



## **CANYON SPRINGS INVESTMENTS 82 (PTY) LTD**

### **PROPOSED CANYON SPRINGS COAL MINE**

**FINAL SCOPING REPORT FOR ACTIVITIES LISTED IN TERMS  
OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, NO.  
107 OF 1998 AND AS PER THE EIA REGULATIONS OF GN. 543  
OF 2010**

**DMR REF. NO. MP 30/5/1/1/2/10021 MR**

**MDEDET REF. NO. 17/2/3N-162**

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**Prepared for:**



**HolGoun Mining  
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3	06/08/2012	Romy Antrobus / Zoe Gebhardt	Jonathan van de Wouw		Issued to Competent Authority

# HOLGOUN MINING

## PROPOSED CANYON SPRINGS COAL MINE

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Appendix 9:	Department of Water Affairs Meeting Minutes
Appendix 10:	Draft Scoping Report Authorisation

## ACRONYMS

<b>BID</b>	Background Information Document
<b>°C</b>	Degrees Celsius
<b>dBA</b>	Decibels
<b>DMR</b>	Department of Mineral Resources
<b>DWA</b>	Department of Water Affairs
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environnemental Management Programme
<b>g/t</b>	grams per tonne
<b>GGP</b>	Gross Geographic Product
<b>IEM</b>	Integrated Environmental Management
<b>IAPs</b>	Interested and Affected Parties
<b>IWULA</b>	Integrated Water Use License Application
<b>LOM</b>	Life of Mine
<b>KTPA</b>	Kilo Tonnes per Annum
<b>MBCP</b>	Mpumalanga Biodiversity Conservation Plan
<b>MBS</b>	Meters Below Surface
<b>MAMSL</b>	Meters Above Mean Sea Level
<b>MAP</b>	Mean Annual Precipitation
<b>MAR</b>	Mean Annual Run-off
<b>MPRDA</b>	Minerals and Petroleum Resources Development Act (Act 28 Of 2002)
<b>MRA</b>	Mining Right Area
<b>MTPA</b>	Mpumalanga Tourism and Parks Agency
<b>NEMWA</b>	National Environmental Management: Waste Act (No. 59 of 2008)
<b>NEMA</b>	National Environmental Management Act No. 102 of 1998
<b>NEM:AQA</b>	National Environmental Management: Air Quality Act (Act 39 of 2004)
<b>PCD</b>	Pollution Control Dam
<b>PM<sub>10</sub></b>	Particles with a diameter of 10 microns or less
<b>ROM</b>	Run of Mine
<b>SAHRA</b>	South African Heritage Resources Agency
<b>SLP</b>	Social and Labour Plan
<b>SMME's</b>	Small, Medium or Micro Enterprises
<b>TPM</b>	Tons per Month
<b>TPH</b>	Tons per Hour
<b>WUL</b>	Water Use License



# 1. INTRODUCTION AND BACKGROUND

## 1.1 Applicant's Contact Details

Name of Applicant:	Canyon Springs Investments 82 (Pty) Ltd
Contact person:	Mr Mike Nell
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Email Address:	<a href="mailto:mike.nell@holgoun.co.za">mike.nell@holgoun.co.za</a>
Commodity:	Coal

HolGoun Investment Holdings (Pty) Ltd. is a family owned, South African investment holding company, established in 2003. The Group's activities and investments straddle a range of sectors including Mining and Exploration, Engineering, Property, Healthcare, Lifestyle & Leisure, Finance and Risk Management.

Canyon Springs Investments 82 (Pty) Ltd is a subsidiary of HolGoun Mining and its parent company, HolGoun Investment Holdings (Pty) Ltd. Canyon Springs has submitted an application for a Mining Right to the Department of Mineral Resources which has been accepted by the Department of Mineral Resources (DMR) for **coal** but also including all precious and base-metals, uranium, molybdenite, copper, limestone and rare earths. It is the intention of Canyon Springs to establish a coal-mining operation on the farm Roodekoppies 167 JR.

## 1.2 Environmental Impact Assessment Practitioner Details

Name of Company:	Prime Resources (Pty) Ltd
Name of Environmental Assessment Practitioners	Jonathan van de Wouw Romy Antrobus Peter Theron
Physical Address:	The Workshop, 70, 7 <sup>th</sup> Ave, Parktown North, 2193
Postal Address:	P O Box 2316, Parklands, 2121
Telephone Number:	011 447 4888
Fax Number:	011 447 0355
Email Address:	<a href="mailto:prime@resources.co.za">prime@resources.co.za</a>
Professional Affiliations:	SAIMM; ECSA

As required in terms of Section 17 of GNR543, the EIA Regulations of 2010, the applicant has appointed Prime Resources (Pty) Ltd to conduct the scope associated with this draft Scoping

Report as well as the subsequent EIA / EMP. Prime Resources is an environmental consulting specialist firm providing environmental and related services and which was established in 2003. Prime Resources was founded by Peter 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 Canyon Springs Project, has five years' experience in the field of environmental science. Below are short *Curricula Vitae* of the project team.

**Peter Theron** *BSc Civil Engineering, GDE (Hons.) Environmental Engineering*

Peter Theron is a Principal Environmental Consultant with 26 years' experience and Director of the specialist environmental consulting firm Prime Resources (Pty) Ltd. Peter began his professional career as a specialist geotechnical engineer, discard dump designer and later became involved in the technical aspects of mining and the environment. Implementation of environmental assessments, sustainable development, environmental project management, environmental due diligence and compliance auditing, geotechnical design, discard and waste management, mine closure and environmental costing are Peter's main areas of specialisation.

**Jonathan van de Wouw** *BSc(Hons)*

Jonathan is a senior environmental scientist with considerable experience managing projects in the mining sector, including financial liability assessments associated with mine closure and rehabilitation, mine waste and water management planning, environmental impact assessments and management planning and environmental auditing. He also has a detailed knowledge of environmental law and precedents, both locally and internationally. Jonathan also has experience in integrated waste and water management planning and mining right applications.

### 1.3 Project Overview and Location

Canyon Springs is situated in the Bushveld region of the Mpumalanga Province, South Africa. The proposed mining operation will take place on the farm Roodekoppies 167 IR in the Siyabuswa district within the Dr. JS Moroka Local Municipality (DRJSMLM) (Figure 1 and Figure 2).

All proposed mining activities and infrastructure will be restricted to the farm Roodekoppies 167 IR. The area is situated roughly 60km south-east of the town of Bela-Bela and just north-west of the Rhenosterkop dam (Figure 3).

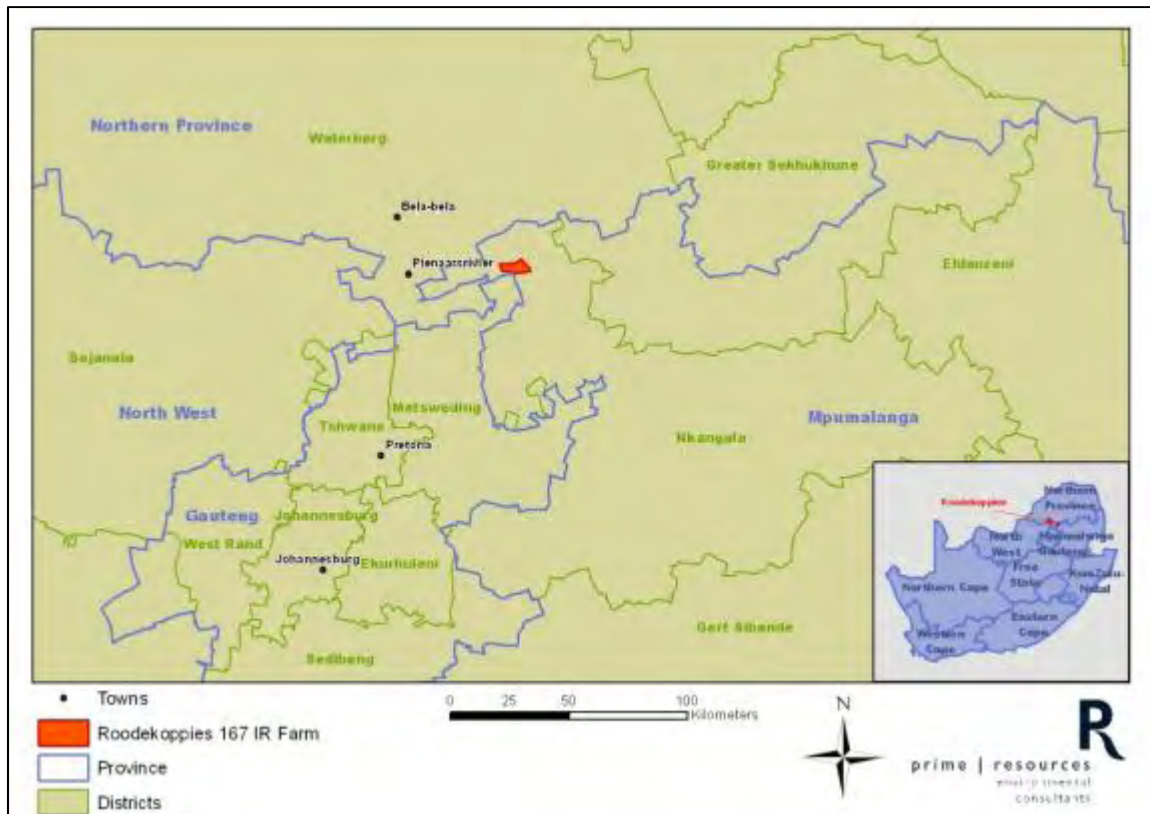


Figure 1 Location of Nkangala District Municipality and Roodekoppies Farm.

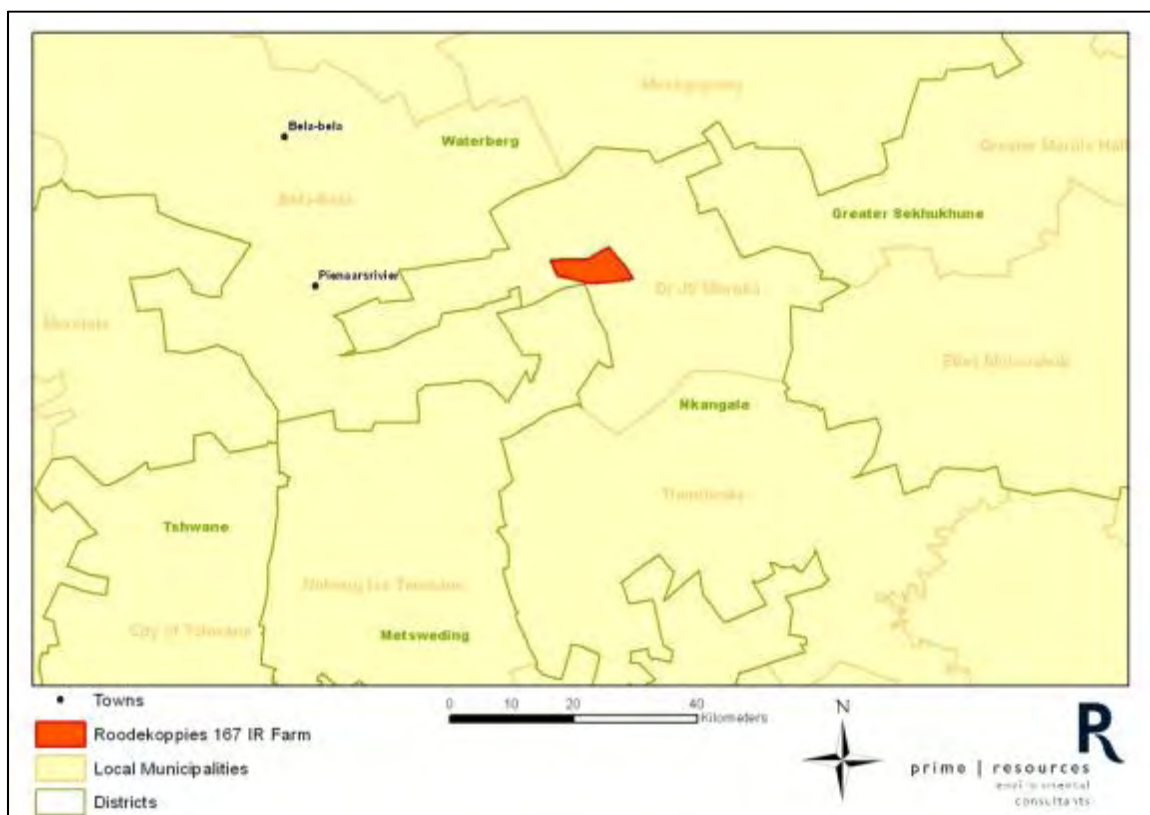


Figure 2 Location of Roodekoppies in Dr JS Moroka Local Municipality.



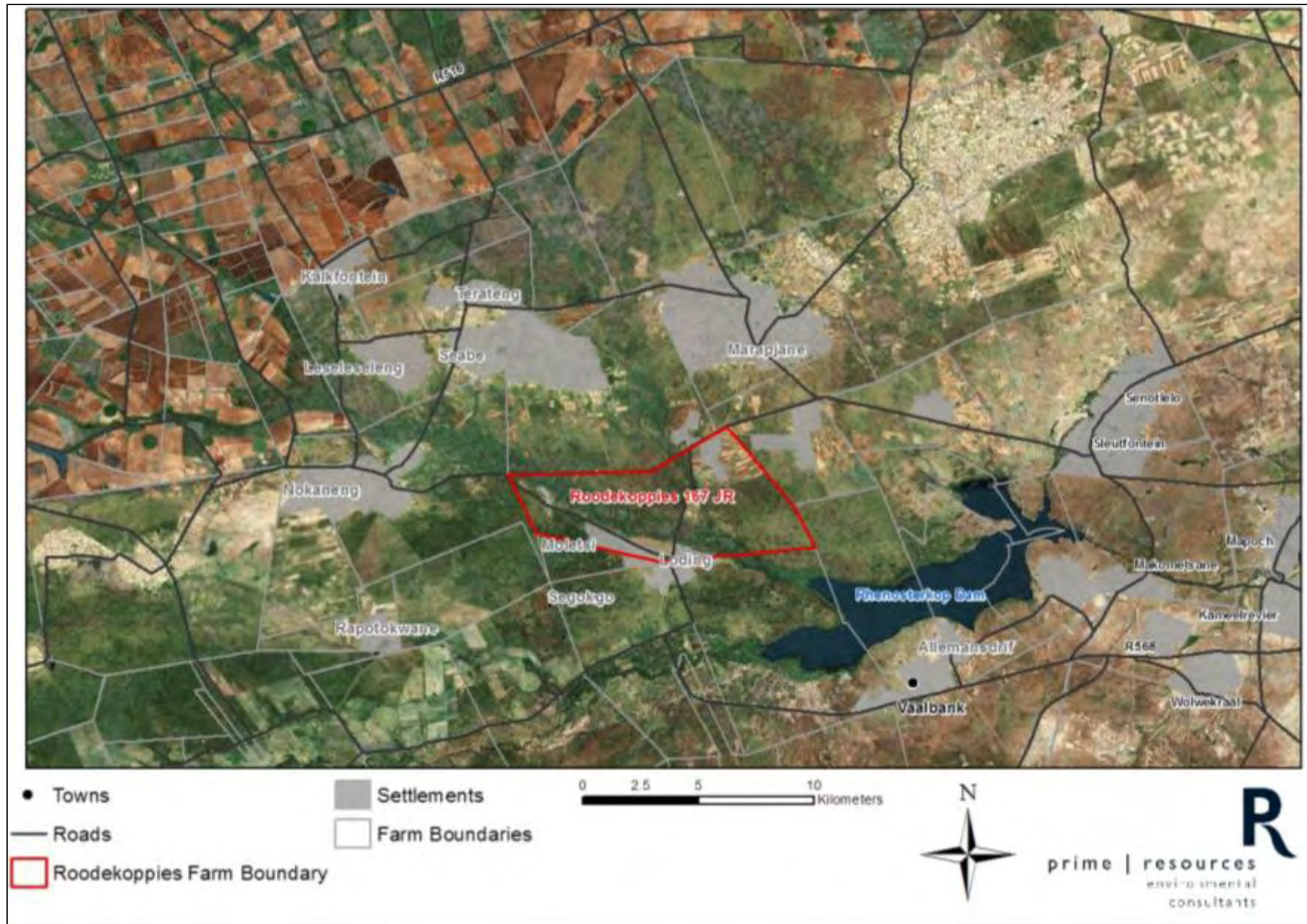


Figure 3 Locality plan of proposed Canyon Springs Project Area.

## **1.4 Legislation**

In order to protect the environment and ensure this development is undertaken in an environmentally responsible manner, there are significant pieces of legislation which focus and guide this Scoping Report, they are as follows:

### **1.4.1 The Constitution of South Africa (Act 108 of 1996)**

Everyone has the right:-

- To an environment that is not harmful to their health or well-being; 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;
  - Promote conservation; and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

### **1.4.2 The Mineral and Petroleum Resources Development Act (Act 28 of 2002)**

The MPRDA is the key legislation in governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The DMR is the delegated authority that deals with all mining related applications.

The MPRDA by definition:-

- Recognises that minerals and petroleum are non-renewable natural resources; acknowledging 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.
- Reaffirms the State's commitment to reform to bring about equitable access to South Africa's mineral and petroleum resources.

The Applicant submitted a Mining Right Application to the DMR in terms of Section 22 of the MPRDA and which was accepted on 19 March 2012. A separate scoping report utilising the DMR template was prepared in terms of Regulation 49 of the MPRDA and submitted on 17 April 2012.

### **1.4.3 The National Environmental Management Act (Act 107 of 1998) and Environmental**

## **Impact Assessment Regulations 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;
- The social and economic impacts must also be considered together with environmental impacts of activities when making decisions.

These principles underpin the principle 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 (scoping) by IAP's.

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, June 2010 (and corrected in December 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 EIA and EMP, is required before the activity can commence.

The following activities listed in terms of the above are relevant to the proposed Canyon Springs coal mine:

**Table 1 Listed activities at the proposed Canyon Springs Coal Mine in terms of the EIA Regulations of 2010.**

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
GNR544	12	The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010.	The combined capacity of all pollution control dams on-site will be greater than 50 000m3
GNR544	22	The construction of a road, outside urban areas, (i) with a reserve wider than 13,5 meters or, (ii) where no reserve exists where the road is wider than 8 metres	The construction of access and haul roads.
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.	Activities requiring a Water Use License in terms of Section 21G of the National Water Act (Dewatering, Pollution Control Dams, Discard Stockpile etc.)
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: i. linear development activities; or	The alteration of the current landscape for the development of the opencast pit and terraces for surface infrastructure

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
		ii. agriculture or afforestation where activity 16 in this Schedule will apply.	
GNR545	22	Any activity which requires a mining right or renewal thereof as contemplated in sections 22 and 24 respectively of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	A mining right for the proposed Canyon Springs Coal Mine has been applied for
GNR546	4	The construction of a road wider than 4metres with a reserve less than 13,5 metres ii. Outside urban areas, in: bb) National Protected Area Expansion Strategy Focus areas; gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	The construction of access and haul roads.
GNR546	13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation in (b) National Protected Area Expansion Strategy Focus areas; c) ii Outside urban areas in Areas within10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	The construction of the opencast pits within 5km of a Formal Protected Area.
GNR546	14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation in a) i). All areas outside urban areas.	The construction of the opencast pits and associated infrastructure.

Although the activities listed above in terms of GNR544 require that a Basic Assessment (BA) process be followed in terms of Part 2 of GNR543, Section 20(2)(c) of GNR543 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 1).

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	1.3, 4



<b>GNR543 SECTION 28</b>	<b>CONTENTS</b>	<b>CHAPTER</b>
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; 4
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(j)	Potential alternatives to the project and the associated advantages, disadvantages as regards the community and environment;	5
1(k)	Copies of any representations, and comments received in connection with the application or the scoping report from interested and affected parties	1 To Follow
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	
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	None

The draft Scoping Report was accepted (Ref: 17/2/3N-162) by the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) on the 2<sup>nd</sup> of August 2012 (see Appendix 10).

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<sup>1</sup> This scoping report is available for public comment. All minutes, comments and representation will be included in the final scoping report as Appendix 07

#### **1.4.4 National Environmental Management: Air Quality Act (Act 39 of 2004)**

The NEM: AQA serves to repeal the Atmospheric Pollution Prevention Act (45 of 1965).

Section 18(1) of the Act allows for the declaration of priority areas which are based on the following:

- If ambient air quality standards are being, or may be exceeded.
- If the area requires specific air quality management action.

GN248 of 31 March 2011 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 for the listed activities. Section 14, Category 5 of the listings pertains to Mineral Processing, Handling and Storage, with Subcategory 5.1 being specific to the Storage and Handling of ore and coal, however, the trigger for the listed activity is the stockpiling of coal off-site which will not occur at the proposed Canyon Springs Coal Mine.

#### **1.4.5 The National Heritage Resources Act (Act 25 of 1999)**

The Act serves to protect and manage the South African heritage and cultural resources. These resources include 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 must, at the earliest stage of initiation, notify 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 300m in length;
- B. the construction of a bridge or similar structure exceeding 50m 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 000m<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 Canyon Springs Coal 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 National Heritage Resources Act. Heritage

considerations therefore will form part of this environmental process and SAHRA will be consulted with during the consultation process.

#### 1.4.6 The National Water Act (Act 36 of 1998)

The National Water Act (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 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 (regulations for the use of water for mining and related activities) regulates 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.

**Table 2 Water Uses Identified at the proposed Canyon Springs Coal Mine Potentially Requiring a Water Use License.**

APPLICABLE SECTION OF NWA	DESCRIPTION OF WATER USE	APPLIES TO
Section 21(a)	Taking of water from a water resource	Recycling water from dewatering of the aquifer associated with the opencast pit in the mine water circuit
Section 21(c)	Impeding the flow of water in a watercourse	Applies to the development of any infrastructure within 500m of a watercourse (including rivers, streams and wetlands)
Section 21(i)	Altering the characteristics of a watercourse	
Section 21(g)	The disposal / handling of waste or water containing waste that may potentially impact on a water resource	Pollution Control Dams (PCD) / Return Water Dams (RWD)
		Discard Dump
		Sewage Plant
		Dust suppression on roads using PCD water
Section 21(j)	Dewatering of mine workings for the safety of men, materials and to ensure the efficiency of mining	Dewatering of the opencast pit

#### 1.4.7 The National Environmental Management: Waste Act (Act 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 schedules at the back of the Act also provide definitions for activities which require a waste management license while also identifying the relevant environmental authorisations which are further required for said activities.

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 100m<sup>3</sup> of general waste and less than 35m<sup>3</sup> of hazardous waste at the transfer facilities at any given time, thereby remaining below the license thresholds. If, however, these limits are too prohibitive to operations, a Waste Management License will be applied for.

#### **1.4.8 Further Applicable Legislation**

- The Hazardous Substances Act, no. 15 of 1973;
- The National Environmental Management: Biodiversity Act, no. 10 of 2004;
- The Mine Health and Safety Act, no. 29 of 1996

## 2. METHODOLOGY APPLIED TO CONDUCT SCOPING

The environmental process to be followed has been based on the requirements as stipulated in the MPRDA Regulations (GN527 of 2004) as well as NEMA and the EIA Regulations (GN543 of 2010). This report is the culmination of the scoping phase as detailed in Section 49 of the MPRDA Regulations and Section 29 of the NEMA EIA Regulations (2010).

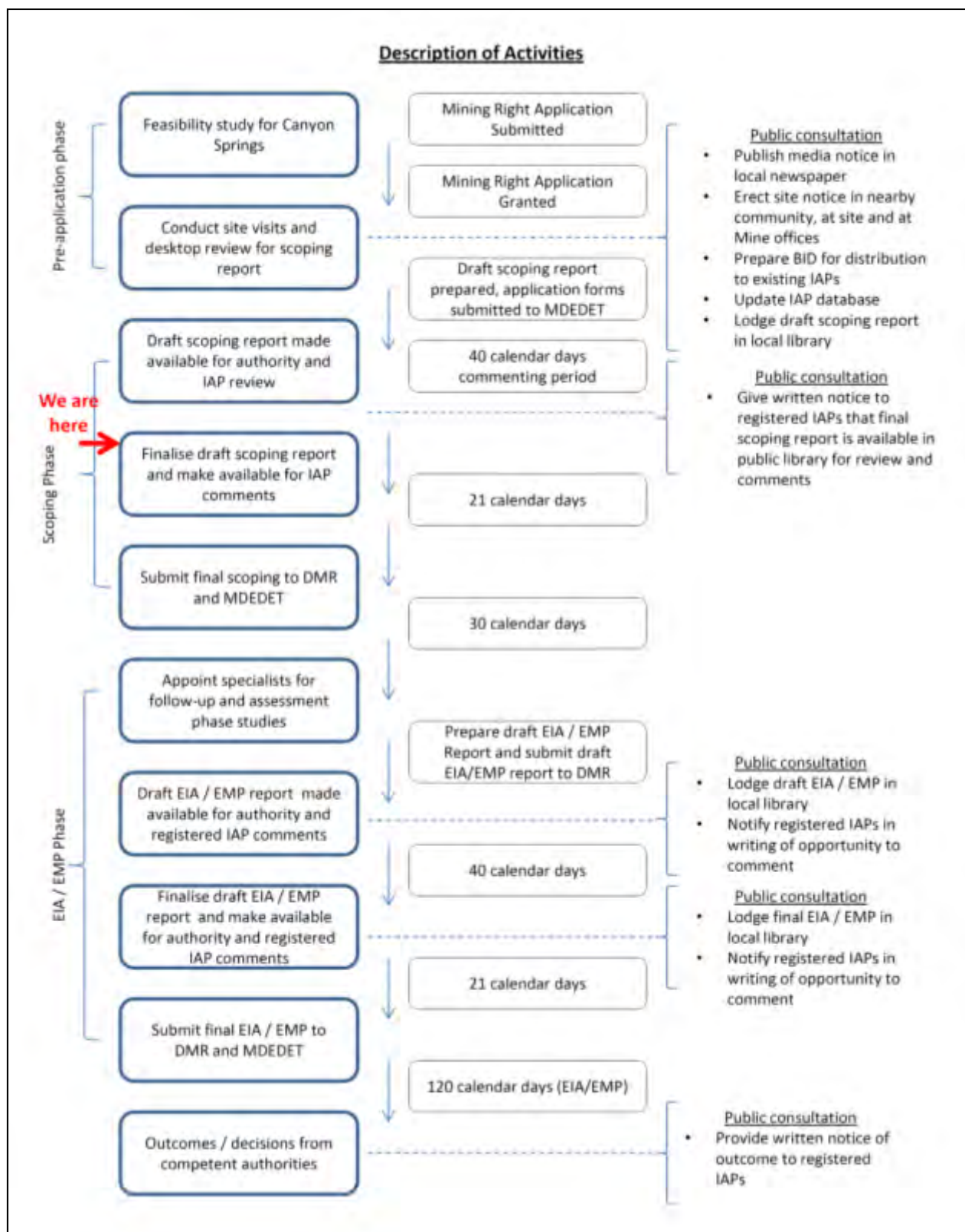
A desktop study was conducted in order to gather as much baseline information regarding the proposed project area as possible. Following the data review conducted, site visits to the proposed project area were conducted by the project team in order to gauge the status quo of the project area in terms of the following:

- Current environmental status of the project area compared to that described in the desktop resources;
- The vulnerability of the area to negative environmental impacts with a particular focus on the activities associated with the proposed development;
- The location of the site with respect to the general land use in the area;
- Accessibility to the area by utilising existing primary and secondary roads;
- The presence of sensitive ecosystems;
- The presence of archaeological artefacts and historical sites; and
- Size of the area taking into consideration the type and nature of infrastructure requirements.

Where inadequate baseline information was available, specialist service providers were appointed to conduct baseline studies of the project area (including groundwater, heritage, wetlands and terrestrial ecology). The project description was obtained through discussions with Turgis Consulting who have been appointed to prepare a Bankable Feasibility Study for the proposed Canyon Springs Coal Mine.

The baseline information, project description, applicable legislation and potential impacts was utilised in the public consultation process to inform surrounding landowners, nearby communities, the Authorities and any other Interested and Affected Parties (IAPs) of the proposed development and to gather issues, comments and concerns. This draft Scoping Report is thus available for comment.

The process to be followed is outlined below:



### 3. DESCRIPTION OF THE ENVIRONMENTAL BASELINE CONDITIONS

#### 3.1 Introduction

This chapter describes the baseline conditions of the environment likely to be affected by the proposed development, both from desktop research and the available specialist studies conducted. This section will also highlight any sensitive environments identified.

#### 3.2 Climate

##### 3.2.1 Regional Climate

The Canyon Springs Project area climate is typical of that for the greater Mpumalanga Province, which has a sub-tropical climate.

The wind direction changes from primarily easterly in the summer to westerly in the winter. Cold fronts are, however, mostly characterised by winds from the South.

The Bela-Bela region normally receives about 481mm of rain per year, with most rainfall occurring during summer. The graph below shows the average rainfall values for Bela-Bela per month. It receives the lowest rainfall (0mm) in June and the highest (95mm) in January (SA Explorer, 2011) (Figure 4).

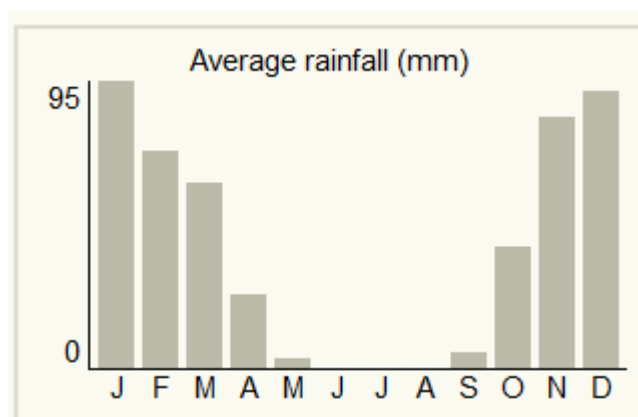


Figure 4 Average annual rainfall for Bela-Bela.

The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Bela-Bela range from 19.9°C in June to 28.8°C in January. The region is the coldest during July when the mercury drops to 2.7°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures (SA Explorer, 2011) (Figure 5).

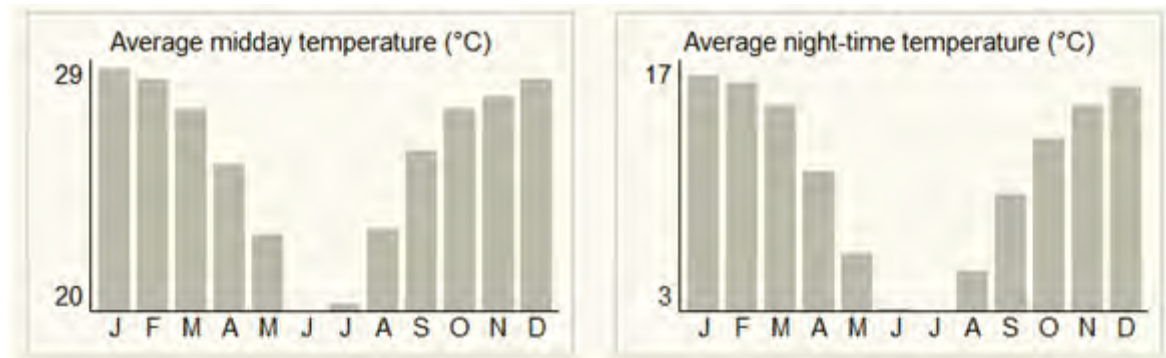


Figure 5 Average annual temperatures for Bela-Bela.

### 3.3 Biodiveristy

A baseline ecological study was conducted by Strategic Environmental Focus (SEF) in November 2011 and February 2012 to assess the fauna, flora and wetland systems within the proposed Canyon Springs project area (Appendix 1).

#### 3.3.1 Fauna

The savannah biome into which the project area falls is subject to a range of environmental factors resulting in variations in the vegetation and the faunal communities it supports. In South Africa, the savannah biome supports a higher biodiversity in terms of fauna than any other ecoregion (Bredenkamp, 2002). Savanna vegetation provides a wide variety of faunal habitats due to the combined diversity of grassland and woodland features and has the capacity to support both browsing and grazing fauna. Browsing and grazing pressure also influences tree-grass dominance in a mixed savannah. The occurrence of fauna depends on features such as topography, grass species, grass length, substrate characteristics, tree height, canopy cover, and the presence of water.

#### *Birds*

The greater project area supports a high avifaunal diversity with approximately 404 bird species potentially occurring within Quarter Degree Squares (QDS) 2528BA and 2528BB combined. Of this total, approximately 305 species (75.5%) are associated with savannah woodland, farmland and rocky areas. A total of 66 bird species were confirmed to occur within the study area, most of which were associated with savannah woodland. A high level of endemism also exists in the area with 51 of the total bird species potentially occurring in QDS 2528BA and 2528BB combined being endemic to southern Africa. A total of 11 endemic bird species were observed in the study area including Swainson's Spurfowl (*Pternistis swainsonii*), Southern Yellow-billed Hornbill (*Tockus leucomelas*), Southern White-crowned Shrike (*Eurocephalus anguitimens*), White-throated Robin-Chat (*Cossypha humeralis*), Ant-eating Chat (*Myrmecocichla formicivora*), Burchell's Starling (*Lamprotornis australis*), Pied Starling (*Lamprotornis bicolour*), Ashy Tit (*Parus cinerascens*), Southern Pied Babbler (*Turdoides bicolor*), Chestnut-vented Tit-Babbler (*Sylvia subcaerulea*) and Cape Sparrow (*Passer melanurus*). Thirty-one (31) species of the total potential 404 species are of



conservation concern (i.e. have a Red Data status higher than Least Concern), two of which are also endemic to southern Africa. Two species, the Red-billed Oxpecker (*Buphagus erythrorhynchus*), which has a provincial and national listing of Near Threatened, and the European Roller (*Coracias garrulus*), which has a global listing of Near Threatened, were observed in the study area. A further eight species were given a high probability of occurring on site, though not observed within the survey period. Such species include the Vulnerable Lappet-faced Vulture (*Torgos tracheliotus*), White-backed Vulture (*Gyps africanus*), Martial Eagle (*Polemaetus bellicosus*), Tawny Eagle (*Aquila rapax*) and Lesser Kestrel (*Falco naumanni*) and the Near Threatened Secretarybird (*Sagittarius serpentarius*), Lanner Falcon (*Falco biarmicus*), and Red-footed Falcon (*Falco vespertinus*).

#### *Mammals*

Approximately 110 mammal species can potentially occur within QDS 2528BA and 2528BB combined. A total of nine mammal species were identified in the area during the field survey and confirmed by sight, field evidence such as spoor, droppings and burrows, or by the local community liaison officer. A further 35 species were given a high probability of occurring in the study area due to the presence of suitable habitat while none of the observed species were of conservation concern, four species of conservation concern were identified as having a high probability of occurring in the area included the Near Threatened Southern African Hedgehog (*Atelerix frontalis*), Lesser Woolly Bat (*Kerivoula lanosa*), Honey Badger (*Mellivora capensis*) and African Wild Cat (*Felis silvestris*).

#### *Herpetofauna*

According to the Southern African Frog Atlas Project (SAFAP), 23 amphibian species have previously been noted to occur within QDS 2528BA and 2528BB combined. No species were identified during the field survey. However a local interview confirmed the presence of the Giant Bullfrog (*Pyxicephalus adspersus*) in the area. This species has a provincial listing of Vulnerable (MTPA) and a national listing of Near Threatened (Minter et al., 2004), while the IUCN lists it as Least Concern but declining. The Giant Bullfrog (*Pyxicephalus adspersus*) prefers dry savannah and is fossorial for most of the year, remaining buried until they emerge at the peak of the rainy season. Their breeding habitat is characterised by areas of shallow, stagnant, seasonal water, with dense stands of reeds, grass or bulrushes. Such habitat was observed around the rivers and wetlands in the study area. Twelve (12) other amphibian species (none of conservation concern) were given a high probability of occurring in the study area due to the presence of suitable habitat.

According to the Southern African Reptile Conservation Assessment (SARCA), 39 reptile species have previously been noted to occur in QDS 2528BA and 2528BB combined. While no species were observed during the field survey six species of conservation concern were given a high probability of occurring in the area due to the presence of suitable habitat. These include the endemic Shield Cobra (*Aspidelaps scutatus*), listed as Vulnerable by the MTPA, and the endemic Black-spotted Dwarf Gecko (*Lygodactylus nigropunctatus*) listed as Least Concern. Four species with a high probability of occurring in the area are listed in the Convention on International Trade in

Endangered Species (CITES) Appendix II and include the Southern African Python (*Python natalensis*), Common Flap-neck Chameleon (*Chamaeleo dilepis*), Lobatse Hinged Tortoise (*Kinixys lobatsiana*) and Rock Monitor (*Varanus albigularis*).

### 3.3.2 Flora

According to Mucina and Rutherford (2006), the study site is situated within the Springbokvlakte Thornveld, which is characterised as open to dense thorn savannah dominated by Acacia species or shrubby grassland with a low shrub layer. The vegetation of the study site grows on black, vertic clay soils that experience prolonged swelling and shrinking during wet and dry periods. The Springbokvlakte Thornveld is considered an endangered vegetation unit (Mucina & Rutherford, 2006). Approximately only 1% of the vegetation unit is statutorily conserved in the Mkombo nature Reserve. It is further estimated that at least 50% of this vegetation unit has been transformed by cultivation and urban sprawl (Mucina & Rutherford, 2006). Based on the criteria of irreversible loss of habitat, the Springbokvlakte Thornveld is also listed as a vulnerable ecosystem by National Environmental Management: Biodiversity Act (NEMBA). This indicates that the remaining natural habitat in this ecosystem is not more than 60% of its original extent (Government Gazette No 32689, 2009). According to the Mpumalanga Biodiversity Conservation Plan (MBCP, 2006) however, the majority of the proposed project area is of “least concern” or has “no natural habitat remaining” (Figure 6). The north-western corner of the proposed project area however is considered “important and necessary” according to MBCP and the south-eastern corner is occupied by a protected area as well as a “highly significant” area for biodiversity (Figure 6).

Vegetation communities recorded in the study area included valley bottom floodplain with Acacia thornveld, open shrubland, rocky outcrops and cultivated/transformed areas (Figure 7).

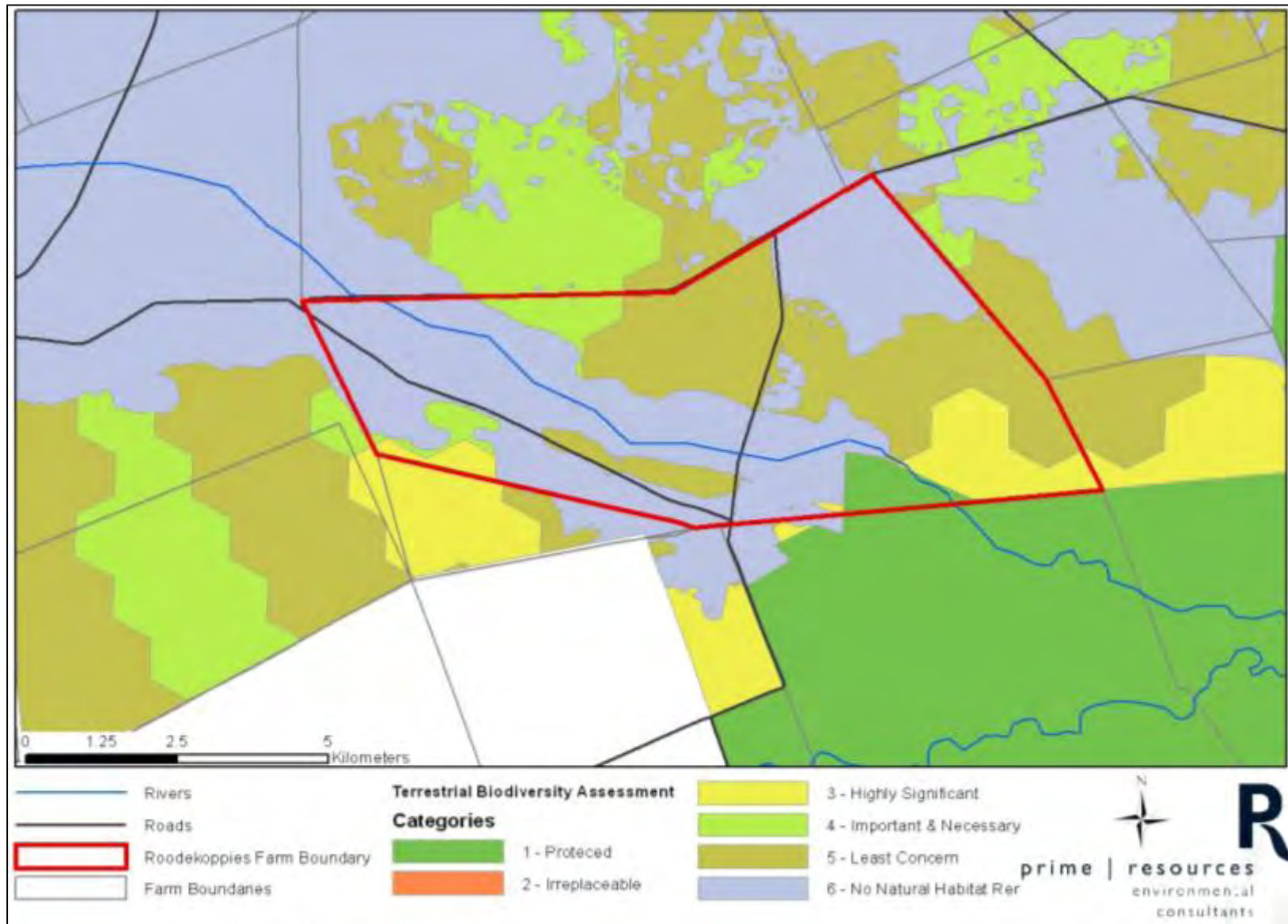


Figure 6 Mpumalanga Biodiversity Conservation Plan in relation to the study area.

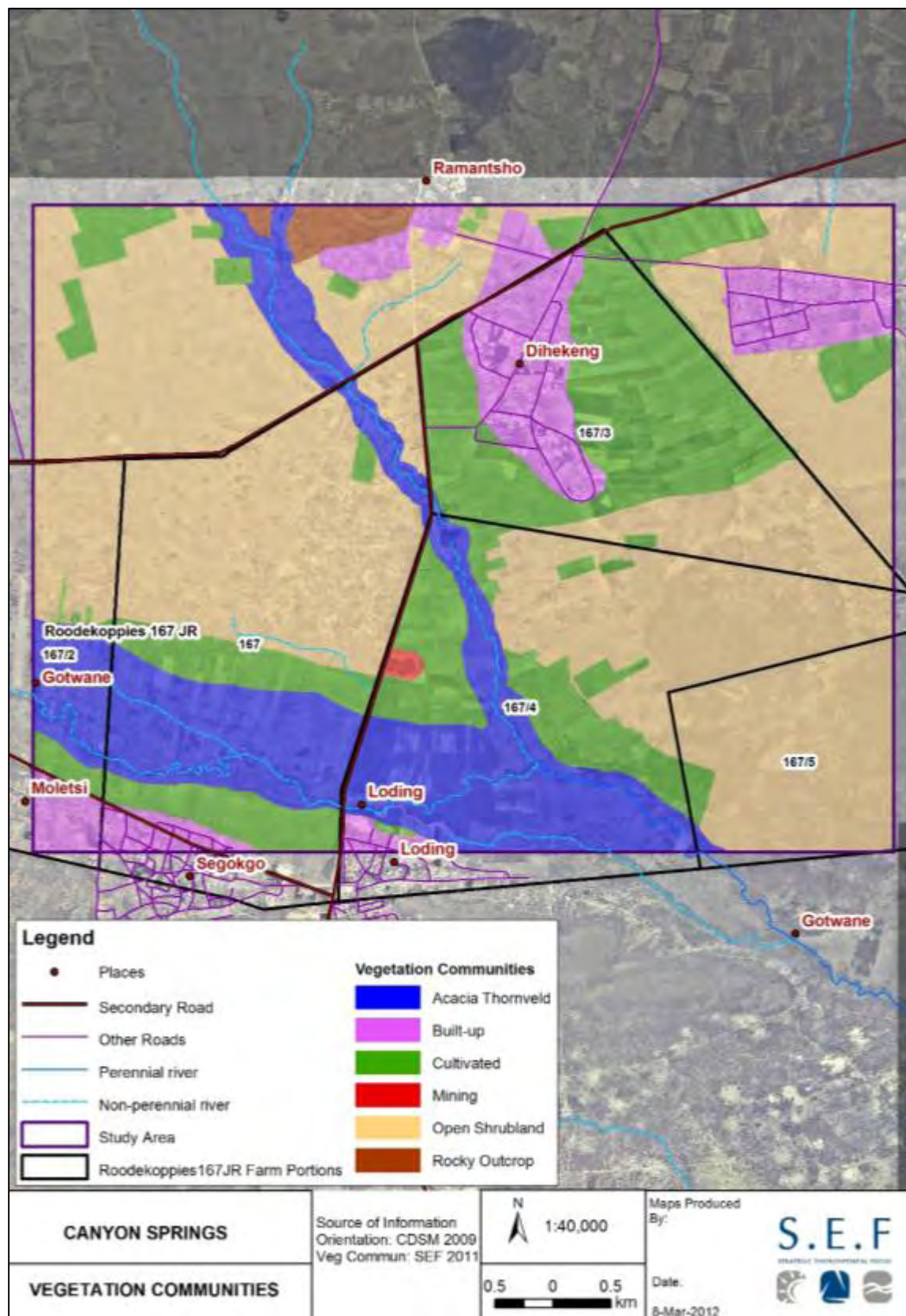


Figure 7 Vegetation communities in the project area.

### ***Plants of Conservation Concern (threatened plant species)***

Plants of conservation concern (previously termed Red Data Plants) are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened (Critically endangered, Endangered and Vulnerable), Extinct in the wild, Data deficient, Near Threatened, Critically Rare, Rare and Declining. Some of these plants are nationally protected by the NEMBA.

**Table 2: Species of conservation concern that could occur on the site.**

Scientific Name	Conservation status	Typical habitat	Occurrence on site
<i>Stenostelma umbelluliferum</i>	Near threatened	Deep black turf in open woodland mainly in the vicinity of drainage lines. Has been recorded in Pretoria North and adjacent areas in the North West Province.	Likely to occur along drainage lines on the site
<i>Acacia erioloba</i>	Declining	Savanna, semi-desert and desert areas, deep sandy soils and along drainage lines in very arid areas, sometimes in rocky outcrops. Widespread in the drier areas of the northern provinces of South Africa.	Confirmed in three locations (refer to Appendix 1)
<i>Crinum macowanii</i>	Declining	Mountain grassveld and stony slopes in hard dry shale, gravelly soil or sandy flats	Recorded within the Quarter Degree Square of the site (POSA, 2011). Likely to occur along drainage lines in areas with limited clay on the study site
<i>Lydenburgia cassinoides</i>	Near threatened	Exposed norite bedrock and dolomite. Roossenekal to Strydpoort Mountains.	Has been recorded within the Quarter Degree Square of the site (POSA, 2011). However it is unlikely to occur on most of the site. Possible occurrence in the vicinity of the koppie on the northern boundary of the site.

### ***Provincially Protected Plants***

A number of plants that were identified within the study areas are not threatened, but are protected by Schedule 11 of the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998). These are listed in Table 3 and may not be removed, picked, pruned or destroyed without permission or a permit from the Mpumalanga Tourism and Parks Agency (MTPA) (Figure 32).



**Table 3 Provincially protected plants recorded in the project area.**

Species	Protection	Occurrence in Study Area
<i>Aloe greatheadii</i>	All Aloe's naturally occurring in Mpumalanga	Widespread in study area
<i>Gladiolus pretoriensis</i>	Genus	Rocky outcrops
<i>Orbea cf lutea</i>	Whole genus	Rocky outcrops
<i>Adenia digitata</i>	Whole genus	Acacia thornveld

### ***Nationally Protected Trees***

The National Forest Act, 1998 (Act 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).

The study site provides suitable habitat for the protected tree *Boscia albitrunca* (Witgat / Shepard's Tree). Although the tree was not identified during the surveys, it could potentially occur within the area. A close relative which is not a protected tree however, *Boscia foetida subsp. rehmanniana* (Stink Witgat / Stink Shepard's Tree), was observed to occur throughout most of the study site.

*Acacia erioloba* (Camel Thorn) (Photograph 6) was recorded at three localities within the study area as shown in Figure 8.

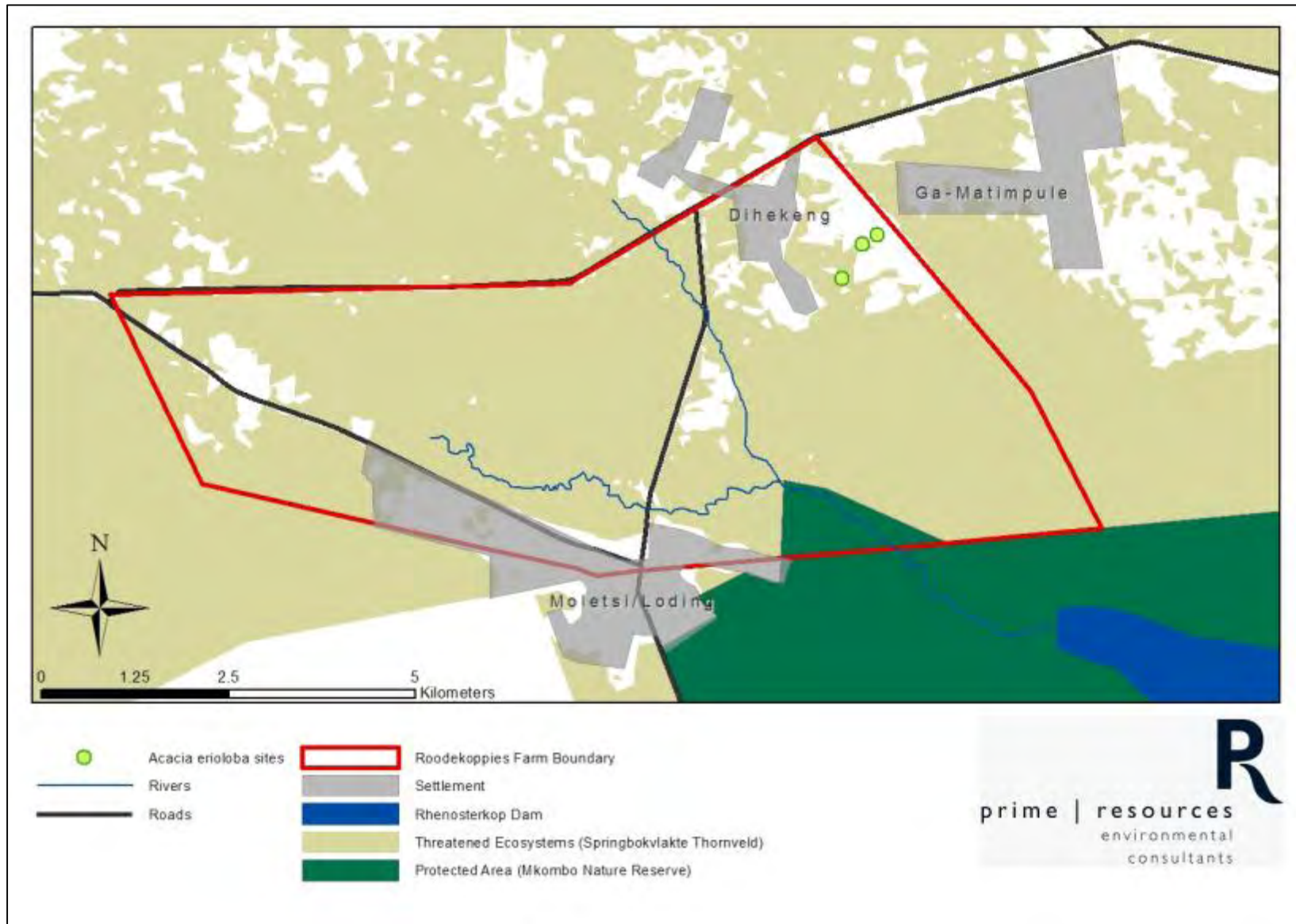
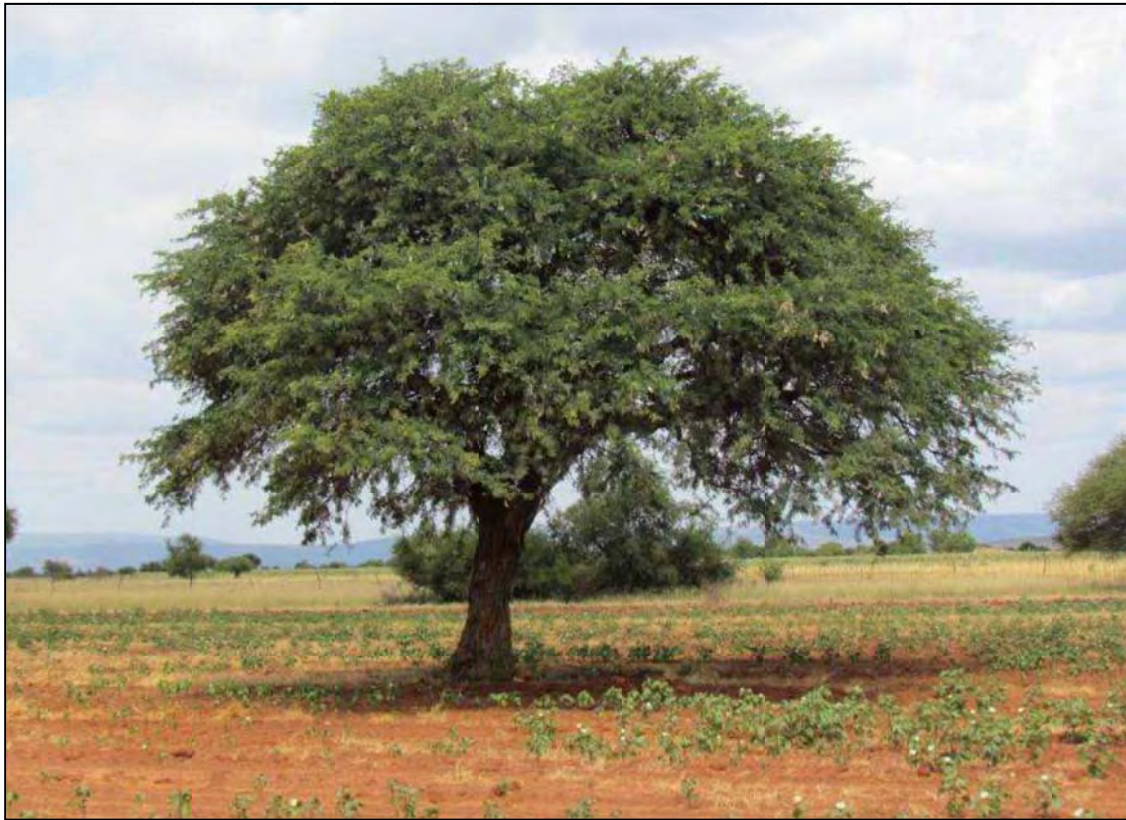


Figure 8 Locations of *Acacia erioloba* (Camel Thorn) within the Canyon Springs Project Area.



**Figure 9 Acacia erioloba in cultivated fields within the project area.**

### ***Alien Invasive Species***

Declared weeds and invaders have the tendency to dominate or replace the herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems. It is therefore important that all these transformers (as defined above) be eradicated and controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species (Henderson, 2001).

The amended Regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) identifies three categories of problem plants:

- Category 1 plants may not occur on any land other than a biological control reserve and must be controlled or eradicated. Therefore, no person shall establish, plant, maintain, propagate or sell/import any Category 1 plant species;
- Category 2 plants are plants with commercial application and may only be cultivated in demarcated areas (such as biological control reserves) otherwise they must be controlled; and
- Category 3 plants are ornamentally used plants and may no longer be planted, except those species already in existence at the time of the commencement of the regulations (30 March 2001), unless they occur within 30m of a 1:50 year flood line and must be prevented from spreading.



Thirteen alien invasive species were recorded during the field survey (Table 4). *Opuntia ficus-indica* (Sweet Prickly Pear) and *Cereus jamacaru* (Queen of the night) were widespread throughout the study area (Figure 10). Two Agave species, *Agave americana* var *americana* (American Agave) and *Agave sisala* (Sisal) were recorded from areas around human settlements (Figure 11).



Figure 10 *Opuntia ficus-indica* (Sweet Prickly Pear) (left) and *Cereus jamacaru* (Queen of the night) (right) recorded throughout the study area.



Figure 11 Two Agave species namely *Agave americana* var *americana* (American Agave) and *Agave sisala* (Sisal) were recorded from areas adjacent to human settlements.

Table 4 Alien invasive plant species recorded in the project area.

SCIENTIFIC NAME	COMMON NAME	LOCALITY IN STUDY AREA	CATEGORY
<i>Agave americana</i> var <i>americana</i>	American Agave	Widespread, especially around human settlements	Special effect weed (Competitor and visual impact)
<i>Agave sisala</i>	Sisal	Around human settlements	2
<i>Bidens bipinnata</i>	Black-jack	Widespread in disturbed areas	Weed

SCIENTIFIC NAME	COMMON NAME	LOCALITY IN STUDY AREA	CATEGORY
<i>Catharanthus roseus</i>	Periwinkle	Widespread around human settlements	Weed
<i>Cereus jamacaru</i>	Queen of the night	Widespread throughout study area	1
<i>Conyza bonariensis</i>	Flax-leave Fleabane	Widespread in disturbed areas	Weed
<i>Datura stramonium</i>	Thorn Apple	Drainage lines and disturbed areas	1
<i>Melia azedarach</i>	Seringa	Widespread	3
<i>Opuntia ficus-indica</i>	Sweet Prickly Pear	Widespread	1
<i>Ricinus communis</i>	Castor Oil Plant	Drainage lines and river courses	2
<i>Sesbania punicea</i>	Red Sesbania	Drainage lines and river courses	1
<i>Verbena bonariensis</i>	Red Top	Widespread	Weed
<i>Zinnia peruviana</i>		Widespread	Weed

### **Sensitive Areas**

The following sensitive areas were highlighted in the ecological survey (see Section 0 below):

- Areas of high sensitivity: Ghotwane River with a 100m protective buffer zone, the Mkombo Nature reserve and area earmarked by the National Protected Areas Expansion Strategy (NPAES) and the rocky outcrops in the northern section of the study area.
- Areas of medium sensitivity: woodland areas where no cultivation has taken place and in which protected trees species (*Acacia erioloba*) were recorded. This area also provided suitable habitat for species of conservation concern as well as provincially protected species.
- Areas of medium to low sensitivity: historically cultivated areas and settlements.

### **3.3.3 Wetlands**

Wetlands within the project area were identified and delineated according to the methodology required by the Department of Water Affairs and Forestry (DWA)(2005), whereby wetlands are classified according to the soil types, hydrological processes, presence of wetland vegetation and terrain units. Thereafter, these characteristics were used to classify wetlands into hydro-geomorphic units (HGM). A HGM unit is a single “reach”, segment or unit of a particular wetland type as classified by the characteristics listed above.

Figure 12 below illustrates the verified wetlands in the vicinity of the proposed development.

Two wetland types are associated with the Ghotwane River and its tributaries within the proposed Canyon Springs Area, a channelled valley bottom wetland and a floodplain wetland (Figure 12). Altogether, delineated wetlands occupy approximately 546ha. Wetland areas were found to be highly disturbed as a result of grazing and subsistence farming occurring both within and adjacent

to the wetlands, with a resultant decrease in biodiversity relative to what is expected under natural conditions. Hydrological functioning, however, appears to remain relatively unchanged. It should be noted however that the exact extent of the identified wetlands proved difficult to determine as a result of the vertic nature of the soils present as well as the disturbed nature of the vegetation. It is suggested that should a more definitive delineation be required, an additional investigation into the pedology of the study area be conducted so as to identify specific soil forms.



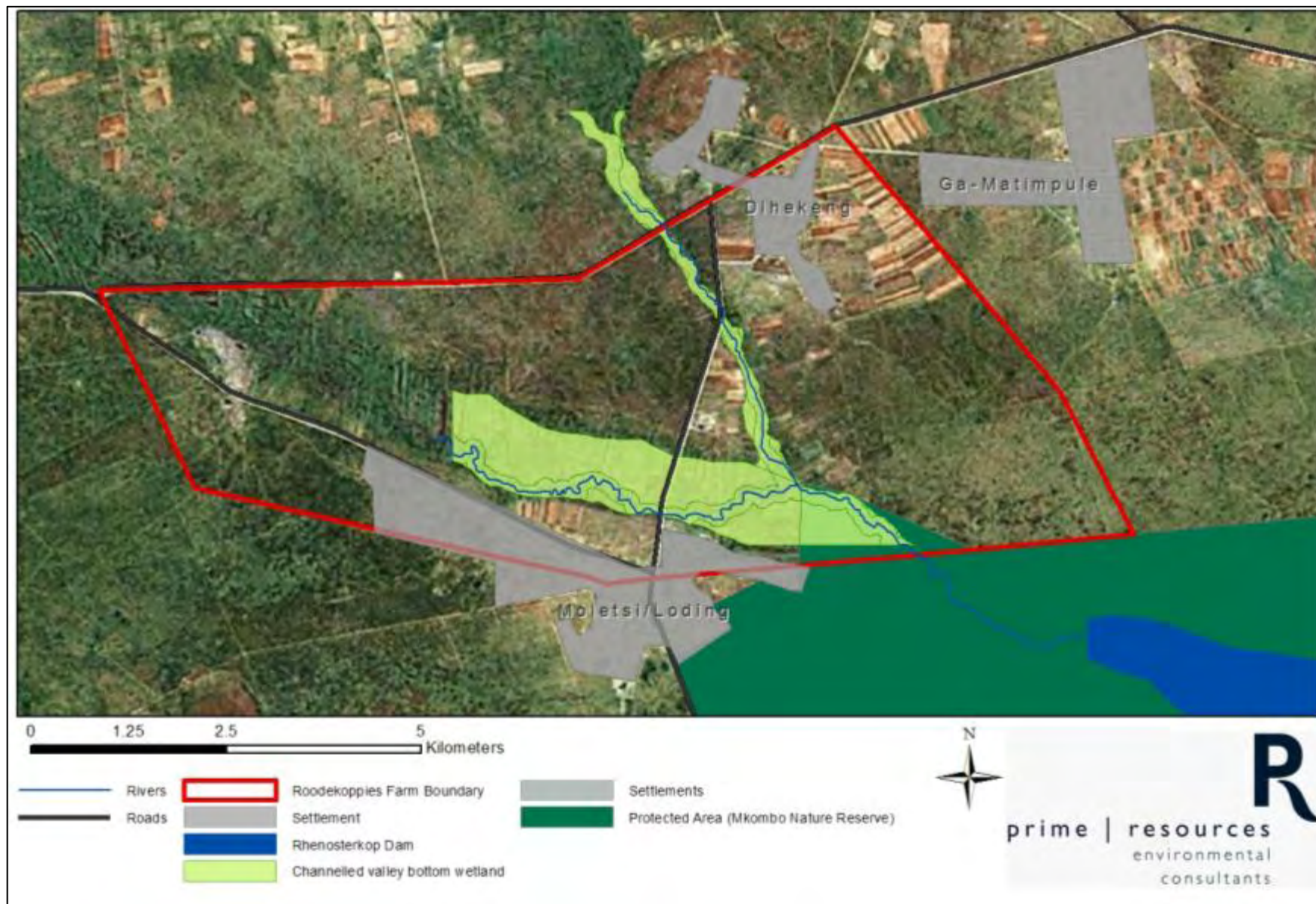


Figure 12 Wetlands in the Canyon Springs project area.

### **3.3.4 Protected Areas**

Protected Areas (PAs) are defined as areas of land that are formally protected by law and managed mainly for biodiversity conservation. The study site includes a portion of the Mkombo Nature Reserve (Figure 13). In addition, the south-eastern corner of the study site is situated within an area earmarked for protection by the NPAES (Figure 13).

The NPAES aims to expand existing protected areas for ecological sustainability and increased resilience to climate change. Although not currently protected, these areas should be considered as being of high development constraint for infrastructure proposed to be located within or in close proximity to these areas.

It should be noted that the presence of these areas was identified at an early stage of planning and have thus been avoided in planning the proposed development

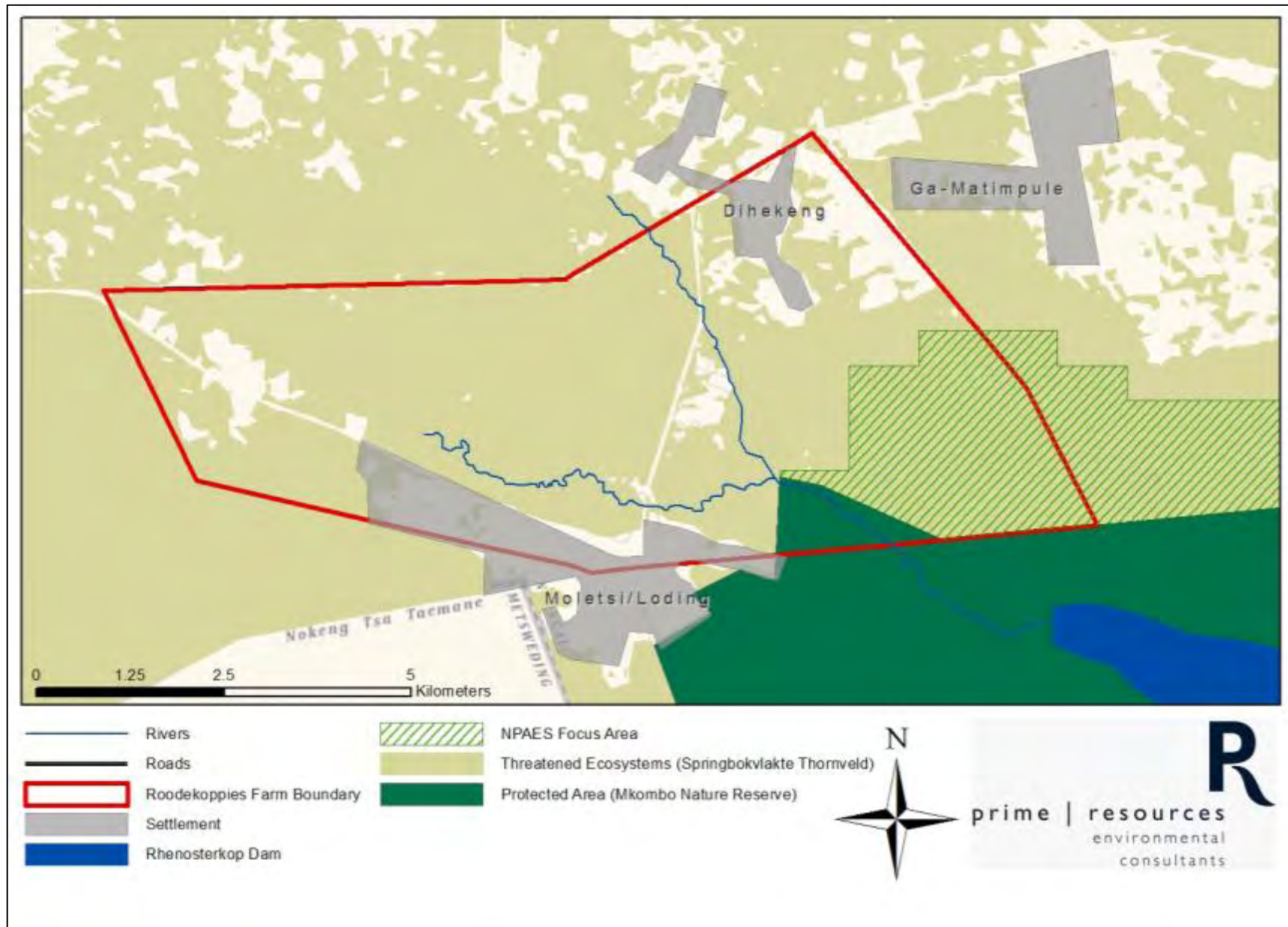


Figure 13 Protected areas within the Canyon Springs project area.

### **3.4 Topography**

The Canyon Springs project area is situated within the Bushveld region of the Mpumalanga Province. The topography of the specific target area is characterised by a flat surface with an average elevation of 800 meter above sea level. There are no pronounced geomorphological features except for a hill to the north of the project area.

### **3.5 Geology**

#### **3.5.1 Regional Geology**

The regional geology consists of various groups within the Karoo Supergroup as well as dolerite intrusions, occurring as both dykes and sills. The Canyon Springs project falls within the Springbok Flats Coalfield (Figure 14) within the Karoo Basin. Primarily due to the nature and depth of the Coal Zone in the Springbok Flats Coalfield, conventional underground mining is currently not an option. About 15% (1 210 Mt) of the coal occurs within the opencastable range (0–75 m) in small resource blocks around the edges of the basin.



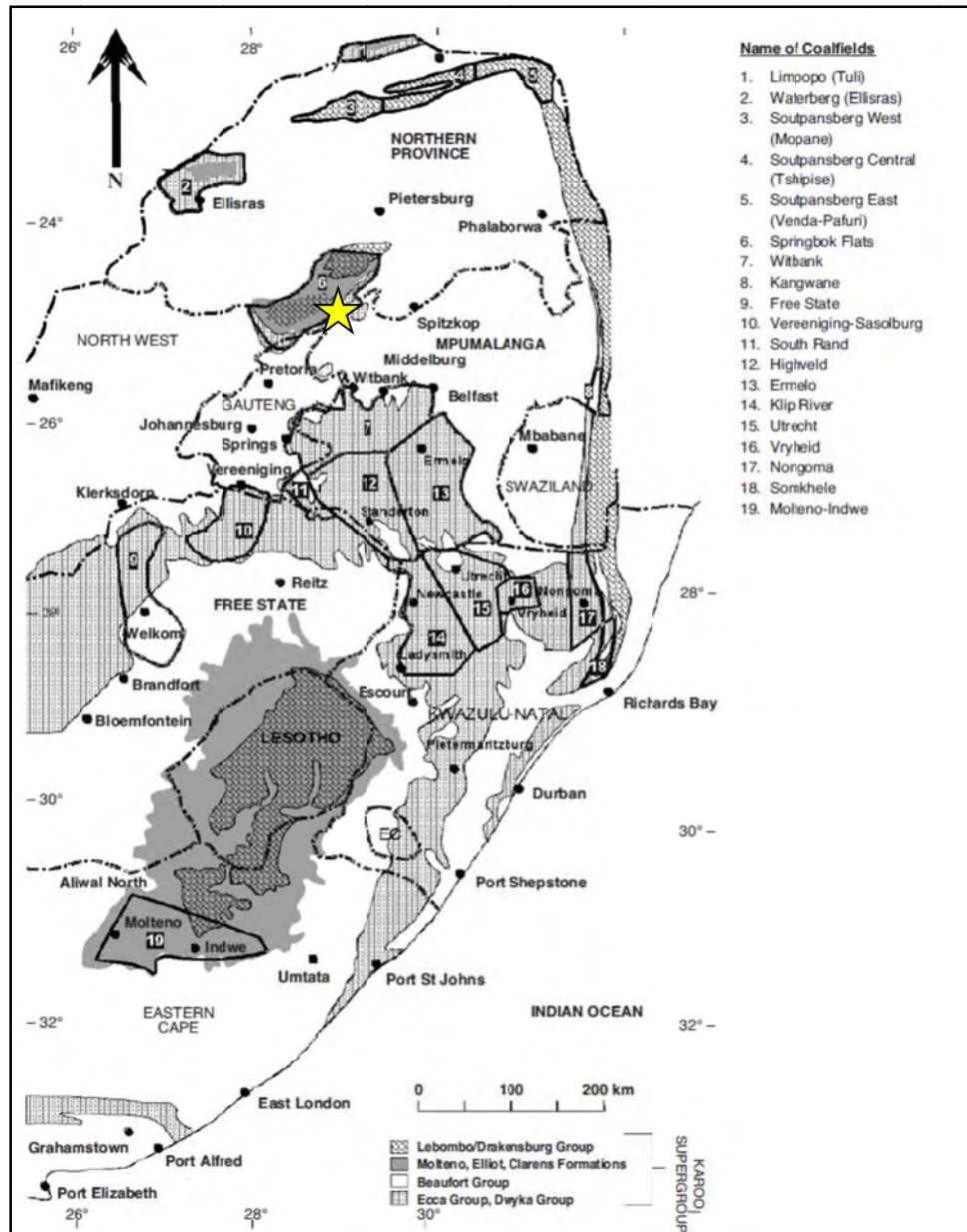


Figure 14 Coalfields of South Africa (Jeffrey, L.S. 2005).

### 3.5.2 Local Geology

The Canyon Springs project area is underlain by the Eccca Formation consisting of shales, shaley sandstone, grit, sandstone and conglomerate with coal in places near the base and the top.



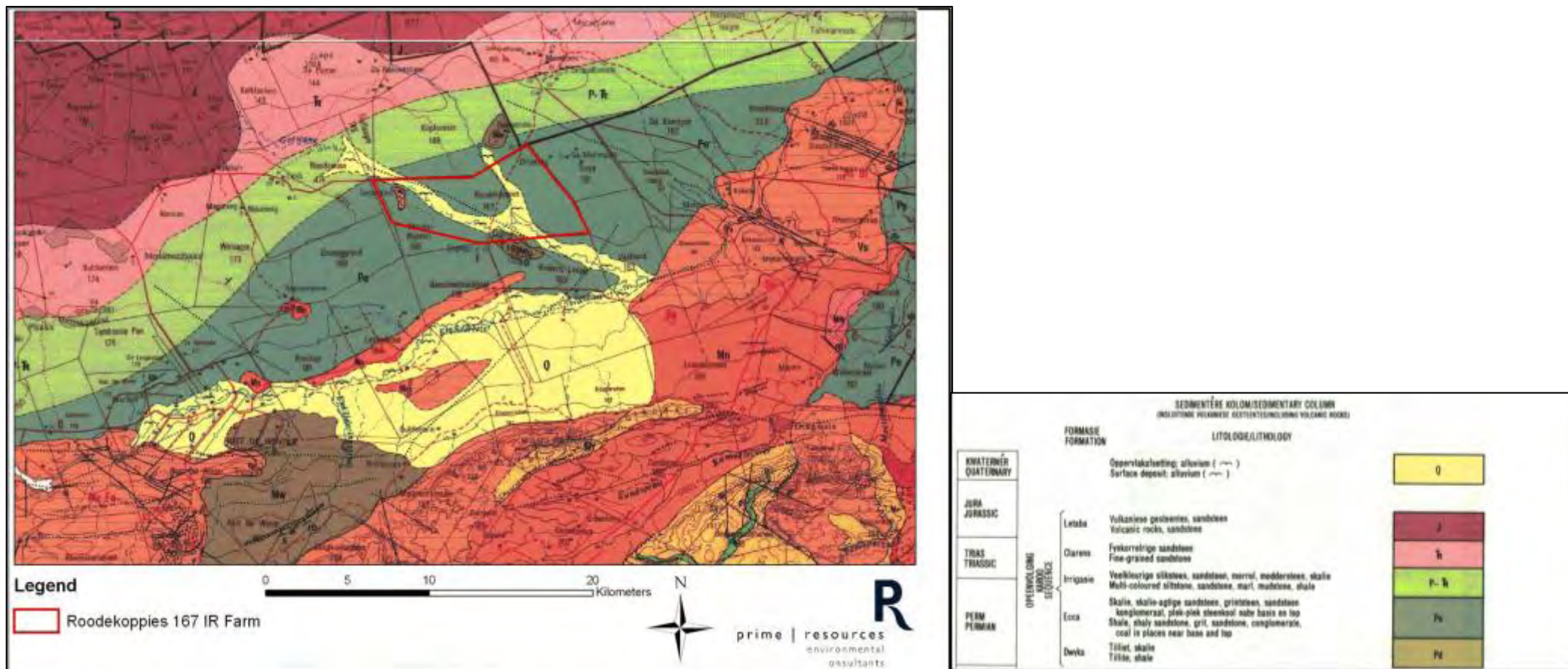


Figure 15 The Geology Underlying the Canyon Springs Project Area.

## **3.6 Land Cover and Land Use**

### **3.6.1 Regional Land-Use**

Mpumalanga is dominated by vast open areas of natural vegetation. Urbanisation is still relatively low, with only 1.25% of the region being classed as urban land. Most of the transformed land has been converted to cultivation (26%), with commercial plantations which comprise 8% of the total land area of Mpumalanga (Mpumalanga SoER, 2003).

The vast majority of land in the Dr JS Moroka Municipality is either tribal or communal land with only a small portion being Government-owned. Cultivated areas (permanent- and temporary- dry and irrigated land) cover less than 15% of the municipality (IDP, 2010-2011). Urban areas cover 14% of the municipality. The Mkhombo and Mdala are the only reserves in the municipality. Land capability within the Dr JS Moroka Municipality has a high agricultural potential, owing to stable soil and geological conditions (IDP, 2010-2011).

### **3.6.2 Local Land-Use**

The eastern side of the farm Roodekoppies (to the east of the tar road that bisects the project area) has been used for grazing (Figure 16; Figure 17). In addition, Acacia trees are regularly removed from the project area to increase the amount of grass cover available for grazing (Pers comm., Rodney). Approximately 50% of the study area was historically cultivated (SEF, 2011). The cultivated areas are situated largely around the Ghotwane River that flows through the site. The western portion of the project area is fenced in and covered with fairly dense, natural vegetation (Figure 16; Figure 18). The residential areas of Loding and Moletsi fall within the south of project area, with Dihekeng in the north-east (Figure 16). These residential areas are associated with areas of degraded land and Dihekeng is surrounded by cultivated land (Figure 16).

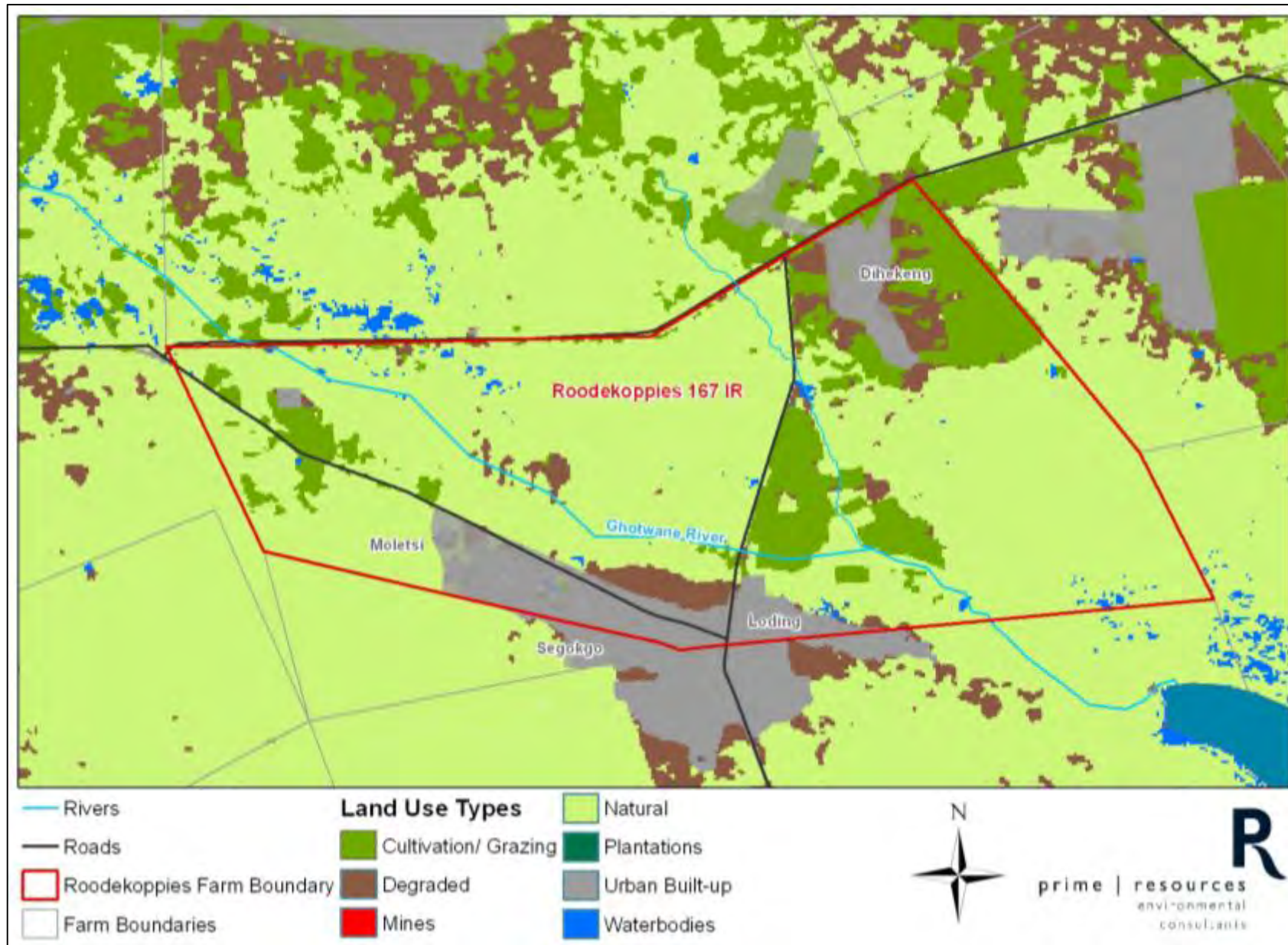


Figure 16 Land Use Types within the Proposed Canyon Springs Project Area.





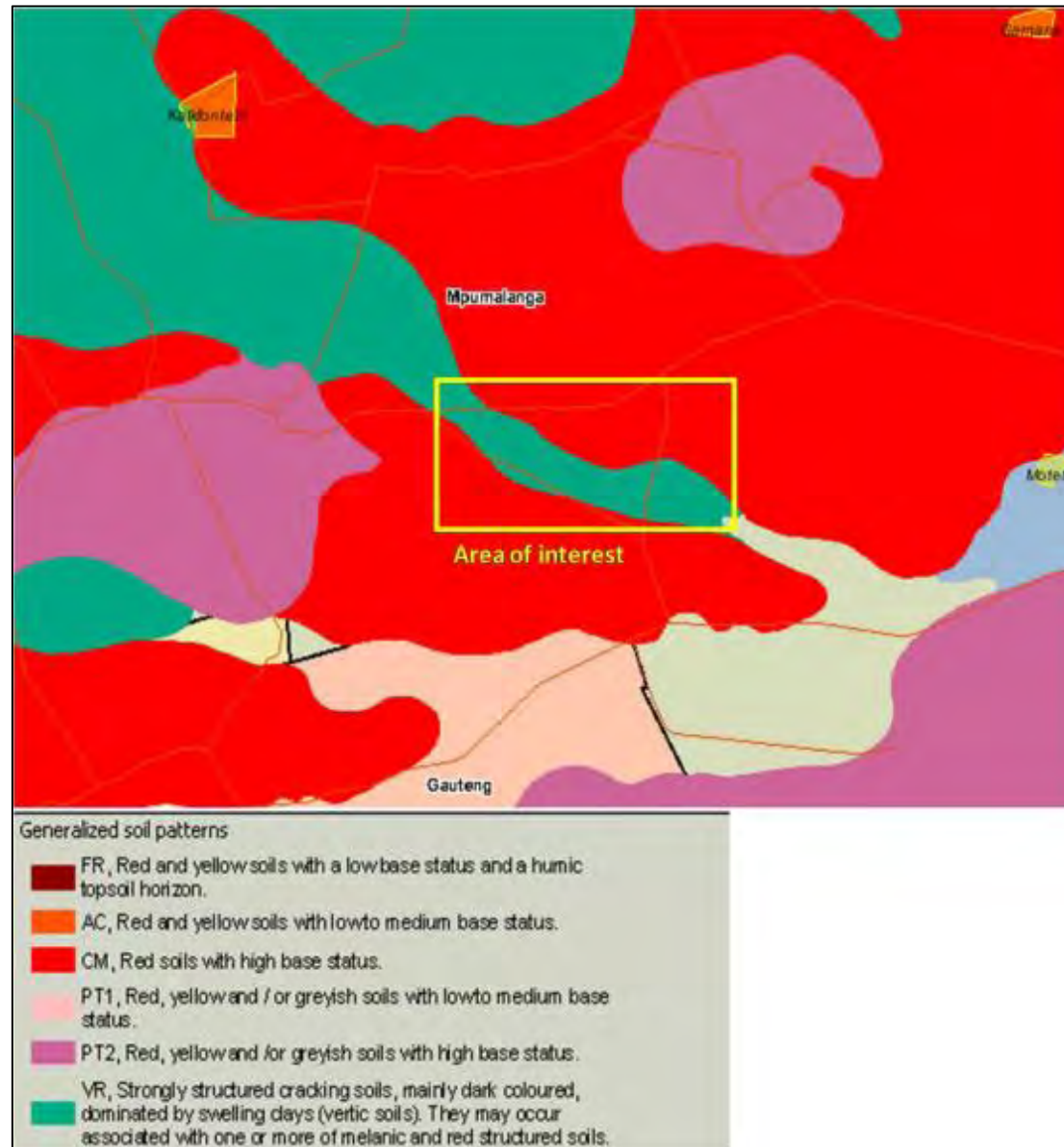
**Figure 17 Area used for grazing on the eastern section of Roodekoppies farm.**



**Figure 18 Western section of Roodekoppies, characterised by natural vegetation.**

### **3.6.3 Soil Quality**

The Canyon Springs project area is characterised by red soils with a high base status and dark, strongly structured, cracking soils dominated by swelling clays along the Ghotwane River (Figure 19) (ARC, 2011). The vertic clay soils experience prolonged swelling and shrinking during wet and dry periods (SEF, 2011). The area is also characterised by a low susceptibility to soil erosion brought about by water (Figure 20). The Agricultural Research Council describes the project area as being moderate potential arable land (ARC, 2011).



**Figure 19 Generalised soil patterns in the Canyon Springs project area (<http://www.agis.agric.za>).**

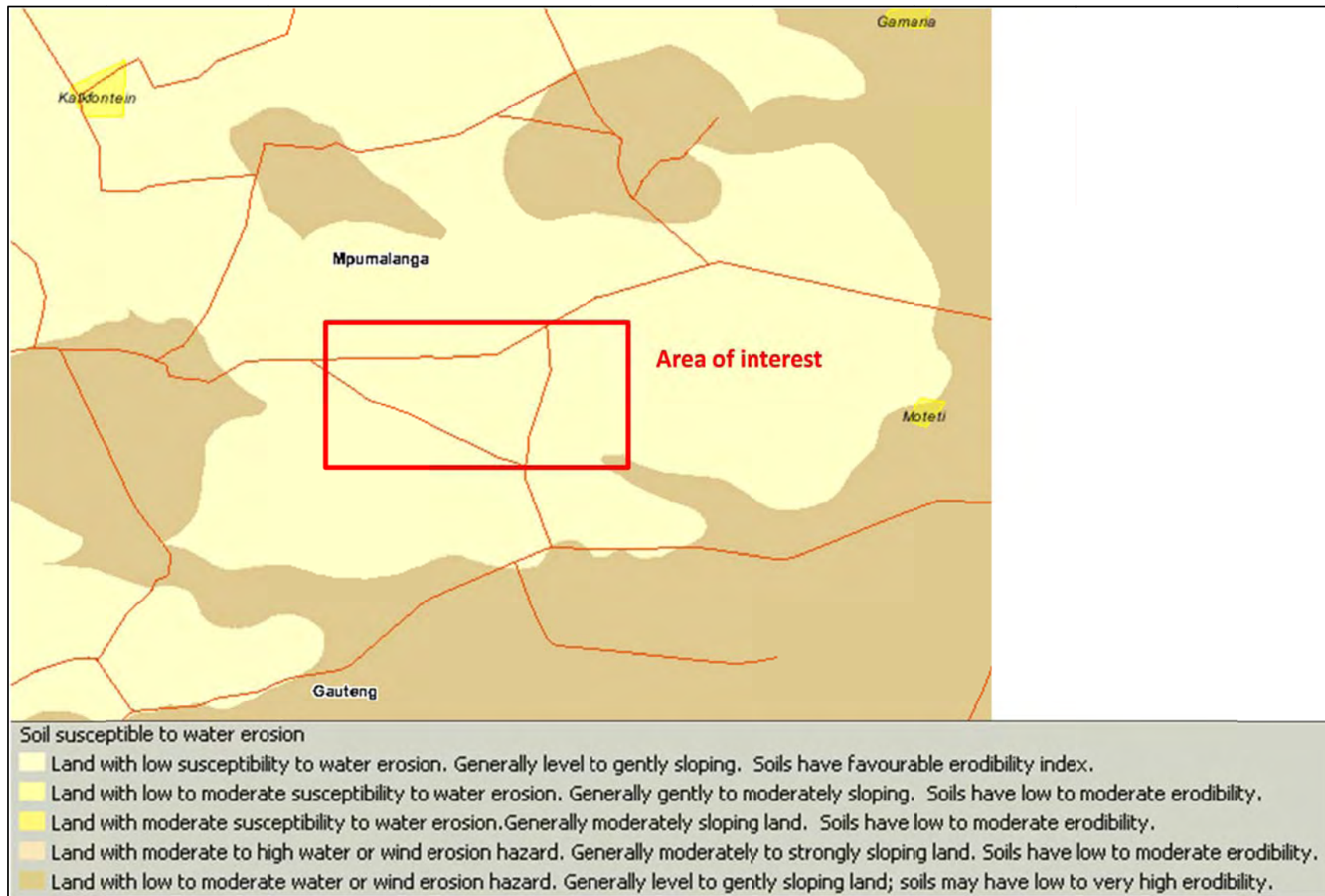


Figure 20 Soil erosion susceptibility in the Canyon Springs project area (<http://www.agis.agric.za>).

### **3.7 Groundwater**

The site falls within quaternary catchment B31E which has a surface area of approximately 1530 km<sup>2</sup>. The Karoo rock types associated with the proposed site for development can be divided into two distinct aquifers, namely a shallow weathered material aquifer and a deeper fractured rock aquifer. The following description of the two aquifers pertains:

#### **3.7.1 Shallow Weathered Aquifer**

This aquifer is associated with the weathered material situated between surface and the more competent material below. This configuration allows the aquifer to be recharged by rainfall, estimated to be approximately 3% of the Mean Annual Rainfall (MAR). The numerous shale layers in the weathered formations restrict the downward infiltration of rainwater into the aquifer and recharging groundwater is thus confined to preferential flow-paths formed at the interface between the weathered material and the more competent underlying material.

The borehole yields in this aquifer are generally low. 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, such as ore stockpiles, waste rock dumps and tailings storage facilities.

#### **3.7.2 Deeper Fractured Aquifer**

Groundwater flow in the deeper Ecca Group rocks underlying the shallow, weathered material is restricted, except along preferential flow-paths formed by secondary fracturing. Groundwater flow in the deeper, fractured material aquifer is thus associated with dolerite dykes, sills and faults in the area.

Although occasional, high-yielding boreholes may be intersected, boreholes in this aquifer generally yield in the region of 1 L/s. The coal seams themselves often show the highest hydraulic conductivity. The groundwater quality in the fractured aquifer is generally of a poorer quality than the weathered aquifer due to the concentration of salts and slower rate of recharge.

#### **3.7.3 Hydrocensus**

A hydrocensus was undertaken within the general project area by Rison Groundwater Consulting in November 2011, to identify and document other groundwater users in the area. A total of 25 boreholes were located in the field (Figure 21). Most of these boreholes belong to the local communities and uses range from crop or garden irrigation to livestock watering and domestic use. The hydrocensus data indicate that there are communities in the general project area that rely solely on the local groundwater resource.



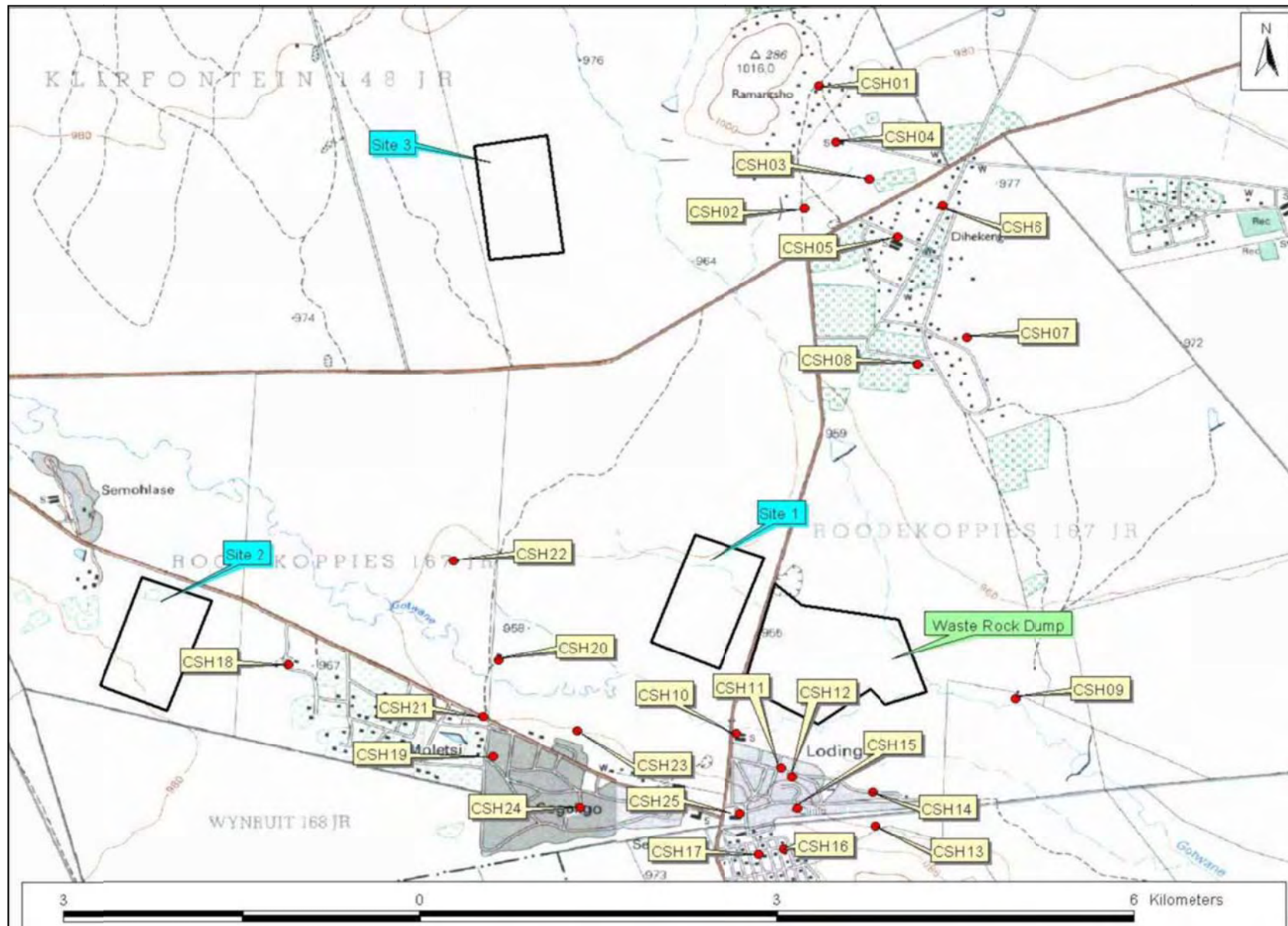


Figure 21 Locality of the hydrocensus boreholes identified.

### 3.7.4 Groundwater Flow Direction

The groundwater table at the project area was found to mimic the surface topography. Since the project area occurs within a topographic low, groundwater flow will be towards the site from most directions (Figure 22). However, groundwater flows away from the site in a south-east direction. Groundwater flow in the study area occurs along a topographical gradient of approximately 0.35 %.

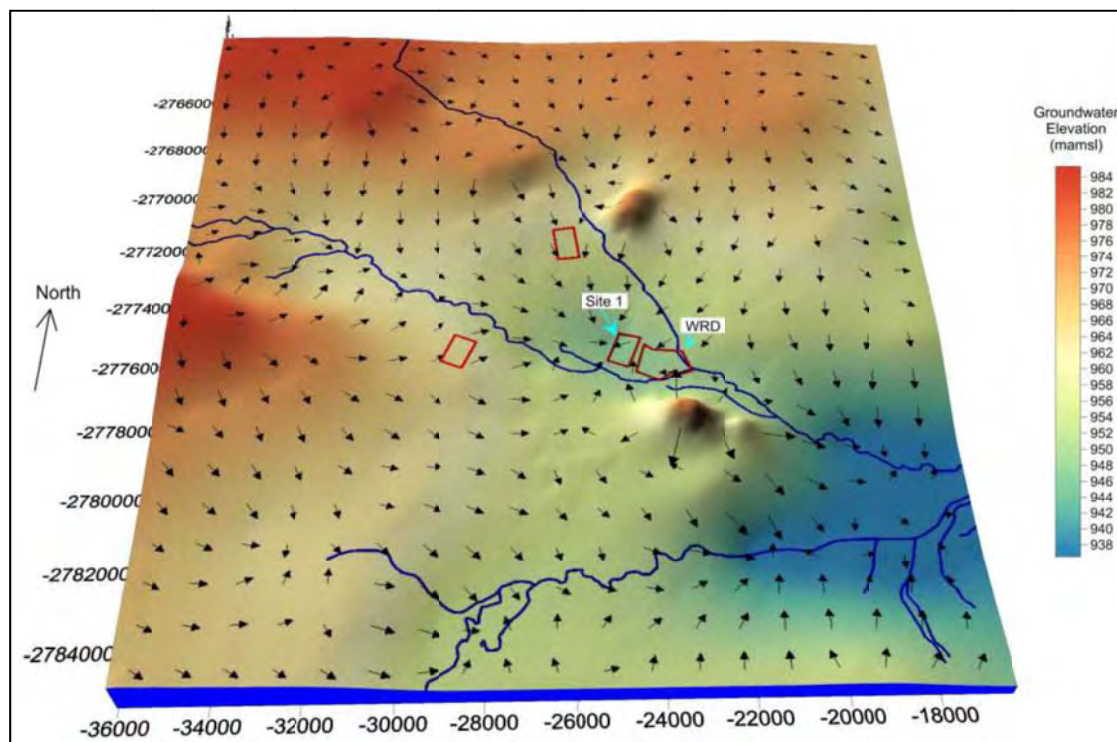


Figure 22 Groundwater flow direction within the Canyon Springs project area.

### 3.7.5 Groundwater Quality and Quantity

According to the municipality, the average borehole yield in the immediate area of Loding is between 1 and 3 litres per second. The groundwater potential in Loding was found to be of "ideal" quality, while the groundwater potential at Klipfontein and Troya, was found to be of marginal quality.

Two boreholes were installed during the baseline assessment. The first borehole was installed near the centre of the proposed developments and was drilled to a depth of 50 meters below surface (mbs), with an insignificant water strike encountered at 37mbs. The second borehole was installed on the southern boundary of the proposed waste rock dump and was terminated at 40 mbs. A major water strike was encountered at 31 mbs at an estimated rate of 10 000 L/hr.

The chemical character of the groundwater samples was determined from samples obtained from both newly drilled and hydrocencus boreholes with the aid of a Piper diagram (Figure 23). The predominant water-type is Na-K-Cl which is typical of ancient water that is described as brackish.

The expected water type in such a pristine environment would be Ca-Mg-HCO<sub>3</sub> which is typical of recharging water. It is thus likely that there is a confining layer preventing recharge to the aquifer and therefore increasing residence time. Increased residence time allows salts to become concentrated in the groundwater.

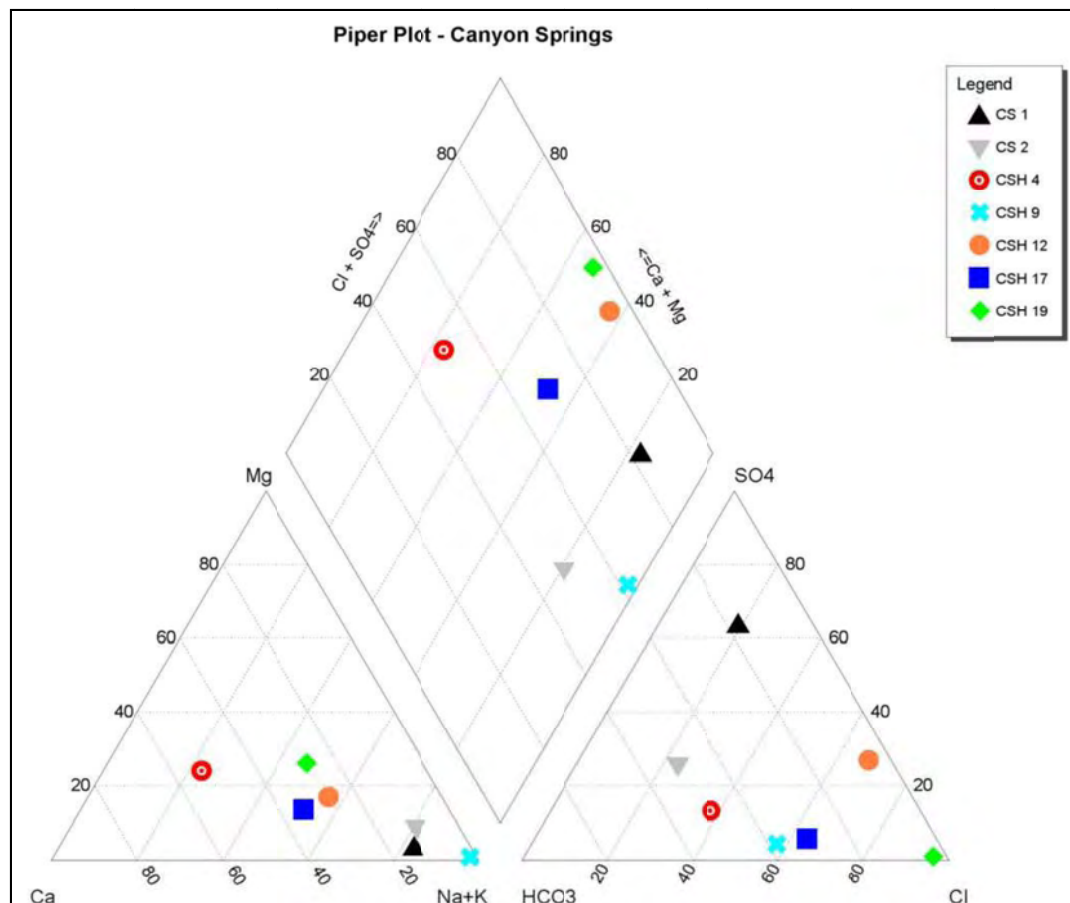


Figure 23 Piper diagram showing hydrochemical classification.

### 3.7.6 Acid Mine Drainage Potential

An Acid Base Accounting exercise determined that samples analysed from the coal seams, footwall and high-wall were potentially acid-generating. The material in question was then subject to leach analysis which determines the composition of runoff generated when water in contact with the material acidifies and thus solubilises elements previously retained *in situ*.

The results for the acid leach testing are summarised below.



Table 5 Results of Acid Rain Leach Testing.

Sample ID	SANS Class 0	SANS Class 2	Coal		FW		HW	
	mg/L	mg/L	Leached mg/kg	Solution mg/L	Leached mg/kg	Solution mg/L	Leached mg/kg	Solution mg/L
Calcium	<80	150-300	1928.101	19.281	996.866	9.969	801.670	8.017
Magnesium	<30	70-100	815.986	8.160	304.415	3.044	223.884	2.239
Sodium	<100	200-400	1342.343	13.423	511.502	5.115	826.235	8.262
Potassium	<25	50-100	190.138	1.901	116.686	1.167	159.458	1.595
Iron	<0.01	0.2-2	0.355	0.004	103.269	1.033	1.579	0.016
Aluminium	<150	300-500	0.385	0.004	0.859	0.009	7.708	0.077
Antimony	<5	Oct-50	0.018	0.000	0.001	0.000	0.017	0.000
Arsenic	<10	50-200	0.350	0.004	0.011	0.000	0.097	0.001
Gold	-	-	0.007	0.000	0.003	0.000	0.008	0.000
Barium	NS	NS	0.708	0.007	0.720	0.007	1.082	0.011
Beryllium	NS	NS	0.001	0.000	0.009	0.000	0.001	0.000
Bismuth	NS	NS	0.000	0.000	0.000	0.000	0.000	0.000
Cadmium	<0.003	0.005-0.01	0.003	0.000	0.002	0.000	0.003	0.000
Caesium	NS	NS	0.021	0.000	0.001	0.000	0.087	0.001
Chromium	<0.05	0.1-0.5	0.005	0.000	0.017	0.000	0.009	0.000
Cobalt	<0.25	0.5-1	0.421	0.004	0.247	0.002	0.666	0.007
Copper	<0.5	1.0-2.0	0.023	0.000	0.032	0.000	0.064	0.001
Indium	NS	NS	<0.0001	0.000	<0.0001	0.000	0.000	0.000
Lanthanum	NS	NS	0.001	0.000	0.003	0.000	0.009	0.000
Lead	<0.01	0.05-0.1	0.001	0.000	0.011	0.000	0.008	0.000
Lithium	NS	NS	0.866	0.009	3.624	0.036	0.648	0.006
Mercury	NS	NS	2.157	0.022	12.883	0.129	0.387	0.004
Manganese	<0.05	0.1-1	13.151	0.132	18.223	0.182	32.253	0.323
Molybdenum	NS	NS	0.042	0.000	0.001	0.000	0.084	0.001
Nickel	<0.05	0.15-0.35	0.451	0.005	0.343	0.003	0.905	0.009
Platinum	-	-	0.001	0.000	0.000	0.000	0.001	0.000
Rubidium	-	-	0.448	0.004	0.073	0.001	0.221	0.002
Selenium	-	-	0.102	0.001	0.040	0.000	0.034	0.000
Tellurium	-	-	0.001	0.000	<0.0001	0.000	0.001	0.000
Thallium	-	-	0.033	0.000	0.004	0.000	0.006	0.000
Tin	NS	NS	0.006	0.000	0.003	0.000	0.006	0.000
Titanium	NS	NS	0.007	0.000	<0.0001	0.000	0.436	0.004
Tungsten	NS	NS	0.004	0.000	0.001	0.000	0.002	0.000
Vanadium	<0.1	0.2-0.5	0.038	0.000	0.001	0.000	0.027	0.000
Zinc	NS	NS	0.833	0.008	1.082	0.011	1.163	0.012
Uranium	-	-	0.006	0.000	0.011	0.000	0.032	0.000

### 3.8 Surface Water

The project area falls within the greater Olifants River Catchment. The Ghotwane River flows in a south-easterly direction across the proposed Canyon Springs project area and into the Rhenosterkop Dam (Figure 24). A tributary of the Ghotwane flows in a southerly direction across the project area (Figure 24). This tributary is non-perennial and appears to rarely hold water, and if so only after major rainfall events.



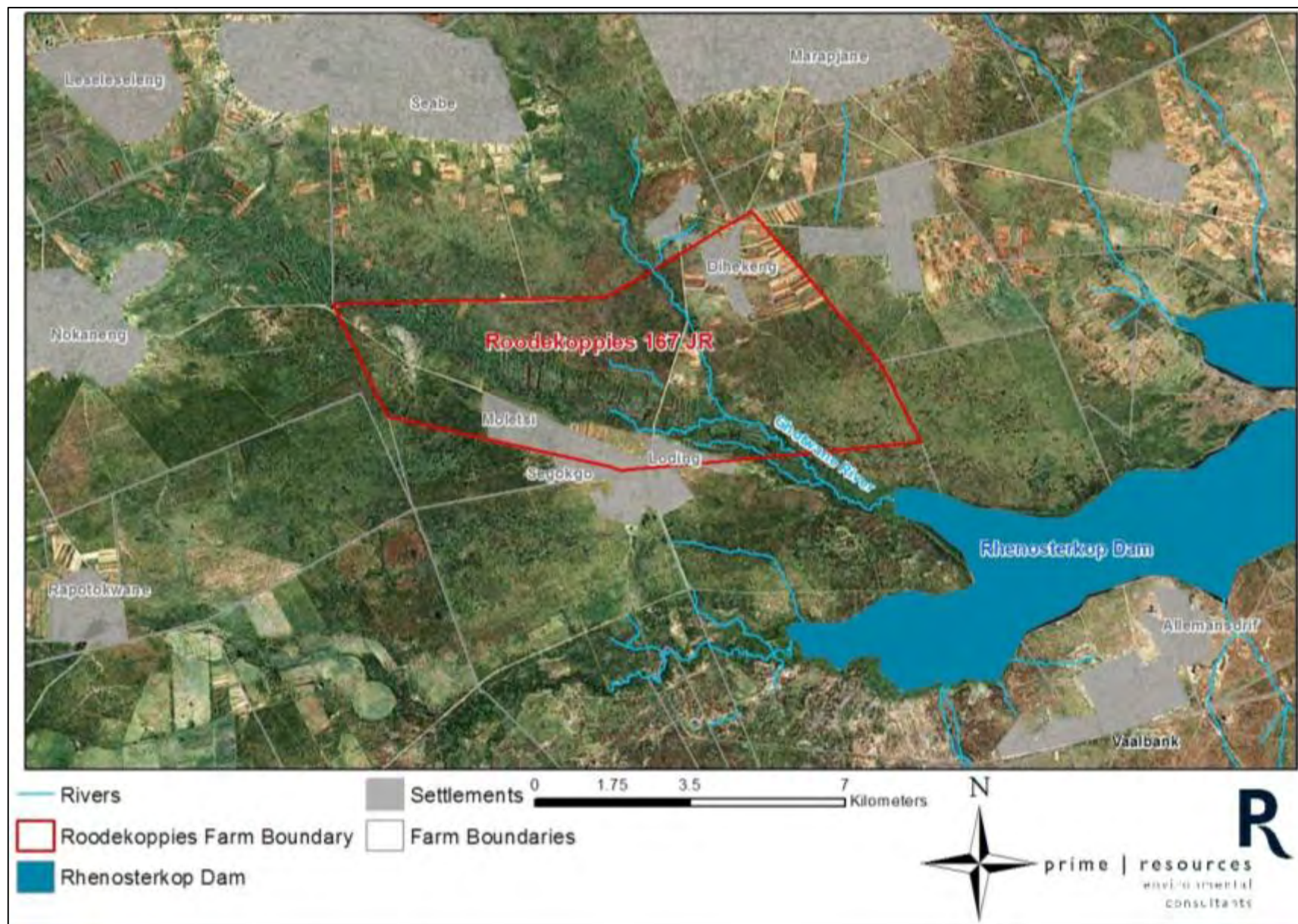


Figure 24 Surface water resources associated with the proposed Canyon Springs project area.

### 3.9 Archaeology

A cultural heritage baseline study was conducted by Archaetnos Culture & Cultural Resource Consultants in November 2011 (Appendix 3). Three sites of cultural significance were identified within the study area:

#### 3.9.1 Site 1

Site 1 comprises the remains of an old farmstead consisting of building ruins, an old dam and other structures (Figure 25). These structures may be slightly older than 60 years but are not unique. The site is regarded as having a **low** cultural significance with little to no heritage value.



**Figure 25 Ruins and Site 1.**

#### 3.9.2 Site 2

Site 2 is an area where Middle and Late Stone Age tools as well as Iron Age pottery were identified (Figure 26 and Figure 27). One of the potshard found had decorations on and it seems to be related to the Rooiberg facies of the Late Iron Age, however this is not conclusive as only one piece of pottery was identified. These materials seem to have been washed into the area from further north. These findings therefore do not really constitute a site, but rather a feature and are therefore regarded as having a low cultural significance.





**Figure 26 Middle and Late Stone Age tools at Site 2.**



**Figure 27 Iron Age pottery at Site 2.**

### **3.9.3 Site 3**

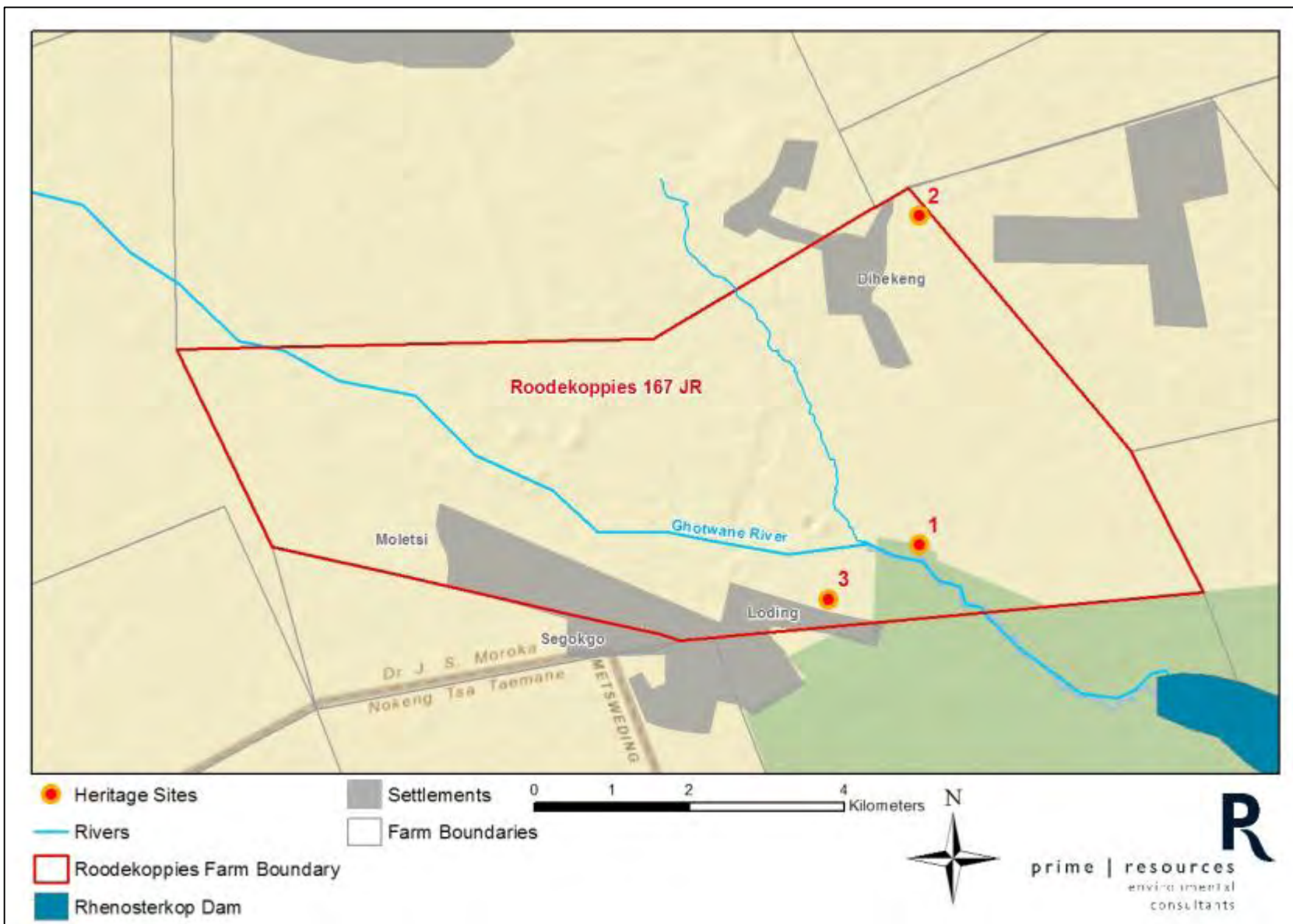
Site 3 is an area where Middle and Late Stone Age tools were (Figure 28). The site is situated within the floodplain of the Ghotwane River and it is clear that these artefacts were washed down the river from further upstream. These artefacts therefore do not constitute a site, but rather a feature and are regarded as having a low cultural significance.





**Figure 28 Late Stone Age tool from Site 3.**

It needs to be considered at all times that the environmental factors may have had an influence on the identification of sites and further sites may thus be uncovered during the course of the development. No graves, apart from those in formal cemeteries in the town of Loding, were identified. The Community Liaison Officer, Mr. Rodney Maodi, indicated that he does not know of any other graves within the project area. Figure 29 displays the location of the three identified cultural/heritage sites.



**Figure 29 Location of the Identified cultural/heritage sites within the Canyon Springs Project Area.**

### **3.10 Air Quality**

A wide variety of air pollution sources exist in Mpumalanga, ranging from veld fires to industrial processes, agriculture, mining activities, power generation, paper and pulp processing, vehicle use and domestic use of fossil fuels (Mpumalanga SoER, 2003).

The Canyon Springs project area, however, is situated within the Nkangala District which is not located within the Highveld Air Quality Priority Area (HPA) in terms of Section 18(1) of the NEM: AQA. When compared to other districts within Mpumalanga, the Nkangala Local Municipality exhibits generally better air quality than in other districts.

Potential sensitive receptors to air quality impacts in the vicinity of the project area would include the inhabitants of the surrounding villages of Moletsi, Sehoko, Loding and Dihekeng.

### **3.11 Noise**

The areas surrounding the proposed Canyon Springs project area are dominated by villages, open veld and grazing lands with no loud noise producing developments in the vicinity. The only noise generated would be that from traffic along the tarred road that bisects the study area and from traffic within the surrounding villages. The project area is thus characterised by a typically rural noise climate associated. These ambient noise levels do not typically exceed 45 dBA between 06h00 and 22h00 and 35 dBA at night

#### **3.11.1 Sensitive Noise Receptors**

Potential sensitive receptors to noise impacts in the vicinity of the project area would be the inhabitants of the surrounding villages of Moletsi, Sehoko, Loding and Dihekeng. Figure 30 shows the villages surrounding the proposed project area.

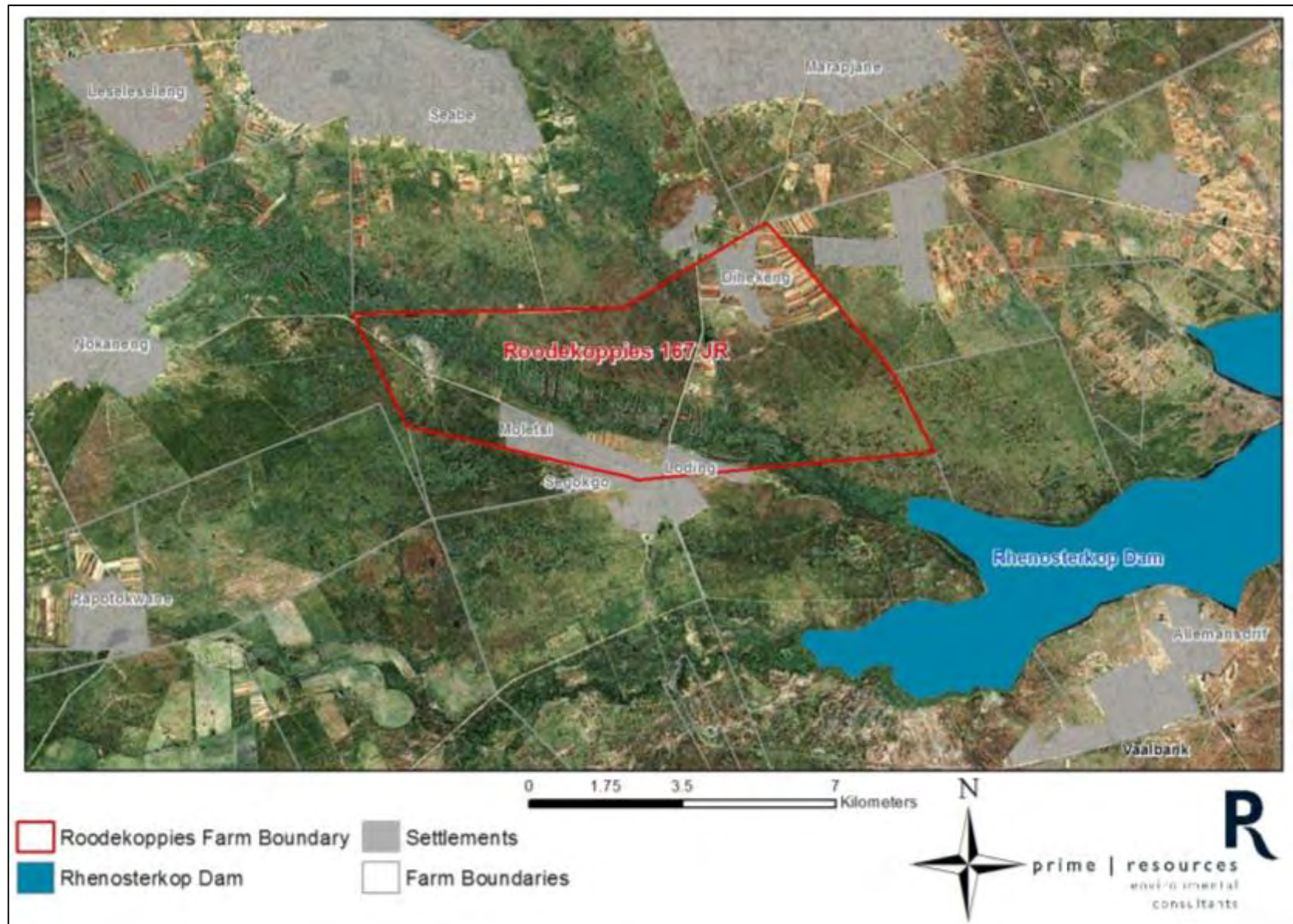


Figure 30 Settlements surrounding the Canyon Springs project area.





11.5% and females 15.1%. This minority therefore supports the rest of the population. The economically active group showed negative population growth between 1996 and 2001 due to migration from the local municipality to surrounding areas for employment opportunities. Table 6 and Table 7 show employment per sector and the individual monthly income. The Tshwane and the Johannesburg Metropolitan Areas are the most important employment centres, and large numbers of people commute daily to these areas ([www.drjsmorokamun.gov.za](http://www.drjsmorokamun.gov.za)).

**Table 6 Employment of the DRJSMLM population per sector (MDALA, 2005).**

INDUSTRY	1996	2001
Agriculture/Forestry/Fishing	1 027	641
Community/Social/Personal	6 266	6 780
Construction	3 958	2 077
Electricity/Gas/Water	712	189
Financial/Insurance/Real Estate/Business	1 280	1 278
Manufacturing	1 911	1 611
Mining/ Quarrying	314	64
Private households	6 443	3 243
Transport/Storage/Communication	1 952	1 346
Undetermined	4 847	1 865
Wholesale/Retail	3 695	3 325

**Table 7 Individual monthly income for the population of the Dr. J.S. Moroka Local Municipality (MDALA, 2005).**

INDIVIDUAL MONTHLY INCOME	1996	2001
None	148 492	195 589
R1 - R400	4 638	7 588
R401 - R800	31 824	24 194
R801 - R1 600	6 533	7 017
R1 601 - R3 200	3 715	5 256
R3201 - R6 400	3 487	2 648
R6 401 - R12 800	304	716
R12 801 - R25 600	85	87
R25 601 - R51 200	76	63
R51 201 - R102 400	27	73
R102 401 - R204 800		72
R204 801 +		9

Although urbanization figures are unavailable, it is expected that more people will be concentrated around towns like Siyabuswa and Marapyane, where access to municipal services, housing and development projects, as well as employment opportunities are available. Smaller towns like Loding do not have sufficient sewerage/sanitation systems, running water and other municipal services.

The local municipality currently exhibits a low standard of education. Employment and money generating opportunities are negatively implicated due to the fact that only 23% of the population



completed Grade 12, and 33% have no schooling. Approximately 25% of the working population has some form of craft or trade related skills that could be used to the benefit the local economy. 18.7% are service workers, shop and market sale workers and only 3% are skilled in agriculture and fishery activities. The large number of poor households implies that an increasing number of learners will be leaving school early due to financial constraints.

The government services sector dominates the economy of the local Municipality which, in general, experiences slow and limited growth. Between 1996 and 2001 the economy of the municipalities grew at a rate of 1.5%. The contribution of the local economy to the economy of the District was 4.1%. The deep rural location of most towns and villages contribute to the dire economic situation. The government, transport, mining and trade sectors, however, enjoy steady growth. These sectors employ roughly 37% of the labour force. The majority of employment offered is either part time or contract positions. This has a negative effect on job security, financial planning and investment in the area. With the majority of businesses, the owner is the only employee. Remuneration in the formal sector ranges from R5 to R40 per day, depending on the performance of the business on the specific day. There is considerable friction between the formal and informal business owners due to the limited consumer buying power.

Water provision is the single largest need identified in the Local Municipality. Approximately 29 out of the 59 villages located in the local Municipality do not have access to a reticulated water supply (<http://www.drjsmorokamun.gov.za>).

Sanitation in this area comprises pit latrines, and the sanitation backlog in the municipal area is 78%. This is due to the unavailability of water which is a prerequisite for the provision of a water-borne sewerage system. Only 12 of the total villages within the municipal area have a waterborne sewer system (<http://www.drjsmorokamun.gov.za>).

Approximately 93% of the households in the municipal area have electricity. Generally, the quality of bulk electricity supplied to the local Municipality is adequate, except for Siyabuswa (<http://www.drjsmorokamun.gov.za>).

### **3.13 Sensitive Environments**

Figure 32 below is a sensitivity map which combines all the sensitive environments mentioned in the sections above.

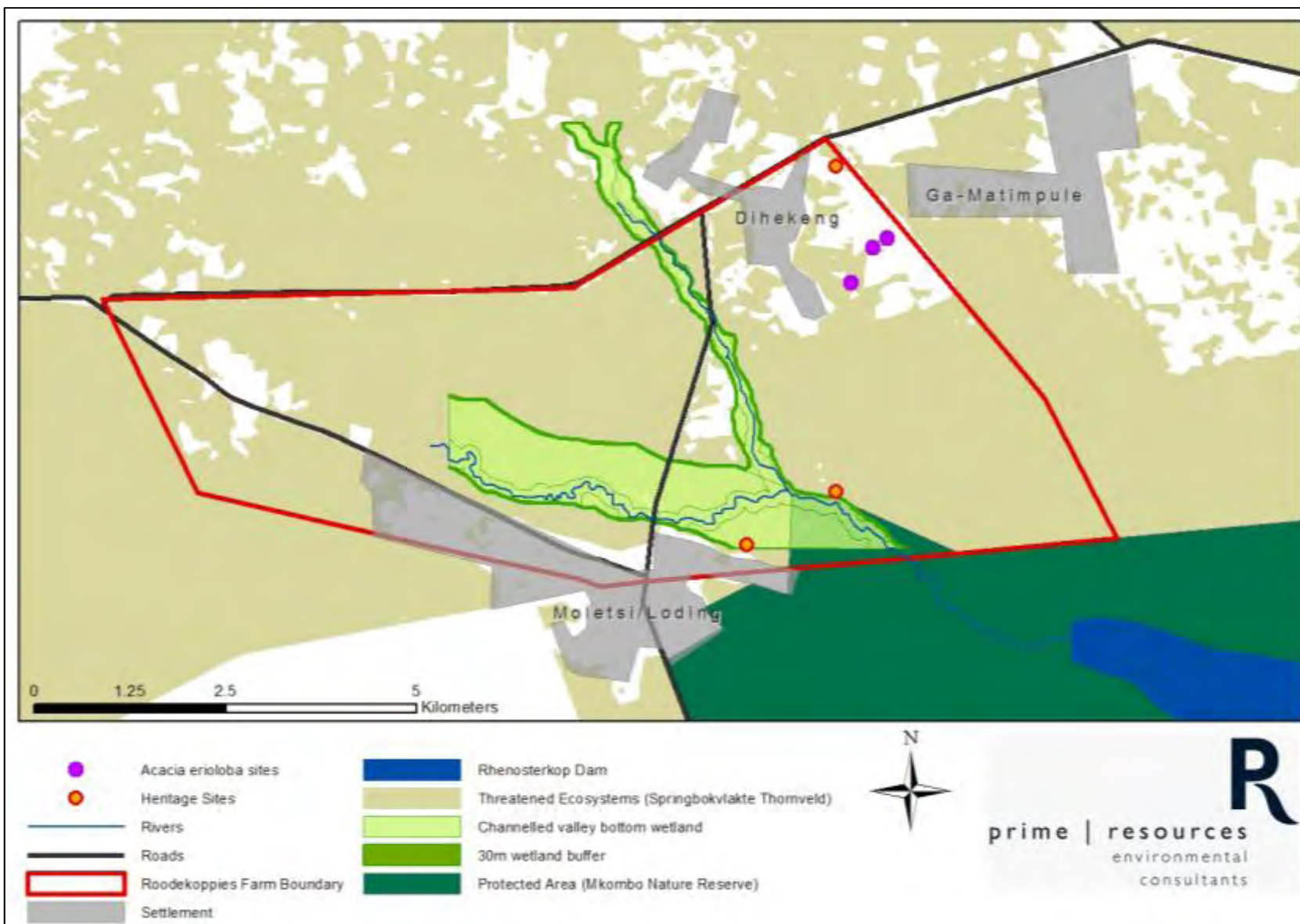


Figure 32 Environmentally sensitive areas within the Canyon Springs project area.

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

This chapter provides a description of the processes and infrastructure anticipated for the proposed development at Canyon Springs. Based on the data currently available, the estimated resource of 81M tons of coal is to be mined over a 27-year life of mine (LOM) through typical opencast coal mining at a rate of 250kt per month.

Refer to Appendix 4 for a copy of the general arrangement / layout plan for the proposed development.

### **4.1 Open-cast Pit**

The mineable coal resources identified have been targeted for opencast pit development in areas where the strip ratio shouldn't exceed 5:1. The location of the proposed opencast pits is indicated on the layout plan in Appendix 4. The shell of each of the opencast pits was divided into mineable blocks via strips across the relevant benches. Strips will be constructed on the crest and toe of every bench and will be approximately 50m in width and 200m in length.

The strips described above will be mined by truck-and-shovel rollover mining with blast development. Initially, strips will be cleared of vegetation, and topsoil and overburden will be sequentially stripped and separately stockpiled.

Initially, three or four strips will be exposed to allow room for mining purposes. Thereafter, overburden material extracted from the strips being mined will be progressively placed into the excavation remaining from the previously mined strips (i.e. progressive rehabilitation). Once mining is complete (i.e. at the end of the LOM) the stockpiled material will then be replaced into the final open strip, followed by the replacement of topsoil and re-vegetation.

### **4.2 Processing Plant**

Run of mine (ROM) will be transported to the plant site via truck / haul road and fed to a ground hopper onto an apron feeder that will discharge the coal through a jaw crusher to a stockpile of approximately least 15 000 tons (storage capacity for half a day's production). Stockpiled coal will then be washed in a Coal Handling and Preparation Plant (CHPP).

Initially, stockpiled coal will be wet screened and the resulting fractions fed into dense medium cyclones and spirals which serve to wash the coal and produce the different quality products (depending on the target market i.e. import or export). The process further involves a thickening circuit which produces thickened slurry and recovered water. Slurry will be pumped to a slurry pond for final settling and recovered water recycled as plant water. The potential for installation of a filter press to further recover water and producing dry discard rather than slurry is being further investigated.

Discard and slurry produced at the CHPP will discharge to a temporary discard stockpile to be

constructed adjacent to the CHPP. There will be a dirty water drain surrounding the discard stockpile which will feed into the pollution control dam associated with the CHPP. The intention is that discard will be re-introduced into the opencast excavation during continuous rehabilitation (as soon as is practically possible) and pending approval by the DWA. This option is being further investigated. The coal product produced will then be trucked to market.

### **4.3 Additional Surface Infrastructure**

Primary access to the site will be gained via the existing series of district roads traversing the project area including D2740 and D1944. Internal haul roads will be unpaved and will branch off the primary access roads to access the opencast pit and beneficiation area.

The mine will further comprise typical infrastructure like a change-house, workshops, security and administration offices. A sewage treatment plant will also be installed.

### **4.4 Bulk Services**

The production for the mine will consume an average of 1 740 kilo litres of water per day. The intention is to reduce the mines make-up water requirement during operation as far as possible by capturing all water generated within the dirty water catchment (i.e. stormwater runoff within dirty water areas and dewatering of the pit) within return water- and pollution control dams and pumping it back to the plant, while also ensuring the plant processes adequately minimises losses during the process (a filter press will be installed to recover water from the discard material generated). There will still, however, be a requirement for make-up water at the mine as precipitation cannot be relied upon year round. Furthermore, the nearby tributary of the Ghotwane River flowing through a portion of the site is non-perennial and no other nearby sources of water for the mine (service water or potable) exist. The Department of Water Affairs has indicated that the nearby Rhenosterkop dam is fully allocated.

It is thus proposed that the treated sewage effluent from the nearby Siyabuswa wastewater treatment works is conveyed to the proposed Mine for recycling to the mine water circuit in order to meet the deficit. This will be accomplished by the following:

- After the last process in the Waste Water Treatment Facility, a new structure is constructed in line of the existing discharge pipe which will contain:
  - A facility to collect the required amount of water for the proposed Canyon Springs Mine. The balance of the water will be diverted back into the existing discharge pipe.
  - A new filtration system - a sand filtration and decontamination system. The sand filters backwash will return to the existing discharge pipe.
  - A multistage pump to deliver the water to the proposed Canyon Springs Mine.
  - A transformer and MCC unit for supplying power to the pump station.
- A new power line is constructed to the Siyabuswa wastewater treatment works in order to provide power for the new equipment.

- A 40.7 km buried pipeline. The pipeline will discharge into a reservoir on the mine. The proposed route is within the existing road servitude in order to avoid disturbance to existing townships, and to avoid clearing a new servitude through undisturbed areas. Three potential alternative routes around the town Troya have been identified. The proposed pipeline route is indicated in Appendix 5. The route to be followed is thus from the WWTW along the D2740 and then to the mine along the D1944 (see Appendix 4).

A treatment plant will then be installed at the mine to process the treated sewage effluent to potable standards and to meet the plant service water requirements. The requirement for potable water will further be reduced by utilising groundwater boreholes on site for potable supply to the mine.

Electrical supply will be provided by a 22KV Eskom line reporting to a sub-station on-site which will be stepped-down and reticulated internally.

#### **4.5 Clean and Dirty Water Handling**

The mine design process has taken cognisance of the environmental requirements for the minimization of the area of dirty-water catchments and the maximization of clean water diversion around the project area so as to avoid removing clean water from the catchment unnecessarily. The separation of clean and dirty water will be via a system of water separation berms and trenches. Dirty water catchments within the project area with pollution potential (i.e. at the plant and discard handling area, as well as any areas where carbonaceous overburden will be stored) will contain stormwater runoff in a system of trenches culminating in pollution control dams. Similarly, water removed during dewatering of the opencast pits will report to a pollution control dam. All water within pollution control dams will be recycled to the plant circuit.



## **5. CONSIDERATION OF ALTERNATIVES**

### **5.1 Introduction**

The objective of this section is to identify land use and development alternatives to the proposed open-cast coal mine.

### **5.2 Alternative locations**

The design of the mine has been optimised by the mine-design engineers based on the position of the available resources and taking cognisance of environmentally sensitive features identified during the initial phases of the project. The possible locations of the opencast pit are restricted by the location of the resource.

There are further two current alternatives in terms of discard management, in that discard can either remain on surface and become a feature of the landscape post-closure (with due rehabilitation) or alternatively be backfilled to the opencast pit as part of continuous rehabilitation.

The alternatives identified in this section will be further assessed in the EIA and the preferable option selected.

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

Should the proposed opencast pit and associated infrastructure not be constructed, the coal resources identified will remain *in situ*. The landowners and legal occupants will continue to utilise the area for grazing and cultivation. There will thus be no added socio-economic benefits over the long-term if the proposed mine was not to proceed, however, potential environmental impacts which may result from the proposed mining operation will be avoided.

## 6. MOTIVATION FOR THE PROPOSED PROJECT

Mining is an important sector in Mpumalanga, providing jobs and contributing to over one fifth of Mpumalanga's Gross Geographic Product (GGP) (Mpumalanga State of the Environment Report, 2003).

The employment of staff members will contribute towards maintaining employment levels in the Dr JS Moroka Local Municipality. The provision of employment at Canyon Springs will positively influence the region through the multiplier effect. According to the IDP of 2010/2011, 314 people were employed by the mining industry in the Dr JS Moroka Local Municipality in 1996, however according to the 2001, this figure had dropped to only 64. The proposed Canyon Springs project would aid in increasing this employment figure again.

The implementation of the proposed project would allow for the initiatives for social upliftment identified in the Local Economic Development Plan of the SLP to be put in place, including:

- The upgrading of the clinic
  - The mine has committed to upgrading the local clinic.. As set out in the Social and Labour Plan (SLP) the construction of the clinic will supply 60 short term employment opportunities. It is anticipated that the existing staff will continue to provide healthcare services at the upgraded clinic. The upgrade of the clinic will also mean better and more readily available health care for the local communities.
- Bakery initiative
  - The development of small business initiatives can play a vital role in providing a sustainable income, developing skills and uplifting sectors of the community. Canyon Springs Coal Mine therefore proposes to establish a bakery initiative that will provide employment and skills development opportunities for 10 people, and will provide a source of affordable, fresh baked goods for the communities in the area.
- Poultry co-operative
  - Agricultural development and poverty alleviation initiatives have been identified as key sectors in the IDP as referred to in the SLP. The poultry co-operative initiative by Canyon Springs Coal Mine will present 8 short term, 5 medium term and 12 long term employment opportunities to local communities. The co-operative will be led by the Community Trust and the profits will be used to benefit the five communities surrounding the mine through investment in bursaries, community infrastructure etc. Therefore approximately 15 000 people will benefit through the provision of sustainable source of income for the community as a whole.

- Vegetable growing projects
  - This initiative will also contribute to agricultural development and poverty alleviation by supplying 60 short-term, 20 medium-term and 12 long-term employment and skills training opportunities. The Vegetable Growing co-operative will not only employ local people in each village, but will also supply affordable, low cost vegetables which could be sold within the local communities and beyond.

The proposed Canyon Springs project would also serve to supplement the supply of coal for power generation to Eskom.

## **6.1 Disadvantages**

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

## **7. PUBLIC PARTICIPATION PROCESS**

### **7.1 Introduction**

This Chapter details the Public Participation process that has been followed for the proposed development.

### **7.2 Public Consultation Conducted for this Scoping Study**

Below is a summary of the public consultation and stakeholder engagement that was undertaken during the Scoping Phase. The process that was followed is as per Regulation 54 of the EIA Regulations of GN No. 543 of 2010.

#### **7.2.1 Interested and Affected Parties**

An IAP Database has been compiled for the Public Consultation Process which includes the landowner (the State and under the control of Department of Rural Development and Land Reform), as well as the legal occupant/s of the land and adjacent occupants. The residents of the towns of Loding, Moletsi, Sehokho and Dihekeng were targeted in this regard. These IAPs were identified through existing tribal structures as well as by registration of any potential IAP who was made aware of the project by the means described in Sections 7.2.2, 7.2.3, 7.2.4 and 7.2.5 below.

Further to the above, the relevant Government Departments administering laws regulating aspects of the project were included in the IAP database, including representatives from the Local Municipality (DRJSMLM), the appropriate ward councillor (Councillor Matlala), the Department of Rural Development and Land Reform (DARDLA) MDEDET, DMR, DWA and SAHRA. A pre-application WULA consultation meeting was conducted with Ms Adivhaho Rambuda of the B31 catchment at the Olifants Catchment Office in Bronkhorstspuit. Minutes of this meeting are contained in Appendix 9.

#### **7.2.2 Background Information Document**

On 7 June 2012, a Background Information Document (BID) was distributed to representatives from each of the surrounding communities at a meeting held at the Loding Community Hall (Appendix 8 for minutes of the Community Leaders' Meeting) to introduce the project and explain the content of the BID. The BID served to briefly describe the background to the project, the proposal in brief, the environmental process, potential impacts identified and included contact details of whom to contact should any queries arise (see Public Consultation Materials in Appendix 6). The BID was further distributed to all IAPs that attended the Open Day, as well as to the Government Departments described above. The BID was available in English, seTswana and isiNdebele.

#### **7.2.3 Site Notice**

Site notices describing the proposed mining activities were published in English, IsiNdebele and

Setswana, and posted up for display within and around the areas of the proposed development and within the communities of Sehokho, Moletsi, Loding and Dihekeng (see Public Consultation Materials in Appendix 6). Notices were thus posted up for display at the Itsoseng General Dealer, Mabena General Dealer and Loding General Dealer and a Moletjie Shop, which are places easily visible to the public in areas of high pedestrian traffic throughput. A site notice was also displayed on-site on the access gate along the D1944 (a map and photographs of the site notices placed at each venue can be viewed in Appendix 6). This provided an opportunity for IAPs in the area to peruse the notices and be made aware of the proposed activities. The site notice invited stakeholders to attend the public meetings of 7.2.5 below. The notices also provided contact details to allow all IAPs the opportunity to raise queries and concerns and find out further details regarding what the proposed activities will entail. Details were also given of the environmental process to be followed and to notify IAPs of the availability of the draft scoping report for comment. Deadlines for the submission of comments were also noted thereon.

#### **7.2.4 Media Notice**

A Media Notice (advertisements) was published in the Sowetan on 7 June 2012. The Media Notices gave a brief description of the proposed project, the environmental process to be followed, details of applicable legislation as well as contact details for the EAP, where further information can be obtained, the availability of the draft scoping report for comment, commenting periods and an invitation to attend the public meeting was published.

#### **7.2.5 Meetings**

A public open-day was held on the 27 June 2012 at the Loding Community Hall between 14h00 and 18h00. IAPs were invited to attend this meeting via the Site Notice, Media Notice and BID. The meeting was held at the Loding Community Hall in close proximity to the proposed project area for all IAPs to attend. A poster presentation was prepared (Public Consultation Material in Appendix 6), which summarised the detail of the draft Scoping Report, including details of the baseline environment identified, the project description, potential impacts to be investigated and details of the environmental process. The posters were presented to all IAPs who were allowed to raise any concerns or questions they may have had on a one-on-one basis (all incorporated in the issues trail of Appendix 7) and add their details to the IAP database. Attendance registers were filled in by all who attended the public open-day and these are included in Appendix 7.

### **7.3 Commenting Periods**

The commenting period commenced once the media had been published and the site notice were displayed (7 June 2012) and continued for 40-days for both Government Departments and IAPs (i.e. until 19 July 2012). The media notice, site notices and BID all provided information on how to contact the independent environmental consultants, and indicated that comments should be sent before the end of the commenting period. The commenting period provided IAPs with 40 days during which any comments, concerns, issues and requests for more information could be raised through registration on the IAP database.



In addition, in line with the requirements for disclosure of all relevant project related information, the draft scoping report was made available for comment at several locations including the Itsoseng, Mabena and Loding general dealers, as well as on the Prime Resources website. The draft scoping report was made available for the duration of the 40 day commenting period during which stakeholders and IAPs had the opportunity to review the documentation and provide comments to the independent environmental consultant. After 40-days, the draft scoping report was revised to include any comments, issues or queries received during the commenting period. This final Scoping Report will be made available to registered IAPs for a further 21 days to comment. The availability of the report will be indicated to all registered IAPs. Any further comments received will be provided together with the final scoping report and submitted to MDEDET and the results of all consultation conducted reported to the DMR.

#### **7.4 Integrated Issues Trail**

An Integrated Issues Trail was maintained and updated regularly throughout the Public Consultation Process (Appendix 7) with any comments, queries or concerns raised by any IAP or authority and which will be further assessed in the EIA and management / mitigation measures proposed in the EMP. Response forms were distributed at the public open-day and 166 were returned. These response forms were captured and have been incorporated into the issues trail (Appendix 7). Verbal comments and concerns raised during the meeting, as well as comments and concerns received via telephone and email after the meeting have also been added into the issues trail (Appendix 7).

#### **7.5 Assessment Phase Public Consultation**

Public Consultation will continue during the assessment phase. An overview of the impacts identified in the EIA and feedback to issues raised during scoping will be distributed to all registered IAPs along with a letter informing IAPs of the availability of the draft EIA/EMP for perusal and comment. The letter to registered IAPs will also inform IAPs of any assessment phase feedback meetings which may be held. Such feedback will include a synopsis of the impacts identified, the specialist studies conducted and the environmental management measures and mitigation measures laid out in the EIA/EMP. The draft EIA / EMP will again be made available to Authorities and registered IAPs for an initial 40-day commenting period, after which the report will be revised with the feedback obtained and this revised report will be made available to registered IAPs for a further 21-day commenting period.

## **8. POTENTIAL ENVIRONMENTAL ISSUES AND IMPACTS IDENTIFIED AT THE SCOPING LEVEL**

### **8.1 Introduction**

This section details the issues that were raised and investigated during the Scoping Phase, and outlines the potential impacts (including cumulative impacts) associated with the proposed development. The potential issues identified will then be fully investigated during the EIA phase.

### **8.2 Land Capability**

The site for the proposed development currently comprises land previously utilised for limited agricultural purposes and currently has no other mining or related infrastructure on surface.

Potential impacts on soil potential and land capability include:

- Loss of arable land;
- Stripping and stockpiling of topsoil for the establishment of infrastructure could result in compaction and erosion;
- Potential contamination of soil from coal stockpiles, hydrocarbons and contaminated run off from workshop areas;
- Reduced capability of the land to support future agricultural processes.

These potential impacts as well as management and mitigation measures will be further investigated during the EIA phase.

### **8.3 Ecology (Fauna and Flora)**

According to the ecological baseline survey conducted by SEF in November 2011, the vast majority of the project area falls within a threatened ecosystem, the Springbokvlakte Thornveld (Figure 32). The flora recorded in the study area included Provincially as well as Nationally protected species which may be negatively impacted upon by the proposed development. A permit is required from MPTA to remove, cut or destroy these species. The proposed project may impact sensitive faunal habitats including the rocky outcrops as well as the watercourses and wetlands and the associated riparian habitat. The Giant Bullfrog (*Pyxicephalus adspersus*), which is listed provincially as Vulnerable and nationally as Near Threatened, may potentially occur on site and the impact thereupon may be affected by the proposed developments.

The potential for impacts to this system will be further investigated and assessed in the EIA and management measures proposed in the EMP based on the final mine design.

## **8.4 Wetlands**

Two channelled valley bottom wetlands were identified in the project area which buffers the two rivers (Ghotwane River and its tributary) (Figure 12). Any potential impacts to these wetlands in terms of polluted discharge, runoff or groundwater dewatering will be further assessed in the EIA and management / monitoring measures proposed in the EMP based on the final mine design.

## **8.5 Groundwater**

The proposed activities at the Canyon Springs Coal Mine could potentially exert an impact on the receiving groundwater regime (discussed in Section 3.7) in terms of groundwater quality and groundwater quantity. The exact nature and extent of these potential impacts (i.e. zone of influence for groundwater drawdown, extent of pollution plume formation etc.) will be calculated as part of the geohydrological numerical model and follow-up assessment during the EIA phase.

## **8.6 Surface Water**

Any potential impacts to surface water quality or the inception of runoff resulting in a reduction in Mean Annual Runoff to the catchment could potentially impact the greater receiving catchment. There is also the potential that the hydrological factors could impact upon the design and operation of the proposed mining activities at Canyon Springs.

Potential impacts to surface water include:

- Potential for contamination of surface water resources through contaminated run off from the mine infrastructure with contamination potential (i.e. stockpiles of carbonaceous material, opencast areas, dirty water runoff catchments);
- Potential reduction in the Mean Annual Runoff to the catchment;
- Potential for altering beds and banks of water courses.

It is recommended that a Surface Water Impact Assessment is conducted during the EIA phase to assess the potential impacts and propose mitigation, management and monitoring measures. A Water Use Licence Application (WULA) will also be compiled for the proposed mine in conjunction with the EIA/EMP and will be submitted to DWA for approval.

## **8.7 Air Quality**

Mine activities such as opencast mining, fallout from stockpiles and vehicle entrainment, could potentially result in a deterioration of the air quality in the project area. The quantification of impacts and areas most likely to be affected must be assessed and the management measures accordingly. It is thus required that an air quality specialist be commissioned to conduct a detailed assessment for the proposed development.

## **8.8 Traffic**

There are three main roads bordering and transecting the project area. The road most probably be most affected is a road that runs north-south through the middle of the project area, D1944. The rural setting of the project area means that there is currently minimal traffic using these roads. The amount of traffic on these roads surrounding and bisecting the project area however will increase during the construction, mining and decommissioning phases of the mine. During the construction and decommissioning phases, construction vehicles and contractors will utilise the roads in the area to access and leave the site. During the mining phase coal trucks will make use of the roads to transport coal product off site. Employees will also utilise these roads to access and leave the mine each day. A specialist traffic impact assessment will thus be conducted during the EIA/EMP phase to quantify the effects of increased traffic on the surrounding road network.

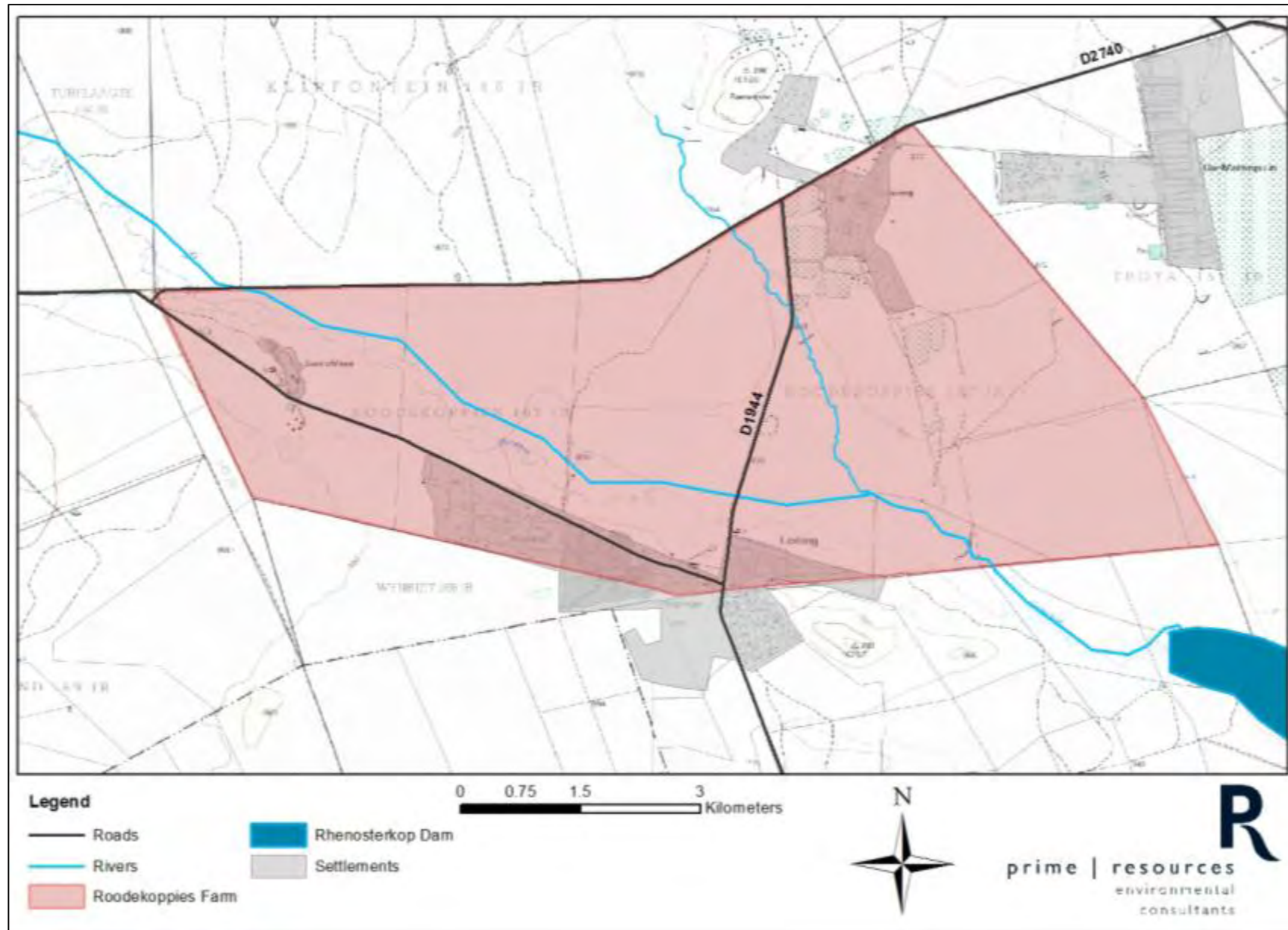


Figure 33 The road network feeding the Canyon Springs project area.



## **8.9 Noise**

The Canyon Springs project area is located in a rural area with low ambient noise levels. The proposed development is therefore likely to increase the ambient noise levels of the area, both as a result of activities at the mine itself and as a result of transportation of coal, and transport access to and from the mine. The potential alteration of the ambient noise environment due to mining activities will be assessed to quantify the potential increase in ambient noise levels on the surrounding area during the EIA phase.

## **8.10 Blasting and Vibration**

Blasting activities have the potential to impact upon humans, animals and structures through the generation of ground vibrations, fly-rock and dust, or during air blasts, the results of which may be altered through the presence of geological structures like faults and dykes. The majority of the blasting activity will occur during the construction phase and while working on the opencast pits.

## **8.11 Socio-Economic Impacts**

The potential negative socio-economic impacts pertain to labour-seeker influx to the surrounding communities and the implications thereof (demand for services and strain on infrastructure). The potential positive impacts result from job-creation and the multiplier effect. The maximisation of potential positive benefits and the significance of negative impacts will be further assessed in the EIA and management measures proposed in the EMP.

## **8.12 Cumulative Impacts**

During the EIA phase, the significance of the potential cumulative impacts for all above potential areas of influence 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**

Specialists will be appointed to conduct assessment phase studies. These studies will further detail the current baseline environment at Canyon Springs and assess the potential impacts the proposed expansion activities will have. These studies will include:

- A groundwater study to:
  - Prepare a detailed numerical model;
  - Determine the extent of potential contamination plume formation for all stages of the proposed development;
  - Determine the extent of dewatering and the resulting drawdown cone as well as identifying any affected groundwater users within the zone of influence;
  - Calculate pit inflow volumes for dewatering purposes;
  - Determine influences of the discard dump on groundwater quality
  - Provide management and monitoring measures
- A surface water study to:
  - Determination of peak runoff and floodlines for streams in 50 and 100- year events
  - Ascertain the latest surface water quality from associated rivers and streams
  - Determine the potential reduction to mean annual rainfall within the catchment
  - Determine the potential reduction in water quality of associated rivers and streams;
  - Assess capacity of water management structures
  - Determined peak runoff from areas
- An air quality study
  - Determine the baseline air quality parameters for the study area
  - Conduct modelling of fallout from dust generating areas and zones of influence
  - Propose monitoring measures
  - Propose management measures
- A follow-up wetland study to:
  - Calculate potential impacts to wetlands arising from the final mine design
  - Devise a wetland impact mitigation strategy
  - Propose an appropriate monitoring programme

- 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
  - Proposed appropriate monitoring and management measures
  
- A blasting / vibration study
  - To calculate appropriate blasting parameters specific to the proposed mine
  - To calculate blasting radius and ascertain the presence of any sensitive structures or other receptors within the blasting radius
  - Propose appropriate monitoring and management measures
  
- Ecology Follow-up Study
  - To determine the potential impact of the final mine-design on the baseline conditions previously identified
  - Propose appropriate management and monitoring measures
  
- Traffic Study
  - To determine updated baseline traffic volumes on the receiving roads
  - Determine the effect that the increase traffic flow arising from the proposed development will have on the surrounding roads
  - Determine alternate routes or other applicable management measures

The outcomes of the above mentioned specialist reports will be incorporated into a draft EIA which will then be made available for public comment. All departmental and IAP feedback will then be incorporated into the issues trail. A draft EMP will then be prepared. Quantum for closure related financial provisions will be calculated. The assessment phase public consultation will then take place and any feedback incorporated. The draft EIA/EMP will then be amended to incorporate any public feedback before submitted to the department.

## **9.2 Stages at which the Competent Authority will be consulted**

Authorities will be consulted when a draft EIA/EMP is available for a 40 day commenting period. The report will then be updated with any outcomes and made available for a further 20 days commenting period. Refer to the scoping and EIA process diagram in Section 2 above.

## **9.3 Method Proposed for Assessment of Potential Impacts**

Significance of both positive and negative impacts will be determined through the evaluation of potential impact consequence and impact likelihood of occurrence.

Impact consequence can be measured in terms of:

- Nature / intensity of impact;

- Spatial extent of impact; and
- Duration of impact.

Impact likelihood of occurrence can be measured in terms of:

- Probability of potential occurrence

**Table 8 Criteria used to define an impact**

Criteria	Category	Description
Status	Positive	Positive influences from the activity
	Negative	Negative influences from the activity
Extent or spatial influence of impact	Large	Beyond 5 km of the proposed activity (regional)
	Medium	Within 5 km of the proposed activity (local)
	Small	On Site or within 1 km of the proposed activity
Magnitude of impact (at the indicated spatial scale)	High	Natural and/ or social functions and/ or processes are severely altered
	Medium	Natural and/ or social functions and/ or processes are notably altered
	Low	Natural and/ or social functions and/ or processes are slightly altered
	Very Low	Natural and/ or social functions and/ or processes are negligibly altered
	Insignificant	Natural and/ or social functions and/ or processes remain unaltered
Duration of impact	Short Term	During Construction/Decommissioning
	Medium Term	Duration of Mining Operation
	Long Term	Post Closure/ Decommissioning
Probability of the impact	Improbable	Possibility of the impact materialising is very low
	Probable	Distinct probability that the impact will occur
	Definite	The impact will occur regardless of any preventative measures

A classification will drop a level if the impact is improbable.

**Table 9 Definition of significance ratings**

Significance Rating	Level of Criteria Guideline
High	High magnitude with large extent and duration High magnitude with either large extent and medium duration or medium extent and long duration Medium magnitude with large extent and long duration
Medium	High magnitude with both a medium extent and duration High magnitude with either medium extent and short duration or small extent and medium duration High magnitude with large extent and short duration or small extent and long duration Medium magnitude with any combination of extent and duration except small, short, large, and long Low magnitude with large extent and long term duration
Low	High magnitude with small extent and short duration Medium magnitude with small extent and short duration Low magnitude with any combination of extent and duration except small, short, large, and long Very low magnitude with large extent and long duration
Very low	Low magnitude with small extent and short duration Very low magnitude with any combination of extent and duration except large and long
Neutral	Zero magnitude with any combination of extent and duration



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