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## **MBILA RESOURCES (PTY) LIMITED**

### **PROPOSED MSEBE OPENCAST ANTHRACITE MINE, KWAZULU-NATAL**

**DRAFT SCOPING REPORT PREPARED IN TERMS OF  
REGULATION 28 OF THE NATIONAL ENVIRONMENTAL  
MANAGEMENT ACT, NO. 107 OF 1998 AND THE  
ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, NO.  
R543 OF 2010**

**MARCH 2014**

**Prepared for:**



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**KZNDAE REF NO. KZN/EIA/0001370/2013**

**REVISION TABLE**

<b>REV</b>	<b>DATE</b>	<b>AUTHORS</b>	<b>INTERNAL REVIEW</b>	<b>EXTERNAL REVIEW</b>
1	11/03/2014	Amanda Mooney, Louise Kendall, Romy Antrobus	Jonathan van de Wouw	Issued for internal review
2	14/03/2014			Issued for external review

# MBILA RESOURCES (PTY) LTD

## DRAFT SCOPING REPORT FOR THE PROPOSED MSEBE OPENCAST ANTHRACITE MINE

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# LIST OF ACRONYMS

<b>AGIS-AGRIC</b>	Southern African Agricultural Geo-referenced Information System
<b>APPA</b>	Atmospheric Pollution Prevention Act No. 45 of 1965
<b>C-plan</b>	Conservation Plan
<b>CR</b>	Critically Endangered
<b>CSIR</b>	Council for Scientific and Industrial Research
<b>DAFF</b>	Department of Agriculture, Forestry and Fisheries
<b>dB(A)</b>	Decibels
<b>DEA</b>	Department of Environmental Affairs
<b>DMR</b>	Department of Mineral Resources
<b>DWA</b>	Department of Water Affairs
<b>EAP</b>	Environmental Assessment Practitioner
<b>EC</b>	Electrical Conductivity
<b>EIA</b>	Environmental Impact Assessment
<b>EIS</b>	Ecological Importance and Sensitivity
<b>EKZNW</b>	Ezemvelo KZN Wildlife
<b>EMP</b>	Environmental Management Programme
<b>EN</b>	Endangered
<b>EIA</b>	Environmental and Impact Assessment
<b>FEPAs</b>	Freshwater Ecosystem Priority Areas
<b>FRAI</b>	Fish Response Assessment Index
<b>GIS</b>	Geographic Information System
<b>IAPs</b>	Interested and Affected Parties
<b>IDP</b>	Integrated Development Plan
<b>IEM</b>	Integrated Environmental Management
<b>IHAS</b>	Invertebrate Habitat Assessment System
<b>KZNDAE</b>	KwaZulu-Natal Department of Agriculture and Environmental Affairs
<b>LED</b>	Local Economic Development
<b>LoM</b>	Life of Mine
<b>M Seam</b>	Main Seam
<b>MAMSL</b>	Metres Above Mean Sea Level
<b>MAP</b>	Mean Annual Precipitation
<b>MAR</b>	Mean Annual Run-off
<b>MBGL</b>	Metres Below Ground Level
<b>MIRAI</b>	Macroinvertebrate Response Assessment Index
<b>MPRDA</b>	Mineral and Petroleum Resources Development Act No. 28 of 2002
<b>MRA</b>	Mining Right Application
<b>NEMA</b>	National Environmental Management Act No. 107 of 1998
<b>NEMAQA</b>	National Environment Management Air Quality Act No. 39 of 2004
<b>NEMBA</b>	National Environmental Management: Biodiversity Act No. 10 of 2004
<b>NFEPA</b>	National Freshwater Ecosystem Priority Areas
<b>NHRA</b>	National Heritage Resources Act 25 of 1999
<b>NWA</b>	National Water Act, No. 36 of 1998
<b>PES</b>	Present Ecological State



<b>PM</b>	Particulate Matter
<b>RoM</b>	Run of Mine
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SAIAB</b>	South African Institute of Aquatic Biodiversity
<b>SANBI</b>	South African National Biodiversity Institute
<b>SANParks</b>	South African National Parks
<b>SANS</b>	South African National Standards
<b>SASS5</b>	South African Scoring System 5
<b>SEF</b>	Strategic Environmental Focus
<b>SMMEs</b>	Small, Medium and Micro Enterprises
<b>SOTER</b>	Soil and Terrain Database
<b>TDS</b>	Total Dissolved Solids
<b>VU</b>	Vulnerable
<b>WMA</b>	Water Management Area
<b>WULA</b>	Water Use License Application

# 1 INTRODUCTION AND BACKGROUND

## 1.1 Applicant

Name of Applicant:	Mbila Resources (Pty) Ltd
Contact person:	John de la Harpe Beck
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Email:	john.beck@mineraltech.co.za
Telephone Number:	011 447 0540
Fax Number:	011 327 7301
Cellular Number:	082 323 0000
Commodity:	Coal (specifically anthracite)

## 1.2 Details of the Environmental Assessment Practitioner

Name of Company	Prime Resources (Pty) Ltd
Name of Environmental Assessment Practitioners	Peter Theron, Jonathan van de Wouw, Amanda Mooney, Louise Kendall, Romy Antrobus
Physical Address:	70 - 7 <sup>th</sup> Avenue, Parktown North, Johannesburg
Postal Address:	PO Box 2316, Parklands, 2121
Telephone Number:	011 447 4888
Fax Number:	011 447 0355
Email:	<a href="mailto:prime@resources.co.za">prime@resources.co.za</a>
Professional Affiliations:	PrEng; PrSciNat, SAIMM

As required in terms of Section 17 of GNR543 of 2010, the Environmental Impact Assessment (EIA) Regulations, the applicant has appointed Prime Resources (Pty) Ltd to conduct the scope associated with this Scoping Report as well as the subsequent Environmental Impact Assessment (EIA) / Environmental Management Programme (EMP).

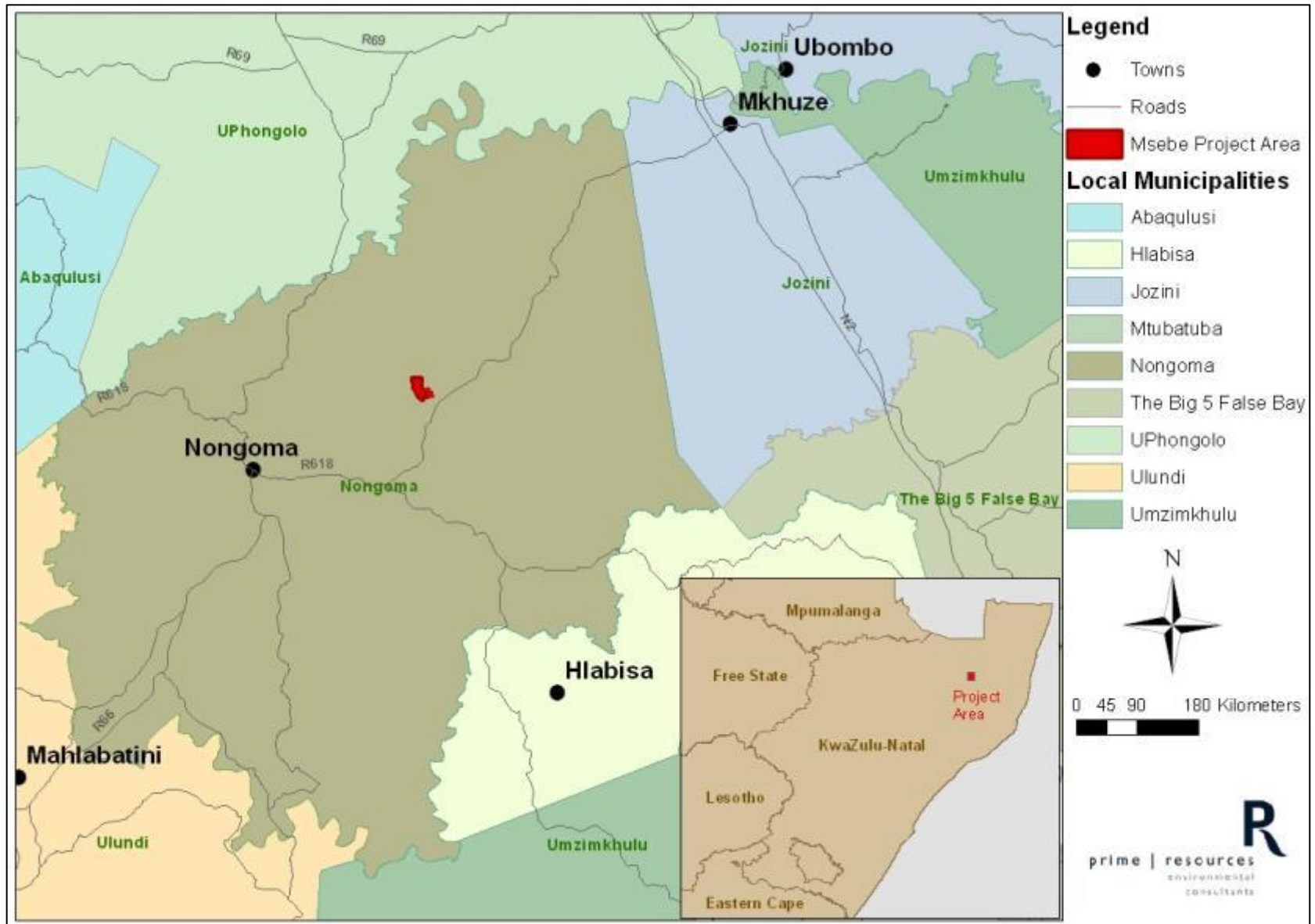
Prime Resources is a specialist Environmental Consulting Firm providing environmental and related services, which was established in 2003. Prime Resources was founded by Peter J. Theron, the Managing Director of the firm, who has over 26 years' experience in the field of environmental

science and engineering. Jonathan van de Wouw, the Project Manager and Senior Scientist for the proposed Msebe Opencast Mining Activities, has six years' experience in the field of environmental science. Refer to Appendix 1 for the Prime Resources Statement of Capabilities.

Mbila Resources (Pty) Ltd "the Applicant" has targeted a coal resource, specifically anthracite, in the KwaZulu-Natal Province for the development of an opencast mining operation. Certain activities at the proposed Msebe Opencast Anthracite Mine will invoke activities listed in terms of the EIA Regulations of 2010 (GNR544, 545 and 546) and therefore require that Environmental Authorisation is granted by the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZNDAE) before they can legally commence. A Water Use License Application (WULA) is also required for potential Water Uses listed in terms of Section 21 of the National Water Act, No. 36 of 1998 (NWA).

### **1.3 Project Location**

The proposed project area is located on a Portion of Portion 9 of reserve 12 (Reg. Div. HU) (being 52 946 ha in extent), number 15832, within the KwaZulu-Natal Province and falls under the jurisdiction of the Nongoma Local Municipality and the Zululand District Municipality (Figure 1). The proposed project area is located approximately 15 km east of the town of Nongoma.

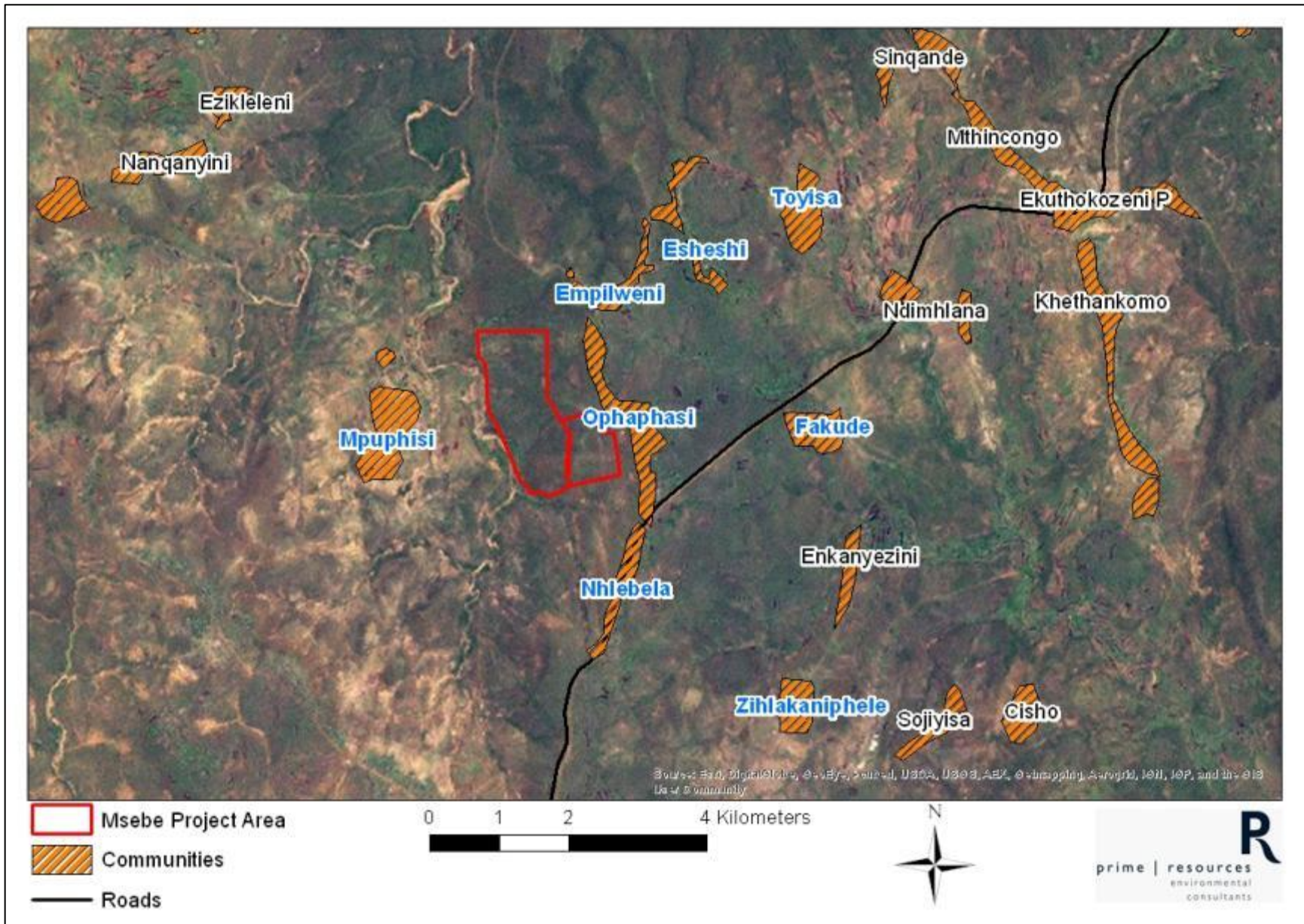


**Figure 1: The locality of the proposed project area within the Nongoma Local Municipality, KwaZulu-Natal, South Africa**

While a large number of communities are situated within the greater area associated with the Mining Right Application, the communities in close proximity to the proposed project area are represented in Table 1 and Figure 2 below:

**Table 1: Proximity of surrounding communities in relation to the proposed project area**

<b>COMMUNITY (ILLUSTRATED IN BLUE IN FIGURE 2 BELOW)</b>	<b>PROXIMITY TO THE PROPOSED PROJECT AREA (±KM)</b>
Ophaphasi	1.4
Emphilwene	1.7
Mpuphisi	2
Nhlebelala	2.5
Esheshi	3.2
Fakude	4.3
Toyisa	4.9
Zihlakaniphele	6



**Figure 2: Communities in close proximity to the proposed project area**

## 1.4 Legal Requirements

In order to protect the environment and ensure that the proposed development is undertaken in an environmentally responsible manner, the following pertinent laws apply and guide this report:

### 1.4.1 The Constitution of South Africa (No. 108 1996)

South Africa's Constitution guarantees all citizens the right to an environment that is not harmful to their health and / or wellbeing; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation. The Constitutional obligations of the State to protect the environment with respect to new development can only be met through the implementation, enforcement and monitoring of effective legislation.

### 1.4.2 The Mineral and Petroleum Resources Development Act (No. 28 of 2002)

The Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) is the key legislation governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The Department of Mineral Resources (DMR) is the competent authority that deals with all mining related applications.

The MPRDA by definition:-

- Recognises that minerals and petroleum are non-renewable natural resources;
- Acknowledges that South Africa's mineral and petroleum resources belong to the nation and that the State is the custodian thereof;
- Affirms the State's obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development;
- Recognises the need to promote local and rural development and the social upliftment of communities affected by mining; and
- Reaffirms the State's commitment to reform to bring about equitable access to South Africa's mineral and petroleum resources.

An Application for a Mining Right (MRA) in terms of Section 22 of the MPRDA was accepted by the DMR on 26 August 2013 (DMR Ref. No. KZN 30/5/1/2/2/10042 MR) which requests that the following are submitted in support of the MRA as required in terms of Section 39 of the MPRDA when read in conjunction with Regulations 50 and 51 thereof (GN527 of 2004):

- Scoping Report on- or before 8 October 2013 (submitted);
- EIA and EMP together with the results of consultation with Interested and Affected Parties and State Departments on- or before 19 May 2014.

The environmental processes in this regard will be aligned to that of the National Environmental Management Act (No. 107 of 1998) (NEMA) as far as possible, especially with regards to public consultation and the investigation of potential impacts to the receiving biophysical and social

environment, as well as any commitments made regarding the management and monitoring thereof.

### **1.4.3 The National Environmental Management Act (No. 107 of 1998) and the Environmental Impact Assessment Regulations (GNR 543 of 2010)**

This Act is enabling legislation intended to provide a framework for integrating environmental management into all developmental activities to promote co-operative environmental governance with regard to decision making by state organs on matters affecting the environment.

The principles of NEMA are laid out in Section 2:

- To avoid and minimize disturbance to ecosystems or loss of biological diversity and to rectify damage where possible;
- To avoid, minimize and remediate pollution and degradation;
- Avoid and minimize the creation of waste and to promote recycling and re-use where possible;
- Negative environmental impacts must be anticipated and prevented where possible, and where that is not possible, impacts must be minimised and remedied; and
- The social and economic impacts must also be considered together with environmental impacts of activities when making decisions.

These principles lend themselves to the ideal of Integrated Environmental Management (IEM). A vital component of the IEM principle is accountability to the various parties that may be interested in- or affected by a proposed development. Public participation in the formulation of development proposals is a requirement of the IEM procedure, in terms of the identification of truly significant environmental impacts by Interested and Affected Parties (IAPs).

The IEM procedure is designed to ensure that the environmental consequences of development proposals are understood and adequately considered during the conceptual design process, allowing negative aspects to be resolved or mitigated and positive aspects to be enhanced. It is thus a code of practice for ensuring that environmental considerations are fully integrated into all stages of development, by providing a procedural and regulatory mechanism for EIA's. These regulatory mechanisms are supplied in the form of the EIA Regulations and the subsequent listings which provide a toolkit for the assessment of impacts based on the scope of the project.

Section 28 of NEMA further stipulates that every person who causes-, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. This section has been amended by the National Environmental Laws Amendment Act, No. 14 of 2009, which stipulates (in item 12), that the aforementioned duty of care to remediate applies to any significant pollution or degradation which:

- Occurred before the commencement of the Act;
- Arises or is likely to arise at a different time from the actual activity that caused the contamination; or



- Arises through an act or activity of a person that results in a change to pre-existing contamination.

The EIA Regulations of GN543 of 2010 serve to regulate the procedure and criteria for submitting, processing and considering decisions for applications for environmental authorisation in order to avoid the commencement of activities which may have a detrimental impact on the environment. These Regulations provide details on the process to be followed for the consultation of stakeholders and IAPs, the identification of the Competent Authority and the various timeframes and application requirements for environmental authorisation. A further three Regulations, GNR544, 545, 546, provide lists of activities for which environmental authorisation, either in the form of a Basic Assessment or Scoping and EIA/ EMP, is required before the activity can commence.

The following activities listed in terms of the above are relevant to the proposed Msebe Opencast Anthracite Mine:

**Table 2: Listed activities at the proposed Msebe Opencast Anthracite Mine in terms of the EIA Regulations of 2010**

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
GNR544	11	The construction of: (iv) dams (vi) bulk storm water outlet structures; (x) buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	There are a number of drainage channels within the proposed project area where mining will take place and the associated infrastructure may be located within 32 m of these watercourses.
GNR544	13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	Potential storage of diesel and /or explosives
GNR544	18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (i) a watercourse	There are a number of drainage channels within the proposed project area where opencast mining activities will take place
GNR544	22	The construction of a road, outside urban areas, (ii) where no reserve exists where the	For the construction of proposed haul / access roads which will be greater than 8 m wide

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
		road is wider than 8 metres	
GNR545	5	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of Section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	During a meeting held with KZNDAE regarding the applicability of this listed activity in relation to Section 21G Water Uses applied for at the adjacent Mbila Anthracite Mine, the Department was of the impression that this was not applicable. While the same may be true for the proposed Msebe Opencast Mining Activities, the listed activity is included herein for completeness and can be removed if necessary following review by the State Departments.
GNR545	15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: <ul style="list-style-type: none"> <li>(i) linear development activities; or</li> <li>(ii) agriculture or afforestation where activity 16 in this Schedule will apply.</li> </ul>	The footprint proposed for the development of the Msebe Opencast Anthracite Mine will be upon vacant/undeveloped land and will occupy a surface area of approximately 210 Ha.
GN546	14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: <ul style="list-style-type: none"> <li>(i) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes;</li> <li>(ii) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59</li> </ul>	From the baseline studies GN546 No 14 could be applicable as there is a possibility that the vegetation cover at the proposed project area is 75% or more. The vegetation was found to be indigenous. However, the Department can provide further indication on the applicability hereof during the review of the draft scoping report.

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
		<p>of 2008) in which case the activity is regarded to be excluded from this list;</p> <p>(iii) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010.</p> <p>(a) In Eastern Cape, Free State, KwaZulu-Natal, Gauteng, Limpopo, Mpumalanga, Northern Cape, Northwest and Western Cape:</p> <p>(i) All areas outside urban areas.</p>	

In terms of Part 2 of GNR543, Section 20(2) (c) stipulates that a Scoping, EIA and EMP process in terms of Part 3 of GNR543 must be followed if the application pertains to two or more activities as part of the same development and any of the activities is listed in terms of GNR545, as is the case (refer to Table 2).

An application for Environmental Authorisation for the aforementioned activities has been accepted by the KZNDAE on 18 December 2013 and has been allocated the reference number DC26/0028/2013.

This Scoping Report has been prepared to meet the requirements of GNR543, Section 28, as indicated below:

GNR543 SECTION 28	CONTENTS	CHAPTER
1(a)(i) and (ii)	Details of the Environmental Assessment Practitioner (EAP) who prepared the report and the expertise of the EAP to carry out scoping procedures	1.2
1(b)	A description of the proposed activity	4
1(c)	A description of any feasible and reasonable alternatives that have been identified	5
1(d)	A description of the property upon which the mining activities are to be undertaken and the location of the activity on that property	1.3
1(e)	A description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment	3
1(f)	A description of the applicable legislation and guidelines	1.4
1(g)	A description of environmental issues and potential impacts, including cumulative impacts that have been identified	8
1(h)(i) - (iv)	Details of the public consultation process conducted	7
1(i)	A description of the need and desirability of the proposed activity	6.1
1(j)	Potential alternatives to the project and the associated advantages, disadvantages as regards the community and	5

GNR543 SECTION 28	CONTENTS	CHAPTER
	environment;	
1(k)	Copies of any representations, and comments received in connection with the application or the scoping report from interested and affected parties	Appendix 12 Comments and Response Report
1(l)	Copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants	
1(m)	Any responses by the EAP to those representations and comments and views	Appendix 12 Comments and Response Report
1(n)(i) - (iv)	A plan of study for the assessment phase	9
1(o)	Any specific information required by the competent authority	None
1(p)	Any other matters required in terms of sections 24(4)(a) and (b) of the Act	Specialist Studies Appendix 2-10

#### 1.4.4 National Environmental Management: Air Quality Act (No. 39 of 2004)

The National Environmental Management Air Quality Act (NEMAQA) has placed the responsibility for air quality management on local authorities that will be tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and emissions reduction strategies. The main objective of the Act is to ensure the protection of the environment and human health through reasonable measures of air pollution control within the sustainable (economic, social and ecological) development framework.

NEMAQA commenced on the 11th of September 2005 with the exclusion of the sections pertaining to the listing of activities and the issuing of atmospheric emissions licenses. The Atmospheric Pollution Prevention Act No. 45 of 1965 (APPA) was repealed on the 1st of April 2010, therefore fully enacting NEMAQA. GN893 of 2013 provides the list of activities in terms of Section 21(1) (a) for which a license is required in terms of Chapter 5 of the Act. This notice further establishes minimum emission standards for the listed activities. **None of the activities in terms of the above schedule will be triggered by the proposed Msebe Opencast Anthracite Mine.**

The ambient air quality standards (GN1210 of 2009) were determined based on international best practice for PM<sub>10</sub> (particulates with an aerodynamic diameter of 10 micron), dust-fall, sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), carbon monoxide (CO), lead (Pb), benzene and recently PM<sub>2.5</sub>. The PM<sub>2.5</sub> standards were published in GN486 of 2012.

**Table 3: National air quality standard for inhalable particulates (PM<sub>10</sub>)**

AVERAGING PERIOD	CONCENTRATION (µG/M <sup>3</sup> )	FREQUENCY OF EXCEEDANCE	COMPLIANCE DATE
24 hour	120	4	Immediate
	75	4	1 Jan 2015
1 year	50	0	Immediate
	40	0	1 Jan 2015

**Table 4: National air quality standard for fine particulates (PM<sub>2.5</sub>)**

<b>AVERAGING PERIOD</b>	<b>CONCENTRATION (µG/M<sup>3</sup>)</b>	<b>FREQUENCY OF EXCEEDANCE</b>	<b>COMPLIANCE DATE</b>
24 hour	65	4	Immediate – 31 Dec 2015
	40	4	1 Jan 2016 – 31 Dec 2029
	25	4	1 Jan 2030
1 year	25	0	Immediate – 31 Dec 2015
	20	0	1 Jan 2016 – 31 Dec 2029
	15	0	1 Jan 2030

Section 32 of NEMAQA allows for the promulgation of measures to control and monitor dust. The National Dust Control Regulations (GNR827 of 2013) prescribe general measures for the control of dust in all areas, including residential and light commercial areas. In addition, the Regulations propose the prohibition of dust pollution above specified levels and the establishment of criminal liability for noncompliance, as well as new tools for air quality officers to better monitor dust emissions.

Air quality monitoring and management measures will be stipulated in the EMP to ensure the applicant complies with the above legislative requirements following a specialist study to determine the likely impacts to air quality resulting from the proposed activities at the Msebe Anthracite Mine.

#### **1.4.5 The National Heritage Resources Act (No. 25 of 1999)**

The National Heritage Resources Act (NHRA) serves to protect and manage the South African heritage and cultural resources. These resources included places, buildings, structures and equipment of cultural significance, historical settlements and townscapes, archaeological and paleontological sites, graves and burial grounds. The Act protects any heritage resources from damage by developments by stipulating in Section 38 that any person intending on undertaking any form of development which involves the activities listed below must, at the earliest stage of initiation, notify the Amafa, the KwaZulu-Natal branch of the South African Heritage Resources Association (SAHRA):

- A. the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- B. the construction of a bridge or similar structure exceeding 50 m in length;
- C. any development or other activity which will change the character of a site—
  - i. exceeding 5 000 m<sup>2</sup> in extent; or
  - ii. involving three or more existing erven or subdivisions thereof; or
  - iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  - iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

- D. the re-zoning of a site exceeding 10 000 m<sup>2</sup> in extent; or
- E. any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority

Of the developments listed above, items A and C (i) are invoked for the proposed Msebe Opencast Anthracite Mine. Section 38(8) of the Act states that if heritage considerations are taken into account as part of an application process undertaken in terms of NEMA and the EIA process, there is no need to undertake a separate application in terms of the NHRA. Heritage considerations will form part of this environmental process. In terms of the requirements of the NHRA, a specialist cultural and heritage consultant and a palaeontology consultant were appointed to conduct baseline assessments of the area. No sites of archaeological, cultural or heritage significance were identified as being directly affected by the proposed development i.e. as being situated directly within the development footprint the proposed project area. Three grave yards, which are always regarded as having a high cultural significance, were found near to the area; however the cultural heritage impact assessment concluded that the proposed development may continue, as these graveyards will not be directly impacted. Mitigation measures for the possible indirect impacts will be indicated in the EMP (refer to Section 3.12 and Appendix 2 for the findings of the specialist assessment). The palaeontology consultant confirmed the presence of fossilised plant material at multiple sites in the area (refer to Section 3.13 and Appendix 3 for the findings of the specialist assessment).

SAHRA (specifically the KwaZulu-Natal branch Amafa) was identified as an IAP and will thus be provided with a copy of the draft Scoping Report for comment.

#### **1.4.6 The National Water Act (No. 36 of 1998)**

The NWA regulates all matters relating to inland water resources. It thus operates as a management instrument with the lead authority being the Department of Water Affairs (DWA). This Act provides mechanisms for the prevention of the pollution of water resources to support the management of water as a renewable resource. Section 21 of the Act lists water uses for which authorisation is required from the DWA, while Section 39 identifies several water uses where the need for a license is dispensed with. The use of water for which a license is not required is also described.

Regulation GN704 of 1999 provides regulations for the use of water for mining and related activities and is aimed to further protect water resources. These regulations describe how mining activities should be managed to protect water resources. The Act thus plays a crucial role in the mining process as many mining-related activities use water as listed in Section 21, thereby requiring approval from DWA. Refer to Section 3.7.4 and Appendix 4 for a detailed description of the surface water resources within the proposed project area.

The following water uses thus apply to the proposed Msebe Opencast Anthracite Mine and will be included in the WULA:

**Table 5: Description of the water uses which apply to the proposed Msebe Opencast Mining Activities**

SECTION 21 WATER USE		DESCRIPTION OF WATER USES FOR THE PROPOSED MSEBE OPENCAST MINING ACTIVITIES	
NO.	NARRATIVE		
21(c)	Construction of the overburden dumps within 500m of a watercourse	Soft and hard overburden dumps	Proposed location of the overburden dumps is situated within 500m of the Mpuphusi River.
21(i)	Altering the characteristics of a watercourse	Soft and hard overburden dumps	Proposed location of the overburden dumps is situated within 500m of the Mpuphusi River.
21(c) + (i)	Altering the bed, banks or characteristics of a water course or impeding the flow of water within a watercourse	Culverts / stream crossings	There are numerous drainage channels located within the proposed project area which will be mined out as a result of the proposed opencast mining activities.
21(g)	The temporary handling or disposal of waste or water containing waste in a manner which may detrimentally impact on a water resource.	Overburden Dump	Excess material from the area east of the anticline axis will be placed on a surface dump until closure. Backfilling for the remainder of the overburden.
		Pollution control dam	The pollution control dam will serve to receive surface water run-off from the mining area (including any contaminated run-off) as well as any water abstracted from the opencast pit.
		ROM Stockpile	ROM stockpile to be located in the surface infrastructure area.
21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource.	Dust Suppression	Water from the PCD will be utilised for dust suppression. This water will be collected by a bowser and used for dust suppression on site upon all unpaved haul and access roads within the dirty water catchment.
21(j)	Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons.	Dewatering of Opencast Pit	Water removed from the opencast pit is discharged the PCD for re-use in dust suppression activities.

#### 1.4.7 The National Environmental Management: Waste Act (No. 59 of 2008)

This Act serves to reform the laws regulating waste management in order to protect public and environmental health by providing measures for the prevention of pollution and ecological degradation and to provide defining requirements for the licensing and control of waste management activities.

This Act succeeds Section 20 of the Environmental Conservation Act, no. 73 of 1989 and provides measures for waste management covering the various aspects of activities which generate waste. The Act (GN921 of 2013) provides definitions for activities which require a waste management license while also identifying the relevant environmental authorisations which are further required for said activities. The Act also provides national norms and standards for the storage of waste above the license thresholds (GN926 of 2013).

The applicable activities at the mine pertain to the temporary handling and transfer facilities for general and hazardous waste storage at the mine, however, the Applicant will endeavour to store less than 100 m<sup>3</sup> of general waste and less than 80 m<sup>3</sup> of hazardous waste at the transfer facilities at any given time, thereby remaining below the license thresholds or if these thresholds are exceeded at any given time to ensure that waste is on temporarily stored (less than 90 days). If, however, these limits are too prohibitive to operations, a Waste Management License will be applied for.

#### **1.4.8 Hazardous Substances Act (No. 15 of 1973)**

This Act aims to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitising or flammable nature, or by the generation of pressure. The Act provides for the division of such substances or products into groups in relation to the degree of danger as well as the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products. Hazardous materials such hydrocarbons will be stored and handled on site. The Applicant will ensure that any hazardous materials on site are handled and stored in a manner in line with that described in the Act.

#### **1.4.9 The National Environmental Management: Biodiversity Act (No. 10 of 2004)**

The purpose of the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act (107 of 1998). This includes: the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity Institute (SANBI).

The Act stipulates that a National Biodiversity Framework must be adopted, which provides for the identification of priority areas for conservation, as well as an integrated, co-ordinated and uniform approach to biodiversity management in protected areas. It should also reflect regional co-operation with respect to biodiversity management. The goal of biodiversity management in these bioregions must be aimed at ensuring the long-term survival of species in nature.

Section 52 of the Act provides for listing of threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems. Threatened terrestrial ecosystems have been delineated based on the South African Vegetation Map, national forest types



and priority areas identified in a provincial systematic biodiversity plan, in this case the Ezemvelo KZN Wildlife (EKZNW) Conservation Plan (C-plan). The proposed project area is located within the Zululand Lowveld ecosystem which is not currently listed in terms of Section 52 of NEMBA.

Chapter 4, Part 2 of the Act provides for listing of species as threatened or protected. If a species is listed as threatened, it must be further classified as critically endangered, endangered or vulnerable (GNR151 of 2007). The Act also defines restricted activities in relation to a specimen of a listed threatened or protected species (GNR152 of 2007). Two floral species of conservation concern, *Hypoxis hemerocallidea* (an extensive population of more than 200 individuals) and *Boophone disticha*, both currently listed as declining, were confirmed to be present within the proposed project area. There is also a high likelihood of *Albizia suluensis* (Endangered) and *Drimia elata* (Data Deficient- Taxonomic) occurring within the proposed project area. Many faunal species were recorded within the proposed project area including four avifaunal species- and one bat species, *Eidolon helvum* currently listed as Near Threatened, of conservation concern. The proposed project area was also considered suitable habitat for additional mammal and bird species of conservation concern. Refer to Section 3.7.1 and Appendix 5 for detailed findings of the floral assessment and Section 3.7.2 and Appendix 6 for the faunal assessment. A permit in terms of NEMBA issued by Ezemvelo KZN Wildlife will be required if any of the species of conservation concern are to be damaged or removed.

#### **1.4.10 The KwaZulu-Natal Nature Conservation Management Amendment Act (No. 5 of 1999)**

Eight floral species identified within the proposed project area are not threatened in terms of NEMBA but are protected by Schedule 6 and 7 of the KwaZulu-Natal Nature Conservation Management Amendment Act, (No. 5 of 1999); these include *Ammocharis coranica*, *Eulophia petersii*, *Gladiolus sp.*, *Huernia sp.*, *Ornithogalum saundersiae*, *Polystachya c.f. transvaalense*, *Stapelia sp.* and *Urginea sp.* The two floral species of conservation concern, *Hypoxis hemerocallidea* and *Boophone disticha*, recorded within the proposed project area, are also provincially protected. Refer to Section 3.7.1 and Appendix 5 for detailed findings of the floral assessment. Damaging or removing any of the above mentioned protected species will require a permit issued by Ezemvelo KZN Wildlife.

In addition to the above mentioned floral species the provincially protected *Sylvicapra grimmia* (Common Duiker) was also identified within the proposed project area. Refer to Section 3.7.2 and Appendix 6 for the faunal assessment. A permit is required from Ezemvelo KZN Wildlife to hunt/remove this species.

#### **1.4.11 The National Forest Act, 1998 (No. 84 of 1998)**

The National Forest Act, 1998 (No. 84 of 1998) enforces the protection of a number of indigenous trees. The removal, thinning or relocation of protected trees will require a permit from the Department of Agriculture, Forestry and Fisheries (DAFF). Two nationally protected tree species, *Sclerocarya birrea* and *Sideroxylon inerme* were common throughout the proposed project area. Refer to Section 3.7.1 for detailed findings of the floral assessment.

#### **1.4.12 Mine Health and Safety Act (No. 29 of 1996)**

The Mine Health and Safety Act and the Regulations (GNR992 of 1970 and GNR93 of 1997) provide for protection of the health and safety of employees and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; to promote training and human resources development; to regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety; to ingrain the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations of the Republic relating to mining health and safety. The Applicant will ensure that operations on site are in line with the requirements of the Act and Regulations.

## 2 METHODOLOGY APPLIED TO CONDUCT SCOPING

The environmental process to be followed has been based on the requirements as stipulated in NEMA and the EIA Regulations (GN543 of 2010) and further aligned with the requirements of the MPRDA and the Regulations thereof (GN527 of 2004). This report presents the latest available findings of the scoping phase.

A description of the proposed development, which was provided by the client, gives the outcomes of the design and planning phase. A desktop study was conducted in order to gather as much baseline information regarding the proposed project area as possible. The layout plan was imported into a Geographic Information System (GIS) where it was overlaid with layers from existing databases in terms of land use, geology, climatic data, topography, soils, vegetation types and sensitive areas.

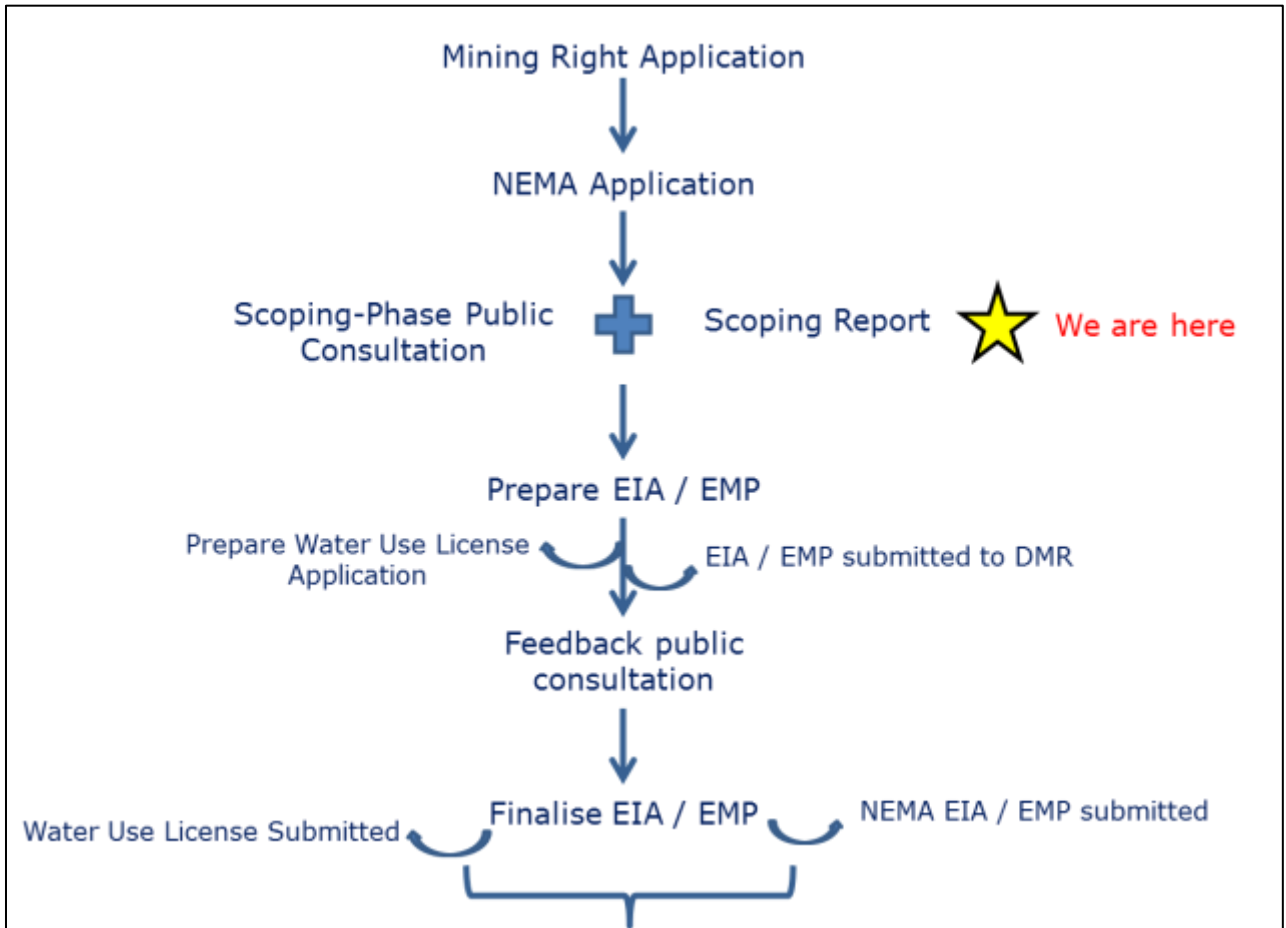
The above data was then elaborated further with information from the public domain and internet resources as well as with data gathered for the adjacent proposed Mbila Anthracite Mine.

From the above, it was inferred where further specialist input would be required in order to characterise the baseline environment. The studies commissioned in this regard included hydrology, groundwater, terrestrial and aquatic ecology, soil, wetlands, paleontological / cultural / heritage resources, traffic, noise and air quality.

The baseline information, project description, applicable legislation and potential impacts will be utilised to inform a public consultation process (see Section 7 below) to inform surrounding landowners, nearby communities, the state department and any other IAPs of the proposed development and to gather issues, comments and concerns. The draft Scoping Report will be made available for comment in this regard.

Following public and state department review and consideration of the draft Scoping Report period, the draft Scoping Report will be updated to include the outcomes of the public consultation process so as to further define the requirements for the tasks to be conducted in terms of the EIA. The purpose of this document is to incorporate all findings (including outcomes of public consultation) at the scoping level and the final Scoping Report will be further provided for review and comment to all state department and IAPs for a period of 21-days.

The process to be followed is outlined below:



### 3 DESCRIPTION OF THE PRE-OPERATION ENVIRONMENT

#### 3.1 Introduction

This Section serves to briefly summarise the baseline environment for the proposed Msebe Opencast Anthracite Mine, both from desktop research and the available specialist studies conducted for the adjacent proposed Mbila Anthracite Mine, as well as specialist studies conducted for the proposed Msebe project area. This section will also highlight any sensitive environments identified.

#### 3.2 Climate

According to the specialist surface water and hydrology assessment report, compiled by African Environmental Development in February 2014 (attached as Appendix 4), the closest meteorological gauging station to the proposed project area is at Charters Creek, St Lucia (W3E001) in quaternary catchment W32H, 74 km east-southeast of the proposed project area. The rainfall and evaporation data was obtained from the above mentioned Charters Creek station. However, due to the distance of the station from the proposed project area, the rainfall curve was amended to reflect the true rainfall for the proposed project area. The average monthly rainfall for the proposed project area can be seen in Table 6 below.

**Table 6: Average monthly rainfall for the proposed project area**

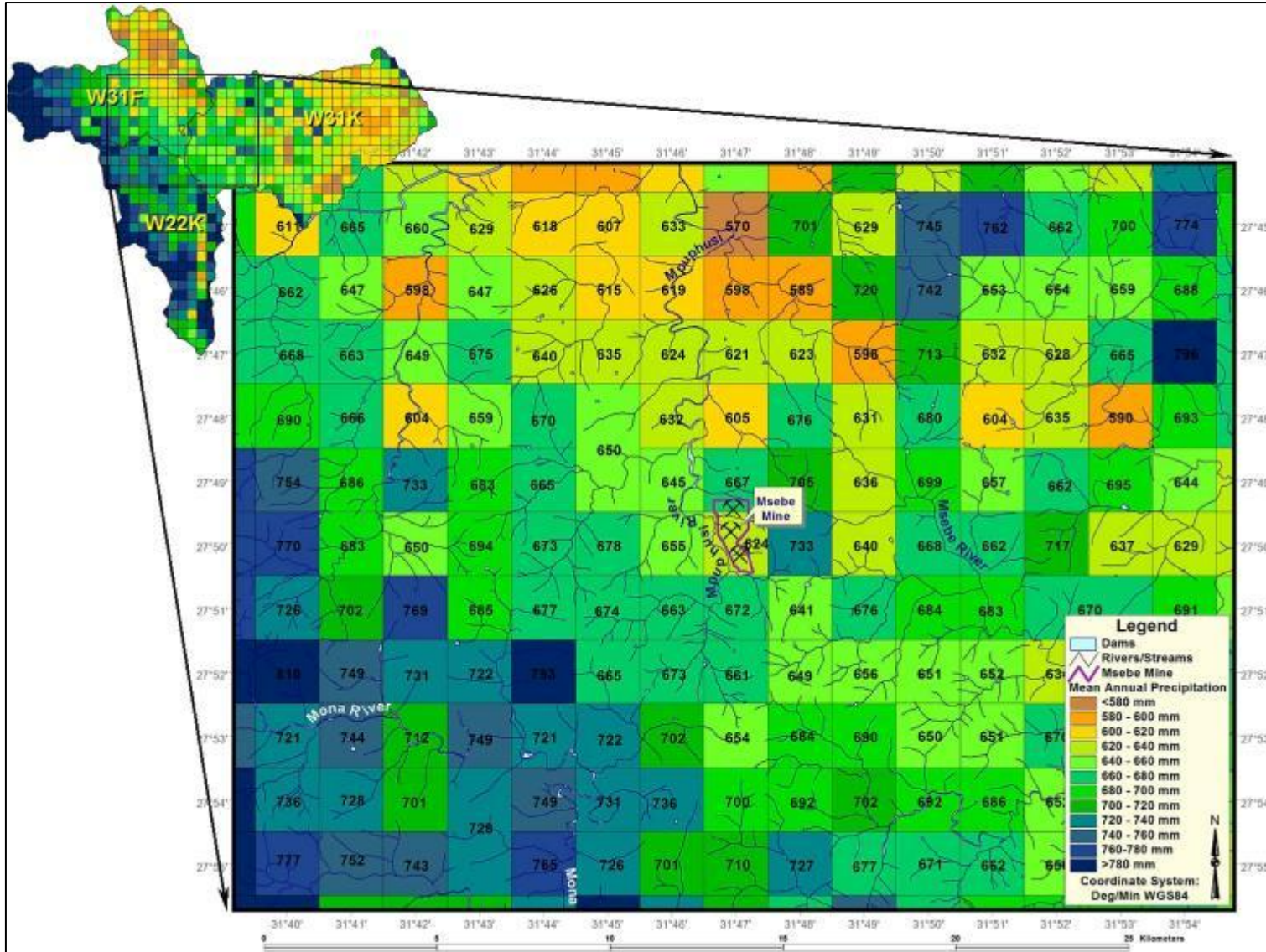
MONTH	RAINFALL (mm)
January	102
February	93
March	76
April	54
May	32
June	14
July	4
August	7
September	26
October	38
November	79
December	99
<b>Total</b>	<b>624</b>

The mean annual precipitation (MAP) at the proposed project area is between 624 and 667 mm/a, which is lower than the MAP of 692 mm average for quaternary catchment W31F, as a result of the much higher rainfall in the western parts of this catchment (Figure 3).

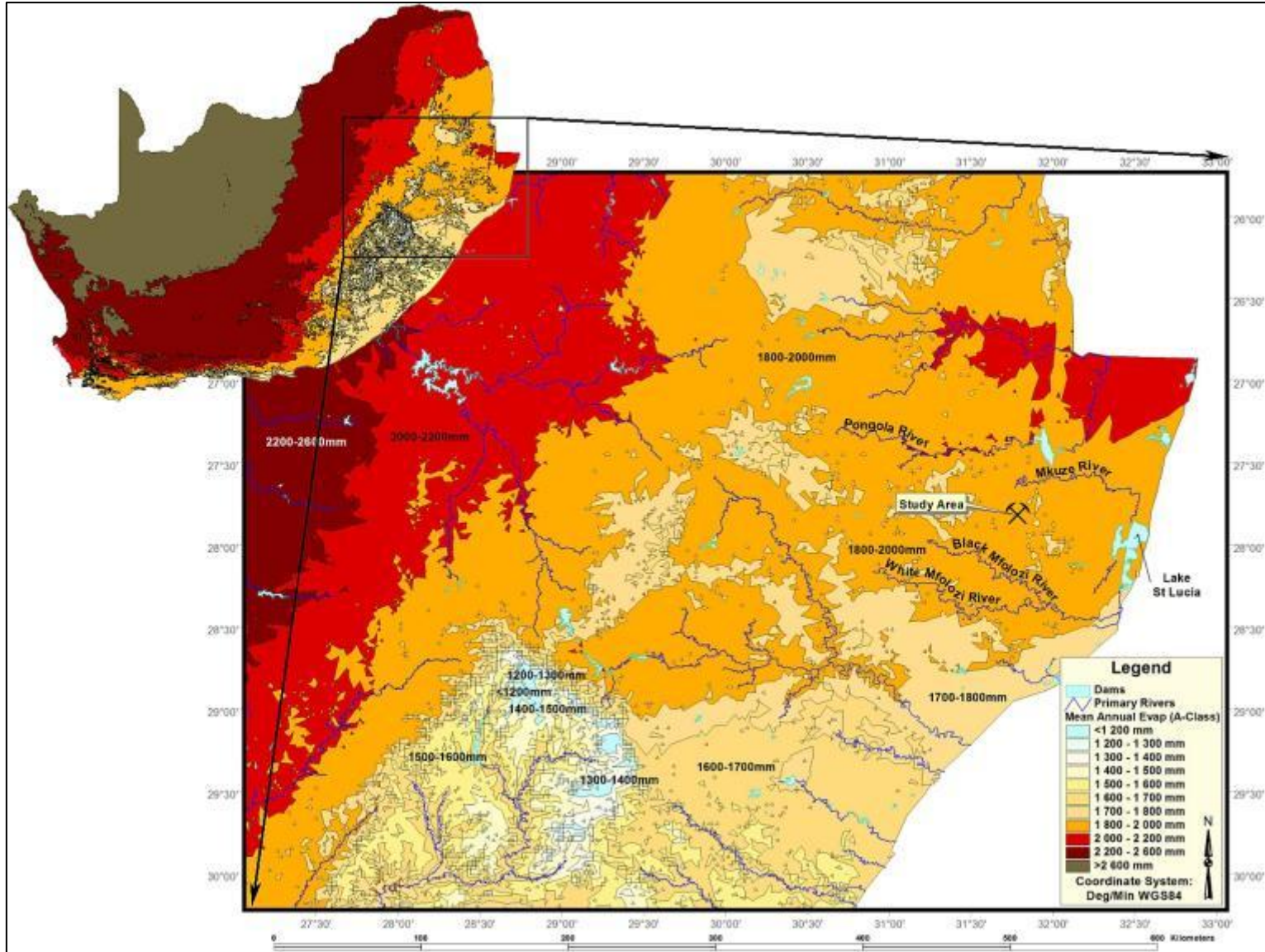
The average A-class Pan evaporation rate at the Charters Creek station, St Lucia (W3E001) is 1521 mm/a. This value is slightly lower than the values recorded in Figure 4 (1 800 to 2 000 mm).

According to the SA Explorer the minimum and maximum midday temperatures of 22.9 °C and 29.5 °C occur in June and January respectively.

Wind data was obtained from the South African Weather Services station at Pongola. The data revealed that winds throughout the year frequently blow from the south, south-south-east and the north-eastern sector. The windiest seasons are spring and summer and have winds blowing south and south-south east which frequently blow stronger than 3 m/s, sometimes reaching 10 m/s. Winds blowing from the north-east sector usually do not exceed 4 m/s. During winter the winds blow mostly from north-east and east-north-east with a magnitude of less than 3 m/s, winds from the south –south east seldom blow and rarely reach up to 10 m/s. Winds blow more frequently and at greater speeds during the day than at night. The hilly and undulating topography of the proposed project area may also influence local airflow. Airflow will generally be downhill during the night and uphill during the day.



**Figure 3: The mean annual precipitation for the areas surrounding the proposed project area**

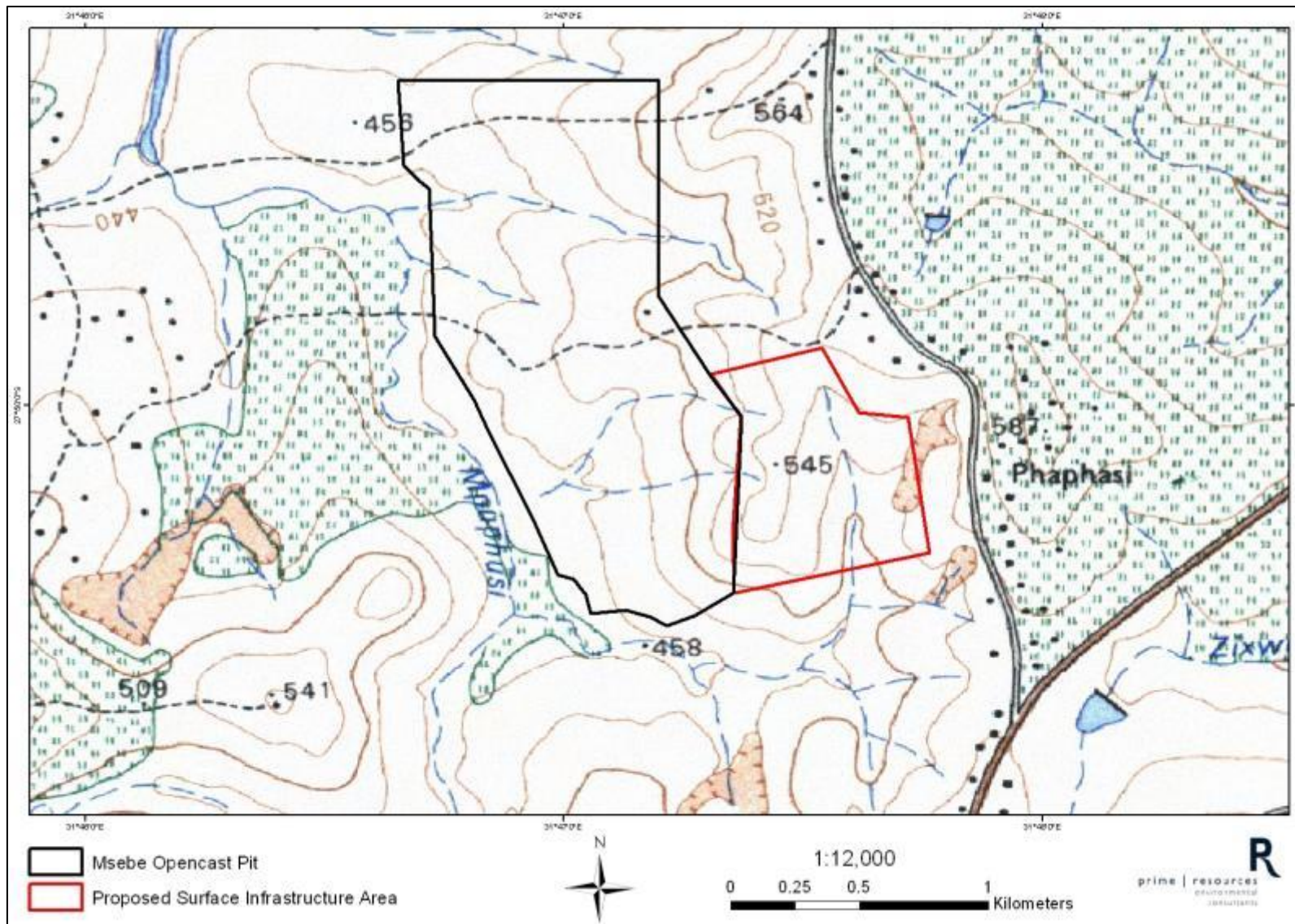


**Figure 4: The average A-Class Pan evaporation rate for the areas surrounding the proposed project area**

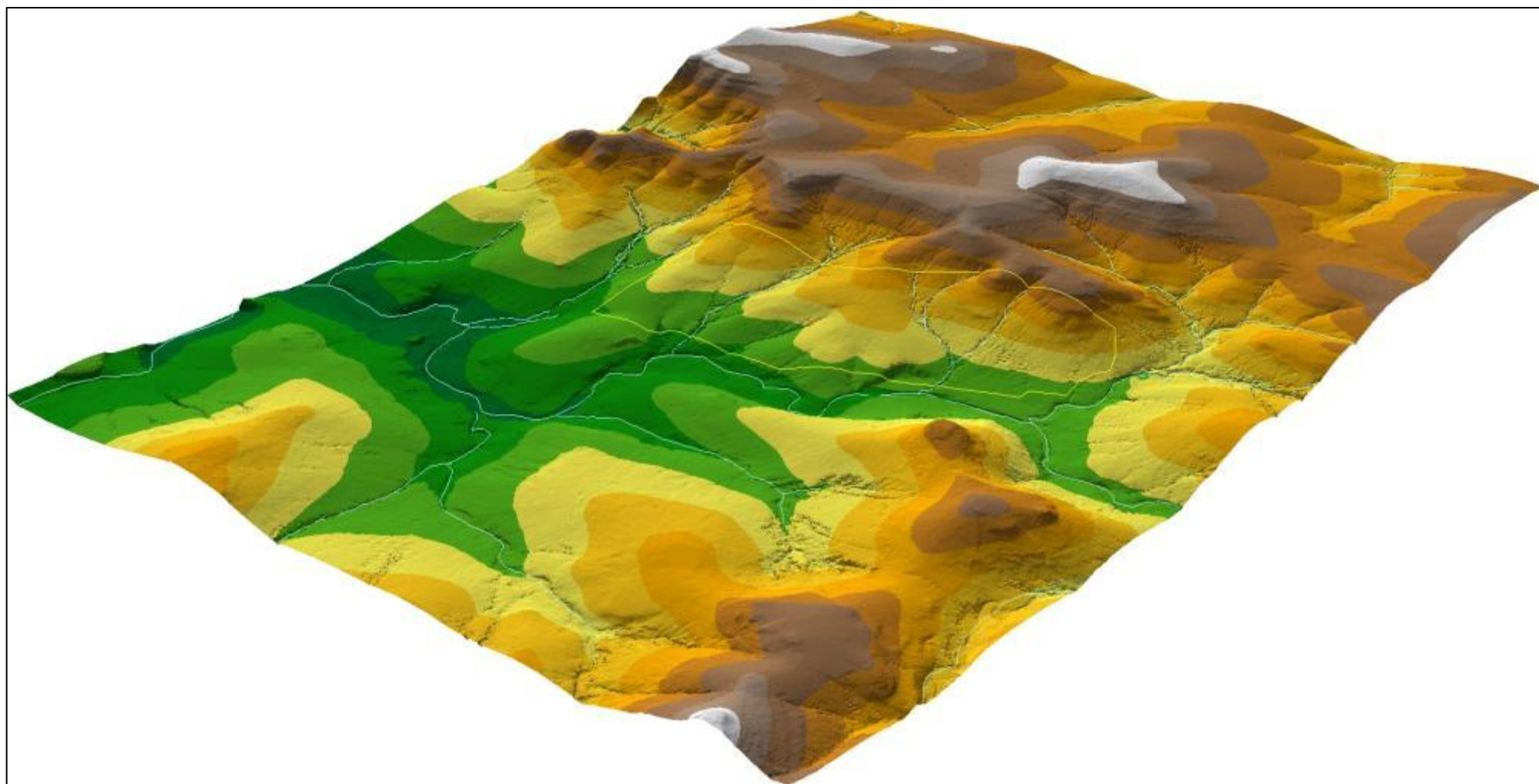


### **3.3 Topography**

The project area located on a portion of Portion 9 of Reserve 12 number 15832 HU is situated in an area characterised by undulating hills punctuated by crests of a small magnitude. There is a general downward steep slope across the proposed project from east to west. The elevation on the eastern portion of the proposed project area is approximately 555 mamsl and the elevation at the banks of the Mpuphusi River at the western portion of the proposed project area is approximately 440 mamsl. The topographical map below (Figure 5) shows the location of the project area in relation to the Mpuphusi River, the surrounding hills and the main transportation route that will be used to haul the coal to the processing plant.



**Figure 5: Topographical map of the proposed project area**



**Figure 6. Topography of the proposed opencast pit (shown in yellow) and the surrounds (from the Baseline Surface Water and Hydrology report using Southern Mapping LiDAR data at 2X exaggeration)**

## **3.4 Geology**

### **3.4.1 Regional Geology**

The regional geology consists of various groups within the Karoo Supergroup as well as numerous dolerite intrusions. The coal field in this region comprises anthracite of a particularly high quality - the resources which are to be mined consist of both the Beaufort and Ecca series (Figure 7). The coal reserves are found in blocks of varying sizes within an area approximately 14 km in length and 12 km wide.

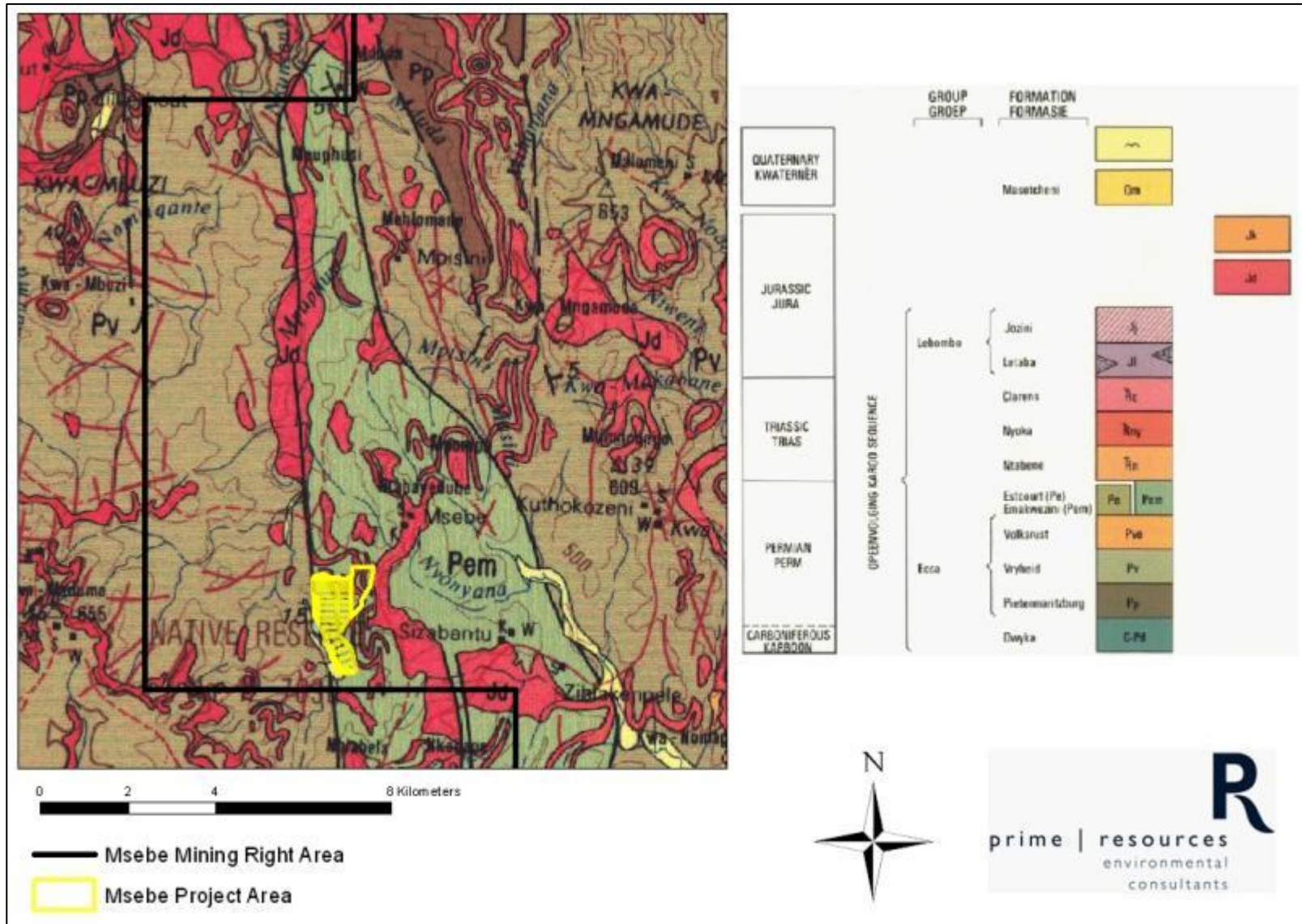
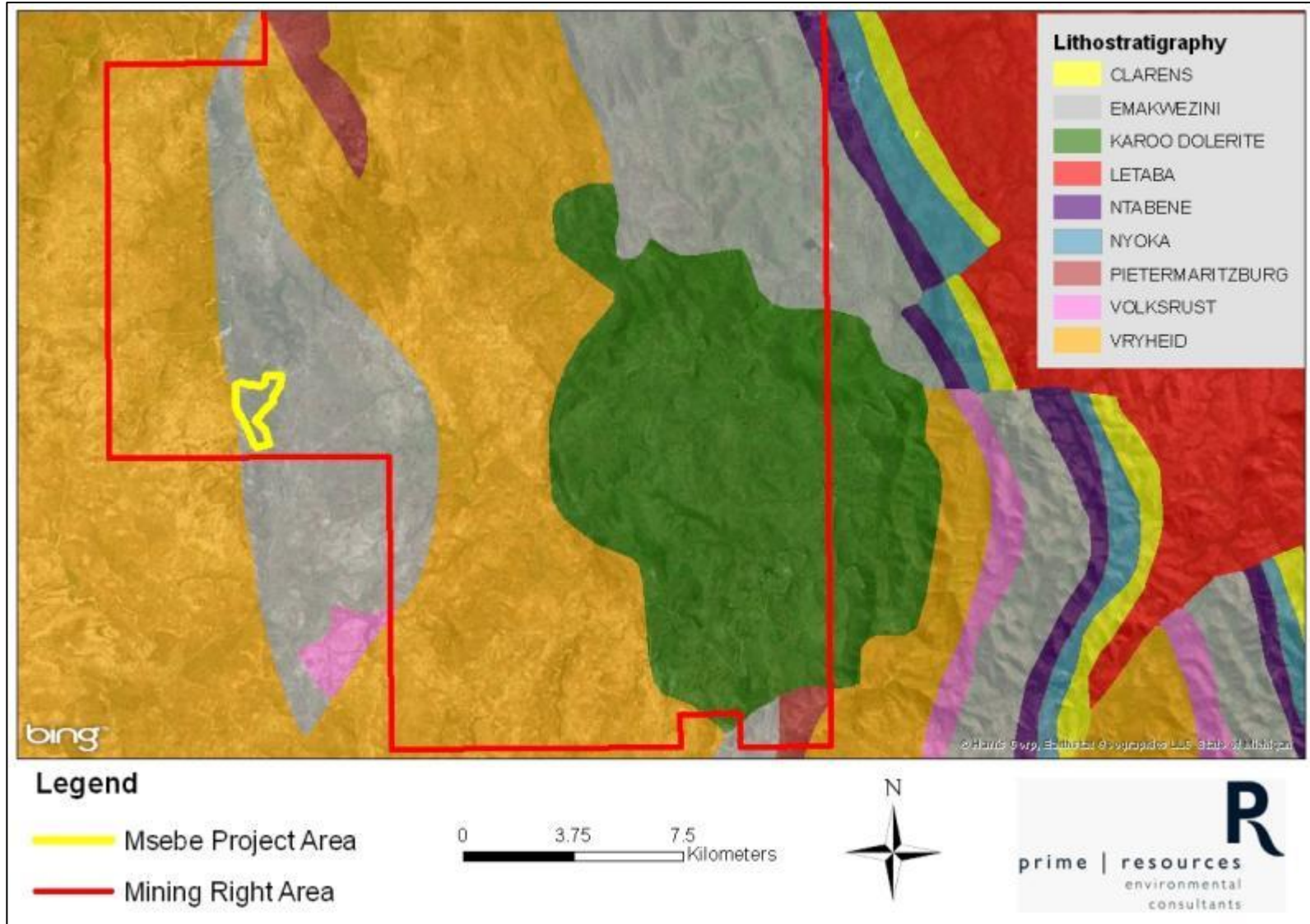


Figure 7: Geological map indicating part of the Msebe Mining Right Area and the actual project area

### **3.4.2 Local Geology**

The Msebe Mining Right Area hosts both Ecca Group and Beaufort Group sediments of the Karoo Supergroup. The proposed Msebe Opencast Mining Activities, located in the south west of the mining right area, lies in an area of the Beaufort Group that has been down-thrown by a major fault causing it to occur at the same modern day topographic elevation as the Ecca Group. Coals in the Beaufort Group are located in the Emakwazini Formation which is stratigraphically situated above the Vryheid Formation of the middle to lower Ecca Group (Figure 8).



**Figure 8: Lithostratigraphy of the target area of this application**

Four main coal seams (or zones) are recognised in the Beaufort Group, namely the A Seam, B Seam, C Seam and D Seam (Figure 9). The B Seam is considered the most economically important with the focus of historical modelling and estimations prioritising it as a target. However more recently the A Seam has also been included as a potential resource.

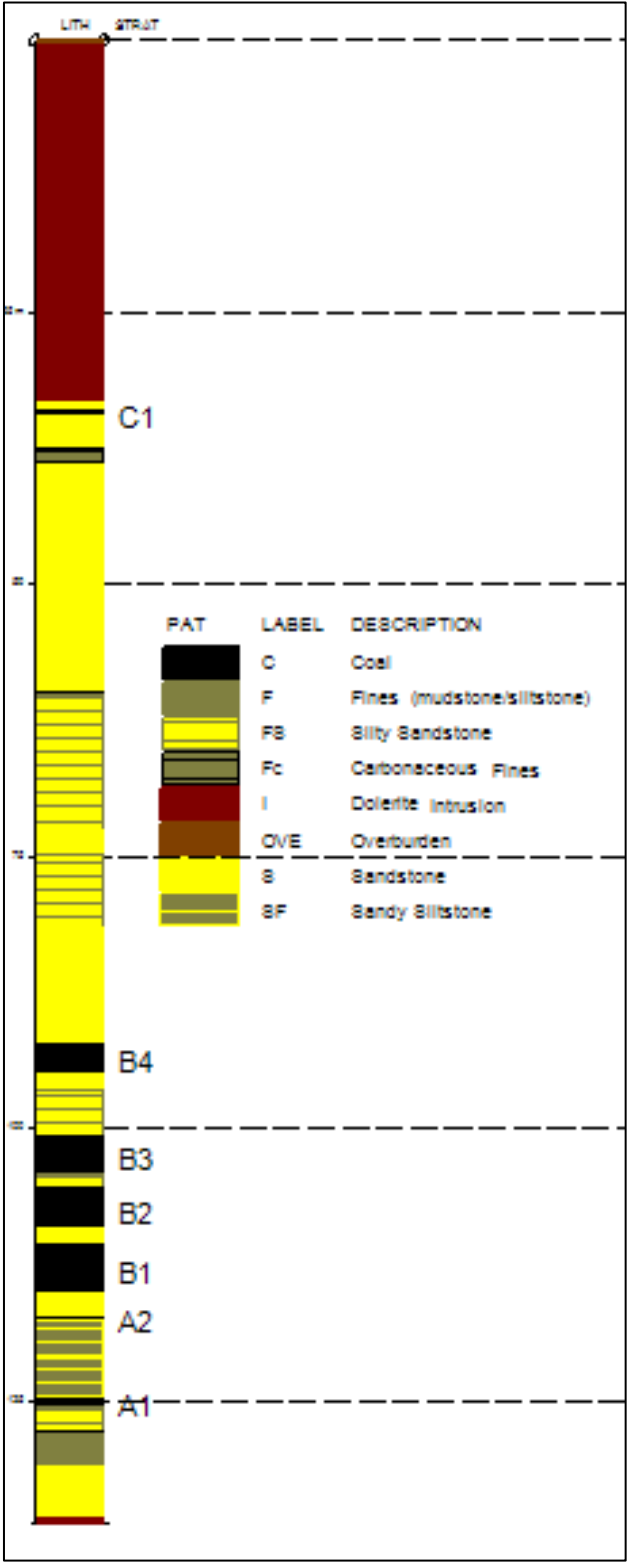


Figure 9: Beaufort Group local stratigraphy

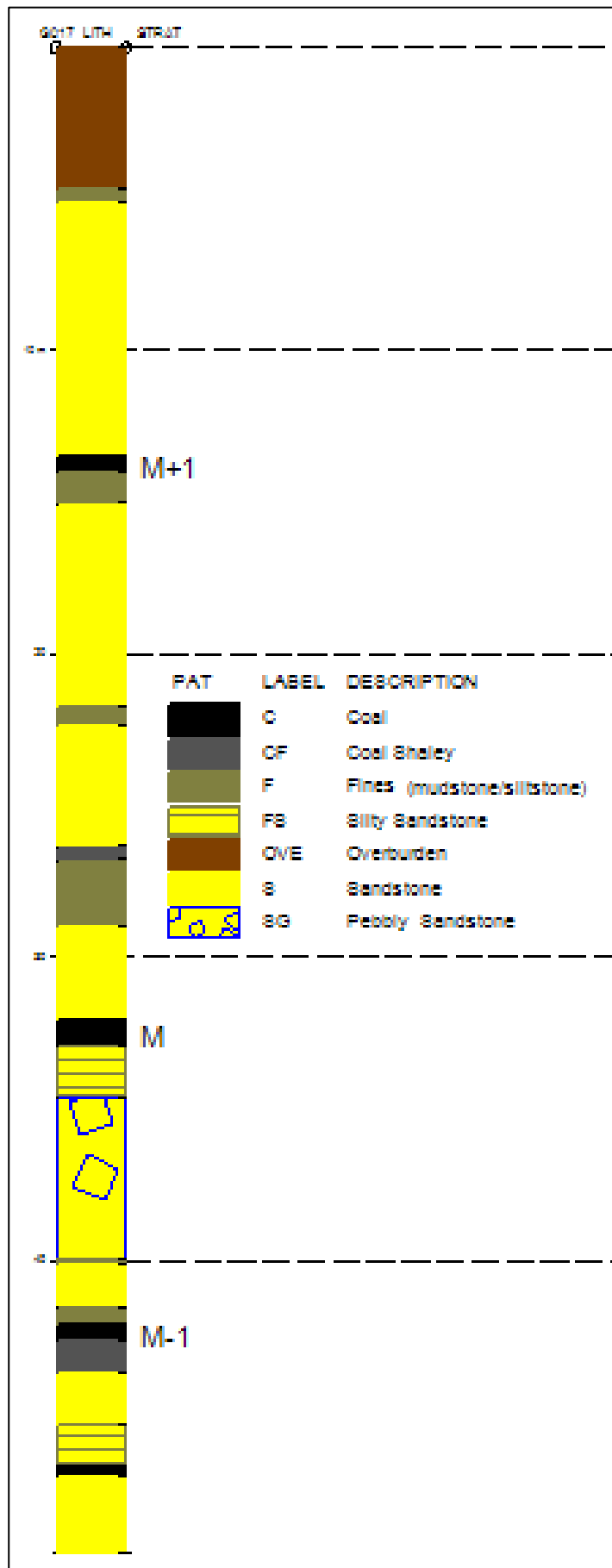


The coal seams in the Beaufort Group are divided into sub-seams which are separated by carbonaceous mudstone partings. The B Seam coal sub-seams are termed the B4, B3, B2 and B1 which have been labelled as such from top to bottom. The B4 occurs approximately 5 m above the B3 and is generally thin (c. 1.8 m) and discontinuous which has historically not been considered part of the economic package. The B3-B1 coal package is on average 12 m thick and the 2.8-3.5 m sub-seams are separated by 0.50-2 m carbonaceous mudstone partings.

Both the roof and floor to the B Seam package are made up of interbedded sandstone-siltstone horizons that are occasionally carbonaceous. The A Seam occurs approximately 20 m below the B1 and is divided into two sub-seams - the A2 and A1 from top to bottom. The A2 varies in thickness from 0.14-4.0 m with an average of 1.3 m while the A1 varies in thickness from 0.34-4.85 m thick with an average of 2.86 m. The A1 is moderate quality coal that requires washing and is overlain by a medium to coarse-grained sandstone. The C Seam occurs approximately 50m above the B4 and is sub-divided into numerous sub-seams. On Mbila up to three sub-seams have been identified - namely C3, C2 and C1 labelled from top to bottom. The coal is thin (0.5 m) and discontinuous and is currently not considered an economic target. The average dip of the Beaufort Group coal is 9° northeast though the coal gently undulates throughout Msebe and the surface topography causes the coal to occur at greater depths towards the south.

In the Ecca Group, coal occurs in the Vryheid Formation, a formation which is characterized by fine-grained mudstone, carbonaceous mudstone and coarse-grained sandstone all of which was deposited in a fluvio-deltaic environment. Three major coal seams occur in the Vryheid Formation of the Nongoma Coalfield, namely the Main Seam ("M Seam"), the M-1 Seam and the M+1 Seam (Figure 10). Of the three seams only the M Seam is of economic importance.

The mining right area contains a major gabbro intrusion in the southeast corner and no coal is expected to occur in this area. The remainder of the property has potential for both Ecca and Beaufort Group coal measures to exist. In particular the Beaufort Group is of interest towards the northeast of the mining right area.



**Figure 10: Ecca Group local stratigraphy**

## 3.5 Soils and Land Capability

The following baseline information was obtained from a specialist soil and agricultural baseline assessment conducted by Mzansi Agriculture in February 2014 for the proposed project area (attached as Appendix 7).

### 3.5.1 Soil Classification

Three soil forms were identified within the proposed project area these are:

#### Mispah Soil Form

- Found in the northern portion of the study site.
- Characterized by very shallow, light, brown soil (orthic) over solid rock.
- Physical properties include a very shallow topsoil profile, a low clay %, a poor available water capacity, a minimal ability to absorb and retain rainwater and thus a high level of rainwater run-off. Soil is unable to either absorb or release moisture and nutrients at any significant level.
- Derived from shale parent material.

#### Milkwood Soil Form

- Found on the midslopes in the southern portion of the site.
- Characterized by dark, shallow, blackish blocky clay covers solid rock, often contains fragments of shale.
- Physical properties include 20 % to 35 % clay content, a good water holding capacity, a medium rainfall intake rate, moderate drainage qualities and a low to moderate erosion hazard.
- Derived from Dolerite parent material.

#### Swartland Soil Form

- Found fringing drainage channels and watercourses in the study site.
- Characterised by dark sandy loam topsoil over blocky clay, soft decomposing rock and gravel.
- Physical properties include high erodibility due to dispersive clays and low organic matter, especially when formed along watercourses and drainage channels.
- Derived from shale parent material.

According to a specialist wetland and riparian baseline assessment conducted by Strategic Environmental Focus in February 2014, no hydric soil types were found to be present within the proposed project area. The dominant soil forms identified included Mispah, Glenrosa and Oakleaf.

The parentage of the soil at the proposed project area is the Emakwezini Formation of the ECCA Group of the Karroo Sequence (Figure 11). The area is classified as RGd- Dystric Regosols according to the Soil and Terrain database (SOTER) for South Africa (Figure 11).

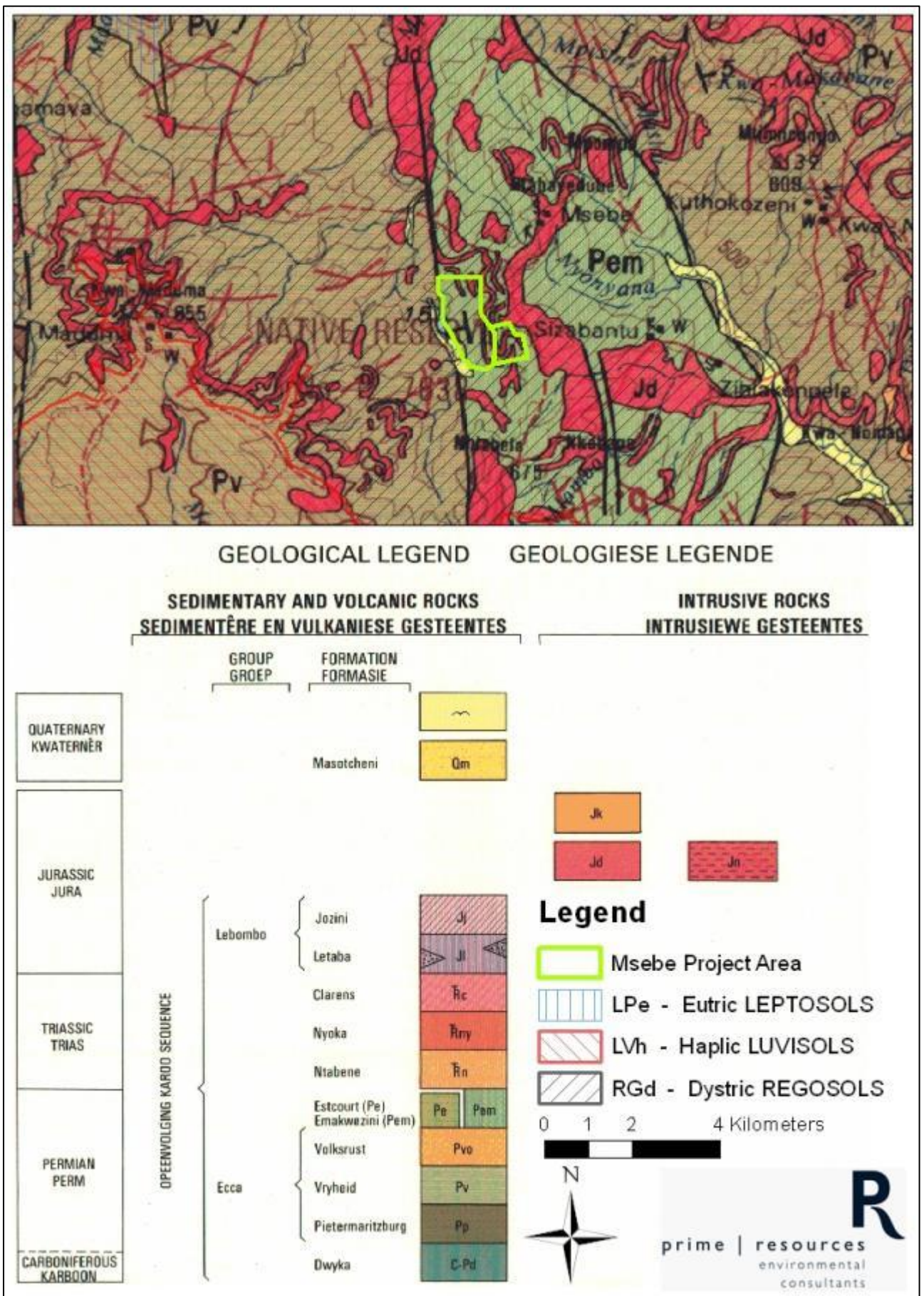


Figure 11: Soil Parent Materials Map

### **3.5.2 Soil Erosion Sensitivity**

There is a broad band of steep land that runs parallel to and above the proposed project area and the soils are shallow and can only hold a few millimetres of rainwater and the vegetation is sparse and cannot arrest or disperse flow which results in high levels of rainwater run-off during rainfall events.

The effects of unsustainable agricultural activities can be seen in the extensive drainage channel development along the watercourses and drainage channels in the area. Such unsustainable agricultural activities include former overstocking of the veld coupled to poor management of livestock movement to drinking water, overgrazing and human traffic. Excessive run-off during thunderstorms and associated downpours at the start of the rains results in further erosion. The Swartland Soil Form is more susceptible to erosion in the area due to dispersive clays and low organic matter.

### **3.5.3 Agricultural Potential**

The Southern African Agricultural Geo-referenced Information System (AGIS AGRIC) describes soils in this area as non-arable with a low grazing potential. All the soils occurring in the target site are classified as LCC VII, which can be described as "Too rocky, too steep... suitable only for rough grazing or wildlife conservation". There is also no irrigation water available at the project area and this lack of irrigation water rules out the possibility of any semi-commercial or commercial crop production.

The proposed project area currently hosts grazers and browsers and small domestic crops/gardens which were noted to be in a good condition. There is also a large cattle kraal. The proposed project area also hosts many indigenous plants which are valuable in terms of traditional medicine.

The specialist soil and agriculture baseline assessment concluded that the combined physical properties of the soils and the hostile climate result in an environment that cannot under any circumstances support cultivated crops. These soils are suitable for livestock and game only.

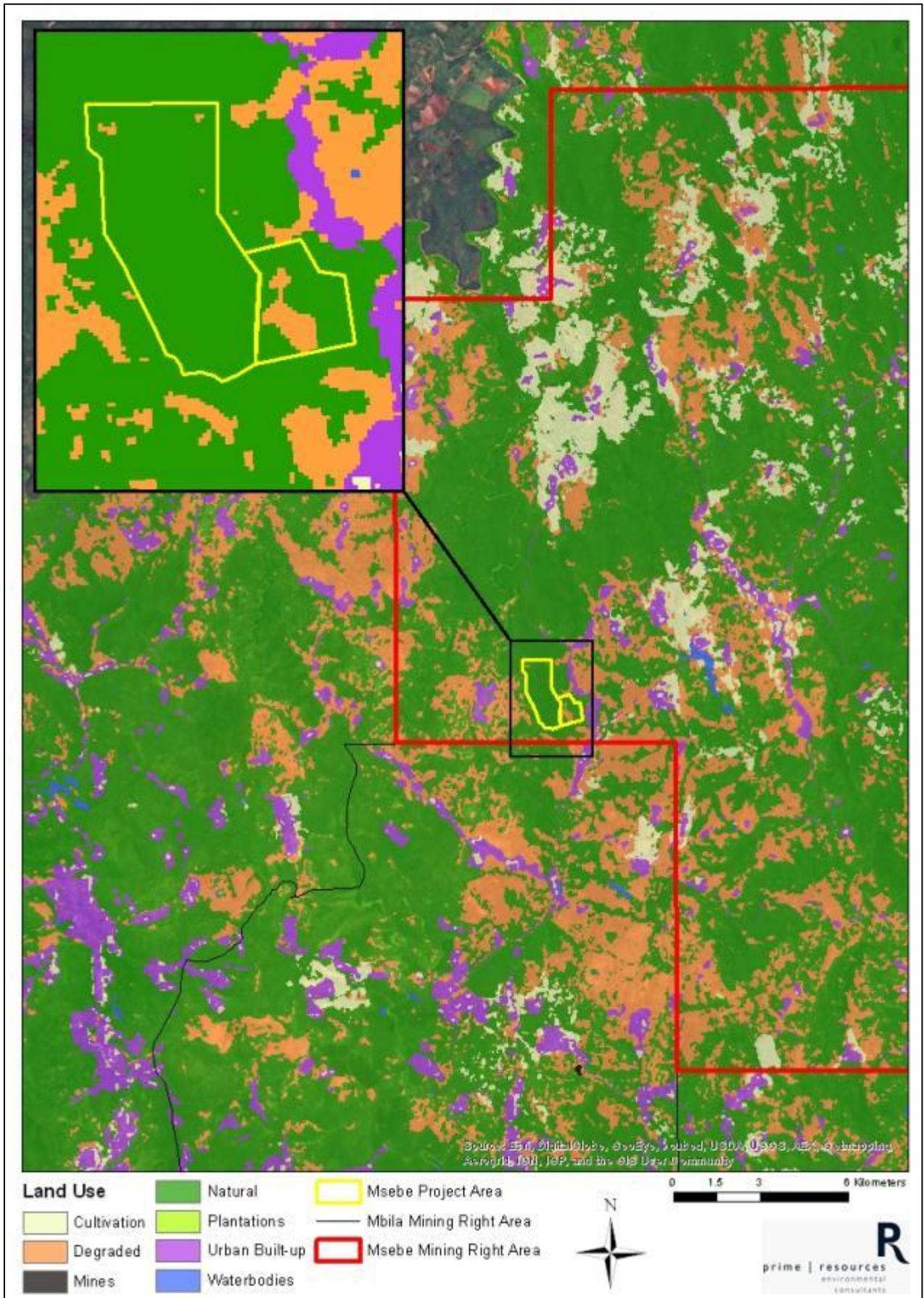
### 3.6 Land Cover and Land Use

Approximately half of the Zululand District Municipality falls under the jurisdiction of traditional authorities, the remainder being privately owned commercial farms or protected areas. The Msebe Opencast Anthracite Mine falls entirely within the Mandlakazi Traditional Authority area which is one of the most remote areas in the KwaZulu-Natal Province.

The land associated with the proposed mining footprint is currently vacant, natural or undisturbed and is utilised for the grazing of livestock and to gather natural vegetation for fuel and medicinal purposes. According to spatial data obtained from SANBI GIS Land Cover Map for Nongoma Municipality, the site for the proposed mining development currently comprises land characterised largely by natural landscape (Figure 12 and Photo 1). Numerous drainage channels and drainage channels have been identified within the proposed project area (Photo 2).

There are numerous settlements and households (Photo 3) involved in small scale agricultural activities in close proximity, but not within the proposed mining footprint. Subsistence farming plots (Photo 4 and Photo 5) also exist within the floodlines near the Mpuphusi River and to the north of the unpaved road (Photo 6) (Figure 13). Some of these farming plots are within the proposed mining footprint in the south west region.

According to a surface water and hydrology specialist study undertaken by African Environmental Development in February 2014 (attached as Appendix 4), the small agricultural fields alongside the Mpuphusi River and some of its tributaries are located in this region as the river flood plains are the only comparatively level surfaces with deep and relatively fertile soil. Most of the surrounding areas are simply too steep or rocky for agricultural purposes. The Mpuphusi River is non-perennial and does not allow for much irrigation.



**Figure 12: SANBI-BGIS Land Cover Map for Nongoma Municipality showing the Land Use within mining right area and the proposed project area**



Photo 1: The proposed project area can be defined as vacant / natural land.



Photo 2: Drainage channels within the proposed project area.



Photo 3: Settlements and households in the vicinity of the proposed project area.



Photo 4: Small-scale agricultural activities within the proposed project area

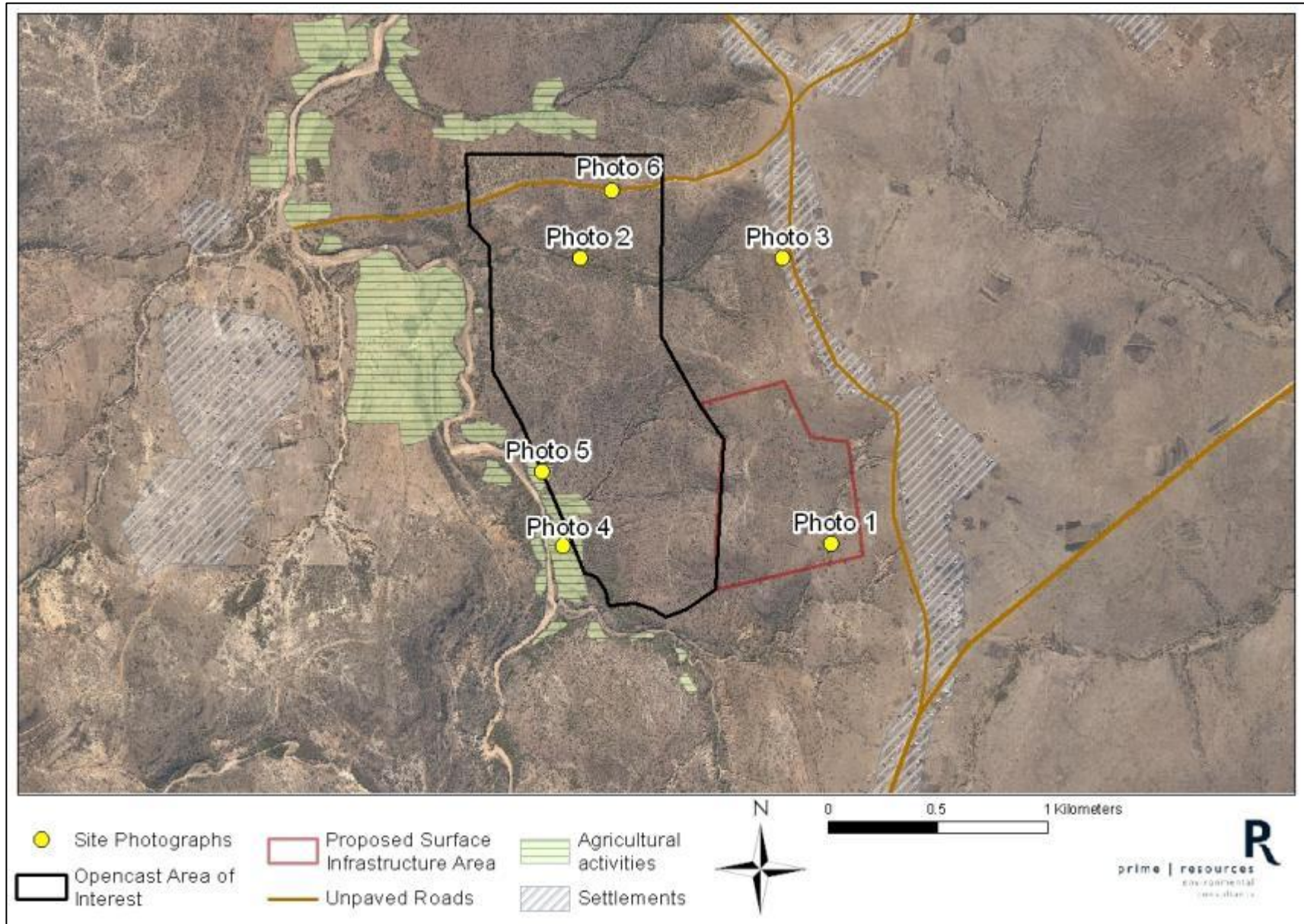


Photo 5: Small-scale agricultural activities within the proposed project area



Photo 6: Unpaved road to the east of the proposed project area.





**Figure 13: Land uses of the proposed project area and surroundings**

## 3.7 Terrestrial Ecology

Specialist ecological assessments were conducted by Strategic Environmental Focus in February 2014 for the proposed project from which the following baseline information was obtained.

### 3.7.1 Flora

According to the specialist floral assessment conducted (attached as Appendix 5) the proposed project area is situated within the Savanna Biome, and the Zululand Lowveld vegetation type (Figure 14). This vegetation type is currently listed as a vulnerable (Figure 14) in KwaZulu-Natal but does not fall within a listed ecosystem in terms of Section 52 of NEMBA. According to the recently updated EKZNW C-plan the proposed project area is located within a biodiversity area (Figure 15) which represents a natural or near natural environmental area which has not been identified for optimisation. Species of conservation concern may still occur within these areas even though these areas are not classified as critical biodiversity areas.

The proposed project area (approximately 205 ha) can be divided into three broad vegetation communities (Figure 16) according to topography and the dominant vegetation type which included drainage channels, *Acacia karoo* (Sweet Thorn)/ *Aloe marlothii* (Mountain Aloe) mixed woodland and modified areas (agriculture and roads).

#### Drainage Channels

Approximately 11 ha of the proposed project area comprised drainage channels. The majority of the drainage channels are affected by extensive erosion, however, those closer to the Mpuphisi River were generally larger and not eroded. Numerous indigenous species were recorded within the drainage channels and ecological function within these areas is intact. Common species identified within the drainage channels included woody species such as *Clausena anisata* (Horsewood), *Berchemia zeyheri* (Ivorywood), *Scythia brachypetala* (Weeping Boerbean), *Spirostachys africana* (Tamboti), *Pyrostria hystrix* (Potato Bush), *Ptaeroxylon obliquum* (Sneezewood), *Allophylus africanus* (African False Currant) and *Scolopia zeyheri* (Thorn Pear). Succulent species associated with the larger drainage channels such as *Euphorbia ingens* (Euphorbia), *Euphorbia grandidens* (Euphorbia), *Euphorbia tirucalli* (Euphorbia), *Aloe rupestris* (Grass Head Aloe), *Stapelia* sp. (Carrion Flowers) (provincially protected) and a *Huernia* sp. (Toad Plant) (provincially protected). The herbaceous layer included *Sansevieria hyacinthoides* (Mother-in-Law's Tongue), *Cissus quadrangularis* (Edible Stemmed Vine) and *Eulophia petersii* (Euphorbia) (provincially protected).

Two nationally protected tree species, *Sclerocarya birrea* (Marula) and *Sideroxylon inerme* (White Milkwood)- and three provincially protected plant species *Eulophia petersii* (Peters' Eulophia), *Stapelia* sp. (Carrion Flowers) and *Huernia* sp. (Toad Plant) were confirmed to be present in some of the drainage channels during the survey. Suitable habitat also exists for one plant species of conservation concern, *Callilepis leptophylla* (Declining), and provincially protected plant species within the genus Hyacinthaceae (Bluebell).

### Acacia karoo (Sweet Thorn)/ Aloe marlothii (Mountain Aloe) Woodland

The majority of the proposed project area (approximately 190 ha) consisted of *Acacia karoo* (Sweet Thorn) / *Aloe marlothii* (Mountain Aloe) mixed woodland. The south eastern portion was affected by anthropogenic activities as wood harvesting and grazing resulting in less dense vegetation within this portion. Despite this, similar species were recorded throughout the area. *Aloe marlothii* (Mountain Aloe) was very common throughout the area and this species is considered to be an important keystone species providing food for various sunbirds and insects as well as providing shelter for mammal species such as *Neoromicia capensis* (Cape Serotine Bat) and various rodent species.

Common species identified within this vegetation community included *Acacia karoo* (Sweet Thorn), *Acacia tortillis* (Umbrella Thorn), *Acacia luederitzii* (Candle Thorn), *Acacia nilotica* (Egyptian Thorn), *Dichrostachys cinerea* (Sicklebush), *Searsia dentata* (Nana-berry), *Ziziphus mucronata* (Buffalo Thorn) and *Combretum molle* (Velvet Bush Willow) within the woody layer. The graminoid layer was not well developed but included species such as *Melinis repens* (Natal Grass), *Heteropogon contortus* (Black Spear-grass), *Chloris virgata* (Feather Finger-grass), *Aristida bipartita* (Three-awned Spear-grass) and *Cymbopogon excavatus* (Broad-leaved Turpentine Grass).

Plant species of conservation concern identified included *Boophone disticha* (Poison Bulb) currently listed as Declining, *Hypoxis hemerocallidea* (Star-flower) currently listed as Declining and *Drimia cf. elata* (Satin Squill) currently listed as Data Deficient Taxonomic. Two nationally protected tree species, *Sclerocarya birrea* (Marula) and *Sideroxylon inerme* (White Milkwood)- and numerous provincially protected species such as *Ammocharis coranica* (Ground Lily), *Boophone disticha* (Poison Bulb), *Drimia cf. elata* (Satin Squill), *Urginea sp.* (Squill), *Hypoxis hemerocallidea* (Star-flower) and *Ornithogalum saundersiae* (Giant Chinchinchee) were recorded within this vegetation community. Suitable habitat also exists for various provincially protected orchid species.

### Modified Areas (Agriculture and Road)

A small portion of the proposed project area (approximately 5 ha) was modified by small agricultural fields, some ploughed and returning to fallow land at the time of the survey, others being utilised for small-scale agricultural / subsistence farming purposes, as well as a road through the northern portion of the proposed area which supported indigenous species along the edges.

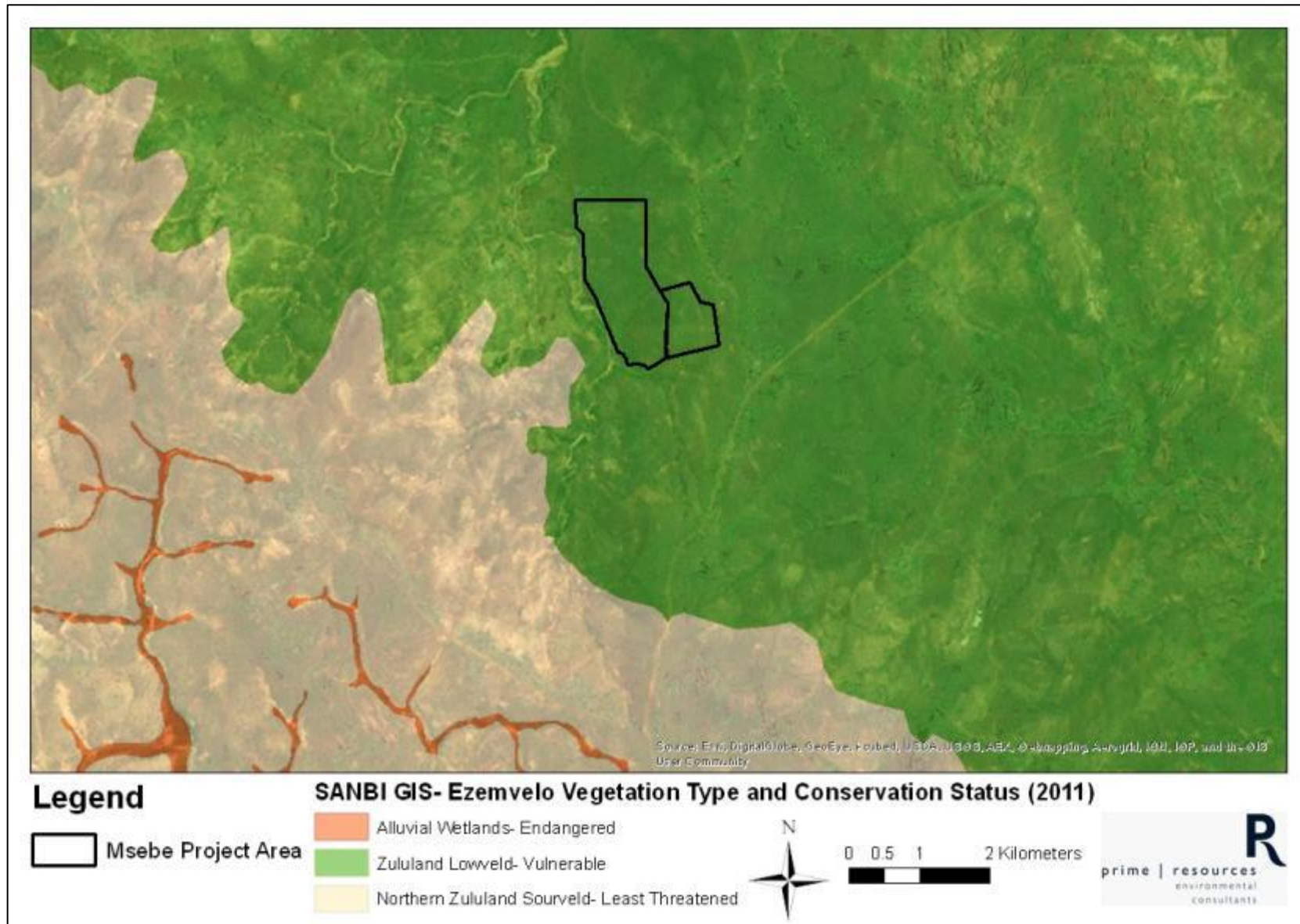
### Medicinal Plants

A number of plant species within the proposed project area are of importance in terms of their medicinal properties. These species include *Aloe maculate* (Aloe), *Aloe marlothii* (Mountain Aloe), *Aloe rupestris* (Grass Head Aloe), *Boophone disticha* (Poison Bulb), *Clausena anisata* (Maggot Killer), *Diospyros lycioides* (Monkey Plum), *Drimia cf. elata* (Satin Squill), *Erythrina altissima* (Broad-leaved Coral Tree), *Eulophia petersii* (Peters' Eulophia), *Helichrysum appendiculatum* (Sheep's Ear), *Huernia sp.* (Toad Plant), *Hypoxis hemerocallidea* (Star-flower), *Ornithogalum saundersiae* (Giant Chinchinchee), *Pachycarpus appendiculatus*, *Pelargonium appendiculatus* (Ivy-leaved), *Persicaria sp.* (Knotweed), *Phoenix reclinata* (Coffee Palm),

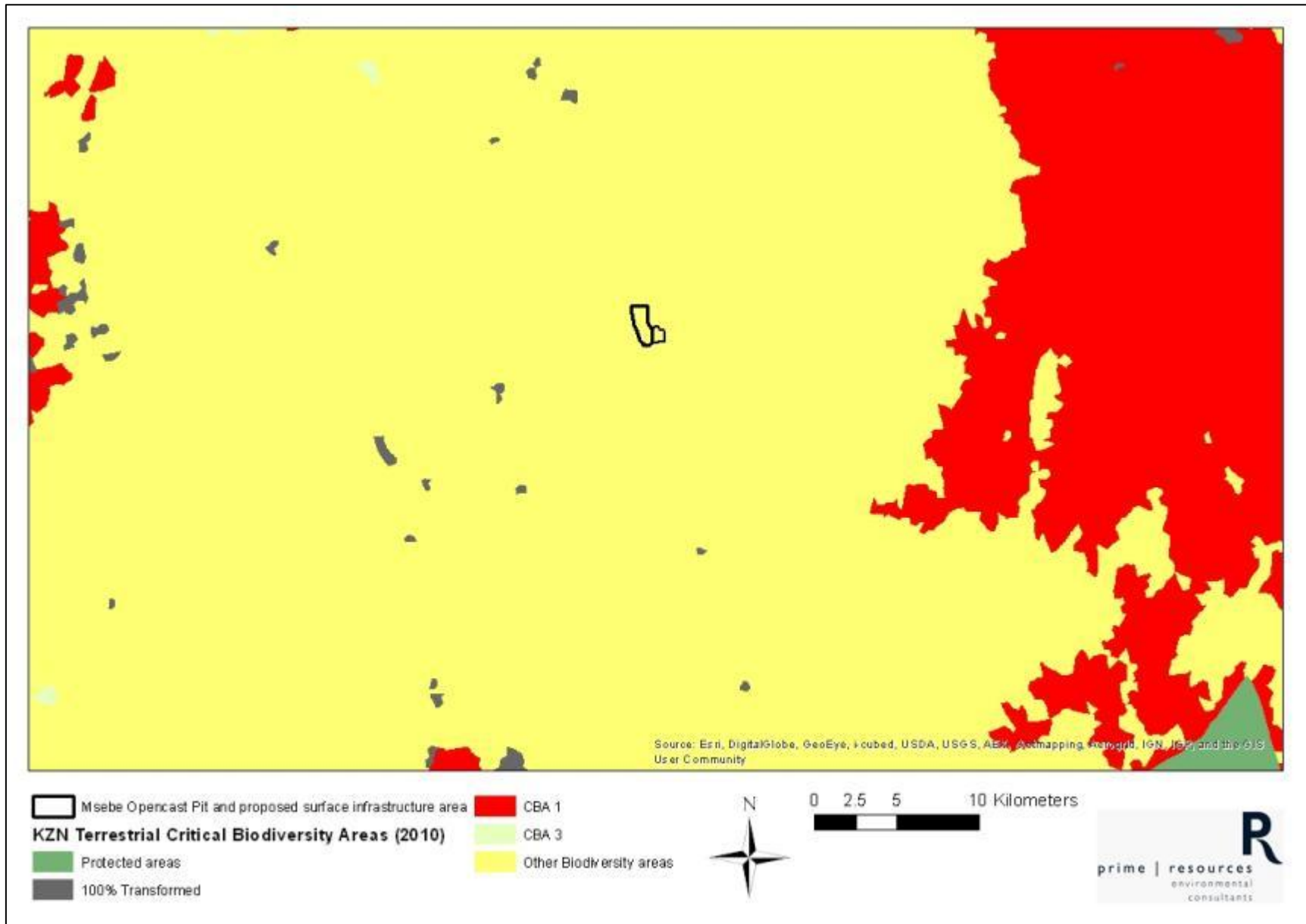
*Sansevieria hyacinthoides* (Mother-in-law's Tongue), *Sclerocarya birrea* (Marula), *Urginea sp.* (Squill), *Ximenia Americana* (Wild Olive), *Ximenia caffra* (Large Sour Plum) and *Ziziphus mucronata* (Buffalo Thorn). The use of plants for medicinal purposes provides an important ecosystem service to the communities living within the area.

#### Alien Invasive Species

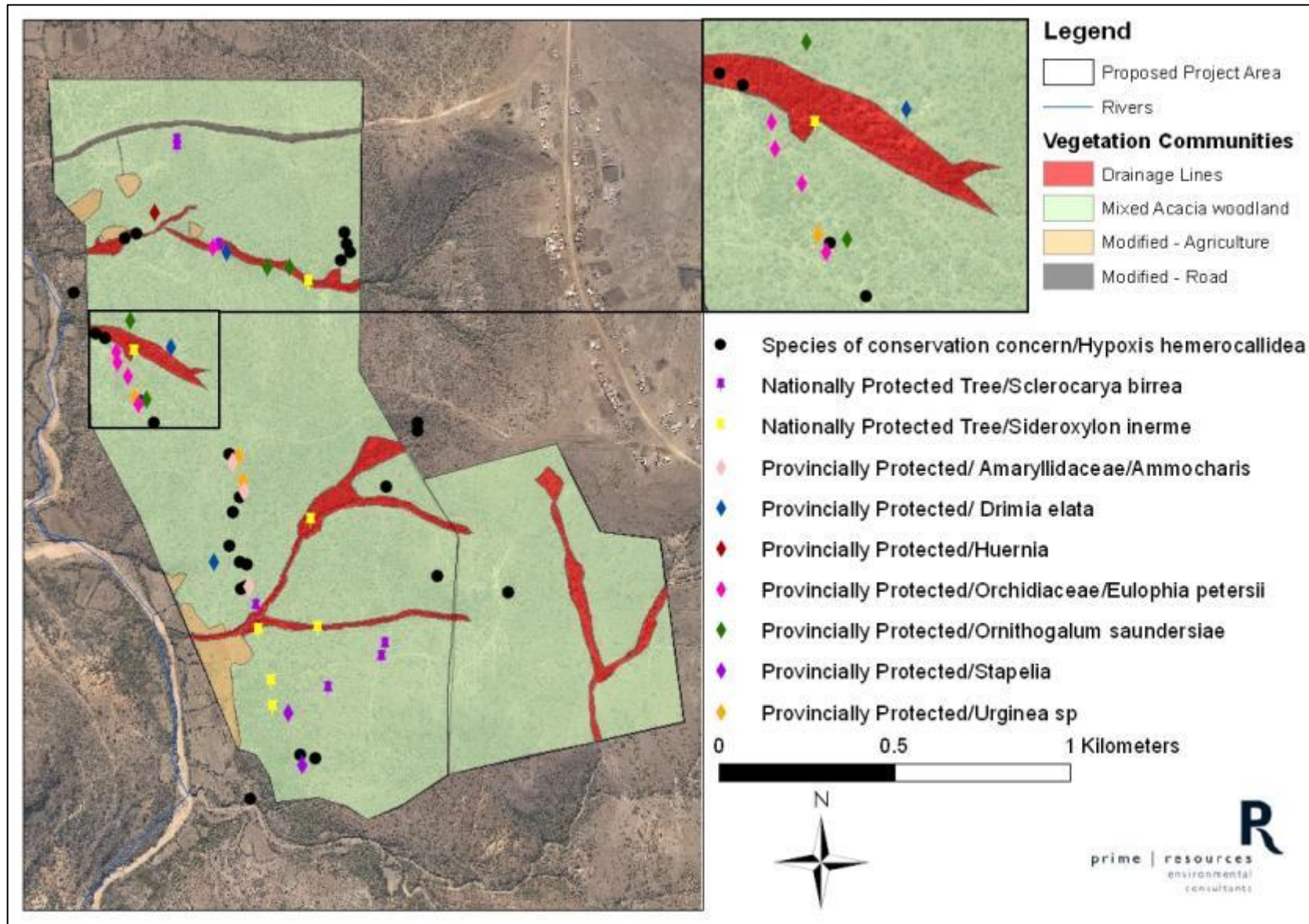
Alien invasive species recorded within the proposed project area were mostly confined to areas close to human settlements and included *Lantana camara* (Tick-berry), *Chromolaena odorata* (Triffid Weed) and *Agave sisalana*.



**Figure 14: Vegetation type and Conservation Status thereof within the proposed project area (SANBI-BGIS, KZN Ezemvelo 2011)**



**Figure 15: The proposed project area in relation to the EKZNW C-plan**



**Figure 16: The vegetation communities within the proposed project area**

### 3.7.2 Fauna

According to the specialist faunal assessment conducted (attached as Appendix 6) the following faunal species were identified within the proposed project area:

#### Mammals

Twelve non-flying mammal species were identified within the proposed project area during the field survey, all of which are currently have a conservation status of least concern. *Sylvicapra grimmia* (Common Duiker) however has a provincial protection status; a permit is required to hunt or remove this species.

A further 15 species were given a high probability of occurring in the proposed project area due to the presence of suitable habitat, only one of which is of conservation concern namely the *Aonyx capensis* (Cape Clawless Otter) which is Nationally protected. Suitable habitat was also observed for an additional eight species; however, due the close proximity of the area to settlements and the high probability of these species being hunted extensively, they were given a medium-high probability of occurring within the area. These species include the following species of conservation concern *Tragelaphus angasii* (Nyala) and *Tragelaphus scriptus* (Bushbuck) which are both protected at a National and Provincial level as well as *Mellivora capensis* (Honey Badger) which is currently listed as Near Threatened.

Seven chiropteraen (bat) species were recorded within the proposed project area, currently listed as Least Concern. One of these species, *Eidolon helvum*, is of conservation concern (currently listed as Near Threatened). Suitable habitat was observed for a further 15 bat species. Refer to Appendix 6 for a detailed list of mammals, along with the probability of each species occurring in the proposed project area.

#### Avifauna (Birds)

A total of 89 bird species were observed within the proposed project area during the field survey, the majority being associated with savanna and riparian woodland. Refer to Appendix 6 for a detailed list. Of these, four species are of conservation concern (refer to Table 7).

**Table 7: Avifaunal species of conservation concern which occur within the proposed project area**

SPECIES	CONSERVATION STATUS
<i>Gyps africanus</i> (White-backed Vulture)	Vulnerable
<i>Geronticus calvus</i> (Southern Bald Ibis)	Vulnerable
<i>Aquila rapax</i> (Tawny Eagle)	Vulnerable
<i>Coracias garrulus</i> (European Roller)	Near Threatened



The proposed project area has suitable breeding and/or foraging habitat, for nine additional species of conservation concern (refer to Table 8) which therefore have a high probability of occurring in the area, but which were not recorded during the field survey.

**Table 8: Avifaunal species of conservation concern which may occur within the proposed project area**

SPECIES	CONSERVATION STATUS	LIKELIHOOD OF OCCURRENCE
<i>Bucorvus leadbeateri</i> (Southern Ground-Hornbill)	Vulnerable	Highly likely
<i>Torgos tracheliotus</i> (Lappet-faced Vulture)	Vulnerable	Highly likely
<i>Trigonoceps occipitalis</i> (White-headed Vulture)	Vulnerable	Highly likely
<i>Terathopius ecaudatus</i> (Bateleur)	Vulnerable	Highly likely
<i>Polemaetus bellicosus</i> (Martial Eagle)	Vulnerable	Highly likely
<i>Falco naumanni</i> (Lesser Kestrel)	Vulnerable	Highly likely
<i>Apalis ruddi</i> (Rudd's Apalis)	Near Threatened	Highly likely
<i>Hypargos margaritatus</i> (Pink-throated Twinspot)	Near Threatened	Highly likely
<i>Falco biarmicus</i> (Lanner Falcon)	Near Threatened	Highly likely

#### Reptiles

Six reptile species were recorded during the field surveys, namely *Chamaeleo dilepis* (Flapneck Chameleon), *Stigmochelys pardalis* (Leopard Tortoise), *Varanus albigularis* (Rock Monitor), *Trachylepis margaritifer* (Rainbow Skink), *Lygodactylus capensis* (Cape Dwarf Gecko) and *Pachydactylus vansonii* (Van Son's Thick-toed Gecko). These species have not had their conservation status adequately evaluated. A further 27 species were given a high probability of occurring in the area due to the presence of suitable habitat. Refer to Appendix 6 for a detailed list of reptiles, along with the probability of each species occurring in the proposed project area.

#### Amphibians

Four amphibian species were identified in the proposed project area during the field surveys, namely *Leptopelis mossambicus* (Brown-backed Tree Frog), *Chiromantis xerampelina* (Southern Foam Nest Frog), *Amietophrynus gutturalis* (Guttural Toad) and *Cacosternum boettgeri* (Boetger's Caco), none of which are of conservation concern. A further 16 amphibian species have a high probability of occurring within the proposed project area due to the presence of suitable habitat, one of which, *Pyxicephalus edulis* (African Bullfrog), is listed as protected. Refer to Appendix 6 for a detailed list of amphibians along with the probability of each species occurring in the proposed project area.

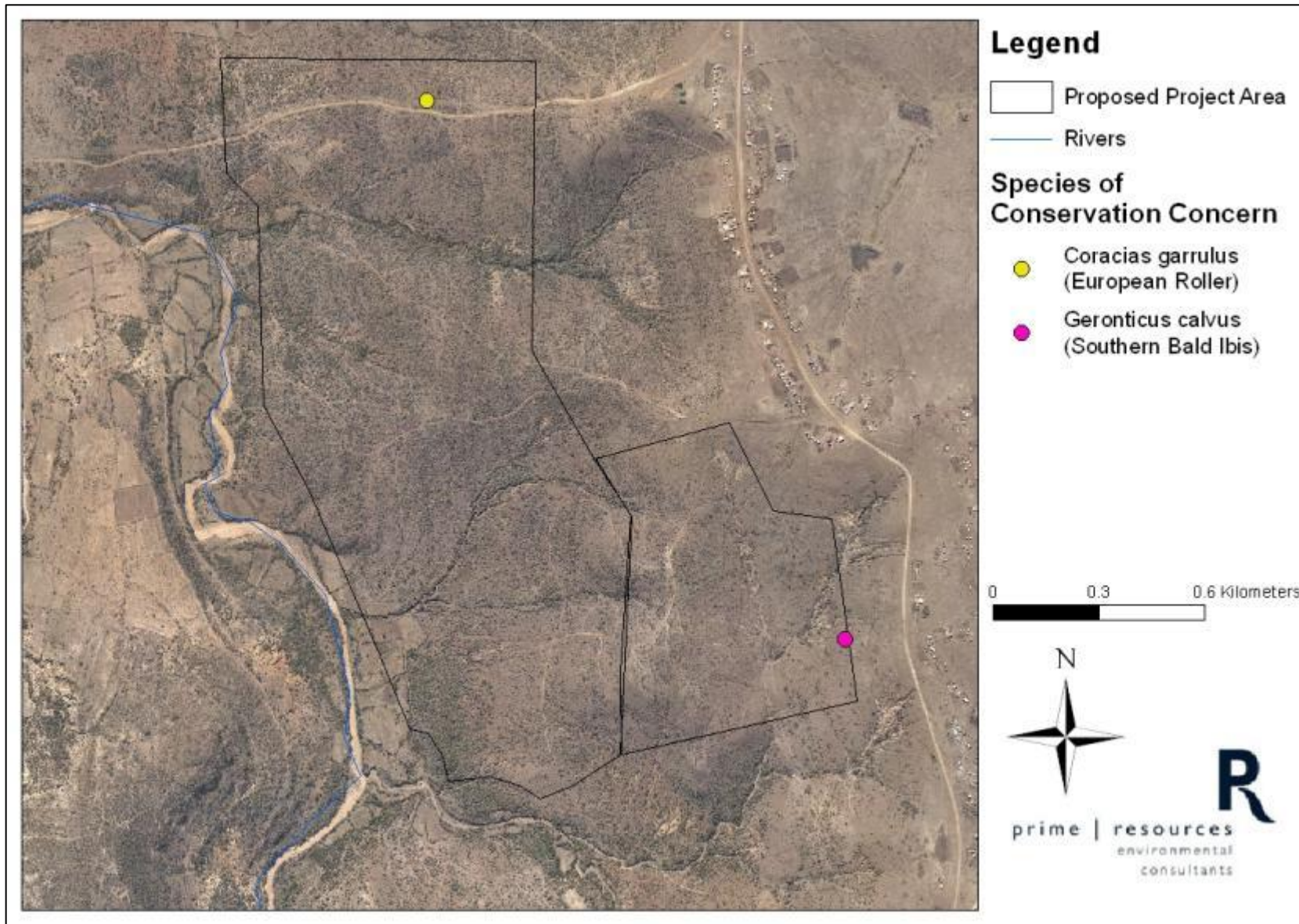
#### Invertebrates (Spiders and Insects)

Arachnid species recorded during the survey include *Hippasa spp.* (Funnelweb Spiders), *Stegodyphus spp.* (Community Nest Spiders), *Argiope australis* (Common Banded Argiope), *Caerostris spp.* (Bark Spiders), *Gasteracantha spp.* (Kite Spiders) and *Nephila inaurata* (Red-legged Nephila), none of which are of conservation concern.

Ten Lepidoptera species were recorded during the survey, namely *Colotis euipe omphale*, *Zizeeria knysna*, *Anthene butleri livida*, *Junonia hierta cebrene*, *Hypolimnas misippus*, *Hyalites*

*anacreon*, *Danaus chrysippus aegyptius*, *Belenois aurota aurota*, *Papilio nireus lyaeus* and *Eurema sp.* None of these species are of conservation concern.

Hymenoptera species were recorded within the proposed project area, the most significant of which is the *Apis mellifera* (Honey Bees) due to the essential role they play in pollination. Large colonies of honey bees were recorded near hives located in the drainage channels.



**Figure 17: The location of faunal species of conservation concern recorded within the proposed project area**

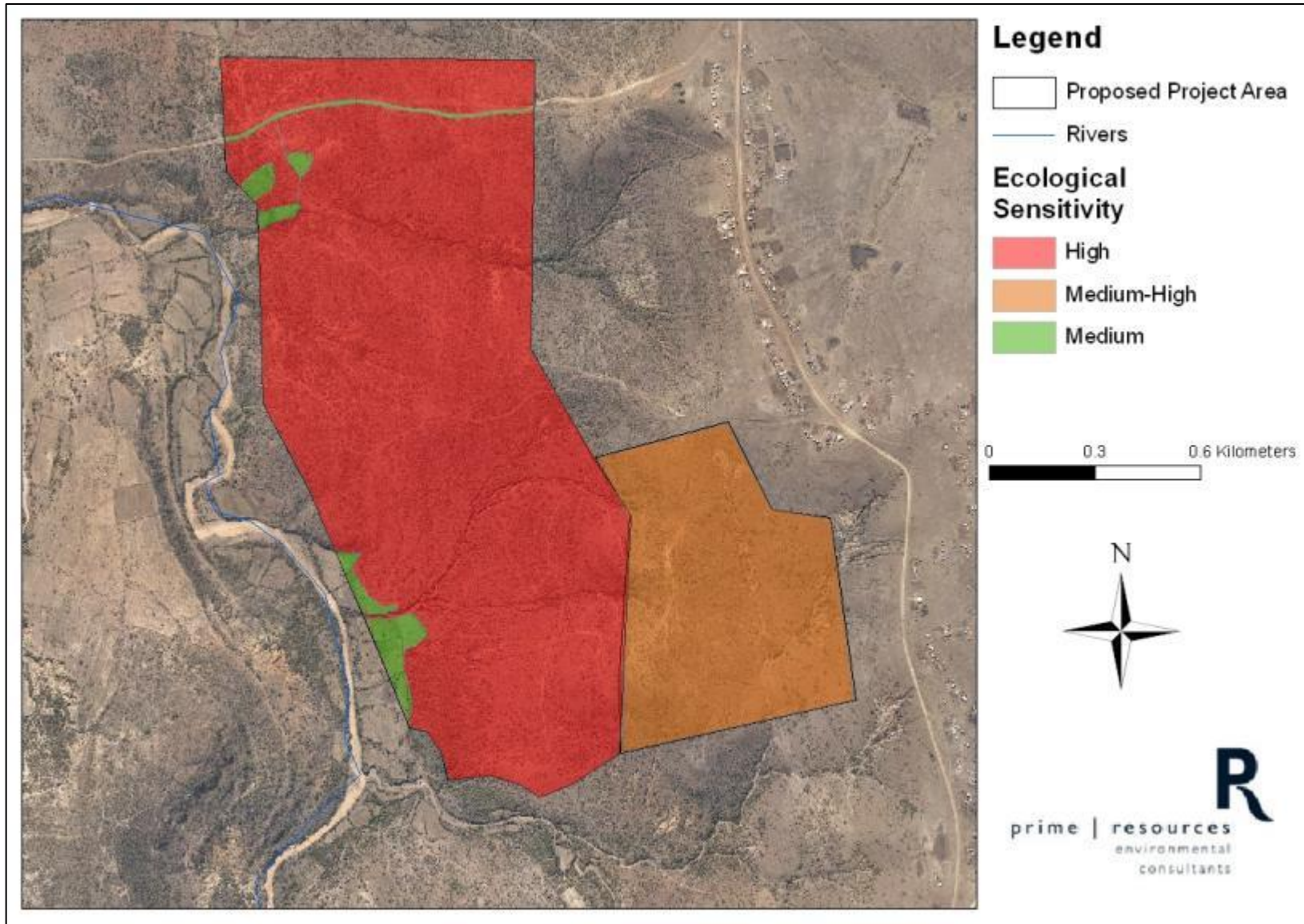
### 3.7.3 Conservation Importance and Ecological Sensitivity

The majority of the proposed project area was classified to be of high conservation importance due to the floral and faunal species of conservation concern identified within the project area. Two plant species of conservation concern, *Boophone disticha* (currently listed as Declining) and *Hypoxis hemerocallidea* (currently listed as Declining) were recorded within the proposed project area. An extensive population of *Hypoxis hemerocallidea* was present (over 200 individuals) and the destruction of this population will affect the conservation status of this species on a provincial and national level. In addition to this, eight provincially protected plants and two nationally protected trees were also common within this portion of the proposed project area.

The majority of the proposed project area supported a rich faunal component where high faunal activity was observed in the savanna woodland as well as the drainage channels. Many faunal species were recorded including four avifaunal species of conservation concern. The site was also considered suitable habitat for additional mammal and bird species of conservation concern.

The provision of ecosystem services was considered to be high, including provisional services in the form of fuel wood, medicinal plant species and food obtained by surrounding communities from the ecosystem; as well as regulating services such as climate regulation, disease regulation (predatory insects, birds and Chiroptera {bats} feeding on vector insect species such as mosquitoes and ticks) and pollination (at least three large *Apis mellifera* {Honey Bee} hives were identified within the drainage channels. Honey Bees are essential for pollination of cultivated as well as wild plant species).

In terms of the above, the ecological sensitivity of the majority of the proposed project area was considered to be high for both the floral and faunal (Figure 18) aspects. The south eastern portion of the area is considered to be of a medium to high sensitivity, as this area was located closer to settlements and had been impacted on by the removal of tree species for firewood, footpaths and presence of a higher number of cattle. The cultivated fields in the western boundary of the proposed project area as well as the road in the northern portion of the proposed project area were considered to be of medium ecological sensitivity. Although these areas have been impacted on by anthropogenic activities, the cultivated fields were mostly very small and, since some were not planted at the time of the survey, were thus reverting to fallow land dominated by indigenous pioneer species. The road was also relatively narrow with natural vegetation surrounding it. Faunal species were observed in and around both the cultivated fields and the road areas.



**Figure 18: Ecological sensitivity of the proposed project area**

### **3.7.4 Protected Areas**

The proposed project area is not classified as a protected area. In terms of surrounding protected areas, the Black Rhino Range is located 8 km south east of the proposed project area, this ecosystem is currently listed as Vulnerable and is a priority area for meeting biodiversity targets as defined in the EKZNW C-plan. The formally protected provincial reserve, the Zululand Rhino Reserve is also located 11 km north east of the proposed project area; and the Lowveld Escarpment Mistbelt Forest Ecosystem is located 13.7 km west of the proposed project area. This ecosystem is currently listed as Vulnerable in terms of Section 52 of NEMBA. Refer to Figure 19.

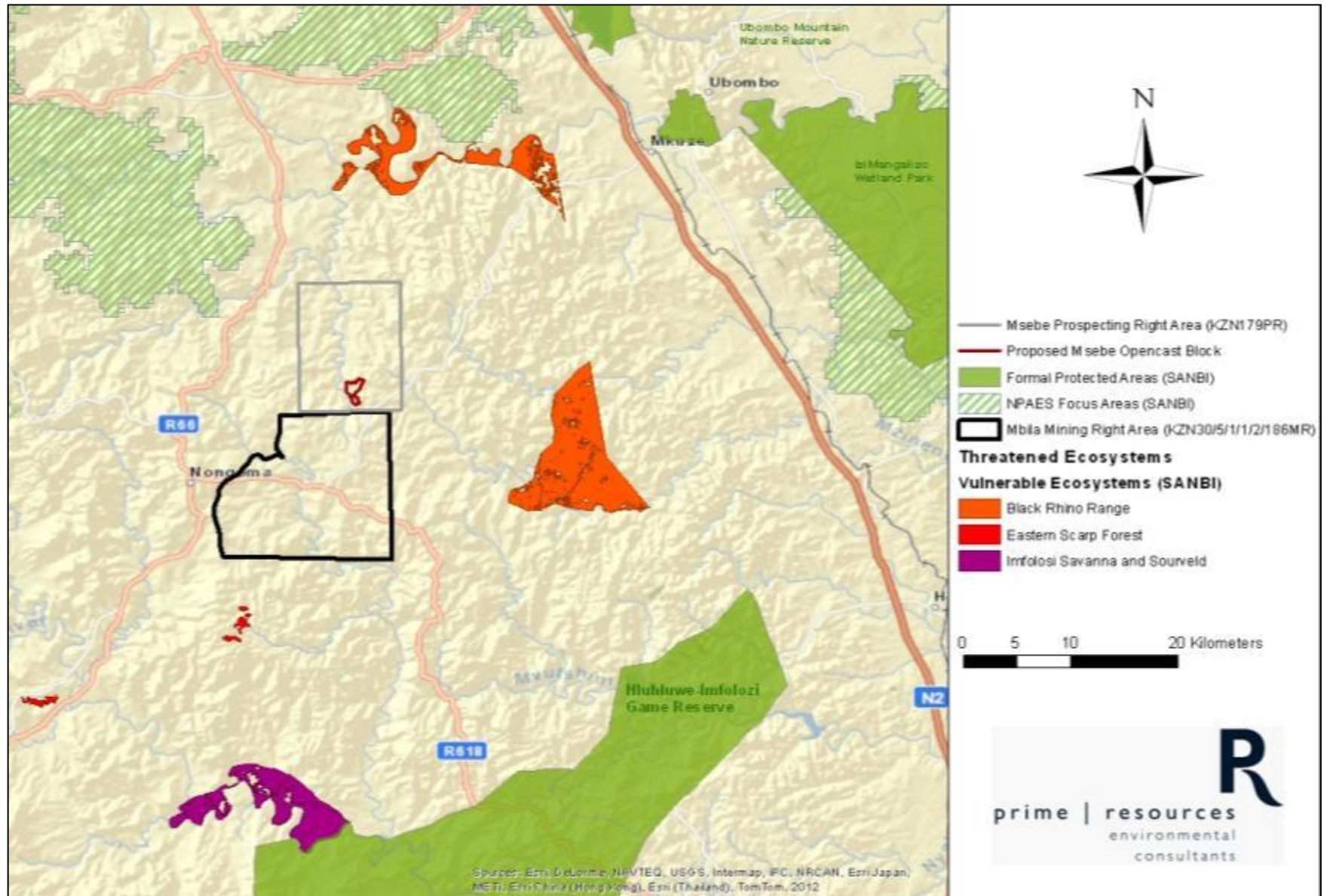


Figure 19: Protected areas in the region surrounding the proposed project area

## **3.8 Surface Water**

### **3.8.1 Catchment Description**

According to a surface water and hydrology specialist study undertaken by African Environmental Development in February 2014 (attached as Appendix 4), the proposed project falls within the Mkuze River Catchment and the only river of importance near the proposed project area is the Mpuphusi River, which flows along the western boundary of the proposed project area in a predominantly northerly direction.

A number of small, ephemeral watercourses and drainage channels occur across the surface of the project area, however, these differ from a non-perennial stream in that they only convey water during (and for a relatively short period after) a rainfall event within the relevant catchment. An ephemeral watercourse is usually a drainage channel flowing off a small and steep catchment. The drainage channels (erosion channels) cutting across the proposed mine pit at Msebe are thus all classified as ephemeral watercourses.

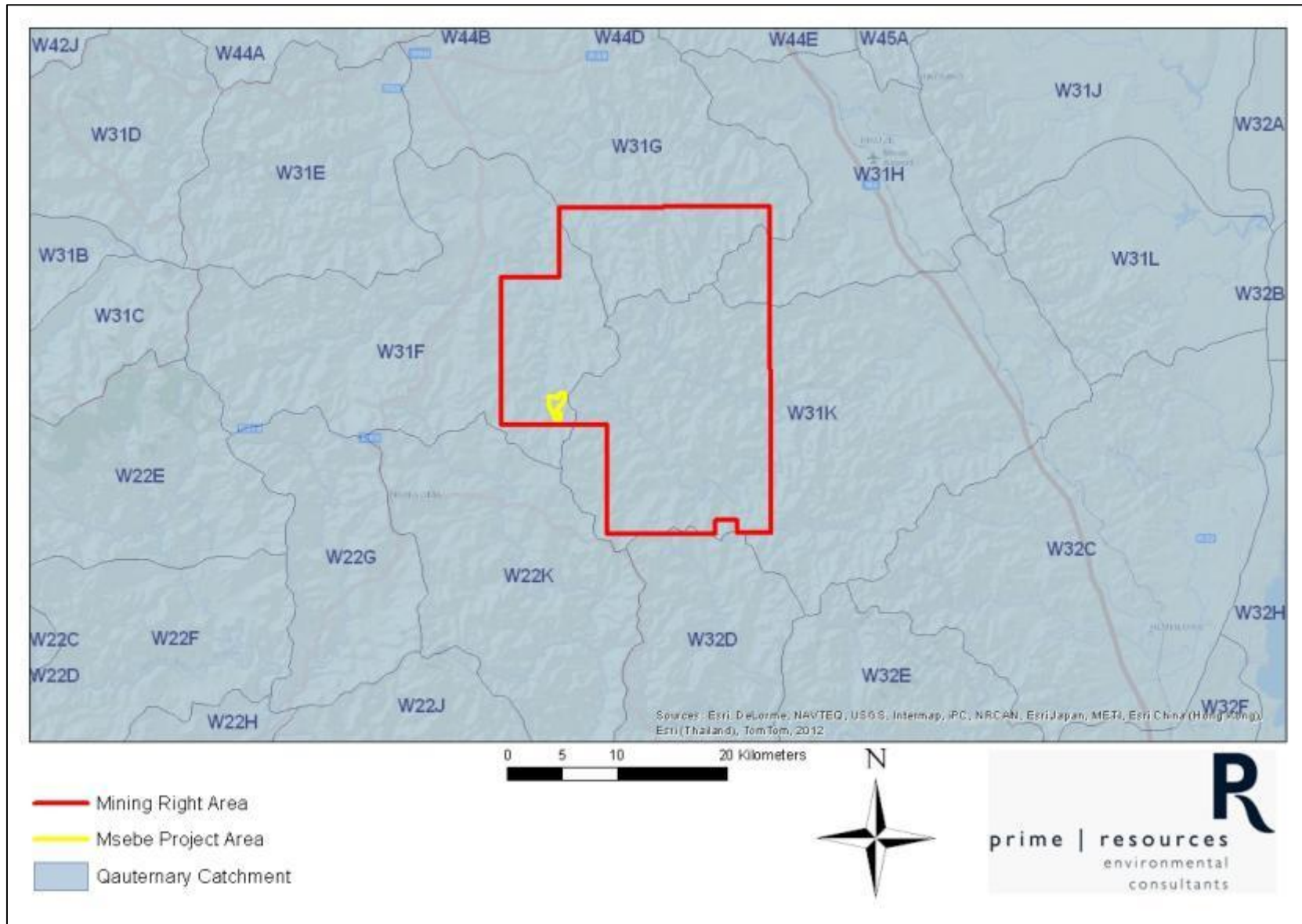
The Msebe project area falls within quaternary catchments W31F within the Usutu to Mhlathuze Water Management Area (WMA) (Figure 20). This WMA includes the primary rivers (from north to south): the uSuthu River, the Pongola River, the Mkuze River (the primary river downstream from the proposed project area) and the Mfolozi River, with its tributaries the Black and White Mfolozi Rivers.

Rainwater falling at the proposed project area will ultimately flow via the Mpuphusi, Nkunzana and Mkuze Rivers through the Lake St Lucia and its associated wetlands and ultimately into the Indian Ocean at the town of St Lucia. This part of the Indian Ocean forms part of the St Lucia Marine Reserve. The Mkuze River thus flows through several sensitive areas including the Mkuze Game Reserve, the Greater St Lucia Wetland Park (a World Heritage Site) and enters into the Indian Ocean at the St Lucia Marine Reserve.

The catchment of the Mpuphusi River encompasses approximately 20 km<sup>2</sup>. The Mean Annual Run-off (MAR) from the Mpuphusi River is estimated to be 0.6 million m<sup>3</sup>/annum. The run-off for this catchment is 25 mm/annum. There are several ephemeral drainage channels cutting across the site, flowing from east to west, to the Mpuphusi River.

The slope of the land in the vicinity of the proposed mine is decidedly steep and thus surface run-off and erosion would occur at an accelerated rate. The steep slope is probably the cause of the deep drainage channels that cut across the proposed project area.



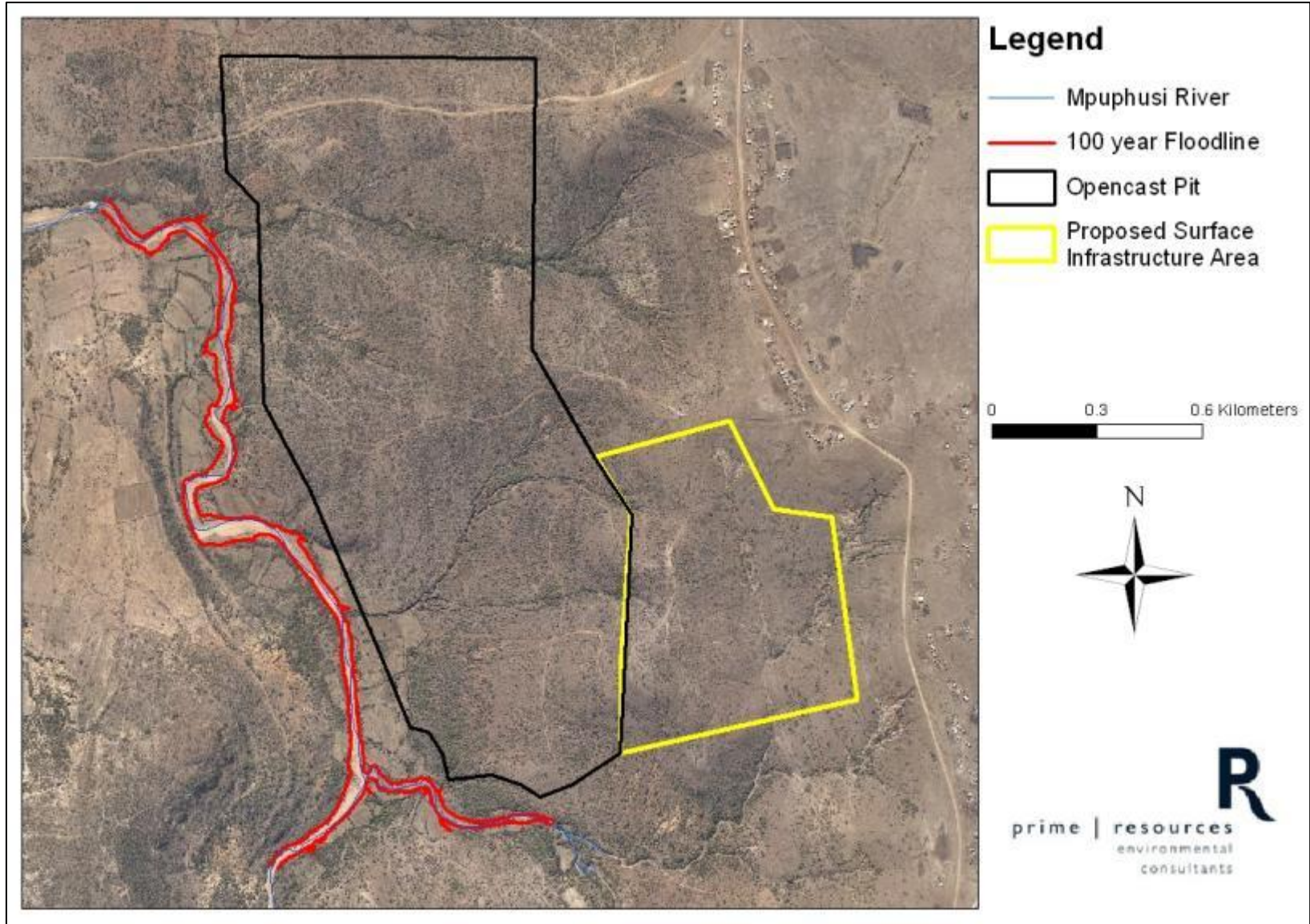


**Figure 20: Quaternary catchment of the proposed project area**

### **3.8.2 50- and 100- Year Flood Lines**

To determine the amount of total surface run-off that would occur in a 50-year flood scenario, a typical design storm with a return period of 50 years, falling over an area of 78.5 km<sup>2</sup>, was modelled (i.e. a theoretical circular-shaped design thunderstorm with a 5-km radius of the proposed project area). The results hereof indicated that 50- and 100-year floods produced discharges relatively close together, implying that the 50- and 100-year flood lines would plot very close together, thus only the 100-year flood lines were plotted. A total volume of 1 560 572 m<sup>3</sup> would occur as surface run-off over a 24-hour period, flowing off natural veld in Veld Zone 8 (Bushveld) at the proposed project area. This equates to 19.9 litres per m<sup>2</sup> of surface area of natural veld (i.e. the current situation). The surface type will be manipulated for the proposed development and thus the runoff can be expected to be altered to between 60 and 200 litres per m<sup>2</sup> depending on the surface types on-site.

The 1:100 floodlines are represented in Figure 21. It should be noted that the ephemeral drainage channels cutting across the proposed opencast pit at the Msebe study area are too small to warrant the plotting of flood lines



**Figure 21: Mpuphusi River 100 year floodlines**

### **3.8.3 Surface Water Quality**

Five samples, at- and downstream of the proposed project area, were collected for the baseline water quality analysis. The results of the analysis were compared with the South African National Standard, SANS 241:2011 – Edition 1.0 (the official South African drinking water standard).

**Table 9: Water quality baseline results for the five samples collected at and downstream of the proposed project area**

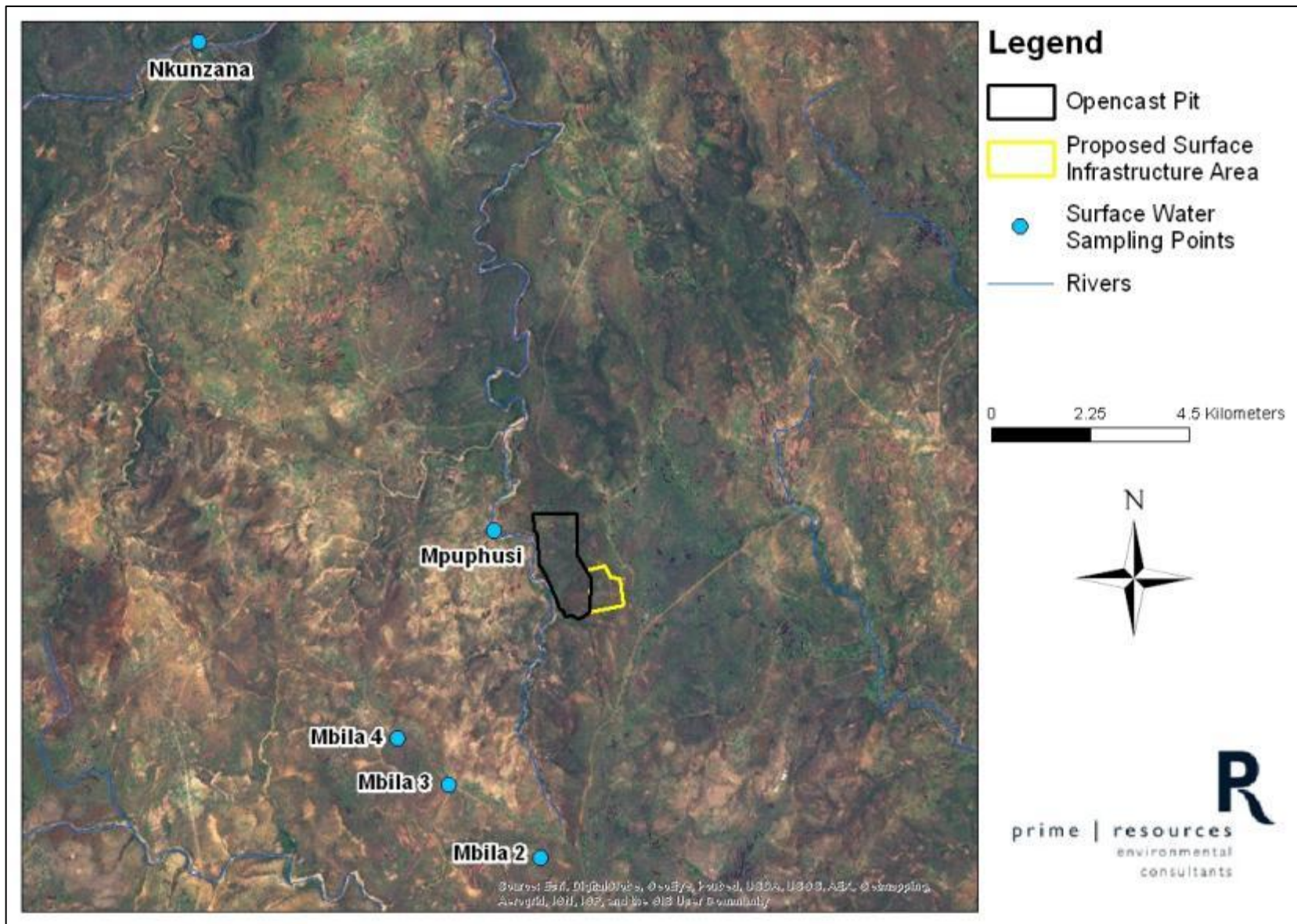
Sample ID	Units	Mbila 2	Mbila 3	Mbila 4	Mpumpusi River	Nkunzana River	SANS 241:2011 GUIDELINE VALUE	
							STANDARD LIMITS	RISK
pH	@25°C	8.0	8.0	7.7	8.1	8.1	≥5.0 - ≤9.7	Operational
Conductivity	mS/m @25°C	180.0	37.0	48.0	54.0	55.0	≤170	Aesthetic
Total Dissolved Solids	mg/l	1170.0	240.5	312.0	351.0	357.5	≤1200	Aesthetic
Total Hardness	mg/lCaCO3	352.0	78.0	117.0	83.0	171.0		
Chloride	mg/l	336.0	32.0	56.0	54.0	59.0	≤300	Aesthetic
Sulphate	mg/l	<40 (36)	<40 (10)	67.0	<40 (16)	<40 (13)	250 and 500	Acute Health: ≤500 Aesthetic: ≤250
Ammonia	mg/l	5.8	3.8	4.1	3.2	5.5	≤1.5	Aesthetic
Nitrate	mg/l	1.8	4.1	8.1	2.5	0.5	≤11	Acute Health
Calcium	mg/l	54.0	13.0	27.0	15.0	29.0	<150	(SANS 241;2006 Class I)
Magnesium	mg/l	53.0	11.0	12.0	11.0	24.0	<70	(SANS 241;2006 Class I)
Sodium	mg/l	273.0	38.0	46.0	82.0	48.0	≤200	Aesthetic
Potassium	mg/l	3.1	14.0	7.1	3.2	1.6	<50	(SANS 241;2006 Class I)
Manganese	µg/l	0.351	0.038	0.024	0.085	0.004	0.1 and 0.5	Chronic Health: ≤0.5 Aesthetic: ≤0.1
Iron	µg/l	0.016	4.901	3.224	0.843	0.016	0.3 and 2.0	Chronic Health: ≤2.0 Aesthetic: ≤0.3
Total Alkalinity	mg/lCaCO3	426.0	99.0	56.0	54.0	59.0		
<b>Micro Determinants</b>								
Aluminium	µg/l	39.00	13885.60	10268.70	3390.80	63.00	≤300	Operational
Antimony	µg/l	0.05	0.10	0.10	0.10	0.10	≤20	Chronic Health
Arsenic	µg/l	0.25	1.10	0.60	0.40	0.50	≤10	Chronic Health
Barium	µg/l	385.00	276.00	248.00	101.00	95.00		

Sample ID	Units	Mbila 2	Mbila 3	Mbila 4	Mpumpusi River	Nkunzana River	SANS 241:2011 GUIDELINE VALUE	
							STANDARD LIMITS	RISK
Beryllium	µg/l	0.04	0.50	0.30	0.10	0.05		
Bismuth	µg/l	0.02	0.03	0.03	0.01	0.00		
Cadmium	µg/l	<0.001	0.02	0.10	0.02	0.01	≤3	Chronic Health
Chromium	µg/l	0.29	11.00	8.70	3.00	0.30	≤50	Chronic Health
Cobalt	µg/l	2.50	2.40	1.80	0.40	0.20	≤500	Chronic Health
Copper	µg/l	1.50	7.40	5.40	2.30	0.90	≤2000	Chronic Health
Lanthanum	µg/l	0.04	2.30	3.60	0.40	0.02		
Lead	µg/l	0.05	2.80	2.60	0.50	0.10	≤10	Chronic Health
Lithium	µg/l	4.80	4.35	3.49	1.16	1.68		
Mercury	µg/l	0.98	0.66	0.58	0.70	0.90	≤6	Chronic Health
Molybdenum	µg/l	1.49	1.17	1.20	1.60	1.60		
Nickel	µg/l	4.90	9.80	9.60	2.50	1.20	≤70	Chronic Health
Platinum	µg/l	0.005	0.008	0.002	0.008	0.004		
Selenium	µg/l	5.57	1.30	4.48	2.30	1.40		
Tellurium	µg/l	0.30	0.18	0.10	0.26	0.07		
Thallium	µg/l	0.16	0.20	0.17	0.09	0.07		
Tin	µg/l	0.03	0.30	0.30	0.08	0.02		
Titanium	µg/l	1.50	154.40	148.00	40.70	0.60		
Uranium	µg/l	3.06	2.25	0.60	1.10	1.15	≤15	Chronic Health
Vanadium	µg/l	12.60	11.80	10.00	5.50	2.50	≤200	Chronic Health
Zinc	µg/l	1.30	8.39	7.16	1.96	1.46	≤5000	Aesthetic

From the results of the surface water samples (Table 9) collected from the proposed project area, Mbila 2 exceeded the SANS 241:2011 standard. Mbila 2 comprises a large drainage channel to the east of the sampling site and it is likely that salts incorporated in the soils of this drainage channel would contribute to the salinity of the water at this site. The Mbila 3 and 4 samples, collected along the watershed upstream from the proposed project area, had comparatively low Total Dissolved Solids (TDS) values (240 and 312 mg/l respectively) than Mbila 2 (1 170 mg/l). Mbila 2 was the only sample collected from effluent flowing from an erosion drainage channel. It is therefore concluded that Mbila 3 and 4 are more representative of the true surface water quality at the watershed where the Mpuphusi River begins.

The ammonium concentrations at all of the sampling sites were slightly high. This is most likely from the manure of the animals roaming the area. This manure contains high concentrations of ammonium and during rainfall events; this manure will be washed into the surface water.

From the electrical conductivity and total dissolved solids results for the surface water samples, as well as the electrical conductivity of boreholes monitored by DWA, it is evident that this part of the Mkuze catchment has a naturally occurring salinity problem. This high salinity is most likely due to the saline groundwater, which, is likely caused by the geology in the area. As was seen in the Mbila 2 sample, any disturbances of the topsoil or overburden (erosion drainage channel upstream of sample site) results in increased salinity.



**Figure 22: Surface water sampling points**



### 3.8.4 Drainage Density

The drainage density for the Mpuphusi River up to the Msebe proposed project area is approximately 2.1 km/km<sup>2</sup> (km watercourse/ km<sup>2</sup> of catchment or"/km"). This is a very high drainage density and suggests high relief, very "flash-like" floods and a greater overall flood risk.

### 3.8.5 Surface Water Use

The water in the streams and dams situated in the region, as well as the sand in the streams, are in high demand and people in the area are reliant on these resources. The water is used for the watering of livestock, for human consumption (drinking) and for washing of people and their clothes, while the sand is utilised for building purposes and also for the making of building bricks. Rainwater, which is a cleaner water source than the dam water, is collected off the roofs of houses into water tanks. Surface water, from the non-perennial surface water resources, is therefore important to the local people in the vicinity of the proposed project area.

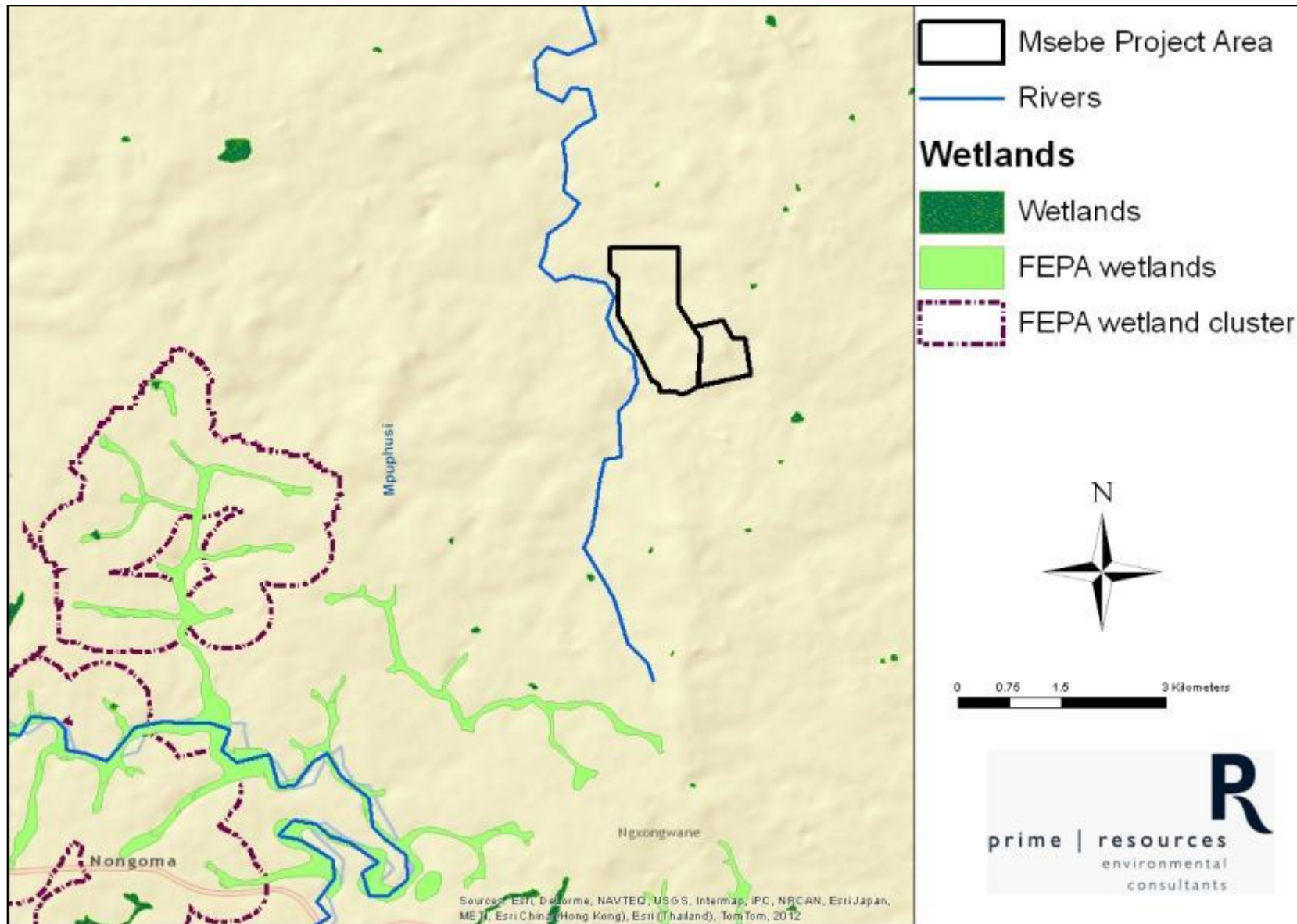
## 3.9 Wetlands

According to the SANBI national wetland database, a few scattered wetlands are present across the project area, however none of them are considered to be National Freshwater Ecosystem Priority Area (NFEPA) (Figure 23) (which differs from the extensive wetland network situated in the adjacent area nearer to Nongoma).

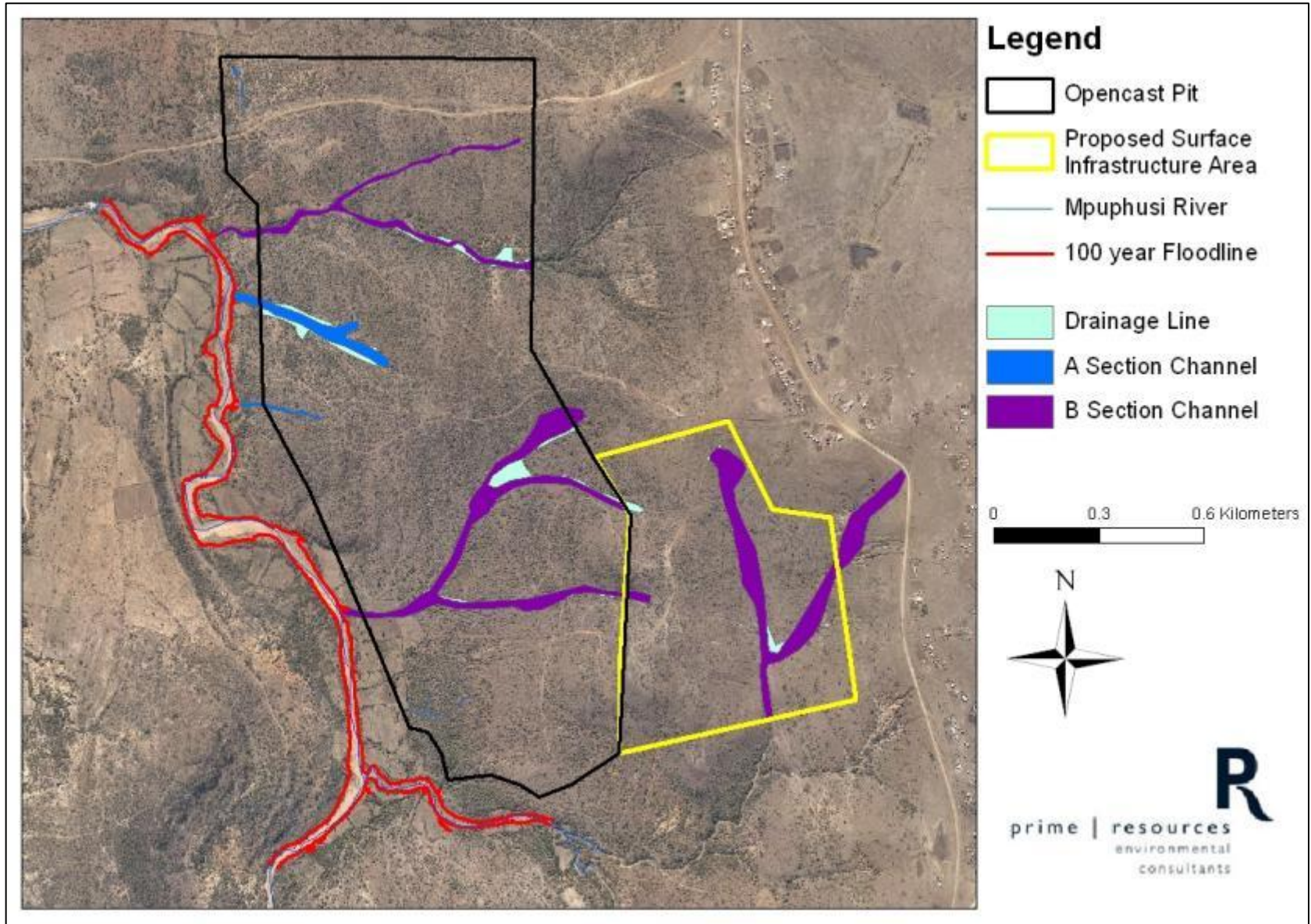
A specialist wetland and riparian baseline assessment was conducted by Strategic Environmental Focus (SEF) in February 2014 for the proposed project (attached as Appendix 8) from which the following baseline information was obtained. According to the assessment conducted by SEF, no wetland areas were identified within the proposed project area, however, a number of riparian habitats and drainage channels leading into the Mpuphusi River were delineated. All of the drainage channels identified have been significantly impacted on by erosion and in some cases are much wider and deeper than what would be expected under natural conditions. The sediment from the erosion processes is being deposited into the Mpuphusi River where it is most likely having an impact on the hydrological functioning of this river system.

### 3.9.1 Drainage Channel Classification

- A-Section drainage channels were delineated along the western edge of the site. These channels carry stormwater run-off towards the Mpuphusi River during rainfall events where flow is of short duration but these do not carry baseflow (Figure 24).
- Three B-Section drainage channels were identified within the proposed project area. These channels occasionally have a base-flow component, particularly after rainfall events. This water drains towards the Mpuphusi River. The baseflow can be described as intermittent, with flow in the channel depending on the rainfall regime and water table within the Mpuphusi River (Figure 24).



**Figure 23: Wetlands associated with the Msebe Mining Right area and actual Msebe Project area**



**Figure 24: Drainage Channel classification within the project area**

### 3.9.2 Conservation Importance and Ecological Sensitivity

The drainage channels associated with the proposed project area perform functions relating to recharge of the baseflow of the Mpuphusi River. A-Section drainage channels are considered the least sensitive watercourses in terms of impacts on water yield from the catchment. B-Section drainage channels, which drain into the Mpuphusi River, are considered more sensitive due to the landscape connectivity that the riparian habitat provides. Despite much of the riparian habitat being lost to erosion in the drainage channels, B-Section drainage channels can provide functions which include:

- sediment trapping and improving water quality;
- nutrient trapping;
- acting as a buffer between aquatic ecosystems and adjacent land uses;
- bank stabilisation and bank maintenance;
- contributes to water storage;
- aquifer recharge;
- flow energy dissipation; and
- maintenance of biotic diversity.

### 3.10 Aquatic Ecology

A specialist aquatic ecology baseline study was undertaken by Strategic Environmental Focus in February 2014 the proposed project (attached as Appendix 9) during which a field survey was conducted. Although the site survey was conducted towards the end of the rainy season, the perennial river and drainage channels on-site were dry. As a result, no water quality samples or invertebrate and fish assessments could be conducted.

The heterogeneity signature of the Mpuphusi River is determined to be South-eastern Coastal Hinterland 3, which is regarded as having a conservation status of Vulnerable with the Present Ecological State (PES) being regarded as largely natural (PES Category B). Only 0.5% of the 13 491 km of river categorised as South-eastern Coastal Hinterland 3 remain intact, in that they have a PES of either A or B. Furthermore, only 18.5% of these sections of river are located within protected areas.

#### 3.10.1 NFEPA

The National Freshwater Ecosystem Priority Areas project represents a multi-partner project between the Council for Scientific and Industrial Research (CSIR), SANBI, Water Research Commission (WRC), Department of Water Affairs (DWA), Department of Environmental Affairs (DEA), Worldwide Fund for Nature (WWF), South African Institute of Aquatic Biodiversity (SAIAB) and South African National Parks (SANParks). The NFEPA project aims to:

- Identify Freshwater Ecosystem Priority Areas (hereafter referred to as 'FEPAs') to meet National biodiversity goals for freshwater ecosystems; and
- Develop a basis for enabling effective implementation of measures to protect FEPAs, including free-flowing rivers.

Based on current outputs of the NFEPA project, the sub-quaternary catchment in which the proposed project area occurs was identified as an Upstream Management Area required for maintaining downstream river FEPAs and Fish Support Areas likely to be associated with the Lake St Lucia wetland system. In addition, the Mkuze River and associated tributaries are classified as flagship free-flowing rivers in South Africa. Free-flowing rivers are rivers without dams that flow undisturbed from their source to the confluence with a larger river or to the sea. These uninterrupted systems have further been identified as flagship systems, based on their representativeness across the country, importance to ecosystem processes and their biodiversity value, and should receive top priority for retaining their free-flowing nature. This is worth noting, as the Mpuphusi River drains into the Nkunzana River, which forms one of the Mkuze River's major tributaries.

### **3.10.2 Aquatic Habitat**

Based on observations obtained following investigation of aerial images of the proposed project area (Google Earth, 2014), it could be deduced that associated watercourses are currently experiencing significant rates of erosion. This was confirmed during the field-based assessment (Figure 25). This was attributed to the soil structure present and poor land management, including cultivation on slopes and overgrazing of livestock, which results in increased catchment run-off and the initiation of erosion.



**Figure 25: Substantial erosion observed within the watercourse associated with the Msebe project area**

Despite the lack of survey water at the time of the survey, the section of the Mpuphusi River associated with the proposed project area was observed to be largely representative of alluvial river channels, which are self-formed features (shaped by the magnitude and frequency of flooding) and able to deposit and transport sediment. The bed and banks of these channels are characteristically made up of unconsolidated mobile sediments, such as silt, sand, and gravel and in some cases, cobbles and small boulders, which were observed on site.

Despite the ephemeral expression of the river at the time of the survey, water was still likely to be present within the alluvial aquifer and only expressed at the surface after sufficient recharge, or forced to the surface by geological knick points. The river channel was noted to exhibit strong alluvium-based features, including the gravel/sand-dominated substrate, limited in-stream habitat and irregular flow, likely to be accentuated by catchment processes, such as free-roaming livestock and overgrazing. Consequently, the watercourse is likely to render the substrate dynamic, with fluctuations in catchment run-off and stream flow resulting in a constant shifting of the substrate structure, preventing possible aquatic biota from finding purchase. As a result, aquatic habitat is likely to be regarded as a key driver in the ecological state of the associated watercourses.

Furthermore, geological knick points were present in some sections of the watercourse which forced water present in the alluvial aquifer to express at the surface for short periods (10-25 m). These knick points form a small, shallow trickle stream, which often resulted in the formation of isolated pools. These short, shallow (maximum of 15 cm deep) systems serve as refugia for some aquatic biota, which allow for more rapid colonisation during times of flow (Figure 26).



**Figure 26: Short, shallow trickle system with isolated pool formation serve as refuge for aquatic biota during the dry seasons within the associated watercourse**

### **3.10.3 Macroinvertebrates (Insects and Worms)**

Studies on the re-colonisation of non-perennial watercourses by aquatic macroinvertebrates are few, but it appears the *Chironomidae* (Midges), *Oligochaeta* (Earthworms) and *Simulidae* (Black Flies) (only in true-running streams) are some of the early colonizers. Re-colonisation occurs from three sources, namely resting eggs, invertebrate forms capable of aestivation and eggs laid by flying adults. Furthermore, re-colonisation occurs rapidly following inundation, with oligochaetes, small crustaceans and insect larvae appearing within the first ten days. Species typical of permanent streams returned within one month of inundation in pools and within 4-6 weeks in streams.

Due to the differential sensitivities of aquatic macroinvertebrates, the composition of aquatic macroinvertebrates can provide an indication of changes in water quality and other related conditions within a river. The use of the South African Scoring System (SASS) has undergone numerous advances, culminating in the Version 5 presently being utilised in river health studies. Whilst SASS5 data has not been sufficiently tested in ephemeral rivers, it should be used with caution. Due to the remote location of the proposed project area, it noted that no data was previously captured for any of the associated quaternary catchments within the Rivers Database. Accordingly, a reference list of macroinvertebrate taxa likely to occur within the area was compiled based on available habitat within the associated watercourses (Appendix 9).

Due to the substantial lack of sufficient water within the proposed project area, the SASS5 protocol could not be applied. Nine different macroinvertebrate taxa were, however, observed within the Mpuphusi River and drainage channels associated with the proposed project area

(Table 10). These taxa were observed to colonise shallow (<5 cm deep) flowing streams and isolated pools associated with boulders and bedrock throughout the observed area. Many of these observed taxa are regarded as tolerant taxa which are considered natural given the characteristics of the associated watercourses.

**Table 10: Macroinvertebrate Taxa Recorded on Site**

No.	Taxon of Invertebrate
1	Potamonautidae (Crabs)
2	Baetidae (Minnow Mayflies)
3	Dytiscidae/Noteridae (Diving Beetles)
4	Gyrinidae (Whirligig Beetles)
5	Chironomidae (Midges)
6	Corixidae (Water Boatmen)
7	Gerridae (Water Striders)
8	Pleidae (Pygmy Backswimmers)
9	Notonectidae (Backswimmers)

Present Ecological State

SASS5 data obtained during the present assessment could not be used in the Macroinvertebrate Response Assessment Index (MIRAI) in order to determine the PES, as the SASS5 protocol could not be properly applied. However, based on the non-perennial expression of the aquatic habitats present within the proposed project area, as a result of its topographical location within the landscape and the depositional processes associated with the alluvial aquifer, the PES of watercourses associated with the proposed Msebe Opencast Anthracite Mine is likely to be limited.

**3.10.4 Ichthyofauna (Fish)**

Based on known or inferred distribution ranges, a total of 21 species can potentially occur within the proposed project area based on previous extrapolation from the River Health Programme monitoring sites located along main stem rivers in close proximity to the proposed project area.

It was further noted that many species potentially occurring within watercourses associated with the proposed project area are in need of taxonomic revision which may result in new species being identified to be associated with the proposed project area in the future. These species include: *Brycinus lateralis* (Striped Robber), *Barbus cf. anoplus* (Chubbyhead Barb), *Amphilius sp.* (Catfish species), *Barbus crocodilensis*, *Barbus sp. "eutaenia cf. southeast Africa"* (Orangefin Barb). Due to the lack of sufficient water within the watercourse or sufficient depth within the isolated pools present, no fish species were present within the proposed project area at the time of the survey. During periods of high flow, *Barbus cf. anoplus* (Chubbyhead Barb) and *Oreochromis mossambicus* (Mozambique Tilapia; listed as Near Threatened) are expected to occur within the area.

Species of Conservation Concern

Two fish species of conservation concern were determined to potentially occur within the proposed project area. These include:



- *Oreochromis mossambicus* (Mozambique Tilapia; listed as Near Threatened) – This species is widely dispersed beyond this range to inland regions and to the south west and west coastal rivers including the lower Orange and rivers of Namibia where it occurs in all but fast-flowing waters, and thriving in standing waters. This species has until recently not been considered of conservation importance in the southern Africa region. However, *Oreochromis niloticus* (Nile Tilapia) is invading its natural range in the Zambezi and Limpopo river systems, with hybridisation occurring in the Limpopo system and pure strains of *O. mossambicus* are likely to become extirpated in those systems through competition and hybridisation.
- *Amphilius natalensis* (Natal Mountain Catfish; listed as Data Deficient) - Due to the notable differences in characteristics of populations of *A. natalensis* from KwaZulu-Natal and Mpumalanga, as well as the numerous isolated populations in streams of the east coast mountain chain, this species has been listed as Data Deficient until such time as further studies on the species have been conducted. It should be noted that although this fish species has a distribution range which extends over the present proposed project area, it lives among cobbles and rocks in swiftly flowing water, which was largely unavailable within the associated watercourses.

#### Present Ecological State

Since no fish could be collected within the dry alluvial river channels of the Mpuphusi River, the assessment of the PES of the fish assemblage associated with the proposed Msebe Opencast Anthracite Mine could not be conducted by means of the Fish Response Assessment Index (FRAI).

### **3.10.5 Ecosystem Services**

Ecosystem services have been defined as the benefits people obtain from ecosystems. They can be classified along functional lines as: (i) provisioning, (ii) regulating, and (iii) cultural services, which are each maintained by (iv) supporting services. These might include:

- Provisioning Services (Products obtained from the ecosystem) – includes food, fresh water, fuel wood, fibre, biochemical and genetic resources;
- Regulating Services (Benefits obtained through regulation of ecosystem processes) – includes climate regulation, disease regulation, water regulation, water purification and pollination;
- Cultural Services (Nonmaterial benefits obtained from ecosystems) – includes spiritual and religious, recreation and ecotourism, aesthetic, inspirational, educational, sense of place and cultural heritage; and
- Supporting Services – includes soil formation, nutrient cycling and primary production.

Based on the findings within the proposed project area, the associated watercourses are likely to provide freshwater to local communities for domestic use, potential food, in the form of fish and/or waterfowl during flow events, water purification by the alluvial aquifer, and a potential recreation activity, especially during periods of high flow when fishing and swimming is possible.

### 3.10.6 Summary and Ecological Sensitivity

After cursory interviews with individuals from the local community, it was believed that the Mpuphusi River only usually expresses surface water intermittently during two months of the year, or for a temporary period directly after a rainfall event. However, water was still likely to be present within the alluvial aquifer throughout the year and only expressed at the surface of the river channel after sufficient recharge. The river channel exhibits strong alluvium-based features likely to be accentuated by catchment processes, such as livestock overgrazing. Due to the ephemeral nature of the system and the highly dynamic shifting of alluvial bed dictates that the biota that colonise this system are well adapted and relatively tolerant to harsh conditions. Therefore, the aquatic macroinvertebrate taxa and fish species present in the area are expected to represent a lower diversity than usually expected within a perennial river. This was evident for the aquatic macroinvertebrates observed in the little water that was present at the time of the survey. During periods of high flow, *Barbus cf. anoplus* (Chubbyhead Barb) and *Oreochromis mossambicus* (Mozambique Tilapia; listed as Near Threatened) are expected to occur within the area.

## 3.11 Groundwater

The following baseline information was obtained from a study conducted for the adjacent Mbila Project by Rison Groundwater Consulting in 2007.

### 3.11.1 Aquifer Classification

The Karoo rock types can be divided into two distinct aquifers, namely a shallow weathered aquifer and a deeper fractured aquifer.

#### Shallow Weathered Aquifer

The depth of the weathered aquifer was found to be approximately 21m. This aquifer, which is recharged by rainfall, is often perched and, due to the impermeable shale horizons, may even be artesian in places. The recharge to this aquifer is estimated to be in the order of 3% of the annual rainfall.

The numerous shale layers in these formations often restrict the downward filtration of rainwater into the aquifer. The largest accumulation of water is normally confined to the contact between the weathered and "fresh" bedrock. The borehole yields in this aquifer are generally low due to the very low aquifer parameters of the aquifer material. The groundwater quality in undisturbed areas is good due to the dynamic recharge from rainfall. This aquifer is, however, more likely to be affected by contaminant sources situated on surface.

#### Deep Fractured Aquifer

The primary porosity of the Ecca Group rocks does not allow significant groundwater flow, except where the porosity has been increased by subsequent secondary structures. Groundwater flow in the fractured aquifer is often associated with the abundant dolerite dyke- and sill intrusions in the area.

Although occasional high yielding boreholes may be intersected, this aquifer also does not constitute an economic aquifer able to sustain excessive pumping and irrigation. The groundwater quality in the fractured aquifer is generally of a poorer quality than the weathered aquifer due to the concentration of salts. This may be attributed to a less dynamic system and a longer residence time of rainfall recharge within the aquifer.

It is most probable that both aquifers (shallow weathered and deep fractured) are hydraulically connected.

### **3.11.2 Groundwater Level and Flow Patterns**

The groundwater levels monitored in boreholes was found to show a correlation to surface topography and thus conforms to a Bayesian relationship meaning that groundwater elevation mimics topographical elevation in the project area. Groundwater flow patterns should therefore be towards the north east.

The predicted groundwater flow paths are from elevated areas down towards lower lying areas which are often associated with surface drainage and water courses. The aquifer parameters calculated as part of the groundwater flow model were low, with the groundwater flow rate calculated as 0.02 m/day or 7.7 m /year.

### **3.11.3 Groundwater Use**

A hydrocensus was conducted to ascertain groundwater use and dependency associated with the project area. A number of boreholes are used for domestic purposes such as washing and drinking as well as for livestock watering. The groundwater was also found to be generally poor by drinking standards, which is apparent by the elevated levels of TDS and electrical conductivity (EC).

### **3.11.4 Groundwater Quality**

Quality of groundwater resources associated with the area is generally poor, characterised by high TDS and EC concentrations. Elevated levels of EC are primarily related to high regional concentrations of chlorine, sodium and sometimes magnesium and manganese. The highest iron (Fe) concentration recorded is above 7.7 mg/l. The highest magnesium (Mg) concentration is 206 mg/l, while the manganese (Mn) concentrations are elevated to a maximum of 0.77 mg/l. Sodium (Na) concentrations are moderately high, with the maximum recorded being 1143 mg/l. The groundwater quality monitored is not suitable for human consumption.

## **3.12 Archaeology, Cultural and Heritage**

According to a cultural and heritage assessment (attached as Appendix 2), conducted by Archaeos Cultural and Cultural Resource Consultants in February 2014 for the proposed project area, no sites of cultural heritage importance were identified within the area, although three grave yards were found nearby. The area and surrounds host a large number of

archaeological sites, from the Middle Stone Age to the Historical age when people were able to read and write.

The proposed project area would have been suitable for Stone Age people, although no caves or rock shelters were identified during the field survey. Such caves and shelters are most likely to be found in the surrounding mountainous areas. Middle and Late Stone Age materials were found scattered in the area, such as flakes and scrapers, especially in the erosion drainage channels.

Iron Age people could have settled in the proposed project area and surrounds as these areas provided good grazing and ample building material. However the Iron Age people would most likely have settled closer to the mountains.

During the Anglo-Zulu War and the Anglo-Boer War (1899-1902) many battles were fought in the vicinity of the proposed project area. It was therefore expected that farm buildings and objects could be present, although none of the above mentioned archaeological remains were noted within the proposed project area during the survey conducted. Many graveyards have been identified in the surrounding region during previous surveys carried out by Archaetnos.

Three grave yards were identified close to (specifically Site 3) - but not within the proposed project area (Figure 27). Graves are always regarded as having a high cultural significance. The sites can be described as follows:

Site 1:

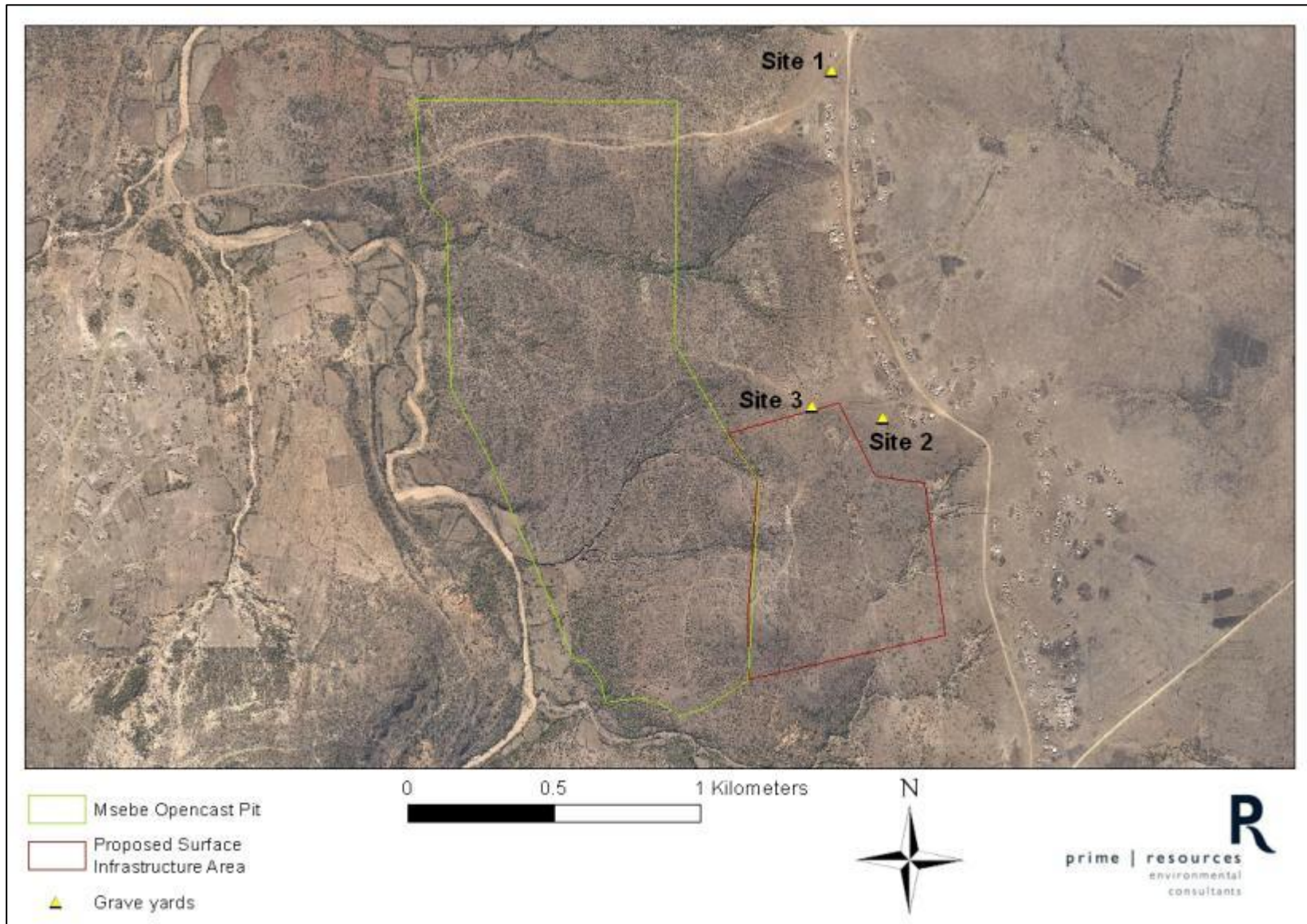
- Comprises a graveyard containing at least 14 graves, the graves are all stone packed and some have headstones.
- None of the headstones have any information thereon.

Site 2:

- Comprises a graveyard containing at least 102 graves, the graves are either stone packed or have cement borders.
- The oldest date of death indicated on the headstones is 2001 and the youngest is 2008.

Site 3:

- Comprises a graveyard containing at least one grave, the grave is stone packed and does not have a headstone.

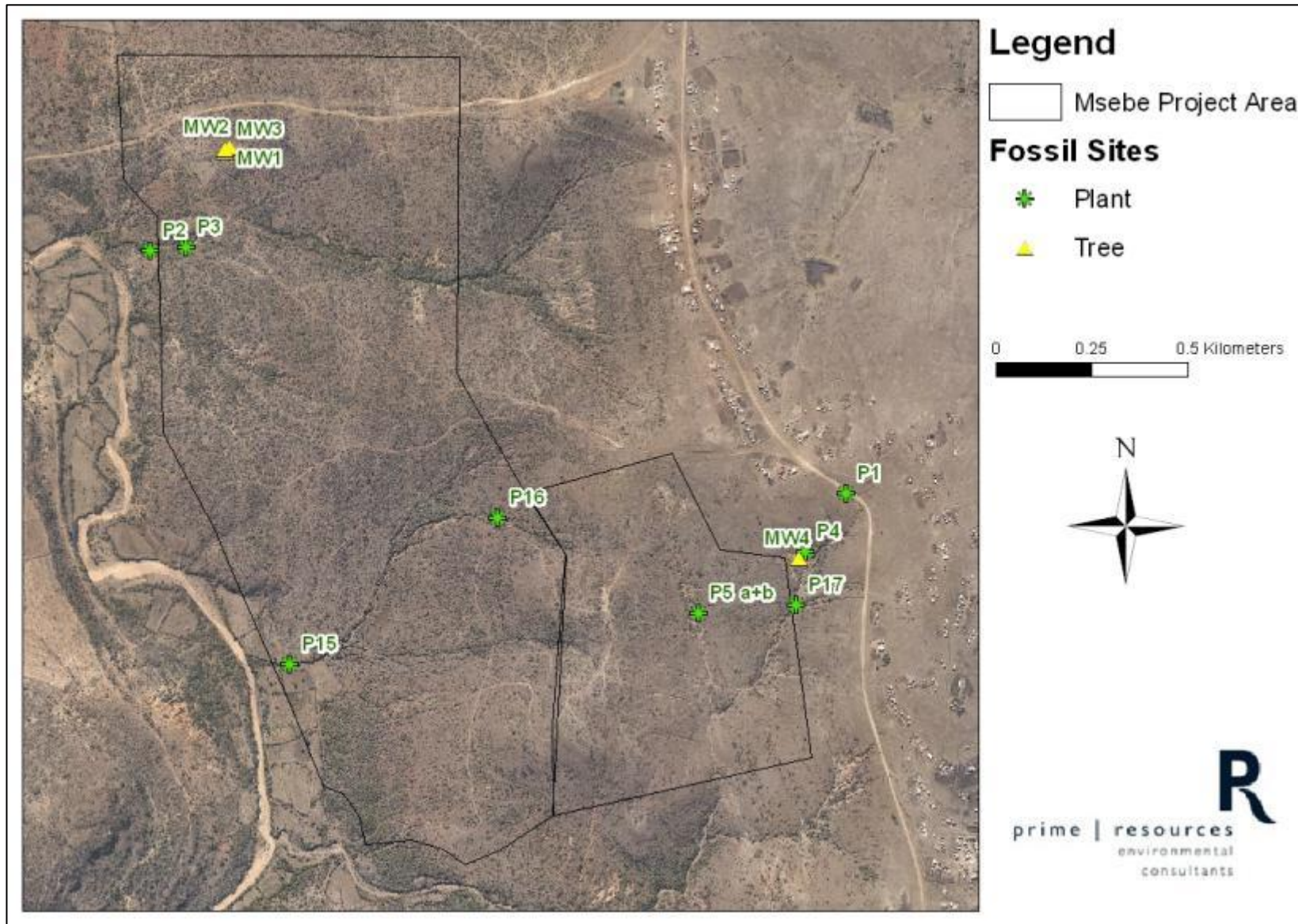


**Figure 27: Location of the heritage sites (grave yards) identified in relation to the proposed project area**

### **3.13 Palaeontology**

According to a Phase 1 palaeontological impact assessment (attached as Appendix 3), conducted by Albany Museum in February 2014 for the proposed project area, multiple plant fossils were identified within the area. The field survey undertaken at the proposed project area and immediate surrounds documented 13 fossil sites, nine of which are plant fossil localities and four are wood/tree sites (Figure 28). Of these 13 fossil sites, 10 of these are of such good quality that they would require significant mitigation during a Phase II palaeontological impact assessment prior to any mining activities.

The proposed project area overlies rocks of the Emakwezini Formation. Mining will target multiple coal seams found in these Late Permian deposits. These coal-bearing host rocks have previously demonstrated a high potential for fossil plants (Glossopteris-dominated fossil floras) of high quality and significance. SAHRA lists the Emakwezini Formation as being of 'very high' palaeontological significance.



**Figure 28: Location of the tree and plant fossils in relation to the proposed project area**

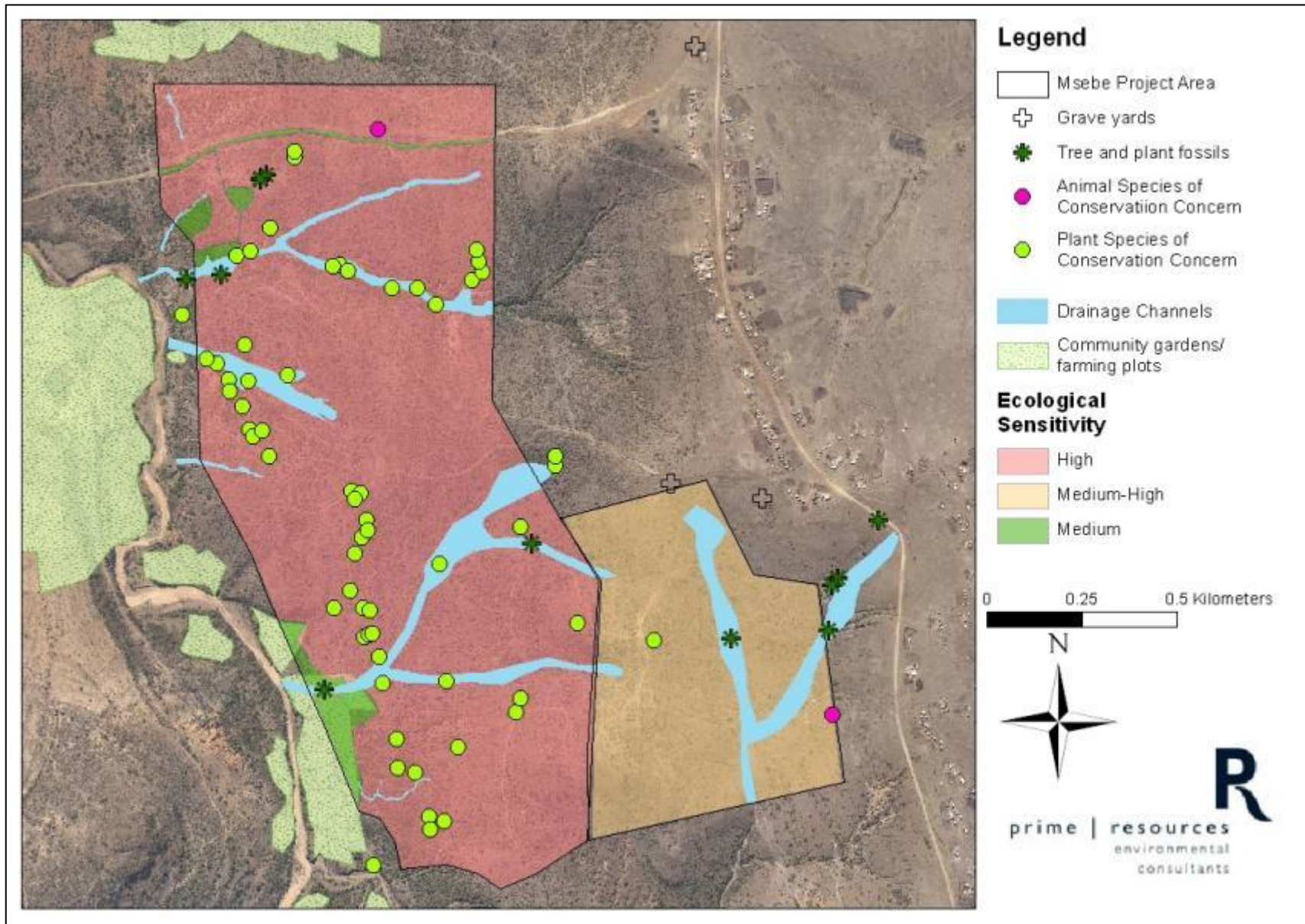
### 3.14 Sensitive Areas

The following sensitive areas were identified within the area proposed for development of the Msebe Opencast Anthracite Mine:

- The proposed project area falls within 500 m of the Mpuphusi River;
- Faunal and floral species of conservation concern were identified within an area of high ecological sensitivity;
- Fossilised tree and plant material found within the proposed project area;
- Saline and highly erodible soils found along the watercourses and drainage channels as well as a lack of topsoil in the area make the area sensitive to erosion;
- Community gardens/ farming plots in close proximity to the Mpuphusi river;
- Graves.

Refer to Figure 29 below for the location of the proposed project area in relation to the above mentioned sensitive areas.





**Figure 29: Sensitive areas within the proposed project area**

### 3.15 Air Quality

No ambient air quality data exists for the proposed project area and thus the background concentrations / fallout for the area could not be assessed, however, it is assumed that, considering the rural, undeveloped nature of the project area, the air quality is likely to be good. An air quality assessment will be conducted during the EIA phase to establish the ambient air quality and likely impacts of the proposed project.

Background sources of air pollution within the proposed project area may include:

- Vehicle tailpipe emissions;
- Fugitive emissions from existing mining operations;
- Biomass burning;
- Household fuel combustion; and
- Miscellaneous fugitive dust sources.

There are numerous small villages within the proposed project area (Figure 2) which may be considered sensitive receptors in terms of ambient air quality.

### 3.16 Traffic

The following information was obtained from the baseline traffic study carried out by UWP for the proposed project in March 2014 (attached as Appendix 11). The road network associated with the proposed project area includes the N2, R618, P234 and D1815 (refer to Figure 30). The proposed project is located west of the D1815 and north of the R618. The D1815 will serve as access to the proposed mine.

The sections of the roads associated with the proposed project can be described as follows:

#### R618

- Provincial road linking Nongoma and the N2.
- Surfaced road, with condition ranging from average to good.
- This road is approximately 8 m wide with shoulders of varying widths up to 1 m.
- This is generally a busy road, with many trucks, minibus taxis and cars.
- The road should have a general speed limit of 100 km / hr, but it is often reduced to 80 km / hr. and 60 km / hr. due to the width, shoulder, sidewalks, horizontal alignment, vertical alignment and road profile and the presence of sensitive areas, such as schools and shops.
- There are many areas where cattle roam alongside or cross the road as well as areas with pedestrians walking alongside the road.
- The road is well signed, with warning signs for cattle, children or to slow down, as well as steep grades or sharp bends.

#### P234

- The first 10 km of the P234, starting at the intersection with the R618 was observed.
- Gravel road in a poor condition (extensive potholes, rutting, severe corrugations and

poor drainage).

- This road is approximately 10 m wide, including shoulders.
- There is a reasonable amount of traffic and whilst there are villages along the road, these villages are set back, with limited direct access.
- There is little pedestrian traffic, but stray cattle were observed.
- There are no speed limit signs on this road.

#### D1815

- The first 3 km of the D1815, starting at the intersection with the P234 was observed.
- Gravel road in a poor condition (erosion, loose material and poor drainage).
- This road is approximately 5 m wide for the first kilometre and 3 m wide for the remainder, including shoulders.
- Small volumes of traffic most of the day, except during a one hour morning peak, when traffic volumes are moderate.
- There is a village east (Emphilweni) of the road for the first 1.5 km and thereafter the road passes through the middle of the village (Kwajuba).
- No vehicular traffic was observed along this road, which was during an off peak period, but a few pedestrians were observed walking in the road.
- There is no provision for stormwater drainage; hence this road will be prone to erosion during the rainy season.
- The road generally follows a ridge, which will minimise stormwater volumes running along or across the road.
- There are no speed limit signs on this road and the road has many bends.

#### D1814

- This road was not assessed by UWP during the baseline studies but is being further investigated.
- From a site visit and a desktop investigation it can be assumed that the conditions of this road are similar to the D1815.
- Gravel road in a poor condition (erosion, loose material and poor drainage).
- Steep gradient down to the Mpuphusi River.
- About 6 m wide.
- No vehicular traffic was observed along this road but a few pedestrians were observed walking in the road.
- Power line runs on the northern side of this road.

The following results were obtained for the daily traffic recorded in a 12 hour count on 29th January 2014:

**Table 11: Daily Traffic volumes for the R618 and P234 roads**

	North West	South East
<b>R618</b>		
Light Vehicles	358	562
Buses	15	42
Light Trucks	240	281
Medium Trucks	41	36
Heavy Trucks	7	8
<b>P234</b>		
Light Vehicles	248	175
Buses	9	6
Light Trucks	175	133
Medium Trucks	18	22
Heavy Trucks	1	7

The different truck types in the above table are classified as follows:

- Light = Single axle, length of up to 7.5 m e.g. delivery vans
- Medium = Single axle, length from 7.5m to 14m e.g. 7.5 tonne trucks
- Heavy = Double axel, length from 14m and more e.g. 32 tonne trucks

From the intersection assessments undertaken at five intersections along the P234, to understand the daily traffic volumes on the R618 and the P234, the peak hour appears to occur from 07H00 to 08H00 (refer to Figure 30). All intersections are currently operating at an acceptable level of service.

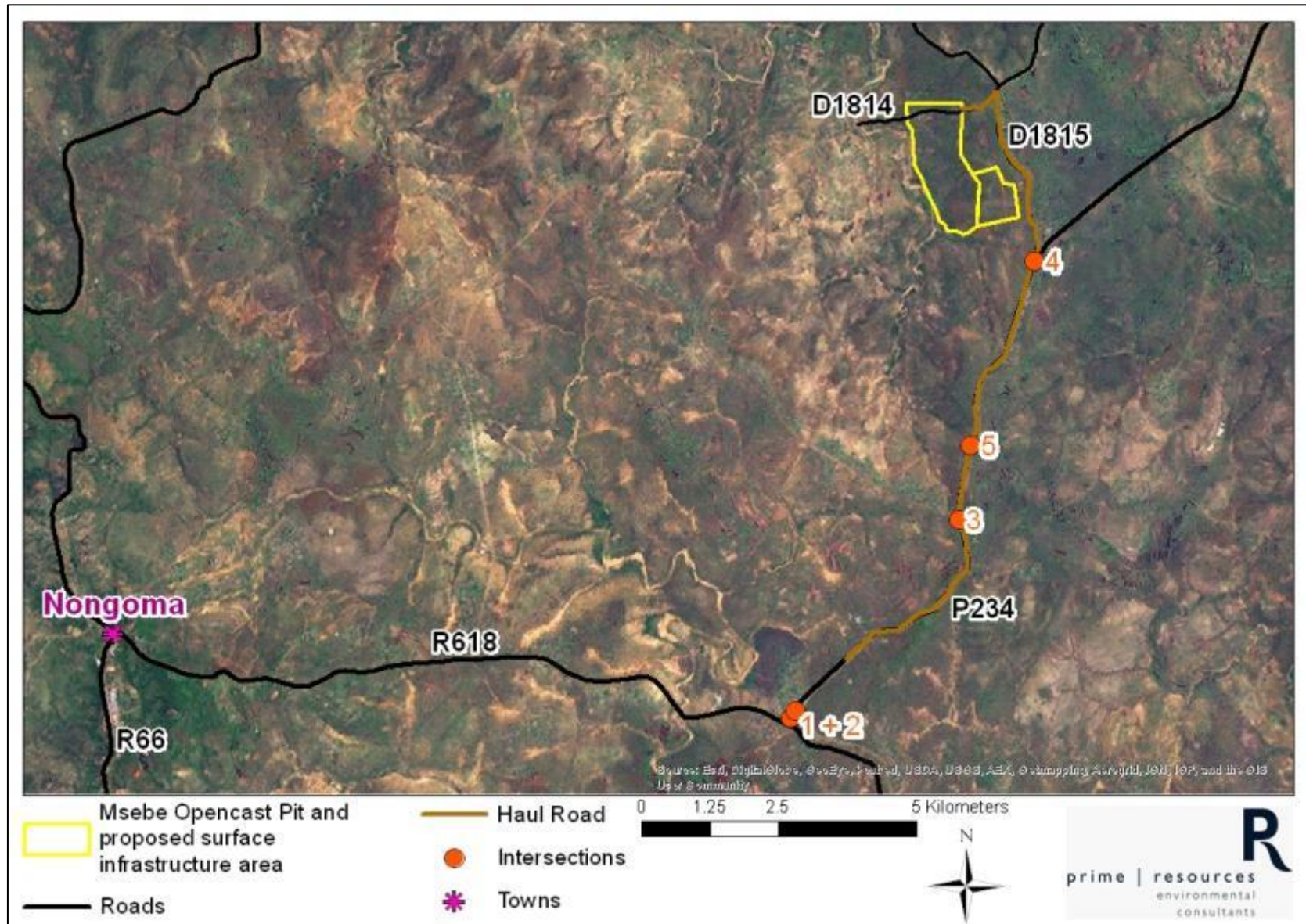


Figure 30: Roads associated with the proposed project area

### **3.17 Noise**

The following ambient noise baseline information was obtained from a noise impact assessment conducted for the adjacent Mbila Mine area prepared by KRD Acoustic Services in 2007.

The proposed project area and surroundings comprise of villages and settlements (Figure 2), open areas and cultivated / grazing lands. During the noise impact assessment undertaken, ambient noise levels were recorded (in accordance with the SANS 110103:2004 code of practice) in order to establish baseline conditions. Recordings which are relevant to the proposed Msebe Project include the Zondela Primary School and in an area just west of the proposed Mbila plant area:

- 48.1 dB(A) at the Zondela Primary School; and
- 45.2 dB(A) at the area west of the proposed plant.

These levels are in line with the rating levels given in SANS 10103 for rural and suburban districts with little road traffic and which likely apply to the greater Msebe project area.

There are numerous small villages within the proposed project area (Figure 2) which may be considered sensitive receptors in terms of noise. A specialist noise assessment will be conducted during the EIA phase to detail the current ambient noise levels across- and current noise character of the proposed project area, as well as confirm the surrounding sensitive receptors.

### **3.18 Visual**

#### **3.18.1 Landscape Character**

The area is generally characterised as rural natural landscape with scattered subsistence agriculture plots and communities. The natural environment within the proposed project area has not been significantly disturbed by anthropogenic activities, with no significant developments in terms of infrastructure. The topography within the proposed project area, as described in Section 3.3 above, is hilly with steep slopes along the eastern border.

#### **3.18.2 Views**

Sensitive viewing areas are considered to be views of the proposed mining operations from surrounding communities and public rights of way. Areas considered not sensitive would be where the view of the proposed operations will be obstructed.

##### *Sensitive Viewing Areas*

The P234 and D1815 constitute the major public roads in the vicinity of the proposed project area (Figure 30). The proposed mining operations will be visible from these major public roads. The D1815 road is approximately 200 m away from the proposed mining operations at its nearest point. A number of communities exist within the vicinity of the proposed project area, which will have a view of the proposed mining operations due their location on the top of

adjacent hills. These communities include Mpuphusi, Empilweni, Ophaphasi and Nhlebela (Figure 2).

#### Non-Sensitive Viewing Areas

Non-sensitive viewing areas include most close up views of the proposed mining operations where the view will be obstructed by vegetation. Furthermore, the view of the mining operations will also be obstructed in certain areas due to the hilly and undulating nature of the surrounding topography.

### **3.19 Socio-Economic Conditions**

#### **3.19.1 KwaZulu-Natal Province**

The KwaZulu-Natal Province is located on the east coast of South Africa, with a population of approximately 8.4 million people living on 92 100 km<sup>2</sup> of land. The province has the largest population in the country. The dominant language group is isiZulu (80%), followed by English (16%) and Afrikaans (2%). The province is characterised by an unskilled labour force (almost 23% of adults in the province have never attended school).

Economic activities in the province are mainly centred in the eThekweni Municipality, with significant economic contributions coming from the Richard's Bay/ Empangeni area, the Ladysmith/ Ezakheni area, the New castle/ Madadeni area and the south coast regions. Sugar farming is the main agricultural activity in the mainland where as the coastal belt region of the province is a large producer of sub-tropical fruit. Farming in the hinterlands is focussed on vegetable, dairy and stock farming.

Although the province does not have extensive mineral resources, coal is mined in the northern area, whilst heavy minerals are mined in the east. Industrialisation in the province has been rapid and thus many job opportunities are in the manufacturing industries. As with most provinces in South Africa KwaZulu-Natal is characterised by a large gap between urban and rural income per capita, less than half of the potential labour force is employed in the formal economy which results in high levels of migration to Gauteng.

#### **3.19.2 Zululand District Municipality**

The Zululand District Municipality is located in a remote area situated far away from major development centres such as Durban, Richards Bay and Pietermaritzburg and the main growth corridors along the N2 and N3 routes. The district is characterised by high levels of poverty and high incidences of HIV / Aids. Most of the rural settlements are small which makes service delivery very costly, another prevailing problem is poor accessibility to basic facilities and services. The majority of Zululand's impoverished population can be found residing in Abaqulusi and Nongoma municipalities.

Approximately half of the Zululand District Municipality falls under the jurisdiction of traditional authorities, the remainder being privately owned commercial farms or protected areas. The Msebe Opencast Anthracite Minefall entirely within the Mandlakazi traditional area which is one

of the most remote areas in the KwaZulu-Natal Province (Zululand District Municipality Draft Integrated Development Plan (IDP) 2012/13).

### **3.19.3 Nongoma Local Municipality**

Nongoma is one of the five sister municipalities that make up Zululand District, it is approximately 2,184 km<sup>2</sup> in extent. A census carried out in 2011 revealed that the estimated population of the Nongoma Municipality is 194 908 of which 42 % are young (0-14 years) and 54.6 % are female. Nongoma, which has the second highest population of all the Zululand municipalities, only contributes 13.6 % to the District's economic output. The unemployment rate for the municipality is 49.3 %. There are 34 341 households of which 64.6 % are housed in formal dwellings and 63.6 % use electricity for lighting. Only 4.5 % of the households have flush toilets connects to a sewerage system and only 9.6 % have piped water inside their dwellings. The education levels in Nongoma are very poor, 20.5 % of the population aged 20+ have no schooling, 4.8 % of the population aged 20+ have higher education and 27.8% of the population have a matric (Umkhandlu Wakwa – Nongoma Municipality Draft IDP 2012/13 to 2016/17 and Statistics South Africa 2011).

The entire municipality consists of communal settlements and a mixture of farming practices takes place by small holders with cattle and goats being the most important enterprises. The agricultural potential is low unless irrigation is available. Two development programmes that have been identified in Nongoma, aim to improve production and marketing of vegetables on the Bulelwane project and to improve access to markets for beef farmers (Zululand Biodiversity Sector Plan 2010).

### **3.19.4 Mandlakazi Traditional Area**

The Mandlakazi Traditional area is characterised by rural villages / settlements, referred to locally as Isigodi. The Isigodi are headed by Indunas and traditional councillors (Umkhandlu Wakwa – Nongoma Municipality Draft IDP 2012/13 to 2016/17).

#### Water and Sanitation

The area falls within the Usuthu to Mhlatuze Water Management Area, where water is a very scarce resource. Approximately 34% of the households in the Mandlakazi Traditional area have no access to piped water and less than 1% of the population have access to piped water in their homes. Approximately 20% of the residents in the area use the local rivers and streams as a source of drinking water, the rest of the population has access to drinking water via other sources.

Data collected by Synergistics Environmental Services in 2007 indicated that most residents in the proposed mining area source their water from: dams, communal water tanks, boreholes and independently delivered water. There are no bulk sanitation schemes in the rural areas of the Nongoma Local Municipality, as mentioned previously the provision of services in this area is inadequate. More than 52% of households in the Mandlakazi Traditional area do not have access to a toilet, 35% have utilise pit latrines, 6% utilise chemical toilets and less than 4% utilise flush toilets.



### Access to Electricity

Electricity and wood are the main sources of energy for cooking and heating, whilst candles are the main source of light. The highest percentage of energy usage is located within Ward 9 with more than 60% of the households using electricity for lighting and more than 35% using electricity for cooking and heating. Approximately 94% of the households in Ward 1 use wood as an energy source for heating, cooking and lighting. Only 19% of the households in the Mandlakazi Traditional area have access to pre-paid electricity; more than 62% of the households use candles for lighting, the rest use paraffin, gas and solar energy for lighting purposes.

### Health Care Facilities

There are 12 clinics within Nongoma, 1 hospital and a number of mobile clinics. Within the Mandlakazi Traditional area there are only 4 health care facilities, namely the: Buxedene Clinic, Ekubungazeleni Clinic, Njoko Clinic and Sovane Clinic. Access to health care facilities is a concern in the community.

### Educational Resources

Within Nongoma there are 188 schools, 28 of which are in the Mandlakazi Traditional area. Of these 28 schools, there are 18 primary and 10 high schools and there is thus an urgent need for early learning centres to be introduced. The majority (74%) of the population in the Mandlakazi Traditional area are illiterate, 9% have had some primary school education, 12% have attended high school and only 4% have a matric. Less than 2% of the population in the Mandlakazi traditional area have had some form of tertiary education; this can be attributed to the fact that, apart from one college, there are no other institutions of higher learning in the Mandlakazi Traditional area. Additionally, there is little exposure to sources of knowledge such as libraries and computer centres. There is a growing concern in the communities about the lack of educational facilities.

### Housing

The majority of people (61%) in the Mandlakazi Traditional area live in dwellings / huts made of traditional materials; 27% of people live in brick houses and the remaining population live in informal dwellings. More than 15% of the households in the Mandlakazi Traditional areas have ten or more members living in them, 61% of the households have between 4 and 9 members whilst 24% of the households have 3 or less members living in them.

### Safety and Security

All offences relating to crime, domestic disturbances and threats to the safety of the community are reported to the Induna of the affected Isigodi who deals with the matter through traditional court structures. There is a formal police station in the town of Nongoma and the police work in conjunction with the traditional police. Minor criminal offences are dealt with at the traditional court where the Nkosi can issue fines to the perpetrators and more serious offences are dealt with by the formal police in Nongoma.

### Access to Transport

In the Mandlakazi Traditional area 46% of the residents commute on foot, 2% of the residents use cars (as passengers or as the driver) and the remainder of the community uses public transport (bus, taxi or train) to get around. Public transport facilities are available around the traditional court; however, most of the villages are located far away from this point therefore it is difficult for most residents to use public transport efficiently.

## **4 DESCRIPTION OF THE PROPOSED DEVELOPMENT**

### **4.1.1 Mineable Resource**

The proposed Msebe Opencast Anthracite Mine will have a surface area of approximately 210 hectares (which includes the opencast pit and surface infrastructure area), while the existing mining right area covers a surface area of 52,946 hectares. Exploration activities at Msebe have revealed that the coal resources identified are of the Beaufort series occurring on three separate seam horizons, namely the B3 Seam, the B2 Seam and the B1 Seam with the B1 Seam being the lower in sequence and the B3 Seam being the upper.

These coal resources are an extension of those identified previously as targets within the Mining Right area at the adjacent Mbila Anthracite Mine, which is to comprise of underground and opencast mining areas associated with a central beneficiation plant and discard area.

### **4.1.2 Mining Method**

Conventional roll-over mining, which will combine three elements of earth moving in several steps to expose the coal seam, will be used for mining of the Beaufort seam. In order to move blasted rock from the strip cut to the adjacent open void by means of trucks would require substantial ramp construction and this will take up space required for back filling. The mining method therefore sought a means by which to reduce the amount of trucked material to the smallest volume possible in order to maintain a reasonable mining rate and operating cost. By so doing, the pit length will be used to provide ramp space on a temporary basis to haul material from the bottom of the pit and end-dump at the top of the spoil area.

The above will be achieved by ensuring that the initial box-cut void provides sufficient capacity for dumping all the swelled material from the first adjacent cut and the required ramp space. This in turn provides sufficient capacity for spoil and ramps in sequential cuts in the steady-state operation. The only exception is in the area east of the anticline axis, where overburden at a depth greater than 60 metres has to be pre-stripped and placed on a surface dump until closure. Steady state operation will thus entail:

- Maximise the opportunity to cast blast the upper portion of the overburden;
- Carry out a dozer push-over operation to move an intermediate zone of burden;
- Remove the lowest zone of burden by means of excavators and articulated dump trucks; and
- Sequentially mine the coal seams and place the parting material mined out between them in the nearest adjacent mined out area at the bottom of the pit.

The mining operation is planned to begin with topsoil stripping over the entire ramp and box-cut area together with an additional 15 metres beyond the boundaries of this area. The box-cut and ramp will be mined concurrently together in order to expose the upper (B3) Seam at the earliest possible date. Initial production drilling will be for a conventional "drop cut" in both the ramp and box-cut to provide a free face in each, followed by pre-split drilling and blasting along the ramp and box-cut limits. The intention is to mine coal (specifically anthracite) of the Beaufort Group at a rate of 50 000 tons per month.

### **4.1.3 Processing**

Coal washing and screening will take place at the adjacent Mbila Resources processing plant which is to be constructed approximately 18 km east of Nongoma and is situated in the centre of the Mbila mining right area near the Traditional Court at Esiphambanweni. The proposed plant is modular and can thus cater for the increased capacity. The proposed plant will batch treat approximately 50 000 tonnes of coal per month from Msebe (the plant will also treat coal from the adjacent Mbila Mine).

#### ROM stockpile

Mined coal will be temporarily stockpiled in a run of mine stockpile on surface from which it will be loaded onto trucks by front-end loader and removed to the CHPP at Mbila.

#### Hard and Soft Overburden

Soft material overlying the coal material to be mined will be removed and separately stockpiled on a surface dump approximately 0.5 ha in extent with a height of 20 m. Hard overburden material will be separately stockpiled on a surface dump approximately 19 ha with a height of 20m. These stockpiles will be located within the surface infrastructure area.

### **4.1.4 Manpower**

The labour force for the proposed Msebe Opencast Anthracite Mine will be sourced mainly from the local communities. Job opportunities will be created for 145 people.

### **4.1.5 Supporting Infrastructure**

#### Access Road

Access to the Msebe Opencast Anthracite Mine will be via the D1814 and the D1815, district roads that connects to the P234 and then to the R618, which is the main road to Nongoma. The coal will be hauled from the opencast pit to the main plant area via the existing D1815 and P234 local gravel roads.

#### Service and Haul Roads

The main haul road from the Msebe Opencast Anthracite Mine will be linked to the Mbila Processing Plant via the P234. The P234 is an existing gravel road which will be upgraded and used as the transportation route for coal hauling to the coal processing plant. Construction/upgrading of the P234 road will be undertaken during the construction phase.

#### Buildings and Infrastructure

A series of buildings and supporting structures will be constructed at the Msebe Anthracite Mine within the surface infrastructure area and will comprise offices, stores, workshops, change houses, weighbridge and laydown areas. The infrastructural area of the mine will be fenced and access will be controlled by security personnel.

#### **4.1.6 Bulk Services**

Water for the project will be sourced primarily from borehole JJ29 (Njoko) allocated to Mbila Resources (Pty) Ltd by the Zululand District Municipality (ZDM). This borehole will be pumped via a buried pumped main to service water tanks at the Msebe opencast pit; from here water will be reticulated to the offices. Water at the pit will be reticulated in a semi-closed loop system to minimize the volume of makeup water and to reduce the risk of spillages.

Electrical supply to the Msebe Opencast Anthracite Mine will be supplied by Eskom at 22,000 volts – 3 phase.

#### **4.1.7 Separation of Water**

The objective is to keep, as far as possible, water of differing qualities separate on the mine, so as to minimise the water management requirements. The following infrastructure will thus be required for the separation of clean and dirty water at the proposed Msebe Anthracite Mine:

- Upslope diversion berms (designed to cater for a flood event with a 50 year recurrence interval, plus 0.8 m free board) will be required to divert clean run-off around dirty areas into to the natural watercourses;
- Dirty run-off is to be channelled to, and captured in a pollution control dam (PCD) via a concrete lined dirty water drain with the capacity sufficient to prevent overtopping in anything less than a 1: 50 year return event. Dual silt traps are to be used to capture solids;
- Water from the PCD will pumped to the water storage reservoirs for re-use; and
- Culverts to be used at all water course crossings.

The slope of the land in the vicinity of the proposed mine is decidedly steep and thus surface run-off and erosion would occur at an accelerated rate. The steep slope is probably the cause of the deep drainage channels that cut across the proposed project area. Due to the hilly nature of the project area and the length and shape of the upgradient side of the mine, it is going to be difficult to construct upgradient berms or cut-off trenches to divert water around the mine (unless very deep excavations or tunnels are constructed). Some water will inevitably have to flow across the mining area and in the process it will become contaminated. This potential contamination and alternative methods for the separation of clean and dirty water will be further investigated in the EIA phase.

#### **4.1.8 Equipment List**

The following equipment will be utilised in mining operations proposed for the Msebe Anthracite Mine:

- Two, Hitachi 670, Excavators (approximately 67 metric ton payload capacity);
- One, Hitachi 870, Excavator (approximately 87 metric ton payload capacity);
- Four, Komatsu HD465-7, Rigid frame trucks (approximately 55 metric ton payload capacity);
- Three, Volvo A40F, Articulated dump trucks (approximately 39 metric ton payload capacity);
- One, Caterpillar D9T, Pit services dozer;
- One, Komatsu D375A-6, Production dozer for strip mining;
- One, Caterpillar 140K, Motor grader;
- One, Bell B20C 18000L, Water cart; and
- One, Komatsu WA 470, Front end loader for loading coal.



**Figure 31: Map showing the locality of the Msebe Opencast Anthracite Mine in relation to the haul road and plant located in the adjacent Mbila Mining Right area**

## **5 PROJECT ALTERNATIVES**

### **5.1 Introduction**

The objective of this Section is to identify land use and development alternatives to the proposed opencast anthracite mine.

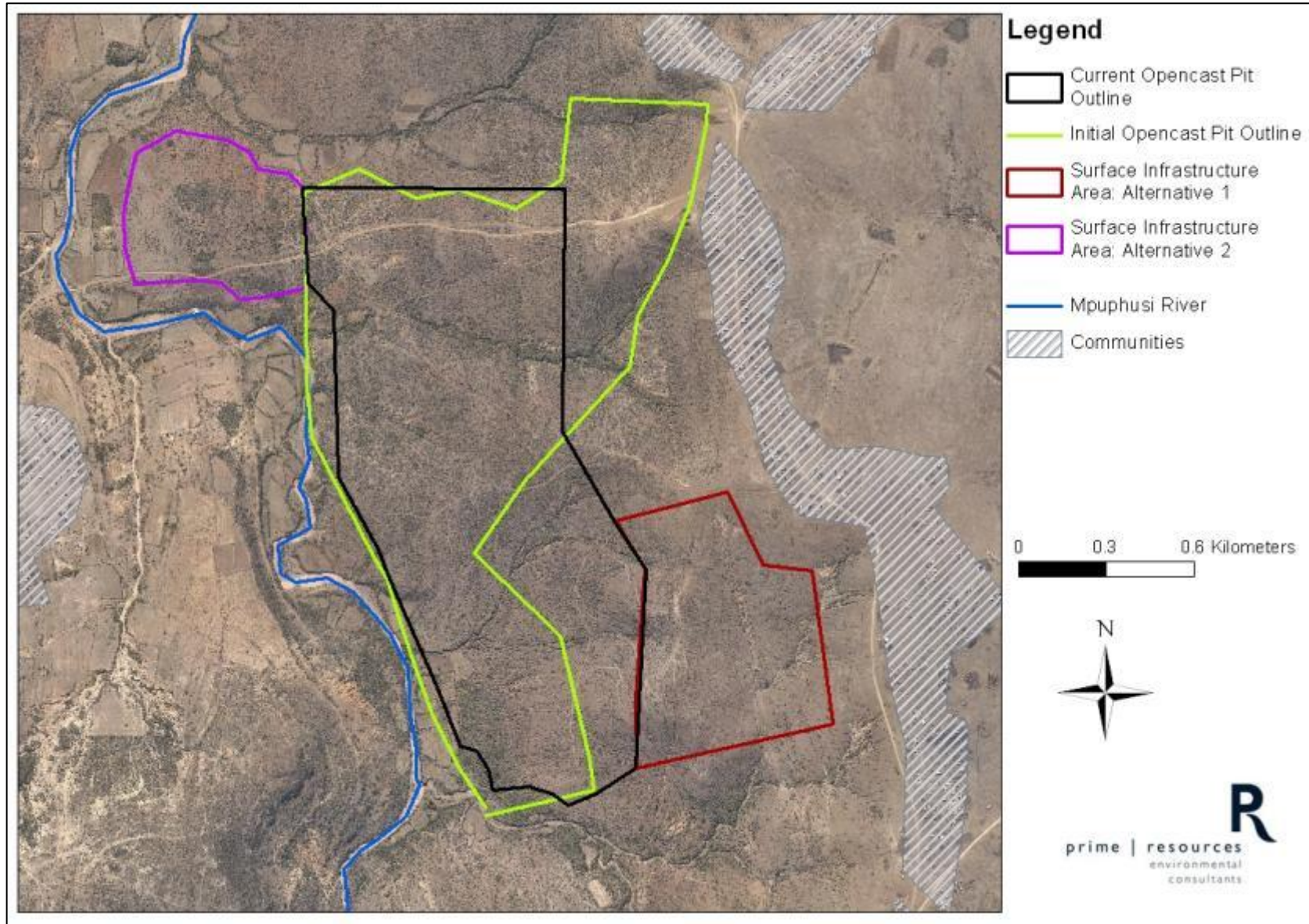
### **5.2 Alternative Locations / Techniques**

The coal resources at Msebe were originally envisaged to be accessed by underground mining methods, however, considering the depth of the coal resources at Msebe, it was later deemed more economically feasible to mine these resources by opencast methods.

Since the location of the coal resource is fixed there are no feasible alternative locations for the opencast pit which is required to access the coal. The opencast pit outline was however adjusted and refined to avoid sensitive areas such as the Mpuphusi River and the surrounding communities (Figure 32).

Two alternative sites for the placement of supporting surface infrastructure at Msebe were initially considered. Alternative 1 is situated to the east of the proposed opencast pit, approximately halfway along the length thereof, which is optimal in terms of hauling distance. Furthermore, this alternative is located at a distance further upstream of the Mpuphusi River than Alternative 2. As such, Alternative 1 was considered to be the preferred alternative and was thus utilised for all baseline studies conducted for the project area. One of the outcomes of the baseline studies, however, was that this area is topographically not suitable from an engineering perspective due to the steep gradient. Alternative 2 (Figure 32), which is situated to the north west, upper extent of the opencast pit, was subsequently identified as a more suitable alternative in terms of the topography, and will now be further investigated as the preferred alternative moving forward.





**Figure 32: Alternative locations considered for the proposed Msebe Anthracite Mine**

### **5.3 No Project' Alternative**

The no project alternative refers to what would happen if the project would not go ahead and if the geological resource was not utilised. The Zululand District is classified as a region of high income disparity and inequality and the activities proposed by Mbila Resources (incorporating both the Msebe Opencast Anthracite Mine and the adjacent Mbila Anthracite Mine) serves to bring positive spin-offs such as improved services and employment opportunities. The proposed Msebe Opencast Anthracite Mine will in-turn increase the mineable resource tonnages targeted by Mbila Resources (Pty) Ltd, thereby increasing the life of mine and ultimately the continuation of employment and the procurement of local services offered by the mining project to the local community. These benefits are then escalated throughout the receiving communities by means of the multiplier effect.

If the no project alternative were to be taken, then the aforementioned spin-offs would not occur and the operations at the adjacent Mbila Anthracite Mine would cease at the forecast time, which would in turn lead to downscaling and retrenchment of the workforce (the same workforce will serve both operations), which would in turn be felt throughout the associated communities by ways of the multiplier effect. In this instance, however, the potential environmental impacts alluded to in the above sections could be avoided and the existing land use would continue unaffected.

## **6 MOTIVATION FOR THE PROPOSED PROJECT**

### **6.1 Benefits of the Project**

The Msebe Opencast Anthracite Mine will employ approximately 145 people (permanent and the core contractor), which will have a multiplier effect as employee households will be positively impacted through direct and indirect income. Considering that the proposed Msebe Opencast Anthracite Mine has an expected life of mine of approximately 20 years, these benefits should be sustainable for a long term period. In order to mitigate the loss of the positive impacts upon closure, the mine will plan towards their eventual closing and put mitigation measures in place, which will assist their employees in finding alternative sources of income.

Msebe Anthracite Mine's workforce will come mainly from the local community, but these people may be representative of other labour sending areas. The future incomes earned by these employees will translate into spending power, benefiting businesses and entrepreneurs not only in the area surrounding the operation where the employees spend their working week, but also in those economies further away. Local procurement of goods and services will contribute significantly to the local economy.

#### **6.1.1 Employment Opportunities**

A major benefit of the proposed Msebe Opencast Anthracite Mine will be an increase in the forecast life of the adjacent Mabila Anthracite Mine, thereby prolonging employment of workers there, which would result in further social upliftment within the surrounding communities. According to the mine's social and labour plan, the proposed Mabila and Msebe projects will together provide approximately, 145 permanent jobs, 69 temporary jobs and 10 administration job opportunities.

Potentially positive impacts include indirect employment opportunities for service providers and opportunities for small, medium and micro enterprises (SMMEs), training and skills development opportunities, developmental cash flows for re-investment in community based development projects, community based projects driven and funded by Msebe and an increase in social welfare and infrastructure in the district.

#### **6.1.2 Human Resource Development**

The human resource development programme for the Msebe Opencast Anthracite Mine will include employee skills development in the form of adult basic education and training, learnerships, portable skills training, mentorship programmes as well as internships and bursaries. The living condition of employees will be improved through the implementation of a housing plan.

#### **6.1.3 Community Development**

The Msebe Opencast Anthracite Mine will provide Local Economic Development (LED) initiatives in the surrounding villages by implementing a crop production and hydroponics gardening

project. This project will alleviate poverty, provide job opportunities, train people through skills development programmes, provide more affordable food products and create a market for emerging farmers to sell agricultural products. Mbila Resources have also begun the construction of a crèche facility in the local community.

#### **6.1.4 Beaufort and Ecca coal**

Beaufort coal has different characteristics to Ecca coal, both of which are targeted by Mbila Resources. The coal from Msebe (Beaufort) is classified as low phosphorous, high vitrinite which is ideally suited for the ferrochrome industry. The Msebe coal is of such quality that it can be easily exported into either of the domestic or international markets. The Msebe, Beaufort coal falls into the top end of the lower grade anthracites category.

The coal from Mbila (Ecca) is also classified as low phosphorous and has a lower phosphorous content than the Msebe Beaufort coal. The Mbila, Ecca coal falls into the high grade metallurgical anthracite category and is ideally suited for the high grade metallurgical industry.

Both the Ecca and Beaufort Groups fall into the "low phos" anthracite category. The demand for this anthracite is dominated by the ferrochrome and mineral sands industries.

## **6.2 Disadvantages**

The disadvantages of the proposed development pertain to the potential impacts identified and discussed further in Section 8 below.

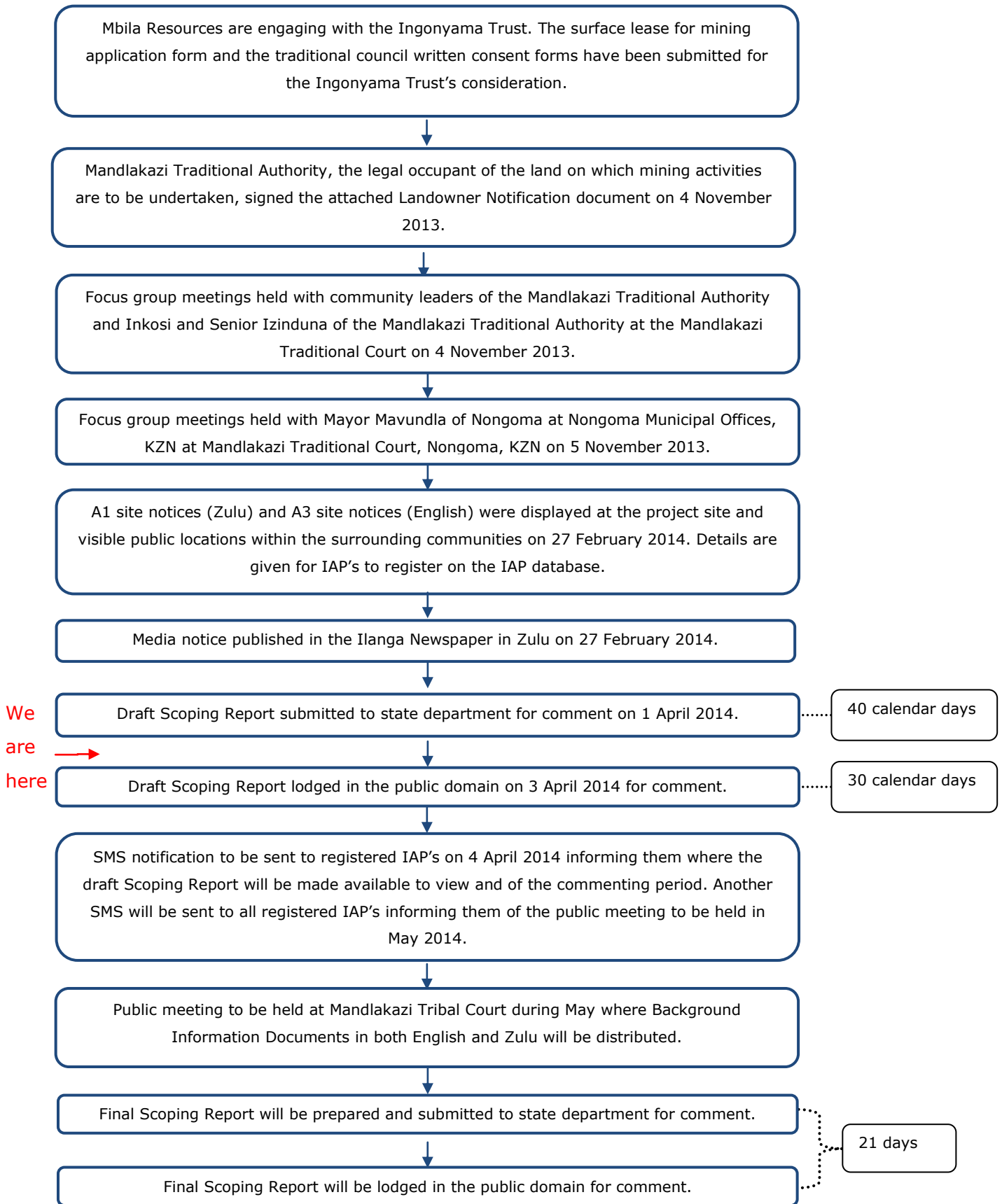
## **7 PUBLIC PARTICIPATION PROCESS**

A public participation process, designed to engage all potential IAPs will be undertaken to ascertain the concerns or issues regarding the proposed project. Below is a summary of the planned public consultation process to be held for the proposed project. Please refer to the Comments and Response Report attached as Appendix 12 for the detailed plan, the IAP database, the issues trail, copies of the public consultation material and proof of consultation.

The public consultation process planned for the scoping phase includes: landowner notification; an IAP registration period of 14 days; the publication of a media notice in the Ilanga newspaper; the posting up of site notices at public locations in the vicinity of the project area; making copies of the draft Scoping Report available at public locations for comment, copies also to be sent to the state department for comment; the distribution of a Background Information Document to state department via email and IAPs at the public meeting; focus group meetings with the Traditional Authority; a pre-WULA meeting with the catchment officer; and a public meeting where a presentation will be made, and any comments and issues will be noted.

Follow-up public consultation will be conducted during the Assessment Phase and will consist of the following: a copy of the draft EIA/ EMP, will made available within the surrounding communities for comment; copies will also be sent to state department for comment; an SMS will be sent to all IAPs to notify them of a feedback public meeting to be held and of the draft EIA/ EMP available for comment; feedback Background Information Documents will be distributed to all the IAPs attending the feedback meeting.

## 7.1 Summary of Public Consultation Activities



## **8 POTENTIAL IMPACTS IDENTIFIED**

### **8.1 Introduction**

This Section outlines the potential impacts identified during the scoping phase for the proposed development, which are to be further investigated during the EIA phase with specialist input as required and management measures ascertained accordingly.

### **8.2 Blasting and Vibrations**

Blasting activities during the excavation of the opencast pit (including establishment of the ramp, removal of overburden and mining itself) have the potential to impact upon wildlife, local residents, livestock and surrounding infrastructure through the generation of ground vibrations, fly-rock, dust and air blasts.

### **8.3 Soil and Land Capability**

The construction of the opencast pit will require the stripping of topsoil / soft overburden material followed by the removal of hard overburden material in order to access the resource to be mined. The upper soil horizons will also be stripped for the construction of surface infrastructure (such as offices, workshops, surface dumps etc.) or compacted (by vehicle movements on surface). This disturbance of the soil horizons may result in physical changes to the soil structure and chemical changes in terms of the soil composition. Soils may be lost from erosion caused by uncontrolled run-off and there is also the possibility that soils may be contaminated by hydrocarbon spills from vehicles, equipment or storage areas. Disturbances to the saline soils in the area could result in increased salinity of the surrounding surface and groundwater. The above mentioned potential impacts may have an effect on the future land capability of the area.

### **8.4 Terrestrial Biodiversity (Flora and Fauna)**

The proposed project may result in the destruction of individuals of two floral species of conservation concern in terms of NEMBA, eight provincially protected floral species and two nationally protected tree species, if these are not removed and relocated prior to the commencement of the proposed activities. There is an extensive population of *Hypoxis hemerocallidea* (Star-flower), currently listed as Declining, within the area. The destruction of this population will affect the conservation status of this species on a provincial and national level.

Suitable breeding and foraging habitat for four bird species- and one bat species of conservation concern, which were confirmed within the area, will be lost due to the proposed project. Suitable breeding and foraging habitat for additional mammal and bird species of conservation concern, which have a high probability of occurrence, will also be lost due to the proposed project.

The intrinsic biodiversity value of the proposed project area may be reduced by the proposed project due to the points mentioned above. These impacts will further assessed by a specialist during the assessment phase.

## **8.5 Aquatic Ecology**

The proposed development is situated within 500 m of the Mpuphusi River. Potential impacts of the mining project to the aquatic environment include increased run-off, water pollution and increased erosion, siltation which may alter aquatic habitats and thereby affect the nature of organisms associated with the biodiversity thereof. The Mpuphusi River and its associated drainage channels appear to only hold water very occasionally after high rainfall events and the potential for these impacts to occur will therefore be determined during the assessment phase.

## **8.6 Groundwater**

Dewatering of the opencast pit will be required for the continuation of mining and the safety of people and material. This activity could impact on groundwater levels in the area through the development of a cone of depression (groundwater drawdown). The resulting zone of influence will be determined and the impacts resulting assessed accordingly. Mining activities may also result in the contamination of groundwater resources through infiltration of water from the dirty water catchment. Furthermore, the interaction between recharging groundwater and host geology may result in poor quality groundwater in the long-term which may decant to surface depending on the nature of the water table in the closure environment. The impacts on groundwater quantity and quality will be assessed by a groundwater specialist during the assessment phase.

## **8.7 Surface Water**

Managing the surface run-off from the steep slope on the up gradient side of the mine, i.e. between the mine's eastern boundary and the top of the ridge may pose quite a challenge once mining starts. Currently the area is covered with relatively dense vegetation. This vegetation is presently adequate to prevent excessive erosion. However, once mining begins and particularly after closure of the opencast pit, erosion could occur if proper preventative measures are not taken. Due to the hilly nature of the topography in the area and the length and shape of the up-gradient side of the mine, there is no simple way of constructing up-gradient berms or cut-off trenches to divert this water around the mine (unless very deep excavations or tunnels are potential for the contamination of the water resource by polluted run-off, increased silt loads and increased salinity from erosion. Any impacts to the quality and quantity of water resources associated with the proposed development may impact external users thereof. Impacts to this end will be assessed by a specialist during the assessment phase.

## **8.8 Archaeology, Cultural and Heritage**

Three grave sites were identified near to but not within the proposed project area. There are two options when dealing with graves: fence in the graves and write a management plan for



the preservation thereof or exhume and remove and rebury the bodies. Since the graves identified during the field survey are outside of the development footprint no direct impacts are foreseen, however indirect impacts could arise due to aspects such as material handling, blasting and activities incidental to mining. Other disciplines will thus take cognizance of these graves as sensitive features in their relevant studies.

## **8.9 Palaeontology**

A site visit confirmed the presence of fossilised wood and fossilised plant material within the project area. Damage to or destruction of any fossil during mining or construction activities would be a highly negative, permanent impact of international significance. Of the 13 fossil sites identified during the Phase 1 palaeontological impact assessment, 10 of these are of such good quality that a Phase II palaeontological impact assessment, during which significant mitigation is required, must be undertaken prior to any mining activities. The Phase II palaeontological impact assessment will mitigate damage to and attempt to prevent loss of fossil material. Samples will be collected for identification, documentation and curation. If the correct mitigation measures are implemented the overall significance of the project could become beneficial and the development could potentially have a positive impact on South Africa's palaeontological heritage.

## **8.10 Air Quality**

Particulate matter (PM) as well as fugitive dust can potentially be generated from vehicle movement, blasting, stockpiles and materials handling and this may potentially result in a localised reduction in air quality. The quantification of impacts and areas most likely to be affected must be assessed and management measures proposed accordingly. The zones of influence will be calculated.

The proposed activities could potentially result in a localised reduction of air quality through the generation of dust and inhalable particulate matter from material stockpiles and opencast mining, as well as a potential reduction in the water quality of the Mpuphusi River. The significance of these potential impacts and the management thereof will be further investigated in the EIA/ EMP.

## **8.11 Traffic**

The transportation of mine employees, materials and the hauling of coal between the opencast pit and plant during the life of the mine will result in a slight increase in traffic on the surrounding roads in the area which may pose an increased road safety risk to residents, pose a nuisance to the surrounding communities and result in further degradation of roads in the area.

The D1814 road and associated power line running alongside will have to be diverted around the mining area. The potential impacts of this diversion and the management thereof will be further investigated in the EIA/ EMP.

## 8.12 Noise

The operation of vehicles and equipment, blasting and the mechanical excavation of coal and materials handling will generate noise which will may have an impact on the characteristic rural noise levels in the area. The increase in ambient noise levels and the zone of influence thereof will be determined.

## 8.13 Visual

The mine will have a visual impact on the surrounding rural natural landscape, although the impact will not be severe as no economic benefits are derived from the surrounding land, apart from subsistence and grazing of livestock. There are also no tourist attractions located in the vicinity of the proposed mining activities and the visual impact will therefore be limited to the communities living nearby and the public roads. The natural scenic quality of the area will progressively deteriorate as mining activities impact visually on the character of the landscape.

## 8.14 Socio-Economic Environment

The development of the proposed project (and related infrastructure) may result in impacts related to:

- Grazing land;
- Natural vegetation utilised for fuel and medicinal purposes;
- Food;
- Land utilised for small-scale farming, although most of the agricultural plots within the vicinity of the proposed project area are returning to fallow lands;
- The presence of beehives and the associated pollination of crops;
- Fresh water used for the watering of livestock, for human consumption (drinking) and for washing of people and their clothes;
- Sand from the river beds which is utilised for building purposes and also for the making of building bricks.

The potential negative impacts on the socio-economic conditions in the area (considering the local community may derive an income there from) will be investigated thoroughly in the EIA phase. Other aspects such as the influx of new people and job seekers and the impacts on a socio-economic scale will also be further investigated to determine the potential thereof.

As mentioned in Section 6.1 the development of the proposed project (and related infrastructure) may result in the following positive impacts: employment opportunities, human resource development, community development and improved community health and healthcare facilities.

## 8.15 Cumulative Impacts

During the EIA phase, the potential cumulative impacts for all above environmental aspects will be assessed and mitigation / management and monitoring measures proposed accordingly.

## **9 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT**

The purpose of this Section is to describe the approach proposed by which to conduct the EIA, as required by Section 28 of GN543.

### **9.1 Description of Tasks to be Undertaken Including Specialist Processes**

Specialist service providers will be appointed to further assess the potential impacts identified (as described above), as well as providing updated information where existing information is deemed insufficient or outdated. These studies will include:

- A follow-up groundwater study:
  - Installation of three groundwater monitoring boreholes;
  - Aquifer testing by way of the above to determine aquifer characteristics;
  - Laboratory testing of groundwater samples to determine baseline groundwater quality;
  - Prepare a detailed numerical model which described baseline groundwater transport conditions. Utilise the model to simulate the mining scenario and determine groundwater flow and contaminant transport for this situation;
  - Determine the extent of any potential contamination plume formation for all stages of the proposed development as well as any users situated within the zone of influence;
  - Identify any affected groundwater users within the zone of influence;
  - Provide management and monitoring measures;
  - Determine any cumulative impacts.
  
- A follow-up surface water study to:
  - Determine the potential reduction to mean annual rainfall within the catchment;
  - Determine the potential reduction in water quality of associated rivers and streams;
  - Determine capacity requirements of water management structures and assess soundness of measures proposed;
  - Provide management and monitoring measures;
  - Determine any cumulative impacts.
  
- A follow-up wetland study to:
  - Identify potential impacts to drainage channels;
  - Identify and assess any potential cumulative impacts;
  - Devise an impact mitigation strategy;
  - Provide management and monitoring measures.
  
- A follow-up soil and agricultural assessment to:

- Determine the potential impact of the proposed mining activities on the soil in the project area;
  - Identify and assess any potential cumulative impacts;
  - Provide monitoring and management measures.
- A follow-up ecological study to:
    - Confirm the baseline conditions of the proposed project area, including the terrestrial (fauna and flora) and aquatic habitats;
    - Determine the potential impact of the final mine-design on the baseline conditions previously identified;
    - Propose appropriate management and monitoring measures.
- An air quality study to:
    - Update the baseline air quality parameters for the proposed project area;
    - Conduct modeling of fallout from new dust generating areas, particulate matter and zones of influence;
    - Describe any sensitive receptors;
    - Identify and assess any potential cumulative impacts;
    - Propose monitoring measures;
    - Propose management measures.
- A follow-up traffic study to:
    - Determine the effect that the increase traffic flow arising from the proposed developments associated with the proposed Msebe Opencast Mining Activities;
    - Identify and assess any potential cumulative impacts;
    - Determine alternate route for the D1814 and give the applicable management measures;
    - Propose appropriate monitoring and management measures.
- A noise study to:
    - Determine the baseline noise environment;
    - Calculate zones of influence from the proposed development;
    - Calculate the presence of any sensitive receptors within the zone of influence;
    - Identify and assess the significance of all noise impacts;
    - Identify and assess the potential cumulative impacts;
    - Propose appropriate monitoring and management measures.
- A blasting and vibration study:
    - Determine sensitive receptors in the area;
    - Assess the impacts the proposed activities may have on the sensitive receptors;
    - Determine any potential impacts arising from the proposed blasting activities;
    - Calculate appropriate blasting parameters for the proposed project;
    - Propose mitigation, management and monitoring measures.



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