alternatives Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	Environmental pollution emanating from construction.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low
Mitigation: Minimize generation of waste. Limit public access to construction sites. Limit indigenous vegetation clearance and optimize removal of alien weeds and invasive species. Maintenance of vehicles by contractors. Recycling of waste materials where feasible. Bunding of stockpiled material. Establish clear construction guidelines and standards as well as conditions of establishment. All earthworks to be carried out in accordance with SABS 1200 (current version). 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. There must be no unacceptable impact on the quality of both surface and groundwater in the area arising from the proposed project. If pollution of any surface or groundwater occurs, it must be immediately reported to the Department of Water Affairs and the appropriate mitigation measures must be employed; The storage of oils, materials, chemicals, fuels etc. to be used during the construction phase must not pose a risk to the surrounding environment. Such storage areas must be located out of the 1:100 year flood line of any river and unauthorised access to these areas must be controlled.									
2	Prevention of ongoing erosion through appropriate placement of infrastructure and choice of engineering options.	Alternative 1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
		Alternative 2	Without Mitigation	-1	-3	-4	-4	-12	Negative high

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			With Mitigation	-1	-2	-3	-3	-9	Negative Moderate
	Mitigation: Adequate stormwater management must be incorporated into the design of the proposed Nkandla-Umlalazi Bulk Infrastructure Project in order to prevent further erosion of the sand soils and the associated sedimentation of the Mamba River River. 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. Soil stockpiling areas must be sufficiently situated away from the seepage zones. Erosion damage to soil stockpiles should be prevented with soil conservation measures such as covering soil stockpiles with appropriate materials such as plastic sheeting, tarpaulins etc.								
3	There is the possibility that once the construction phase has commenced, construction method or design might require alteration to fit in with the prevailing site conditions.	Alternative 1	Without Mitigation	-1	-2	-2	-1	-6	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-3	-3	-3	-10	Negative high
		Mitigation: The best practicable and site accommodating design must be implemented.							
4	Noise impacts.	Alternative 1	Without Mitigation	-2	-2	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
		Alternative 2	Without Mitigation	-2	-2	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
		Mitigation: Refer to EMPr for mitigation measures.							
5	Vegetation clearance and disruption of existing habitats.	Alternative 1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-2	-2	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			With Mitigation	-1	-1	-2	-1	-5	Negative low
	Mitigation: All alien invasive plant and tree species should be removed from the site especially along the Mamba River and non-perennial drainage lines; preventing further invasion. All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones.								
6	Optimisation of provision of services and opportunities from socio-economic perspectives.	Alternative 1	Without Mitigation	1	3	2	2	8	Positive moderate
			With Mitigation	1	4	4	4	13	Positive very high
		Alternative 2	Without Mitigation	1	3	2	2	8	Positive moderate
			With Mitigation	1	4	4	4	13	Positive very high
Enhancement: The development will provide socio-economic opportunities for the future.									
7	Possible encounters with the South African Python.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: As a precautionary measure an educational programme on Southern African Pythons should be implemented for the community and all future property owners. If any pythons are discovered on the site the relevant conservation authorities should be informed and the python relocated in suitable habitat away from the site.									
8	Possible pollution of the Mamba River due to ill-managed toilet facilities.	Alternative 1	Without Mitigation	-2	-2	-3	-2	-9	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low
		Alternative 2	Without Mitigation	-2	-2	-3	-2	-9	Negative Moderate



## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			With Mitigation	-1	-1	-2	-1	-5	Negative low
	<p>Mitigation: The use of temporary toilets during the construction phase of the development must not cause any pollution to water resources as well as pose a health hazard. In addition, these toilets must be situated out of the 1:100 year floodline of a watercourse; The servicing of these toilets must be carried out on a regular basis and the Nkandla Municipality must be contacted to discharge this waste into their sewer system. The site should be graded well to permit drainage and to prevent ponding. In the event that significant groundwater is encountered during construction (high altitude and typically dry nature of the granitic materials make this unlikely) subsoil drains must be installed and designed in accordance with filter criteria of the in-situ soils to prevent piping. 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 storm water ponding. A 30m buffer zone along the outer edge of the riparian zones of the Mamba River and 20m buffer zones along non-perennial drainage lines must be implemented; No developments are to occur within the riparian areas as well as the 30m buffer zone. In addition, storm water must be released and dissipated outside of the riparian buffer. Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface (Mamba River and non-perennial drainage lines) and ground (borehole) water in the area. 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>								
	<p>Surfaces and conduits should be constructed to drain the run off more efficiently. A buffer zone of 30m must be incorporated along the outer edge of the riparian zones of the Mamba River and a 20m buffer zone along all non-perennial drainage lines; this must be adhered to and maintained. No developments must be allowed within the riparian area as well as a 30 m buffer zone from the outer edge of the riparian zone or macro channel bank. Waste generated during construction and operation phases should be disposed on the nearest viable and registered disposal site; A 20m buffer zone must be created away from the temporary wet zone and any activity must be confined outside the buffer zone; Visible marking showing the appropriate 30m and 20m buffer zones must be provided on site; The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998); A geo-hydrological and geotechnical investigation must be conducted with respect to this development and the proposed sewage package plant in the detailed design and planning phase; The construction and maintenance of any access roads must have no unacceptable effect on the quantity and quality of river water; The requirements of the Local Health Department concerning health matters relating to the operation must be strictly complied with at all times;</p>								
<b>Sub-phase: Indirect Impacts</b>									
	Pollution in the surrounding areas.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
9			With Mitigation	-1	-2	-1	-2	-6	Negative low

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	<p>Mitigation: No further loss of topsoil due to construction activities. Successful rehabilitation of all damaged areas within the riparian area. No visible erosion scars after completion of the re-vegetation. An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation. No surface stormwater generated as a result of the development may be directed directly into the Mamba River or non-perennial drainage lines but towards carefully planned stormwater attenuation/retention ponds. Ideally the ponds or dams should be seasonally inundated and be appropriately vegetated providing potential increased habitat diversity on the site. The eroded areas adjacent to the Mamba River as well as non-perennial drainage lines should be appropriately rehabilitated and re-vegetated (especially below stormwater discharge pipes and culverts) in order to prevent further erosion and siltation of downstream habitats. Temporary bunds must be constructed around chemical or fuel storage areas to contain possible spillages; Spillages occurring at the filler point and dispensing area must be contained and cleaned up. Any water containing waste (wastewater) generated as a result of the spillage and associated clean up, must be channelled to an oil/water separator prior to discharge; A spill contingency or Emergency Response Plan must be drawn up and should include the following actions that need to be taken into account in the event of a spill: 1 Stop the source of the spill; 2 Contain the spill; 3 All significant spills must be reported to the DWS and other relevant authorities; 4 Remove the spilled product for treatment or authorised disposal; 5 Determine if there is any soil, groundwater or other environmental impact; 6 If necessary, remedial action must be taken in consultation with the DWS; 7 Incidents must be recorded.</p>								
10	Increased traffic and heavy vehicles and machinery on roads, leading to poorer road conditions and potential accidents to pedestrians and commuters.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: Refer to EMP for mitigation measures.									
11	Vegetation destruction and air pollution due to spreading fires resulting from uncontrolled open fires or ignition of combustible material.	Alternative 1	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: No fires are permitted on site.									

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
12	The permeability of the development area will be decreased through increased population densities and introduction of impervious areas such as surfaced streets, houses and amenities associated with the proposed developments.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate	
			With Mitigation	-1	-1	-1	-2	-5	Negative low	
		Alternative 2	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate	
			With Mitigation	-1	-1	-1	-2	-5	Negative low	
	Mitigation: In order to minimise artificially generated surface stormwater runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.									
	13	Construction activities associated with urban development can lead to massive short term erosion unless adequate measures are implemented to control surface run-off.	Alternative 1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate
With Mitigation				-1	-2	-1	-1	-5	Negative low	
Alternative 2			Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate	
			With Mitigation	-1	-2	-1	-1	-5	Negative low	
Mitigation: In order to minimise artificially generated surface stormwater runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.										
14		Artificial construction lighting will most likely result in a moderate to high negative short, medium and long- term impact on all nocturnal animal species. Numerous species will be attracted towards the light sources and this will result in the disruption	Alternative 1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
	With Mitigation			-1	-1	-1	-1	-4	Negative low	
	Alternative 2		Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate	

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	of natural cycles, such as the reproductive cycle and foraging behaviour.		With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Artificial lighting must be restricted to areas under construction and not directed towards the Mamba 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.								
15	Graves could be affected by construction activities unless identified and protected.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: Ideally, a minimum distance of 10-15 metres should be maintained between construction areas and any ancestral graves. If the distance between a grave and a construction area is 10-15 metres, the grave requires clear demarcation with barrier tape or similar material for the duration of construction. If the distance between a grave and a construction area is 5-10 metres, the grave requires permanent fencing as described below, at the cost of the developer, prior to the start of any construction activities. If a grave is located within 5 metres of construction activities consideration should first be given to alteration of the site layout plan to allow the grave to remain in situ, at a distance of 5-15 metres from any construction areas, and fenced as described above. A heritage practitioner should consult with the project manager and engineers in this regard. If the site layout plan cannot be amended and physical impact on a grave is unavoidable, it should be exhumed and reinterred, with permission from the next-of-kin and a permit from Amafa. Preferred fencing materials are metal corner and straining posts and fencing wire, to a minimum height of 1.2 metres. The fence must be located at a minimum distance of 2 metres from the nearest grave and have an access gate. No construction may occur within a minimum distance of 3 metres from the edge of the fence. If graves are located close to one another, they should be fenced as a group rather than individually.									
16	Change to the natural hydraulic properties of the area due to the proposed construction of the roads, buildings and all surrounding infrastructure.	Alternative 1	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: In order to minimise artificially generated surface stormwater runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.								
<b>Sub-phase: Cumulative Impacts</b>									
17	Optimisation of developmental opportunities and provision of job opportunities for surrounding communities, alleviating inadequate socio-economic circumstances.	Alternative 1	Without Mitigation	1	3	2	3	9	Positive moderate
			With Mitigation	2	3	3	3	11	Positive high
		Alternative 2	Without Mitigation	1	3	2	3	9	Positive moderate
			With Mitigation	2	3	3	3	11	Positive high
Enhancement: Implementation of the project.									
18	Increased job seekers attracted to the area.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	3	3	3	10	Positive high
Enhancement: The development will provide socio-economic opportunities for the future.									
19	Possible contamination of watercourses within the project site will lead to a loss in ecosystem functioning such as providing suitable habitat for important biota and enhancing water resources, which subsequently is of high benefit to society.	Alternative 1	Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
	Mitigation: 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. A 30 meter buffer on the Mamba River and a 20m buffer on non-perennial drainage lines and riparian areas must be incorporated into the final layout of the development in an effort to protect fauna and flora species in and around the site; The removal of any indigenous trees may need to be authorised by DAFF. A storm water management plan is required for the detailed planning and design phase.									
								Average for Alternative 1 without mitigation	-5.79	Negative low
								Average for Alternative 1 with mitigation	-5.44	Negative low
								Average for Alternative 2 without mitigation	-11.88	Negative high
								Average for Alternative 2 with mitigation	-6.88	Negative low

### Sewer Reticulation Alternatives 1 and 2

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Construction Sewer Reticulation Alternatives Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	Pollution emanating from construction.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Minimize generation of waste. Limit public access to construction sites. Limit indigenous vegetation clearance and optimize removal of alien weeds and invasive species. Maintenance of vehicles by contractors. Recycling of waste materials where feasible. Bunding of stockpiled material. Establish clear construction guidelines and standards as well as Conditions of Establishment. All earthworks to be carried out in accordance with SABS 1200 (current version). 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. There must be no unacceptable impact on the quality of both surface and groundwater in the area arising from the proposed project. If pollution of any surface or groundwater occurs, it must be immediately reported to the Department of Water Affairs and the appropriate mitigation measures must be employed; The storage of oils, materials, chemicals, fuels etc. to be used during the construction phase must not pose a risk to the surrounding environment. Such storage areas must be located out of the 1:100 year flood line of any river and unauthorised access to these areas must be controlled.								
	Prevention of ongoing erosion through appropriate placement of infrastructure and choice of engineering options.	Alternative 1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
		Alternative 2	Without Mitigation	-1	-3	-4	-4	-12	Negative high
			With Mitigation	-1	-2	-3	-3	-9	Negative Moderate
2	Mitigation: Adequate stormwater management must be incorporated into the design of the proposed project in order to prevent further erosion of the sand soils and the associated sedimentation of the Mamba River River. 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. Soil stockpiling areas must be sufficiently situated away from the seepage zones. Erosion damage to soil stockpiles should be prevented with soil conservation measures such as covering soil stockpiles with appropriate materials such as plastic sheeting, tarpaulins etc.								
	There is the possibility that once on site for the construction phase that there will be findings on site which will require a change in construction method or design.	Alternative 1	Without Mitigation	-1	-2	-2	-1	-6	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-3	-3	-3	-10	Negative high
3	Mitigation: The best practicable and site accommodating design must be implemented.								



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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
4	Noise impacts.	Alternative 1	Without Mitigation	-2	-2	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
		Alternative 2	Without Mitigation	-2	-2	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
	Mitigation: Refer to EMPr for mitigation measures.								
5	Vegetation clearance and disruption of existing habitats.	Alternative 1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-2	-2	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-2	-2	-1	-6	Negative low
	Mitigation: All alien invasive plant and tree species should be removed from the site especially along the Mamba River and non-perennial drainage lines; preventing further invasion. All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones.								
6	Optimisation of provision of services and opportunities from socio-economic perspectives.	Alternative 1	Without Mitigation	1	3	2	2	8	Positive moderate
			With Mitigation	1	4	4	4	13	Positive very high
		Alternative 2	Without Mitigation	1	3	2	2	8	Positive moderate
			With Mitigation	1	4	4	4	13	Positive very high
	Enhancement: The development will provide socio-economic opportunities for the future.								
7	Possible encounters with the South African Python.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			With Mitigation	-1	-1	-1	-1	-4	Negative low
			Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			Alternative 2 With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: As a precautionary measure an educational programme on Southern African Pythons should be implemented for the community and all future property owners. If any pythons are discovered on the site the relevant conservation authorities should be informed and the python relocated in suitable habitat away from the site.									
8	Possible pollution of the Mamba River due to ill-managed toilet facilities.	Alternative 1	Without Mitigation	-2	-2	-3	-2	-9	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low
		Alternative 2	Without Mitigation	-2	-2	-3	-2	-9	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low
Mitigation: The use of temporary toilets during the construction phase of the development must not cause any pollution to water resources as well as pose a health hazard. In addition, these toilets must be situated out of the 1:100 year floodline of a watercourse; The servicing of these toilets must be carried out on a regular basis and the Nkandla Municipality must be contacted to discharge this waste into their sewer system; The site should be graded well to permit drainage and to prevent ponding. In the event that significant groundwater is encountered during construction (high altitude and typically dry nature of the granitic materials make this unlikely) subsoil drains must be installed and designed in accordance with filter criteria of the in-situ soils to prevent piping. 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 storm water ponding. A 30m buffer zone along the outer edge of the riparian zones of the Mamba River and a 20m buffer zones along non-perennial drainage lines must be implemented; No developments are to occur within the riparian areas as well as the 30m buffer zone. In addition, storm water must be released and dissipated outside of the riparian buffer. Provision of adequate toilet facilities must be implemented to prevent the possible contamination of surface (Mamba River and non-perennial drainage lines) and ground (borehole) water in the area. All temporary soil stockpiles, litter and rubble must be removed on completion of construction activities. No dumping of waste material in surrounding open areas.									

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Surfaces and conduits should be constructed to drain the run off more efficiently. A buffer zone of 30m must be incorporated along the outer edge of the riparian zones of the Mamba River and a 20m buffer zone along all non-perennial drainage lines; this must be adhered to and maintained. No developments must be allowed within the riparian area as well as a 30 m buffer zone from the outer edge of the riparian zone or macro channel bank. Waste generated during construction and operation phases should be disposed on the nearest viable and registered disposal site; A 20m buffer zone must be created away from the temporary wet zone and any activity must be confined outside the buffer zone; Visible marking showing the appropriate 30m and 20m buffer zones must be provided on site; The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998); A geo-hydrological and geotechnical investigation must be conducted with respect to this development and the proposed sewage package plant in the detailed design and planning phase; The construction and maintenance of any access roads must have no unacceptable effect on the quantity and quality of river water; The requirements of the Local Health Department concerning health matters relating to the operation must be strictly complied with at all times.								
<b>Sub-phase: Indirect Impacts</b>									
	Environmental pollution in the surrounding areas.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-2	-1	-2	-6	Negative low
9	Mitigation: No further loss of topsoil due to construction activities. Successful rehabilitation of all damaged areas within the riparian area. No visible erosion scars after completion of the re-vegetation. An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation. No surface stormwater generated as a result of the development may be directed directly into the Mamba River or non-perennial drainage lines but towards carefully planned stormwater attenuation/retention ponds. Ideally the ponds or dams should be seasonally inundated and be appropriately vegetated providing potential increased habitat diversity on the site. The eroded areas adjacent to the Mamba River as well as non-perennial drainage lines should be appropriately rehabilitated and re-vegetated (especially below stormwater discharge pipes and culverts) in order to prevent further erosion and siltation of downstream habitats. Temporary bunds must be constructed around chemical or fuel storage areas to contain possible spillages; Spillages occurring at the filler point and dispensing area must be contained and cleaned up. Any water containing waste (wastewater) generated as a result of the spillage and associated clean up, must be channelled to an oil/water separator prior to discharge; A spill contingency or Emergency Response Plan must be drawn up and should include the following actions that need to be taken into account in the event of a spill: 1 Stop the source of the spill; 2 Contain the spill; 3 All significant spills must be reported to the DWS and other relevant authorities; 4 Remove the spilled product for treatment or authorised disposal; 5 Determine if there is any soil, groundwater or other environmental impact; 6 If necessary, remedial action must be taken in consultation with the DWS; 7 Incidents must be recorded.								
10	Increased traffic and heavy vehicles and machinery on roads, leading to poorer road conditions and potential accidents and pedestrians and commuters.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
		Alternative 2	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: Refer to EMPr for mitigation measures.									
11	Vegetation destruction and air pollution due to spreading fires resulting from uncontrolled open fires or ignition of combustible material.	Alternative 1	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: No fires are permitted on site.									
12	The permeability of the development area will be decreased through increased population densities and introduction of impervious areas such as surfaced streets, houses and amenities associated with the proposed developments.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: In order to minimise artificially generated surface stormwater runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.									
13	Construction activities associated with rural development can lead to massive short term erosion unless adequate measures are implemented to control surface run-off.	Alternative 1	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate
			With Mitigation	-1	-2	-1	-1	-5	Negative low

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
		Alternative 2	Without Mitigation	-1	-2	-3	-3	-9	Negative Moderate
			With Mitigation	-1	-2	-1	-1	-5	Negative low
Mitigation: In order to minimise artificially generated surface stormwater runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.									
14	Artificial construction lighting will most likely result in a moderate to high negative short, medium and long- term 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.	Alternative 1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: Artificial lighting must be restricted to areas under construction and not directed towards the Mamba 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.									
15	Graves could be affected by construction activities unless identified and protected.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Ideally, a minimum distance of 10-15 metres should be maintained between construction areas and any ancestral graves. If the distance between a grave and a construction area is 10-15 metres, the grave requires clear demarcation with barrier tape or similar material for the duration of construction. If the distance between a grave and a construction area is 5-10 metres, the grave requires permanent fencing as described below, at the cost of the developer, prior to the start of any construction activities. If a grave is located within 5 metres of construction activities consideration should first be given to alteration of the site layout plan to allow the grave to remain in situ, at a distance of 5-15 metres from any construction areas, and fenced as described above. A heritage practitioner should consult with the project manager and engineers in this regard. If the site layout plan cannot be amended and physical impact on a grave is unavoidable, it should be exhumed and reinterred, with permission from the next-of-kin and a permit from Amafa. Preferred fencing materials are metal corner and straining posts and fencing wire, to a minimum height of 1.2 metres. The fence must be located at a minimum distance of 2 metres from the nearest grave and have an access gate. No construction may occur within a minimum distance of 3 metres from the edge of the fence. If graves are located close to one another, they should be fenced as a group rather than individually.								
16	Change to the natural hydraulic properties of the area due to the proposed construction of the roads, buildings and all surrounding infrastructure.	Alternative 1	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-2	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-3	-3	-3	-10	Negative high
			With Mitigation	-1	-2	-3	-2	-8	Negative Moderate
		Mitigation: In order to minimise artificially generated surface stormwater runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks. Special care needs to be taken during the construction phase to prevent surface stormwater rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy.							
<b>Sub-phase: Cumulative Impacts</b>									
17	Optimisation of developmental opportunities and provision of job opportunities for surrounding communities, alleviating inadequate socio-economic circumstances.	Alternative 1	Without Mitigation	1	3	2	3	9	Positive moderate
			With Mitigation	2	3	3	3	11	Positive high
		Alternative 2	Without Mitigation	1	3	2	3	9	Positive moderate
			With Mitigation	2	3	3	3	11	Positive high
		Enhancement: Implementation of the project.							

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
18	Increased job seekers attracted to the area.	Alternative 1	Without Mitigation	1	2	2	2	7	Positive moderate	
			With Mitigation	1	3	3	3	10	Positive high	
		Alternative 2	Without Mitigation	1	2	2	2	7	Positive moderate	
			With Mitigation	1	3	3	3	10	Positive high	
	Enhancement: The development will provide socio-economic opportunities for the future.									
	19	Possible contamination of watercourses within the project site will lead to a loss in ecosystem functioning such as providing suitable habitat for important biota and enhancing water resources, which subsequently is of high benefit to society.	Alternative 1	Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate
With Mitigation				-1	-1	-1	-1	-4	Negative low	
Alternative 2			Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate	
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate	
Mitigation: 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. A 30 meter buffer on the Mamba River and a 20m buffer on non-perennial drainage lines and riparian areas must be incorporated into the final layout of the development in an effort to protect fauna and flora species in and around the site; The removal of any indigenous trees may need to be authorised by DAFF. A storm water management plan is required for the detailed planning and design phase.										
Average for Alternative 1 without mitigation								-5.79	Negative low	
Average for Alternative 1 with mitigation								-5.44	Negative low	
Average for Alternative 2 without mitigation								-13.00	Negative very high	
Average for Alternative 2 with mitigation								-6.89	Negative low	



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## No Go Alternative

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Construction No Go Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	None of the potential negatives will occur should the construction phase not commence, however, none of the potential benefits, especially those associated with infrastructural development and socio-economic advantages will also not be realised.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the project.									
2	Currently the harvesting and clearing of riparian vegetation of the Mamba River and non-perennial drainage lines for agricultural activities as well as for firewood collecting is being undertaken and will remain.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the project.									
<b>Sub-phase: Indirect Impacts</b>									
3	Lack of infrastructure.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the project.									

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
4	Increased travel time for local residents and loss of job opportunities.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
	Mitigation: Implementation of the project.								
<b>Sub-phase: Cumulative Impacts</b>									
5	Overall not undertaking the project will have increased impacts on the natural environment as the area is in a degraded state.	Alternative 1	Without Mitigation	-2	-1	-4	-4	-11	Negative high
			With Mitigation	-1	-1	-1	-3	-6	Negative low
	Mitigation: Implementation of the project.								
6	From a socio-economic perspective, the land will remain vacant and there will be a loss of development opportunities and job creation.	Alternative 1	Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Implementation of the project.								
Average for Alternative No-Go without mitigation								-12.00	Negative high
Average for Alternative No-Go with mitigation								2.66	Positive low

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## C. IMPACTS THAT MAY RESULT FROM THE OPERATIONAL PHASE

### a. Site alternatives

N.B. There are no site alternatives as the development is proposed for the Nkandla-Umlalazi Project and will spill around the Mamba One Stop Centre. This is an indigent area with the proposed development having the potential to give opportunities to the previously disadvantaged communities of South Africa, and the area has no fatal flaws associated with it.

List the potential impacts associated with site alternatives that are likely to occur during the Operational phase:

### Alternative S1 (Only Site)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Operational Site Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	Erosion from poor storm water management and inadequate vegetation cover.	Alternative S1	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: Adequate storm water management must be incorporated into the design of the proposed project in order to prevent further erosion of the sand soils and the associated sedimentation of the Mamba River. 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. In order to minimise artificially generated surface storm water runoff, total sealing of paved areas such as the photovoltaic modules, parking lots, driveways, pavements and walkways should not be permitted. Permeable material should rather be utilized for these purposes. In addition, runoff rain water from all roofs should be collected in water tanks.									
2	Upgrade and maintenance of new access road.	Alternative S1	Without Mitigation	-1	-4	-1	-2	-8	Negative Moderate
			With Mitigation	-1	-3	-1	-2	-7	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Maintenance of the access roads must be undertaken in accordance with an approved operations management plan.								
3	Availability of employment opportunities and infrastructure.	Alternative S1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	1	2	3	3	9	Positive moderate
	Enhancement: Employment must be handled in a responsible and realistic manner.								
	The consumption of groundwater can lead to the depletion of a natural resource.	Alternative S1	Without Mitigation	1	1	3	1	6	Positive low
With Mitigation			1	1	4	1	7	Positive moderate	
4	Mitigation: 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. In order to prevent erosion, mechanisms are required for dissipating water energy. The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998); A geo-hydrological and geotechnical investigation must be conducted with respect to this development and the proposed sewage package plant in the detailed design and planning phase; The construction and maintenance of any access roads must have no unacceptable effect on the quantity and quality of river water; The requirements of the Local Health Department concerning health matters relating to the operation must be strictly complied with at all times; Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the DWS; There must be no unacceptable impact on the quality of both surface and groundwater in the area arising from the proposed project. If pollution of any surface or groundwater occurs, it must be immediately reported to the DWS and the appropriate mitigation measures must be employed; No developments are to occur within the riparian areas as well as the 30m and 20m buffer zones. In addition, storm water must be released and dissipated outside of the riparian buffer.								
5	The service infrastructure will lay the foundation for future development planned, such as the recreational facilities such as churches, schools, public open spaces and other institutional establishments will be developed.	Alternative S1	Without Mitigation	1	2	2	2	7	Positive moderate
			With Mitigation	2	3	3	3	11	Positive high
	Enhancement: The development will provide the needed basic infrastructure to promote upliftment of the area.								
6	Possible encounters with the South African	Alternative	Without	-1	-2	-2	-2	-7	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Python.	S1	Mitigation						
			With Mitigation	-1	-1	-1	-1	-4	Negative low
<p>As a precautionary measure an educational programme on Southern African Pythons should be implemented for the community and all future property owners. If any pythons are discovered on the site the relevant conservation authorities should be informed and the python relocated in suitable habitat away from the site.</p>									
7	Possible introduction of alien and exotic flora species through horticultural activities.	Alternative S1	Without Mitigation	-1	-3	-3	-2	-9	Negative Moderate
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
<p>Mitigation: All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation. Only indigenous (to the area) tree and species should be used for horticultural purposes (see attached species lists). No horticultural activities should be allowed in the proposed conserved areas along the Mamba River except for rehabilitation purposes. All remaining large indigenous tree species should be conserved wherever possible with any future development planned around them. No exotic invasive lawn species of grasses should be used on the site especially around the non-perennial drainage lines or Mamba River or any areas that adjoin natural grassland vegetation. The use of Kikuyu (<i>Pennisetum clandestinum</i>) is not recommended and non-invasive indigenous grasses such as <i>Cynodon dactylon</i>, <i>Panicum ecklonii</i>, <i>Panicum maximum</i> (local to the area) should rather be used. The least environmentally damaging insecticides must be applied. Pyrethroids and Phenylpyrazoles are preferable to Acetylcholines. Use insecticides that are specific to the pest (species specific) in question. The lowest effective dosages must be applied. Supplier's advice should be sought. Do not irrigate for 24 hours after applying insecticides in areas where there is a chance of contaminating water-courses. Fungal pathogens should be used in preference to chemical insecticides.</p>									
8	Possible destruction to existing graves on site.	Alternative S1	Without Mitigation	-1	-4	-3	-2	-10	Negative high
			With Mitigation	-1	-2	-1	-1	-5	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	<p>Mitigation: Ideally, a minimum distance of 10 - 15 metres should be maintained between construction areas and any ancestral graves. If the distance between a grave and a construction area is 10 - 15 metres, the grave requires clear demarcation with barrier tape or similar material for the duration of construction. If the distance between a grave and a construction area is 5 - 10 metres, the grave requires permanent fencing as described below, at the cost of the developer, prior to the start of any construction activities. Preferred fencing materials are metal corner and straining posts and fencing wire, to a minimum height of 1.2 metres. The fence must be located at a minimum distance of 2 metres from the nearest grave and have an access gate. No construction may occur within a minimum distance of 3 metres from the edge of the fence. If graves are located close to one another, they should be fenced as a group rather than individually. If a grave is located within 5 metres of construction activities consideration should first be given to alteration of the site layout plan to allow the grave to remain in situ, at a distance of 5 - 15 metres from any construction areas, and fenced as described above. A heritage practitioner should consult with the project manager and engineers in this regard. If the site layout plan cannot be amended and physical impact on a grave is unavoidable, it should be exhumed and reinterred, with permission from the next-of-kin and a permit from Amafa.</p>								
9	Possible littering and the spread of construction debris.	Alternative S1	Without Mitigation	-1	-3	-2	-3	-9	Negative Moderate
			With Mitigation	-1	-1	-2	-1	-5	Negative low
	<p>Mitigation: Waste generated during construction and operation phases should be disposed on Nkandla Landfill site or any other viable and registered disposal site; A 20m buffer zone must be created away from the temporary wet zone and any activity must be confined outside the buffer zone; Visible marking showing the appropriate 30m and 20m buffer zones must be provided on site.</p>								
10	Possible contamination of the Mamba River due to the construction and maintenance of access roads.	Alternative S1	Without Mitigation	-2	-3	-3	-2	-10	Negative high
			With Mitigation	-1	-2	-1	-1	-5	Negative low

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	<p>Mitigation: 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. A buffer zone of 30m has been incorporated along the outer edge of the riparian zones of the Mamba River and a 20m buffer zone along non-perennial drainage lines, this must be adhered to and maintained. No developments must be allowed within the riparian area as well as a 30m and 20m buffer zone from the outer edge of the riparian zone or macro channel bank. 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. No surface storm water generated as a result of the development may be directed directly into the Mamba 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 storm water rich in sediments and other pollutants from entering the Mamba River. In order to prevent erosion, mechanisms are required for dissipating water energy. The locality maps of the detailed design and planning phase must show the 1:100 year flood lines in terms of section 144 of the National Water Act, 1998 (Act 36 of 1998); A geo-hydrological and geotechnical investigation must be conducted with respect to this development and the proposed sewage package plant in the detailed design and planning phase; The construction and maintenance of any access roads must have no unacceptable effect on the quantity and quality of river water; The requirements of the Local Health Department concerning health matters relating to the operation must be strictly complied with at all times; Water quality analysis from the water resources in the vicinity of the project must be done prior to the commencement of the development to form baseline indicators. This would provide a good indication should any water contamination take place. The results must be submitted to the Department of Water Affairs; There must be no unacceptable impact on the quality of both surface and groundwater in the area arising from the proposed project. If pollution of any surface or groundwater occurs, it must be immediately reported to the Department of Water Affairs and the appropriate mitigation measures must be employed; No developments are to occur within the riparian areas as well as the 30m and 20m buffer zones. In addition, storm water must be released and dissipated outside of the riparian buffer.</p>								
11	Possible pollution caused by maintenance activities	Alternative S1	Without Mitigation	1	1	1	1	4	Positive low
			With Mitigation	1	1	1	1	4	Positive low
	<p>Mitigation: The storage of oils, materials, chemicals, fuels etc. to be used during the construction phase must not pose a risk to the surrounding environment. Such storage areas must be located out of the 1:100 year flood line of any river and unauthorised access to these areas must be controlled; Temporary bunds must be constructed around chemical or fuel storage areas to contain possible spillages.</p>								
12	Increased traffic in the area.	Alternative S1	Without Mitigation	-1	-1	-1	-1	-4	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	<p>Mitigation: The impact is considered to be of a low possibility as the area is still relatively under-development, even post development of this proposal.</p>								
<b>Sub-phase: Indirect Impacts</b>									



## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
13	Littering and other aesthetic and health impacts due to inadequate/ improper waste management.	Alternative S1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: 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, banded, covered, labelled and well ventilated. 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. 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 of 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.									
14	Increased human presence.	Alternative S1	Without Mitigation	-1	-1	-1	-3	-6	Negative low
			With Mitigation	1	1	1	2	5	Positive low
Mitigation: This is possibly a positive impact as it will lead to socio-economic upliftment									
15	Increased usage of resources (water).	Alternative S1	Without	-1	-3	-1	-2	-7	Negative Moderate
			With	-1	-2	-1	-1	-5	Negative low
Mitigation: As per item 4 above.									
16	Erosion and loss of soil after construction activities.	Alternative S1	Without	-1	-2	-2	-2	-7	Negative Moderate
			With	-1	-1	-1	-1	-4	Negative low
Mitigation: The development must be well maintained to avoid infrastructure failure. Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr to prevent the loss of topsoil. Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and runoff. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.									
17	Generation of fumes from vehicle emissions may pollute the air.	Alternative S1	Without Mitigation	-1	-1	-1	-2	-5	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Mitigation: Impact is minor in nature. No mitigation can be offered.								
18	Noise disturbance from the development activities.	Alternative S1	Without Mitigation	-1	-2	-1	-2	-6	Negative low
			With Mitigation	-1	-2	-1	-2	-6	Negative low
	Mitigation: Impact is minor in nature. No mitigation can be offered.								
19	Generation and disposal of domestic waste by the proposed development.	Alternative S1	Without Mitigation	-1	-1	-1	-2	-5	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: The site must be maintained. Public bins must be provided.								
20	The establishment of the development will result in the provision of infrastructure such as sewage and water pipelines, telecommunications, electricity, etc. which contributes to the overall development of the area.	Alternative S1	Without Mitigation	1	3	2	3	9	Positive moderate
			With Mitigation	2	3	4	4	13	Positive very high
	Enhancement: Implementation of the project in a responsible manner.								
21	The development will create jobs which in turn will attract Contractors, the influx of people and subsequently will result in the proliferation of social ills and issues such as crime, prostitution, the spread of HIV/AIDS, informal settlements etc.	Alternative S1	Without Mitigation	1	3	2	3	9	Positive moderate
			With Mitigation	2	3	4	4	13	Positive very high
	Enhancement: Implementation of the project in a responsible manner.								
22	Increased traffic in the area is a safety hazard to pedestrians.	Alternative S1	Without Mitigation	-1	-1	-1	-1	-4	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			Mitigation						
	Mitigation: Road navigation education at the local schools must be undertaken.								
23	The accessibility of the development area will be decreased through increased population densities and introduction of impervious areas such as surfaced streets, houses and amenities associated with the proposed developments.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
	Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMP. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.								
24	The migratory movements of several animal (frog, reptile and mammal) species could be completely disrupted by the erection of numerous walls around properties, fences and road networks, which restrict natural movements between suitable foraging and breeding areas. This could potentially result in the disruption of natural gene flow between populations and could result in a high impact on the highly mobile species.	Alternative S1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: It is important that the proposed activities within the Mamba River and non-perennial drainage lines are strictly managed. Low disturbance activities such as hiking, bird watching and hiking are recommended for these sensitive areas. No quad-bikes, motorcycles or off-road vehicles should be permitted within the riparian zone adjacent to the Mamba River and non-perennial drainage lines. No animals are to be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. No air rifles or pellet guns should be permitted. The baiting of selected predators (caracal and black-backed jackal) and subsequent capturing and possible destroying of caught animals should not be allowed. Ideally no fences should occur along the Mamba River and non-perennial drainage lines or alternatively an outer barbed wire fence should be erected preventing livestock (especially goats). Fences should not restrict the natural migratory movements of certain animals and must be restricted to the immediate area of the proposed development.								

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Sub-phase: Cumulative Impacts</b>									
25	Waste generation	Alternative S1	Without Mitigation	-1	-1	-2	-2	-6	Negative low
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Implement community awareness programme for improved management of litter. Implement litter clean-up programme. Implement an audit / monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion are avoided.								
26	Possible contamination of watercourses within the project site will lead to a loss in ecosystem functioning such as providing suitable habitat for important biota and enhancing water resources, which subsequently is of high benefit to society.	Alternative S1	Without Mitigation	-1	-1	-4	-3	-9	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
	Mitigation: Maintenance activities must not impede on the natural ecosystems and all staff must be trained to respect the site's flora and fauna. Refer to EMPr for further mitigation measures.								
Average for Alternative S1 without mitigation								-3.88	Negative low
Average for Alternative S1 with mitigation								-1.08	Negative low

### 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):

# AMENDED BASIC ASSESSMENT REPORT (Version 3)

## Stormwater Alternatives 1 and 2

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Operational Stormwater Alternatives Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	Construction of the stormwater attenuation pond.	Alternative 1	Without Mitigation	1	2	3	3	9	Positive moderate
			With Mitigation	2	4	4	4	14	Positive very high
		Alternative 2	Without Mitigation	0	0	0	0	0	Neutral
			With Mitigation	0	0	0	0	0	Neutral
	Care must be taken to minimise the environmental impacts. It must be noted however, that the inclusion of the stormwater attenuation pond will result in positive impacts such as (1) flood control (2) minimise the runoff from rain (3) promotes pollutant removal through sedimentation (4) high potential ecological, aesthetic and amenity benefits.								
2	Optimisation for provision of infrastructure and improvements from socio-economic perspectives.	Alternative 1	Without Mitigation	1	2	3	3	9	Positive moderate
			With Mitigation	2	4	3	4	13	Positive very high
		Alternative 2	Without Mitigation	1	2	3	3	9	Positive moderate
			With Mitigation	2	4	3	2	11	Positive high
	Enhancement: Implementation of the most responsible design.								
3	Possible encounters with the South African Python.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
		Alternative 2	Without Mitigation	-1	-4	-2	-4	-11	Negative high

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: As a precautionary measure an educational programme on Southern African Pythons should be implemented for the community and all future property owners. If any pythons are discovered on the site the relevant conservation authorities should be informed and the python relocated in suitable habitat away from the site.									
4	Possible introduction of alien and exotic flora species through horticultural activities.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
		Alternative 2	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	3	2	3	10	Positive high
Mitigation: All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation. Only indigenous (to the area) tree and species should be used for horticultural purposes (see attached species lists). No horticultural activities should be allowed in the proposed conserved areas along the Mamba River except for rehabilitation purposes. All remaining large indigenous tree species should be conserved wherever possible with any future development planned around them. No exotic invasive lawn species of grasses should be used on the site especially around the non-perennial drainage lines or Mamba River or any areas that adjoin natural grassland vegetation. The use of <i>Kikuyu (Pennisetum clandestinum)</i> is not recommended and non-invasive indigenous grasses such as <i>Cynodon dactylon</i> , <i>Panicum ecklonii</i> , <i>Panicum maximum</i> (local to the area) should rather be used. The least environmentally damaging insecticides must be applied. Pyrethroids and Phenylpyrazoles are preferable to Acetylcholines. Use insecticides that are specific to the pest (species specific) in question. The lowest effective dosages must be applied. Supplier's advice should be sought. Do not irrigate for 24 hours after applying insecticides in areas where there is a chance of contaminating water-courses. Fungal pathogens should be used in preference to chemical insecticides. All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. The removal of any indigenous trees may need to be authorised by DAFF.									
5	Job creation and education provision.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	4	4	4	13	Positive very high
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	4	4	4	13	Positive very high

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Enhancement: Implementation of the most responsible design.								
6	Increased air quality impacts.	Alternative 1	Without Mitigation	-1	-3	-1	-1	-6	Negative low
			With Mitigation	-1	-3	-1	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-3	-1	-1	-6	Negative low
			With Mitigation	-1	-3	-1	-1	-6	Negative low
	Mitigation: The impact is considered minor. No mitigation measures can be offered.								
7	Possible littering and the spread of debris.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-1	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-1	-5	Negative low
	Mitigation: Implement community awareness programme for improved management of litter. Implement a vegetation control and littering clean-up programme.								
<b>Sub-phase: Indirect Impacts</b>									
8	Increased safety and improved access.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	4	4	4	13	Positive very high
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	3	2	3	9	Positive moderate
	Enhancement: Implementation of the most responsible design.								



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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
9	Vegetation overgrowth within the infrastructure and litter which result in blockages and overflows due to ineffective maintenance and litter clean-up. Establishment / re-establishment of invader weeds and plant species.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation.									
10	The accessibility of the development area will be decreased through increased population densities and introduction of impervious areas such as surfaced streets, houses and amenities associated with the proposed developments.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.									
11	The migratory movements of several animal (frog, reptile and mammal) species could be completely disrupted by the erection of numerous walls around properties, fences and road networks, which restrict natural movements between suitable foraging and breeding areas. This	Alternative 1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-2	-2	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	could potentially result in the disruption of natural gene flow between populations and could result in a high impact on the highly mobile species.		With Mitigation	-1	-2	-2	-1	-6	Negative low
<p>Mitigation: It is important that the proposed activities within the Mamba River and non-perennial drainage lines are strictly managed. Low disturbance activities such as hiking, bird watching and hiking are recommended for these sensitive areas. No quad-bikes, motorcycles or off-road vehicles should be permitted within the riparian zone adjacent to the Mamba River and non-perennial drainage lines. No animals are to be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. No air rifles or pellet guns should be permitted. The baiting of selected predators (caracal and black-backed jackal) and subsequent capturing and possible destroying of caught animals should not be allowed. Ideally no fences should occur along the Mamba River and non-perennial drainage lines or alternatively an outer barbed wire fence should be erected preventing livestock (especially goats). Fences should not restrict the natural migratory movements of certain animals and must be restricted to the immediate area of the proposed development.</p>									
<b>Sub-phase: Cumulative Impacts</b>									
12	Increased socio-economic benefits.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	2	4	4	4	14	Positive very high
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	2	4	4	3	13	Positive very high
Enhancement: Implementation of the best design.									
Average for Alternative 1 without mitigation								-0.75	Negative low
Average for Alternative 1 with mitigation								5.58	Positive low
Average for Alternative 2 without mitigation								-1.64	Negative low
Average for Alternative 2 with mitigation								3.91	Positive low

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## Sewer Reticulation Alternatives 1 and 2

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Operational Sewer Reticulation Alternatives Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
	Construction of the rising main.	Alternative 1	Without Mitigation	0	0	0	0	0	Neutral
			With Mitigation	0	0	0	0	0	Neutral
		Alternative 2	Without Mitigation	-1	-4	-3	-4	-12	Negative high
			With Mitigation	-2	-3	-2	-3	-10	Negative high
1	Pumping water directly into main has the following disadvantages: 1. In case of power interruption, supply of water stops. 2. To compensate the variations in water consumption, a number of pumps having varying capacities are installed and they have to be put in operation according to water requirements and these options are not economical.								
2	Optimisation for provision of infrastructure and improvements from socio-economic perspectives.	Alternative 1	Without Mitigation	1	2	3	3	9	Positive moderate
			With Mitigation	2	4	3	4	13	Positive very high
		Alternative 2	Without Mitigation	1	2	3	3	9	Positive moderate
			With Mitigation	2	4	3	2	11	Positive high
2	Enhancement: Implementation of the most responsible design.								
3	Possible encounters with the South African Python.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
		Alternative 2	Without	-1	-4	-2	-4	-11	Negative high

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			Mitigation						
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: As a precautionary measure an educational programme on Southern African Pythons should be implemented for the community and all future property owners. If any pythons are discovered on the site the relevant conservation authorities should be informed and the python relocated in suitable habitat away from the site.									
	Possible introduction of alien and exotic flora species through horticultural activities.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
		Alternative 2	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	3	2	3	10	Positive high
4	Mitigation: All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous (to the area) vegetation. Only indigenous (to the area) tree and species should be used for horticultural purposes (see attached species lists). No horticultural activities should be allowed in the proposed conserved areas along the Mamba River except for rehabilitation purposes. All remaining large indigenous tree species should be conserved wherever possible with any future development planned around them. No exotic invasive lawn species of grasses should be used on the site especially around the non-perennial drainage lines or Mamba River or any areas that adjoin natural grassland vegetation. The use of <i>Kikuyu (Pennisetum clandestinum)</i> is not recommended and non-invasive indigenous grasses such as <i>Cynodon dactylon</i> , <i>Panicum ecklonii</i> , <i>Panicum maximum</i> (local to the area) should rather be used. The least environmentally damaging insecticides must be applied. Pyrethroids and Phenylpyrazoles are preferable to Acetylcholines. Use insecticides that are specific to the pest (species specific) in question. The lowest effective dosages must be applied. Supplier's advice should be sought. Do not irrigate for 24 hours after applying insecticides in areas where there is a chance of contaminating water-courses. Fungal pathogens should be used in preference to chemical insecticides. All alien invasive vegetation as well as dumped materials should ideally be removed from the riparian areas as well as thornveld buffer zones. The removal of any indigenous trees may need to be authorised by DAFF.								
5	Job creation and education provision.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	4	4	4	13	Positive very high
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	4	4	4	13	Positive very high

## AMENDED BASIC ASSESSMENT REPORT (Version 3)

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
			Mitigation						
	Enhancement: Implementation of the most responsible design.								
	Increased air quality impacts.	Alternative 1	Without Mitigation	-1	-3	-1	-1	-6	Negative low
			With Mitigation	-1	-3	-1	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-3	-1	-1	-6	Negative low
			With Mitigation	-1	-3	-1	-1	-6	Negative low
6	Mitigation: The impact is considered minor. No mitigation measures can be offered.								
	Possible littering and the spread of debris.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-1	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-2	-1	-1	-5	Negative low
7	Mitigation: Implement community awareness programme for improved management of litter. Implement a vegetation control and littering clean-up programme.								
<b>Sub-phase: Indirect Impacts</b>									
	Increased safety and improved access.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	4	4	4	13	Positive very high
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high
			With Mitigation	1	3	2	3	9	Positive moderate
8									

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
	Enhancement: Implementation of the most responsible design.								
9	Vegetation overgrowth with the infrastructure and littering which result in blockages and overflows due to ineffective maintenance and litter clean-up. Establishment / re-establishment of invader weeds and plant species.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-1	-4	Negative low
Mitigation: An alien invasive plant removal programme should be implemented along the section of the Mamba River. Cleared vegetation should be replaced with indigenous in the area.									
10	The accessibility of the development area will be decreased through increased population densities and introduction of impervious areas such as surfaced streets, houses and amenities associated with the proposed developments.	Alternative 1	Without Mitigation	-1	-2	-2	-2	-7	Negative Moderate
			With Mitigation	-1	-1	-1	-2	-5	Negative low
		Alternative 2	Without Mitigation	-1	-2	-2	-3	-8	Negative Moderate
			With Mitigation	-1	-1	-1	-3	-6	Negative low
Mitigation: Protect areas susceptible to erosion with mulch or a suitable alternative. Implement the appropriate topsoil and stormwater runoff control management measures as per the EMPr. Any materials that may hamper re-growth of vegetation must be removed prior to rehabilitation and disposed of at an appropriate site. All earthworks to be carried out in accordance with SABS 1200 (current version). The site should be graded well to permit drainage and to prevent ponding.									
11	The migratory movements of several animal (frog, reptile and mammal) species could be completely disrupted by the erection of numerous walls around properties, fences and road networks, which restrict natural movements between suitable foraging and breeding areas. This could potentially result in the disruption of	Alternative 1	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate
			With Mitigation	-1	-2	-2	-1	-6	Negative low
		Alternative 2	Without Mitigation	-1	-2	-3	-2	-8	Negative Moderate

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No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation	
	natural gene flow between populations and could result in a high impact on the highly mobile species.		With Mitigation	-1	-2	-2	-1	-6	Negative low	
<p>Mitigation: It is important that the proposed activities within the Mamba River and non-perennial drainage lines are strictly managed. Low disturbance activities such as hiking, bird watching and hiking are recommended for these sensitive areas. No quad-bikes, motorcycles or off-road vehicles should be permitted within the riparian zone adjacent to the Mamba River and non-perennial drainage lines. No animals are to be intentionally killed or destroyed and poaching and hunting should not be permitted on the site. No air rifles or pellet guns should be permitted. The baiting of selected predators (caracal and black-backed jackal) and subsequent capturing and possible destroying of caught animals should not be allowed. Ideally no fences should occur along the Mamba River and non-perennial drainage lines or alternatively an outer barbed wire fence should be erected preventing livestock (especially goats). Fences should not restrict the natural migratory movements of certain animals and must be restricted to the immediate area of the proposed development.</p>										
<b>Sub-phase: Cumulative Impacts</b>										
12	Increased socio-economic benefits.	Alternative 1	Without Mitigation	1	3	3	3	10	Positive high	
			With Mitigation	2	4	4	4	14	Positive very high	
		Alternative 2	Without Mitigation	1	3	3	3	10	Positive high	
			With Mitigation	2	4	4	4	14	Positive very high	
	Enhancement: Implementation of the best design.									
	Average for Alternative 1 without mitigation								-1.5	Negative low
Average for Alternative 1 with mitigation								4.41	Positive low	
Average for Alternative 2 without mitigation								-2.58	Negative low	
Average for Alternative 2 with mitigation								2.75	Positive low	



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## No Go Alternative

No.	Impact	Alternative	Mitigation	Extent	Duration	Intensity	Probability	Significance = E+D+I+P	Interpretation
<b>Phase: Operational- No- Go Impacts</b>									
<b>Sub-phase: Direct Impacts</b>									
1	Loss of infrastructure, facilities and associated job opportunities.	Alternative 1	Without Mitigation	-1	-4	-2	-4	-11	Negative high
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the proposed development.									
<b>Sub-phase: Indirect Impacts</b>									
2	Loss of socio-economic benefits.	Alternative 1	Without Mitigation	-1	-2	-2	-4	-9	Negative Moderate
			With Mitigation	2	4	3	4	13	Positive very high
Mitigation: Implementation of the proposed development.									
3	Increased crime due to poor socio-economic status.	Alternative 1	Without Mitigation	-1	-3	-3	-4	-11	Negative high
			With Mitigation	-1	-2	-2	-2	-7	Negative Moderate
Mitigation: Implementation of the proposed development.									
4	Loss of opportunity to address developmental requirements.	Alternative 1	Without Mitigation	-1	2	-2	-4	-5	Negative low
			With Mitigation	1	2	3	3	9	Positive moderate

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Mitigation: Implementation of the proposed development.										
<b>Sub-phase: Cumulative Impacts</b>										
5	Negative socio-economic impacts.	Alternative 1	Without Mitigation	-2	-3	-4	-4	-13	Negative very high	
			With Mitigation	-1	-1	-1	-2	-5	Negative low	
Mitigation: Implementation of the proposed development.										
Average for No Go Alternative 1 without mitigation								-9.80	Negative high	
Average for No Go Alternative 1 with mitigation								4.60	Positive low	

### D. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING OR CLOSURE PHASE

The closure and decommissioning time for the project is unknown at this stage and is likely to extend well into the future. However, when closure and decommissioning does take place for the Bulk Infrastructure, it will be cross verified against the applicable EIA Regulations in force at the time, and if required, a separate EIA process will be initiated for decommissioning and/or closure.

#### a. Site alternatives

List the potential impacts associated with site alternatives that are likely to occur during the decommissioning or closure phase:

##### Alternative S1 (preferred alternative)

##### Alternative S2

##### No-go alternative (compulsory)

Indicate mitigation measures to manage the potential impacts listed above:

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Alternative S1

Alternative S2

**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 decommissioning or closure phase (please list impacts associated with each alternative separately):

**Alternative (preferred alternative)**

**Alternative**

**No-go alternative (compulsory)**

Indicate mitigation measures to manage the potential impacts listed above:

Alternative A1

Alternative A2

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## E. 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.

### Alternative S1 (only site)

### Alternative S2

An Environmental Control Officer (ECO) will be appointed by the project Applicant to monitor the construction activities and the implementation of the EMPr conditions on the monthly basis. The appointed Contractor is required to employ the Environmental Site Officer (ESO) who will assist in the implementation of the EMPr conditions on a daily basis. The ESO will also advise the Contractor on environmental matters.

### Stormwater and Sewer Reticulation Alternatives 1 and 2

An Environmental Control Officer (ECO) will be appointed by the project Applicant to monitor the construction activities and the implementation of the EMPr conditions on the monthly basis. The appointed Contractor is required to employ the Environmental Site Officer (ESO) who will assist in the implementation of the EMPr conditions on a daily basis. The ESO will also advise the Contractor on environmental matters.

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## 2. 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.

### SITE ALTERNATIVES: Alternative S1 (preferred site)

There are no site alternatives as the development will take place on the land which has been identified for this development.

This alternative is preferred from an environmental perspective as 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. No fatal flaws were identified during the Basic Assessment process, which included a comprehensive Public Participation Process with a public meeting and stakeholder consultation.

#### Ecology Assessment Findings:

The vegetation on the site has been transformed by previous agricultural activities such as the ploughing of small-scale lands as well as extensive overgrazing by livestock (especially goats). Existing impacts occurring within the Nkandla-Umlalazi site and surrounding area include:

- Extensive vegetation transformation around the homesteads, livestock enclosures, grazing pastures and small-scale agricultural lands.
- Extensive vegetation degradation due to overgrazing by cattle and goats with the grasses grazed to the ground.
- Extensive soil erosion (surface, rill and gully) especially along the non-perennial drainage lines as well as macro-channel banks of the Mamba River. This is due to poor storm water management as well as uncontrolled livestock drinking activities along the river as well as removal of the riparian vegetation during wood harvesting activities.
- Alteration of the natural fire regime. Frequent fires at the incorrect time of year.
- Wood harvesting and tree clear-felling.
- Thicket formation and severe bush encroachment occurs in the old agricultural lands as well as livestock enclosures as in the lower lying areas of the site by *Acacia spp.* and *Dichrostachys cinera*.
- Numerous human and livestock pathways bisecting the site.
- Illegal poaching and hunting (dogs, catapults and snares).
- Riparian zone degradation due to removal of majority of tree species for wood harvesting.
- Reed invasion in certain sections of the Mamba River due to increased phosphates levels due to washing activities as well as siltation and sedimentation due to poor vegetation and soil conservation around the site.
- Bank erosion from vegetation removal, overgrazing and trampling from cattle.
- Massive siltation and sedimentation accumulates in the perennial and non-perennial (seasonal) rivers and drainage lines/streams.
- Extensive dumping and littering especially adjacent to homesteads.
- Deterioration in water quality due to presence of pit-latrines as well as washing and bathing activities within the Mamba River.

Severe degradation of the remaining vegetation due to surrounding anthropogenic activities including wood harvesting, collection of medicinal plants as well as extensive overgrazing by cattle and goats. This has resulted in impoverished habitats with limited faunal diversity due to habitat destruction and habitat fragmentation.

#### Heritage Assessment Findings:

There were no heritage artefacts and objects identified in the proximity of the proposed development. However, it must be noted that should these be identified a heritage specialist must be consulted to conduct an investigation.

Based on the findings above, the proposed development will in fact prove highly beneficial to the surrounding communities of the Umlalazi – Nkandla site.

### DESIGN ALTERNATIVES: Stormwater and Sewer Reticulation Alternatives 1 (preferred)

The proposed Alternatives 1 (preferred) for stormwater and sewer layout and design are preferred from a technical, financial and environmental perspective. These alternatives have been carefully planned to reduce negative environmental impacts and ensure the best engineering design. They also represent the most cost effective options. The most suitable layouts were provided as they encourage positive socio-economic impacts while being environmentally sustainable and will have less of an impact overall.

### DESIGN ALTERNATIVES: Stormwater and Sewer Reticulation Alternatives 2

The layout and design for alternatives 2 are not suitable for the development as they do not constitute the best design and will

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result in more environmental related impacts.

## SUMMARY OF DESIGN ALTERNATIVES QUANTIFIABLE ASSESSMENT:

### Planning and Design Phase

Average for Stormwater Alternative 1 without mitigation	0.67	Positive low
Average for Stormwater Alternative 1 with mitigation	4.78	Positive low
Average for Stormwater Alternative 2 without mitigation	-0.11	Negative low
Average for Stormwater Alternative 2 with mitigation	3.11	Positive low
Average for Sewer Reticulation Alternative 1 without mitigation	0.67	Positive low
Average for Sewer Reticulation Alternative 1 with mitigation	4.78	Positive low
Average for Sewer Reticulation Alternative 2 without mitigation	0.22	Positive low
Average for Sewer Reticulation Alternative 2 with mitigation	3.00	Positive low

### Construction Phase

Average for Stormwater Alternative 1 without mitigation	-5.79	Negative low
Average for Stormwater Alternative 1 with mitigation	-5.44	Negative low
Average for Stormwater Alternative 2 without mitigation	-11.89	Negative high
Average for Stormwater Alternative 2 with mitigation	-6.89	Negative low
Average for Sewer Reticulation Alternative 1 without mitigation	-5.79	Negative low
Average for Sewer Reticulation Alternative 1 with mitigation	-5.44	Negative low
Average for Sewer Reticulation Alternative 2 without mitigation	-13.00	Negative low
Average for Sewer Reticulation Alternative 2 with mitigation	-6.89	Negative low

### Operational Phase

Average for Stormwater Alternative 1 without mitigation	-0.75	Negative low
Average for Stormwater Alternative 1 with mitigation	5.58	Positive low
Average for Stormwater Alternative 2 without mitigation	-1.50	Negative low
Average for Stormwater Alternative 2 with mitigation	5.89	Positive low
Average for Sewer Reticulation Alternative 1 without mitigation	-1.50	Negative low
Average for Sewer Reticulation Alternative 1 with mitigation	4.42	Positive low
Average for Sewer Reticulation Alternative 2 without mitigation	-2.58	Negative low
Average for Sewer Reticulation Alternative 2 with mitigation	2.75	Positive low

The analysis above shows the preferred alternatives as highlighted in the **dashed blue lines** (after mitigation measures are considered).

## SUMMARY IMPACT TABLE FOR ALL THREE PHASES

ALTERNATIVES	PLANNING	CONSTRUCTION	OPERATION	TOTAL
Stormwater Alternative 1 (with mitigation measures)	4.78	-5.44	5.58	4.92
Stormwater Alternative 2 (with mitigation measures)	3.11	-6.89	5.89	2.11
Sewer Reticulation Alternative 1 (with mitigation)	4.78	-5.44	4.42	3.76

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Sewer Reticulation Alternative 2 (with mitigation)	3.00	-6.89	2.75	-1.14
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From the above summary impact table, it can be seen that alternatives 1 with a total scoring points of 4.92 and 3.76 for both stormwater and sewer reticulation respectively will result in less environmental impacts. Therefore these alternatives are preferred from the environmental perspective.

## No-go alternative (compulsory)

Failure to promote development in the area will prevent all the positive impacts (e.g. employment opportunities and provision of basic services) that can be associated with a well planned development such as this in the region. Therefore the no go alternative is not preferred.

## 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
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If "NO", please contact the KZN EDTEA regarding the further requirements for your report.

If "YES", please attach the draft EMPr 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:

No fatal flaws have been identified for either of the alternatives (sewer and stormwater) associated with the project during the basic assessment process. It must be noted though, that alternatives 1 for both stormwater and sewer reticulation emerged as the preferred alternatives. The development is designed at the planning stage to be environmentally cognisant and to utilise natural recourses in a most sustainable manner, taking into account environmentally sound measures which ensure well rounded sustainability.

This BAR lays the foundation for any further development to be supported by adequate bulk infrastructure, and in the EAPs opinion should be favourably considered. The total footprint and area to be transformed for the bulk infrastructure project is also considered not to be significant, measured against the positive impacts which the development will bring.

It must be reiterated that the development of further infrastructure (e.g. wastewater treatment works) to support future development will each undergo its own environmental assessment at the time at which the detailed planning for such is completed. This application is only for the linear bulk infrastructure and for the transformation of land where the latter refers to the attenuation pond.

All impacts identified during the planning and design, construction and operation can be adequately mitigated and mitigation recommended by the EAP were provided for within the layout plans, infrastructure designs and draft EMPr. Impacts identified and addressed through mitigation included: vegetation, waste management, traffic and emissions.

The main and underlying finding is that the Nkandla-Umlalazi site is dominated by degraded and transformed Eastern Valley Bushveld dominated by anthropogenic grasses and pioneer weedy plant species and invaded by alien invasive plant species. The remnant patches of bushveld occur adjacent to the non-perennial drainage lines as well as riparian zone of the Mamba River. Therefore the development of the site for the upliftment and support of indigent communities is supported.

A positive decision on this project will enable job creation, infrastructural development and integrating the social and economic base of the community. It is however emphasised that there must be integration between government Departments and Local Authorities IDPs and SDFs in the provision of services.

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.
- Should it be deemed required, the ecological and biodiversity specialist should re-assess the site and the EMPr should be updated to include any findings.
- 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.
- The indigenous species identified as per the Ecological Specialist Report must be demarcated and protected during construction and not removed for the purposes of development or any other purpose.
- A water use license must be applied for in accordance with the National Water Act (Act No. 39 of 1998) should there be any



## AMENDED BASIC ASSESSMENT REPORT (Version 3)

activities triggering the Section 21 water uses.

- This application is focused on the overall planning activities required for the [Bulk Infrastructure Project](#).
- All recommendations in the EMPr must be updated and submitted for approval to the Competent Authority and all specifications therein must be adhered to at all times.
- Additional items from Section E (1) of this BAR may be considered for inclusion.
- All road fill material must be sourced from a registered borrow pit with or a mining permit need to be obtained prior to construction activities.
- Construction must commence within 5 years of authorisation.

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.

**RESPONSE REQUIRED IN TERMS OF  
SECTION G: AMAFA APPLICATION FORM**

**DEVELOPMENT PERMIT FORM NID  
(Needs and desirability)**

- In terms of the KwaZulu Natal Heritage Act No. 4 of 2008 and the National Heritage Resources Act No.25 of 1999 (Section 38 (1)), a permit is required to carry out certain listed activities.

It is an offence in terms of section 34 of the KwaZulu Natal Heritage Act, to make false statement or fail to provide required information in this application.

**ALL APPLICATION FORMS AND PROOF OF PAYMENT ARE TO BE FORWARDED TO:  
AMAFA KWAZULU NATAL, ARCHAEOLOGY DEPARTMENT, 195 LANGALIBALELE STREET,  
PIETERMARITZBURG, 3201/ BOX 2685 PIETERMARITZBURG 3200.**

Kindly note that:

1. The Audit process requires that hard copies of this and all subsequent documentation be submitted
2. Kindly note that with effect from 1<sup>st</sup> of April 2010 an application fee will be charged for Needs & Desirability applications and Permit applications. This fee may be reviewed annually.
3. Incomplete applications will not be processed.
4. All information filled in on this form will become public information on receipt by this department. Any interested and affected party can be provided with information contained in this application on request, during any stage of the application process.
5. One Printed Copy (not faxed) and one electronic copy is required to be submitted

- **SUBMISSION FEES**

- 

Regulations make provision for the agency to charge a submission fee. A administration fee of **R600.00** is payable to **Amafa aKwaZulu Natali** by postal order or bank deposit / EFT prior to the processing of this application. Banking Details in case of direct deposits:

**ABSA BANK:** Branch: ULUNDI

Bank Code: 630330 Account in the name of AMAFA AKWAZULU- NATALI

- **Account No. 40-5935-6024**

**NB:** Proof of payment to be forwarded (faxed, posted or delivered) to Amafa, to be referenced **Applicants Name, Project, Date.** Eg Smith. Beach Sands1, 12/05/2011.

**OFFICE USE.**

**AMAFA ID**

**FILE REFERENCE**

**EIA NUMBER (if applicable)**

**DATE RECEIVED**

**DATE ONSIDERED**

**FILTER COMMITTEE RECOMMENDATION**

**RESPONSE REQUIRED IN TERMS OF**

**APPLICATION PAYMENT CONFIRMATION**

**APPLICANTS DETAILS**

Applicant Name (Company/institution/individual):	<b>Ingonyama Trust Board</b>
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Contact Person:	<b>Peter Warner</b>
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Telephone/Fax No:	<b>033 846 9927</b>	<b>033 386 2528</b>
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Email:	<b>WarnerP@ingonyamatrust.org.za</b>
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**DEVELOPMENT DETAILS**

Project Title:	<b>Proposed Bulk Infrastructure Project at Nkandla</b>
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Project Description
<p>The Ingonyama Trust Board is proposing to construct new Bulk Infrastructure between Nkandla and Eshowe in the KwaZulu Natal Province. The proposed project is located between the Lindela and Mamba areas under chieftainships of Inkosi Shange and Inkosi Nxamalala. These two areas fall in the Nkandla Local Municipality which is located within the King Cetshwayo District Municipality. The bulk infrastructure project will comprise of the following components:</p> <ul style="list-style-type: none"> <li>▪ Sewer network;</li> <li>▪ Sewerage Pump station;</li> <li>▪ Construction of various access roads</li> <li>▪ Construction of a stormwater network, including a Stormwater Management Facility.</li> </ul>

Extent of the Development Footprint (in M <sup>2</sup> ):	<b>124 800M<sup>2</sup></b>					
BID	SCOPING (d)	SCOPING (f)	BAR	EMP	ROD	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Nature of Development: ( Please tick appropriate box)		
1	Construction of a road exceeding 300 m in length	<input checked="" type="checkbox"/>
2	Construction of a wall exceeding 300 m in length	<input type="checkbox"/>
3	Construction of a power line exceeding 300 m in length	<input type="checkbox"/>
4	Construction of a pipeline or trench exceeding 300 m in length	<input checked="" type="checkbox"/>
5	Construction of a canal exceeding 300 m in length	<input type="checkbox"/>
6	other similar form of linear development exceeding 300 m in length	<input checked="" type="checkbox"/>
7	Construction of a bridge or similar structure exceeding 50 m in length	<input type="checkbox"/>
8	Any development exceeding 5 000 m <sup>2</sup> in extent any other category of development provided for in regulations	<input type="checkbox"/>
9	Other activity which will change the character of an area of land, or water exceeding 10 000 m <sup>2</sup> in extent	<input checked="" type="checkbox"/>

**RESPONSE REQUIRED IN TERMS OF**

10	Any development involving three or more existing erven or subdivisions thereof	<input type="checkbox"/>
11	Any development, or other activity involving three or more existing erven or subdivisions	<input type="checkbox"/>
12	Any development, or other activity involving three or more existing erven or subdivisions which have been consolidated within the past five years	<input type="checkbox"/>
13	Any development, or other activity the costs of which will exceed a sum set in terms of regulations	<input type="checkbox"/>
14	Rezoning of a site exceeding 10 000 m <sup>2</sup>	<input type="checkbox"/>

To your knowledge, will the Development impact on a heritage resource protected in terms of Sections 33,34,35,36, 37, 38, 39, 40, 41, 42, 43 of the KZN Heritage Act, or is the development located in the vicinity of any of the above. If yes, explain.

**No.**

District Municipality / Metro	<b>King Cetshwayo District Municipality</b>	
Local Municipality	<b>Nkandla Local Municipality</b>	
Traditional authority (if applicable)	<b>Nxamala and Shange</b>	
Town / Area	<b>Nkandla</b>	

Property Description (Erf, Lot, Portion, Farm)	<b>Tugela 4674</b>	
Co-ordinates. (Provide either Decimal or DD MM SS ss)  Decimal eg 28,5075 S 31, 23456 E  DDMMSSss 28.30 ' 45,12"	<b>SOUTH (X)</b>	
	Decimal Degrees	
	Or Degrees ...28° ..... Minutes...49' .....Seconds...46.53" .....	
	<b>EAST (Y)</b>	
	Decimal Degrees	
	Or Degrees ...31° ... Minutes...06' .....Seconds...46.34" .....	
1: 50 000 sheet/ <b>Aerial Photo Map</b>	<b>See Appendix A</b>	
1: 10 000 orthosheet (if applicable)	<b>N/A</b>	


APPLICANT'S CHECKLIST	Y	N
Completed & Signed Application Forms	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Site Photographs	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1:50 000 Topographical / Aerial Photo Map	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Payment/ Proof of Payment	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**RESPONSE REQUIRED IN TERMS OF**

Payment –postal Order	<input type="checkbox"/>	Bank dep	<input type="checkbox"/>	Internet Banking/ EFT	<input checked="" type="checkbox"/>
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**Declaration**

I, **Malcolm Roods** undertake strictly to observe the terms, conditions, restrictions, by-laws and directions under which the Council of Amafa aKwaZulu-Natali may issue the permit.

	Place:	Woodmead, Johannesburg
	Date:	19.06.2017

**NB:**

**APPLICATIONS SUBMITTED WITH INCOMPLETE FORMS WILL NOT BE CONSIDERED**

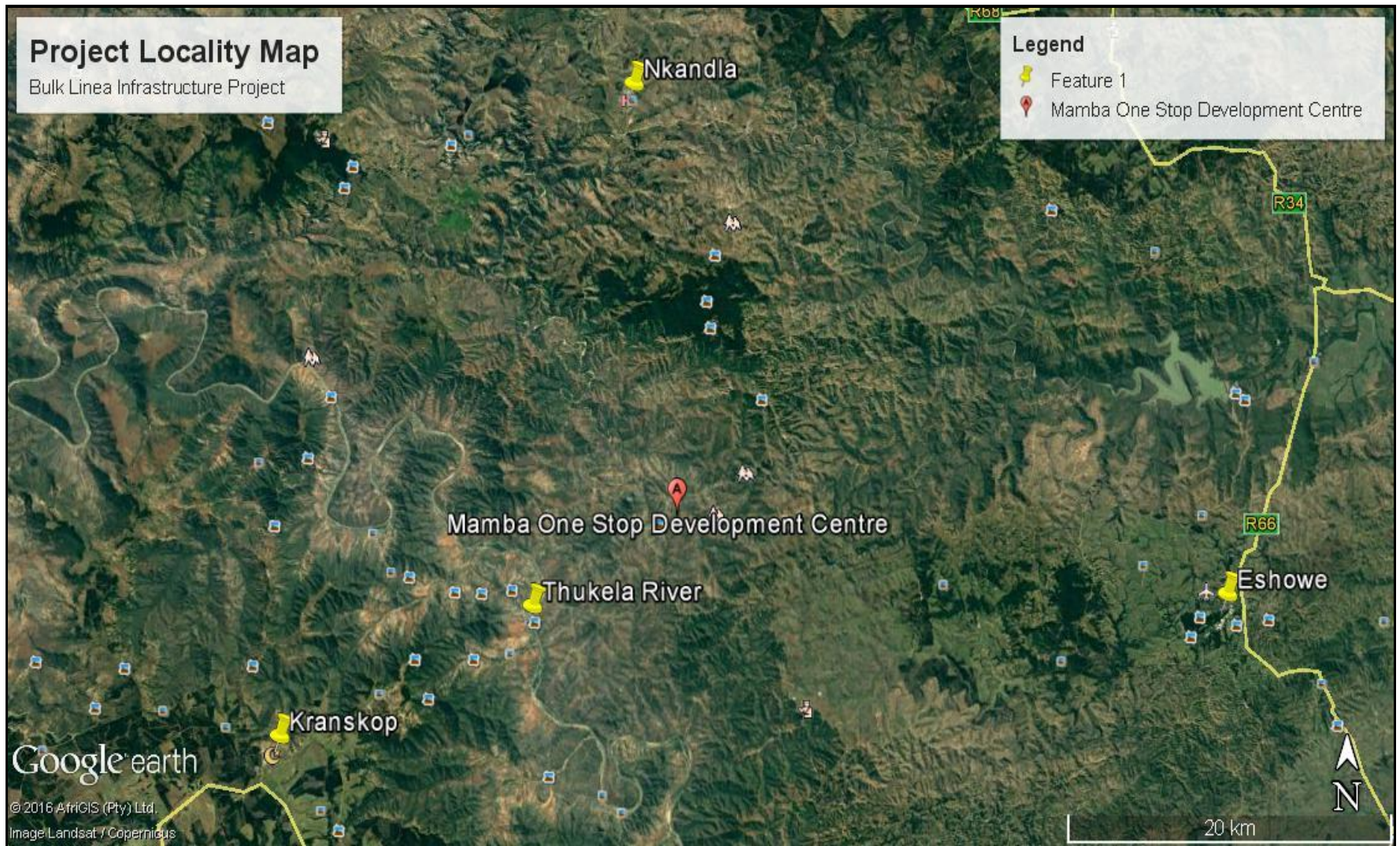
RESPONSE REQUIRED IN TERMS OF

## APPENDIX A

### Locality Map

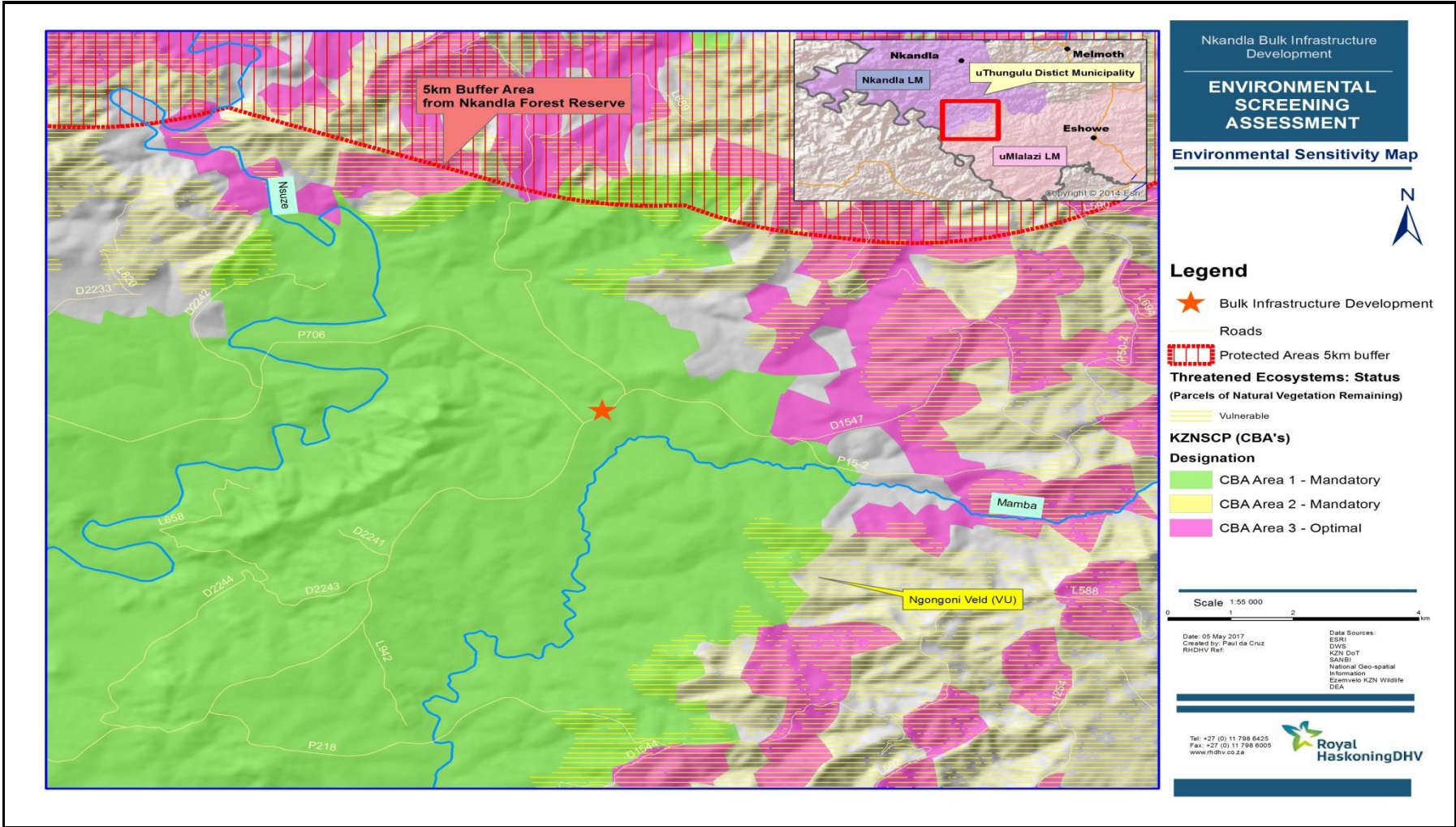


RESPONSE REQUIRED IN TERMS OF





RESPONSE REQUIRED IN TERMS OF





**RESPONSE REQUIRED IN TERMS OF**

**APPENDIX B**

**Photographs**

**RESPONSE REQUIRED IN TERMS OF**



FIGURE 1: NORTHERLY DIRECTION OF THE SITE.



FIGURE 2: SOUTHERLY DIRECTION OF THE SITE



FIGURE 3: EASTERLY DIRECTION OF THE SITE



FIGURE 4: WESTERLY DIRECTION OF THE SITE

## APPENDIX C

### Proof of Payment

# Standard Bank of South Africa

ComputerGeneratedCopy

The Standard Bank of South Africa Limited Registered Bank Reg. No. 1962/000738/06

#### REPRINT CUSTOMER ALL PAYMENTS FINAL AUDIT REPORT

<b>Customer No</b>	600191607	<b>User Name</b>	ROYAL HASKONINGDHV (PTY) LTD
<b>User ID</b>	QAW81	<b>Reference</b>	2017164003
<b>Sub Module</b>	SSVS	<b>Action date</b>	20170613
<b>Description</b>	VM CREDITORS PMTS		
<b>Finalreleasingoperators</b>	NC277 M S KOTTON		HGH89 ALISON JANET SINCLA
<b>Sub-batch</b> 001	<b>From Account no</b> 0000420967699	<b>From Account Name</b>	ROYAL HASKONINGDHV (PTY) LTD
<b>Trans No</b>	1		
<b>Acc No / CDI</b>	4059356024		
<b>Branch No</b>	630330		
<b>Statement Ref</b>	01/06/2017-RHDHV		
<b>Account Name</b>	AMAFA		
<b>Creditor Code</b>			
<b>Amount</b>	700.00		
<b>StatusDescription</b>	FINAL AUDIT TO BE DOWNLOADED		
<b>RTGS/RTC</b>			
<b>ISN/Bus Ref</b>	0		
<b>Pay Alert</b>	N		