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SAMANCOR CHROME (PTY) LTD

PROPOSED SCHEIDING CHROME MINE, LIMPOPO PROVINCE

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

JUNE 2013

Prepared for:

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REVISION TABLE

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2	21/06/2013		Jonathan van de Wouw	Issued for client review

SAMANCOR CHROME (PTY) LTD

DRAFT SCOPING REPORT FOR THE PROPOSED SCHEIDING CHROME MINE

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Appendix 7:	Groundwater Assessment Report
Appendix 8:	Cultural and Heritage Assessment Report
Appendix 9:	IAP database

LIST OF ACRONYMS

AP	Acid Potential
ASPT	Average Score per Taxon
BC	Bushveld Complex
BID	Background information document
CR	Critically Endangered
Cv	Clovelly Soil
DAFF	Department of Agriculture, Forestry and Fisheries
dB(A)	Decibels
LDRDLR	Limpopo Department of Rural Development and Land Reform
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Programme
EN	Endangered
FRAI	Fish Response Assessment Index
GGP	Gross Geographic Product
GIS	Graphical Information System
Hu1	Hu 2200 Suurbekom Soil
Hu2	Hu 2100 Hayfield
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LoM	Life of Mine
MAR	Mean Annual Rainfall
Mamsl	Metres Above Mean Sea Level
Mbgl	Metres Below Ground Level
MIRAI	Macroinvertebrate Response Assessment Index
MPRDA	Mineral and Petroleum Resources Development Act No. 28 of 2002
MRA	Mining Right Application
NEMA	National Environmental Management Act No. 102 of 1998
NEMBA	National Environmental Management: Biodiversity Act No. 10 of 2004
NNP	Net Neutralising Potential
NNR	Net Neutralising Ratio
NWA	National Water Act
°C	Degrees Celsius
PES	Present Ecological Status

PGM	Platinum Group Metal/s
PM	Particulate Matter
QDS	Quarter Degree Square
RDP	Reconstruction and Development Programme
RLS	Rustenburg Layered Suite
RoM	Run of Mine
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SASS5	South African Scoring System 5
SR	Scoping Report
VU	Vulnerable

1 INTRODUCTION AND BACKGROUND

1.1 Applicant

Name of Applicant:	Samancor Chrome (Pty) Ltd
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Commodity:	Chromite

1.2 Details of the Environmental Assessment Practitioner

Name of Company	Prime Resources (Pty) Ltd
Name of Environmental Assessment Practitioners	Peter Theron, Jonathan van de Wouw, Amanda Mooney, Zoë Gebhardt
Physical Address:	70 - 7 th Avenue, Parktown North, Johannesburg
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Professional Affiliations:	PrEng; PrSciNat, SAImm

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

Prime Resources is a specialist Environmental Consulting Firm providing environmental and related services and which was established in 2003. Prime Resources was founded by Peter J. Theron, the Managing Director of the firm, who has over 26 years' experience in the field of environmental science and engineering. Jonathan van de Wouw, the Project Manager and Senior Scientist for the

proposed Scheiding Chrome Mine, has five years' experience in the field of environmental science. Refer to Appendix 1 for the Prime Resources Statement of Capabilities.

Samancor Chrome (Pty) Ltd "the Applicant" has targeted a chromite resource in the Limpopo Province for the development of an opencast mining operation. Certain activities at the proposed Scheiding Chrome Mine will invoke certain activities listed in terms of the EIA Regulations of 2010 (GNR544, 545 and 546) and therefore require that Environmental Authorisation is granted by LEDET before they can legally commence.

1.3 Project Location

The proposed project area is located within the Limpopo Province and falls under the jurisdiction of the Lepelle-Nkumpi Local Municipality and the Capricorn District Municipality (Figure 1). The residential areas and settlements surrounding the proposed project area include Bogalatladi, Scheiding, Ga-Makgoba, Maseleseleng, Madikelong, Gamathabatha, Mphaaneng and another unidentified community, to be identified during public consultation / through consultation with the Tribal Authorities (Figure 2).

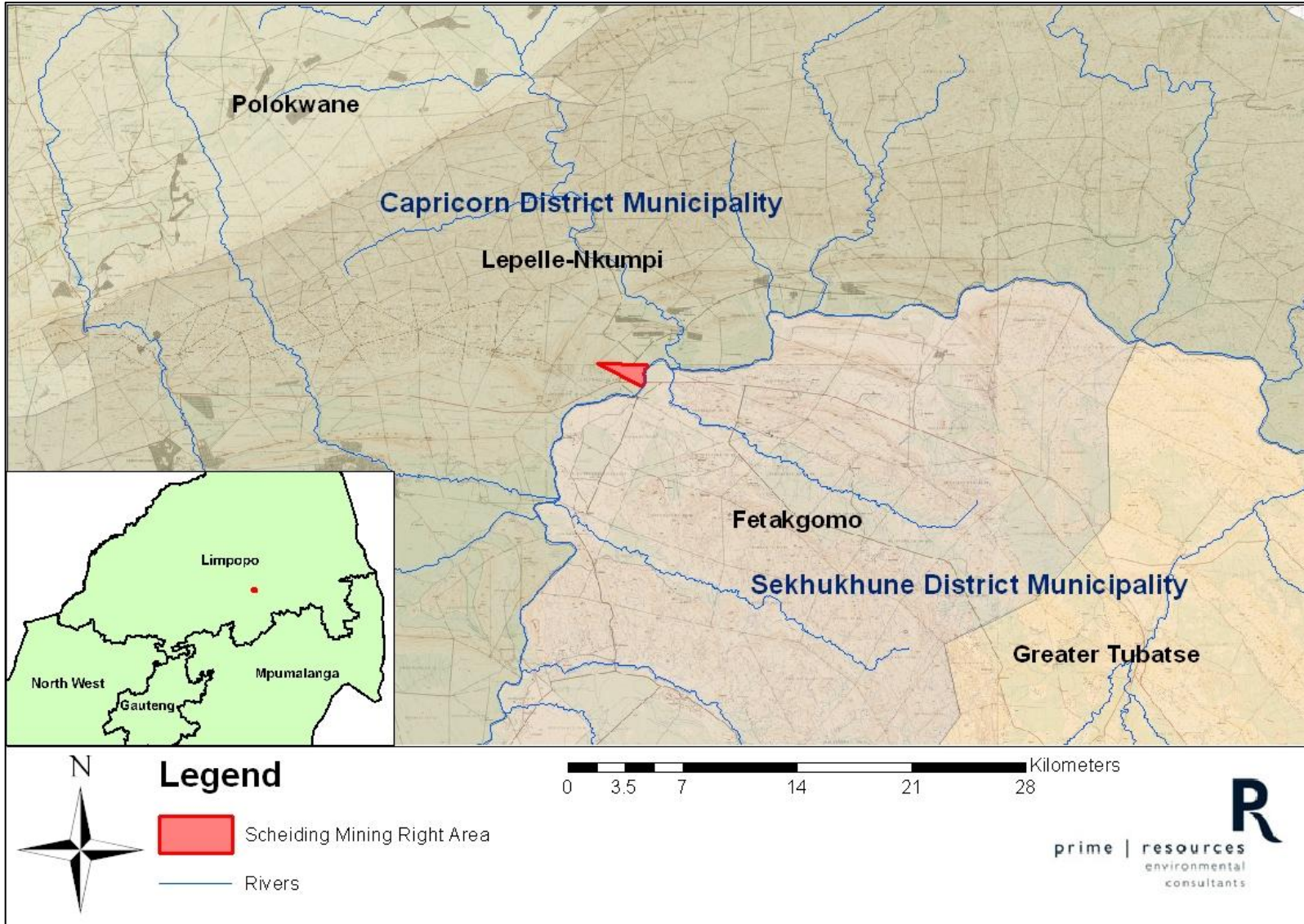


Figure 1: The locality of the proposed project area within the Lepelle-Nkumpi Local Municipality, Limpopo, South Africa.

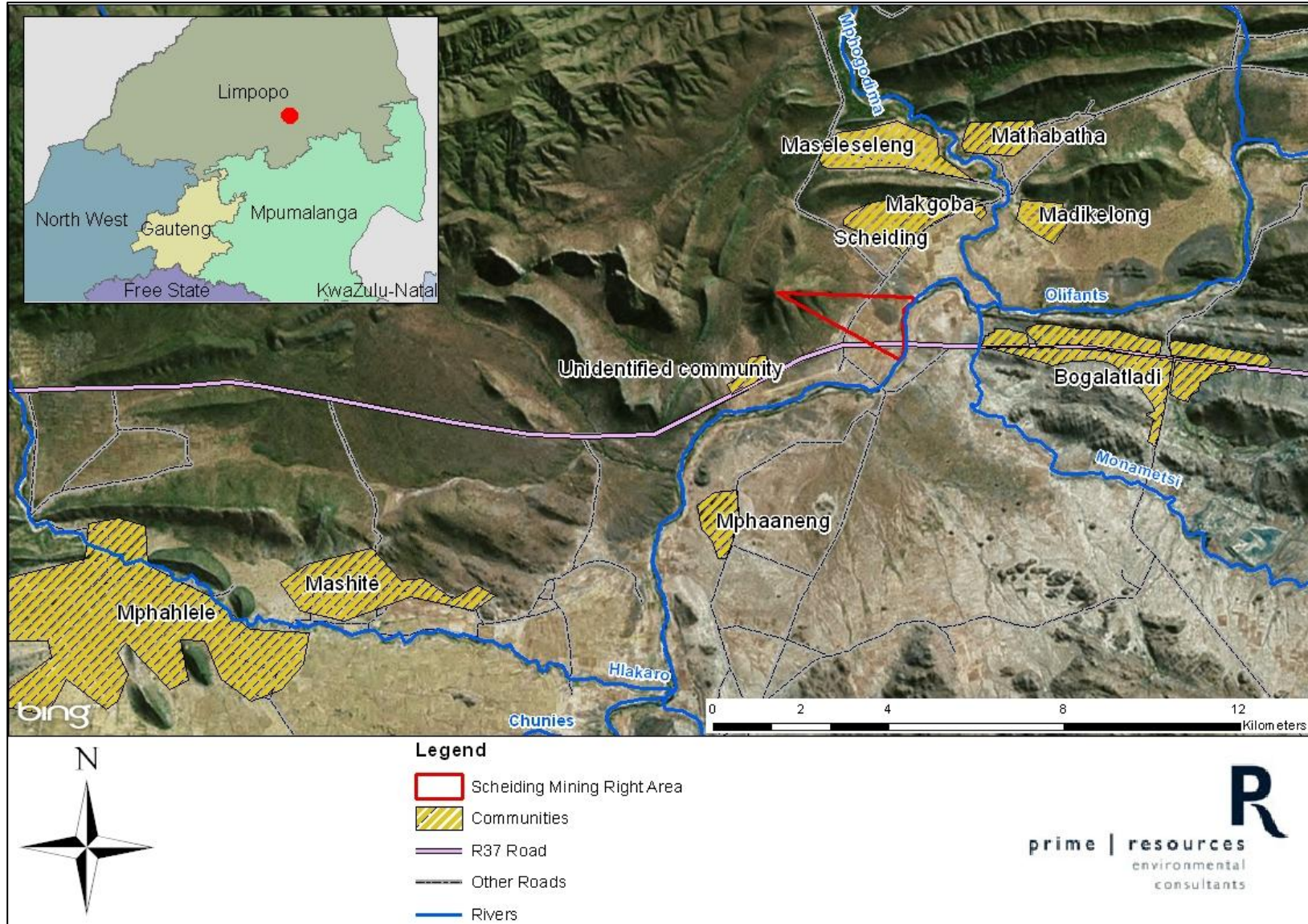


Figure 2: Communities surrounding the proposed project area.

1.4 Legal Requirements

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

In order to protect the environment and ensure that the proposed development is undertaken in an environmentally responsible manner, the following pertinent laws apply and guide this assessment. They are as follows:

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

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

The MPRDA by definition:-

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

An Application for a Mining Right (MRA) in terms of Section 22 of the MPRDA was accepted by the DMR on 17 May 2013 (DMR Ref. No. LP 30/5/1/2/2/10037 MR). As such, a SR, EIAR and EMP will be prepared and submitted to the DMR as part of the process required in terms of Section 39 of the MPRDA when read in conjunction with Regulations 49, 50 and 51 thereof (GN527). The environmental processes in this regard will be aligned to that of NEMA as far as possible, especially as regards public consultation and the investigation of potential impacts to the receiving biophysical and social environment, as well as any commitments made regarding the management and monitoring thereof.

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

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

The principles of NEMA are laid out in Section 2:

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

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

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

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

- Occurred before the commencement of the Act,
- Arises or is likely to arise at a different time from the actual activity that caused the contamination; or
- Arises through an act or activity of a person that results in a change to pre-existing

contamination.

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

The following activities listed in terms of the above are relevant to the proposed Scheiding Chrome Mine:

Table 1: Listed activities at the proposed Scheiding Chrome Mine in terms of the EIA Regulations of 2010.

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
GNR544	13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	Fuel storage facilities.
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 of 10m width.
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.	To be determined following consultation with the DWA in order to define water uses
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	The alteration of the current landscape for the development of the opencast pit and associated surface infrastructure.
GNR546	4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres, in Limpopo, (ii) outside urban areas, in: gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of	The construction of access and haul roads within 5 km of a formal protected area (Bewaarkloof Nature

LISTING NOTICE	ACTIVITY NUMBER	LISTED ACTIVITY	DESCRIPTION
		NEMPAA or from the core areas of a biosphere reserve.	Reserve).
GNR546	10	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres, in Limpopo, (ii) outside urban areas, in (gg) areas within 10 kilometres from national parks or world heritage sites or 5 10 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	The installation of fuel storage facilities for proposed project area which falls within 5 km of a formal protected area (Bewaarkloof Nature Reserve).
GNR546	13 / 14	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation in Limpopo, (ii) outside urban areas in (ff) areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	The proposed project area falls within 5 km of a formal protected area (Bewaarkloof Nature Reserve). Land will be cleared for the development of the opencast pits and associated surface 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).

An application for Environmental Authorisation for the aforementioned activities has been accepted by the Limpopo Department of Economic Development, Environment and Tourism (LEDET) on 21 June 2013 and has been allocated the reference number 12/1/9/2-C29.

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

GNR543 SECTION 28	CONTENTS	CHAPTER
1(a)(i) and (ii)	Details of the Environmental Assessment Practitioner (EAP) who prepared the report and the expertise of the EAP to carry out scoping procedures	1.2
1(b)	A description of the proposed activity	4
1(c)	A description of any feasible and reasonable alternatives that have been identified	5
1(d)	A description of the property upon which the mining activities are to be undertaken and the location of the activity on that property	1.3
1(e)	A description of the environment that may be affected by the activity and the manner in which activity may be	3

GNR543 SECTION 28	CONTENTS	CHAPTER
	affected by the environment	
1(f)	A description of the applicable legislation and guidelines	1.4
1(g)	A description of environmental issues and potential impacts, including cumulative impacts that have been identified	8
1(h)(i) - (iv)	Details of the public consultation process conducted	7
1(i)	A description of the need and desirability of the proposed activity	6.1
1(j)	Potential alternatives to the project and the associated advantages, disadvantages as regards the community and 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	To follow ¹
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	7
1(n)(i) - (iv)	A plan of study for the assessment phase	9
1(o)	Any specific information required by the competent authority	3.13; 7; 9
1(p)	Any other matters required in terms of sections 24(4)(a) and (b) of the Act	None

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

The National Environmental Management: Air Quality Act serves to repeal the Atmospheric Pollution Prevention Act (No. 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. However, none of the activities in terms of the above schedule will be triggered by the proposed Scheiding Chrome Mine.

¹ The minutes of any meetings held, comments received and other representations made will be included in the final scoping report as well as the Comments and Responses Report.

Section 32 of the Act allows for the promulgation of measures to control and monitor dust. In May 2011, Draft National Dust Control Regulations were published for public comment. These Regulations have however not been finalised. The draft regulations are aimed at prescribing general measures for the control of dust in all areas, including residential and light commercial areas. In addition, the draft regulations propose the prohibition of dust pollution above specified levels and the establishment of criminal liability for noncompliance, as well as new tools for air quality officers to better monitor dust emissions. Dust monitoring and management measures will be stipulated in the EMP to ensure the applicant complies with the above legislative requirements.

1.4.4 The National Heritage Resources Act (No. 25 of 1999)

The National Heritage Resources Act serves to protect and manage the South African heritage and cultural resources. These resources includes places, buildings, structures and equipment of cultural significance, historical settlements and townscapes, archaeological and paleontological sites, graves and burial grounds. The Act protects any heritage resources from damage by developments by stipulating in Section 38 that any person intending on undertaking any form of development which involves the activities listed below must, at the earliest stage of initiation, notify the 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 m² 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 000m² 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 Scheiding Chrome 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 (NHRA). Heritage considerations therefore will form part of this environmental process. In terms of the requirements of the NHRA, a specialist cultural and heritage consultant was appointed to conduct a baseline assessment of the area and identified no archaeological, cultural or heritage resources of significance within the proposed project area (refer to section 3.13 for the findings of the specialist assessment).

1.4.5 The National Water Act (No. 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 the DWA, while Section 39 identifies several water uses where the need for a license is dispensed with. The use of water for which a license is not required is also described.

Regulation GN704 of 1999 provides regulations for the use of water for mining and related activities and is aimed to further protect water resources. These regulations describe how mining activities should be managed to protect water resources. The Act thus plays a crucial role in the mining process as many mining-related activities use water as listed in Section 21, thereby requiring approval from DWA. Section 4 (b) of GN704, which specifically deals with the location of mines relative to flood lines of watercourses, legislates that no residue deposit, dam, reservoir or any associated infrastructure may be located within the 100-year flood lines or within 100 m from a river's edge, whichever distance is the greatest. It continues that no opencast or underground mine may be located within the 50-year flood line of a stream or river (or within 100 m from the edge of a river, whichever distance is the greatest) and neither may one erect any sanitary convenience, fuel depots, reservoir or depots for any substance which may cause, or is likely to cause, pollution of a water resource within the 50-year flood line of any watercourse. Under certain conditions DWA will allow mining to encroach to within the flood lines of a river, as long as the proper applications and motivations are made.

According to the modelled flood lines there is approximately a 100-m length of exploitable reef between the edge of the river and the 100-year flood line. The financial viability of the mining of the LG6 chromite seam at Scheiding is dependent on mining as close to the Olifants River as possible. This could potentially take the mine up to, or into both the 50- and 100-year flood line zones (refer to Figure 15). The DWA will be engaged further regarding the proximity of the proposed development to the floodlines in question and that management measures to this end will be further investigated with the necessary specialist input in the EIAR. Refer to Section 3.8 for a detailed description of the surface water resources within the proposed project area.

The possible water uses or, where applicable, general authorisations are being further investigated and the DWA will be engaged for confirmation of any water uses identified during pre-application consultation as part of the WULA process. The potential water uses relate to: dirty water management infrastructure, bulk water supply and dewatering of the opencast workings.

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

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

This Act succeeds Section 20 of the Environmental Conservation Act, No. 73 of 1989 and provides measures for waste management covering the various aspects of activities which generate waste. The schedules attached to the Act also provide definitions for activities which require a waste management license while also identifying the relevant environmental authorisations (either in the form of a Basic Assessment {Schedule A activities} or Scoping, EIAR / EMP {for Schedule B activities} and prepared in terms of NEMA) which are further required for said activities.

The applicable activities at the mine pertain to the temporary handling and transfer facilities for general and industrial hazardous waste storage at the mine, however, the Applicant will endeavour to store less than 100m³ of general waste and less than 35m³ of hazardous waste on-site 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.

1.4.7 The National Environmental Management: Biodiversity Act (No. 10 of 2004)

The purpose of the NEMBA is to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act (107 of 1998). This includes: the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity Institute.

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

Section 52 of the Act provides for listing of threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected (Government Gazette, 2011). The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems. The proposed project area is located within the Sekhukhune Plains Bushveld ecosystem which is not currently listed in terms of Section 52 of NEMBA.

Chapter 4, Part 2 of the Act provides for listing of species as threatened or protected. If a species is listed as threatened, it must be further classified as critically endangered, endangered or vulnerable. The act also defines restricted activities in relation to a specimen of a listed threatened or protected species. A minimum of ten plant species of conservation concern in terms of NEMBA could occur within the proposed project area and two of these species were confirmed during the specialist. Removal of these plants will require a permit in terms of NEMBA and should be accompanied by either a rehabilitation plan where the plants will be re-established or the plants should be rescued and replanted at a suitable site. There are also avifaunal and arachnid species of conservation concern are likely to occur within the proposed project area. A permit in terms of

NEMBA will be required to destroy, collect or kill any of the arachnid species of conservation concern. Refer to section 3.7 for detailed findings of the ecological assessment.

1.4.8 Limpopo Environmental Management Act (No.7 of 2003)

The purpose of the Limpopo Environmental Management Act is to manage and protect the environment in the Province. Chapter 8 of the Act stipulates activities which require permits in terms of indigenous and protected plants in the Province and Schedule 11 and 12 of the Act stipulate the protected plant species specific to Limpopo Province. The destruction or removal of any protected species in terms of the act will require a permit from LEDET. Five species that were identified within the proposed project area during the ecological assessment are protected under the Act.

1.4.9 The National Forest Act, 1998 (No. 84 of 1998)

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). Two protected tree species were identified within the proposed project area and suitable habitat exists for at least another two species. Refer to section 3.7 for detailed findings of the ecological assessment.

2 METHODOLOGY APPLIED TO CONDUCT SCOPING

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

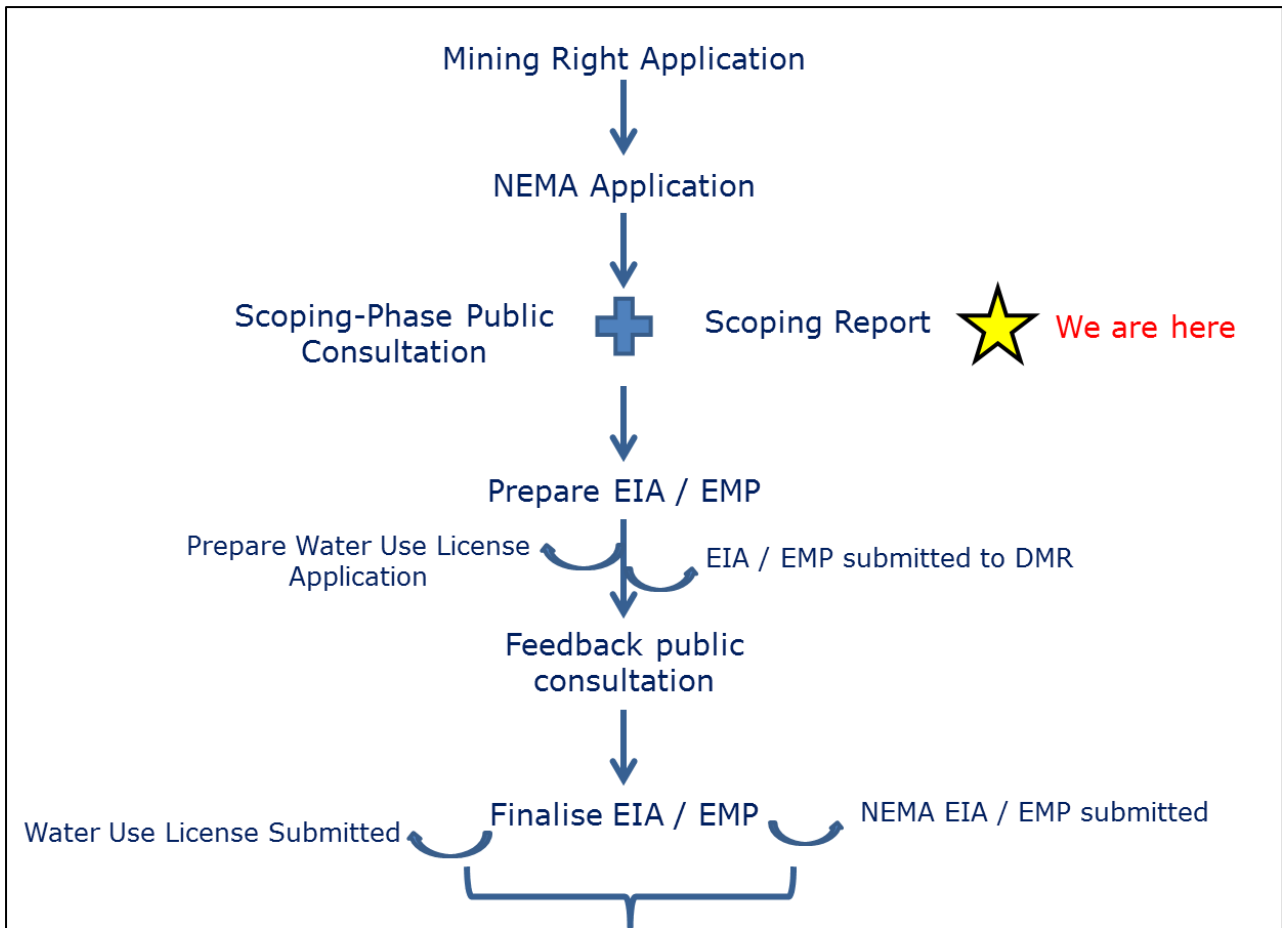
A description of the proposed development was provided by the client. The layout plan in this regard was imported into a Graphical Information System (GIS) where it was overlaid with layers from existing databases in terms of land use, geology, climatic data, topography, soils, vegetation types and sensitive areas.

The above data was then elaborated further with information from the public domain and internet resources as well as with data gathered for the adjoining Jagdlust Mine.

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

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

The process to be followed is outlined below:



3 DESCRIPTION OF THE PRE-OPERATION ENVIRONMENT

3.1 Introduction

This section serves to briefly summarise the baseline environmental information for the proposed Scheiding Chrome mine, both from desktop research and the available specialist studies conducted for mines located on adjacent farms and specialist studies conducted within the proposed project area. This section will also highlight any sensitive environments identified.

3.2 Climate

According to the hydrological assessment report, compiled by African Environmental Development, the closest meteorological gauging to the proposed project area is at Zebediela (B5E001) in quaternary catchment B51G, which is approximately 49.5 km east. The rainfall and evaporation data was obtained from the above mentioned Zebediela station. However, due to the distance of the station from the proposed project area, the rainfall curve was amended to reflect the true rainfall for the proposed project area. The average monthly rainfall for the proposed project area can be seen in Table 2 below.

Table 2: Average monthly rainfall for the proposed project area.

MONTH	RAINFALL (mm)
January	83.6
February	61.6
March	46.9
April	26.1
May	9.1
June	4.4
July	2.6
August	4.1
September	11.3
October	38.1
November	70.6
December	82.6
Total	441.0

The mean annual precipitation (MAP) at the proposed project area is 441 mm/a, which is significantly lower than the MAP of 569.83 mm average for quaternary catchment B52J, as a significant part of this catchment falls in the higher rainfall, mountainous regions to the north of the proposed project area (Figure 3).

The average A-class Pan evaporation rate at the Zebediela station (B5E001) is 2 530.8 mm/a. This value is slightly higher than the values recorded in Figure 4 (2 000 to 2 200 mm).

The following information was obtained from an EMP prepared for the adjoining Jagdlust Mine prepared by M2 Environmental Connections, which was obtained from the Polokwane weather station. The climate of the area is semi-arid and rain tends to fall in summer and early winter.

The average annual minimum and maximum daily temperatures for the area are approximately 12°C and 28°C. The average daily temperature is approximately 20°C. Average daily maximum temperatures may exceed 30°C from September to March. Average daily minimum temperatures of less than 10°C may occur from May to September.

The predominant wind direction is east-north-east (16%) with lesser wind components from the north-east (10%) and south-south-east (8.5%). Wind speeds are generally slow to moderate, although wind speeds exceeding 6 m/s have been recorded. Wind speeds of less than 1 m/s, which are designated as calm, occur infrequently (7.30 % of the time).

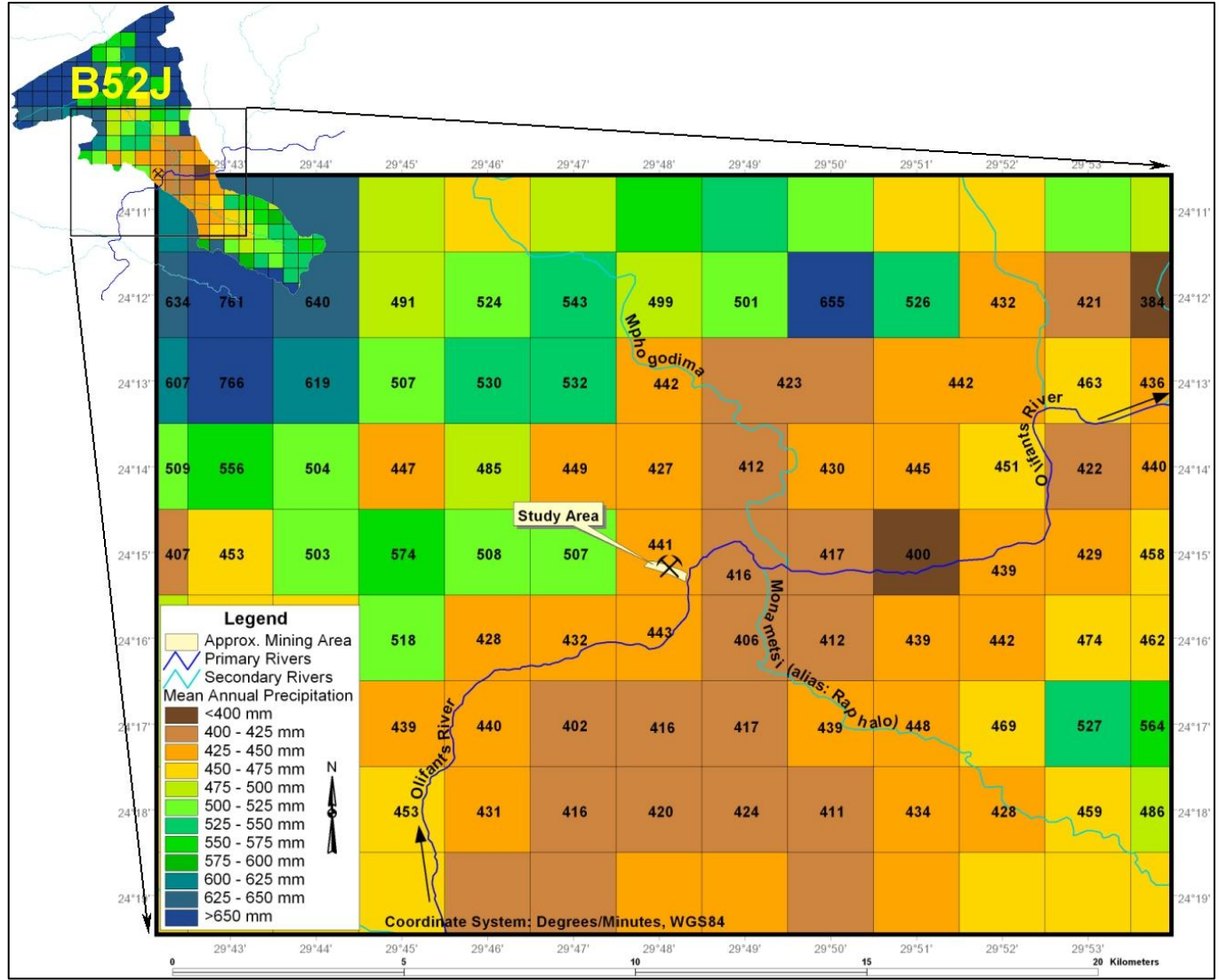


Figure 3: The mean annual precipitation for the areas surrounding the proposed project area.

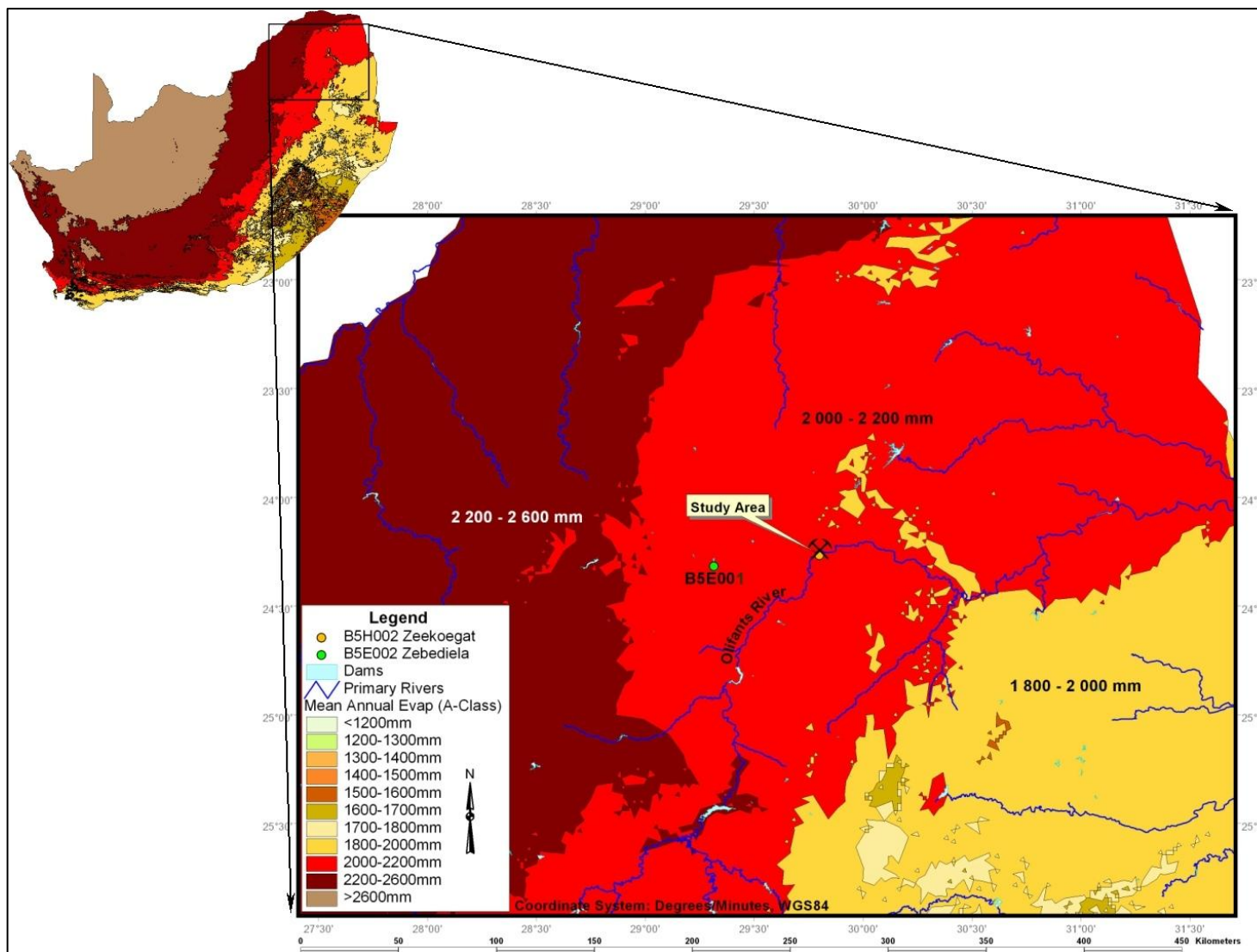


Figure 4: The average A-Class Pan evaporation rate for the areas surrounding the proposed project area.

3.3 Topography

Portion 2 of the Farm Scheiding 407 KS is situated in an area characterised by rugged mountains and broad flat-bottomed valleys. There is a downward slope across the proposed project from west to east. The elevation on the western portion of the proposed project area is approximately 1038 mamsl and the elevation at the banks of the Olifants River at the eastern portion of the proposed project area is approximately 729 mamsl. The area where the proposed mining activities will be located is relatively flat with a gentle undulating topography. The proposed mining activities will therefore be visible from the paved road bisecting the proposed project area as well as from the R37. The topographical map below (Figure 5) shows the location of the project area in relation to the Olifants River, the surrounding mountains and the main transportation routes in the area.

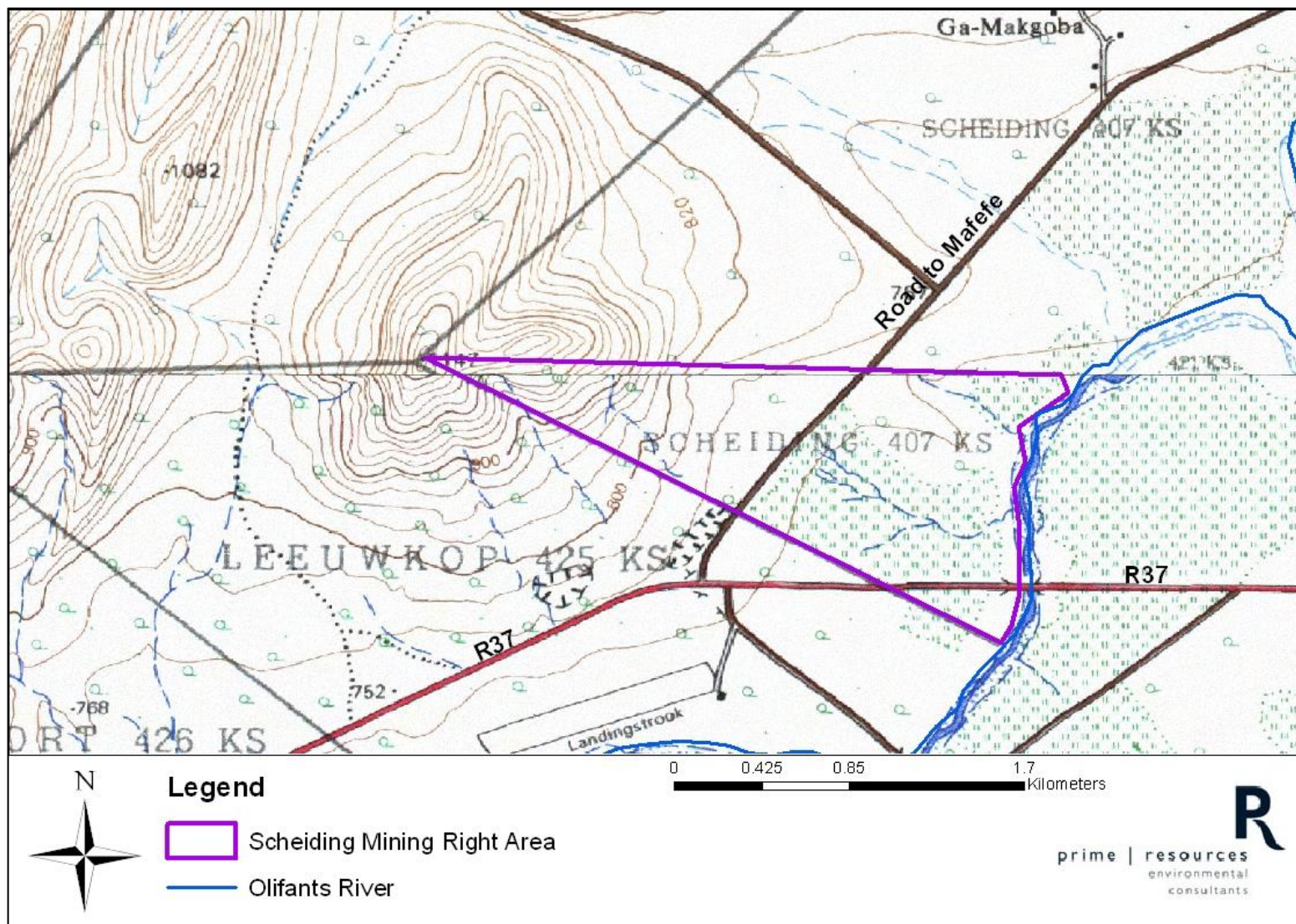


Figure 5: Topographical map of the proposed project area.

3.4 Geology

3.4.1 Regional Geology

The chromitite resources in South Africa are situated within the Bushveld Complex (BC), which is an enormous saucer-like ultramafic/mafic intrusion extending for about 400 km from east to west and roughly the same distance north and south.

The ultramafic/mafic rocks of the BC are collectively known as the Rustenburg Layered Suite (RLS) and have been subdivided, from base to top, into five zones, known as the Marginal, Lower, Critical, Main and Upper Zones. The general sequence and composition of the different zones are shown in Figure 6. The continuity of the Critical Zone is intermediate between that of the Lower Zone and Main-Upper Zones. The Critical Zone is the host to all chromium and Platinum Group Metals (PGM) mineralisation within the BC.

The chromitite seams have been classified into lower, middle and upper groups, with the Lower Group occurring in the Lower Critical Zone and the Upper Group in the Upper Critical Zone. The Middle Group chromitite seams straddle the boundary between lower and upper divisions of the Critical Zone. The chromitite seams are named according to their location within the layered succession, with numbers commencing from the bottom up, with the lowermost group being named LG1, followed by LG2, LG3, etc. in the Lower Group (consisting of 7 layers), progressing to MG0, MG1, MG2, etc. (consisting of 4 layers) in the Middle Group, and then on two layers in the Upper Group, UG1 and UG2. The thickness of these chromitite layers ranges from several millimetres to several metres and these chromitite layers may comprise multiple, composite layers of chromitite separated by interlaminated silicate rocks. The thickest chromitite layers are the LG6 and MG1, which are mined for their chromite content. The target area of the proposed Scheiding Chrome Mine is underlain by rocks of the Lower Critical Zone and Upper Critical Zone of the BC, consisting of chromitite interlayered with pyroxenite, norite, anorthositic norite, and mottled anorthosite (Figure 7).

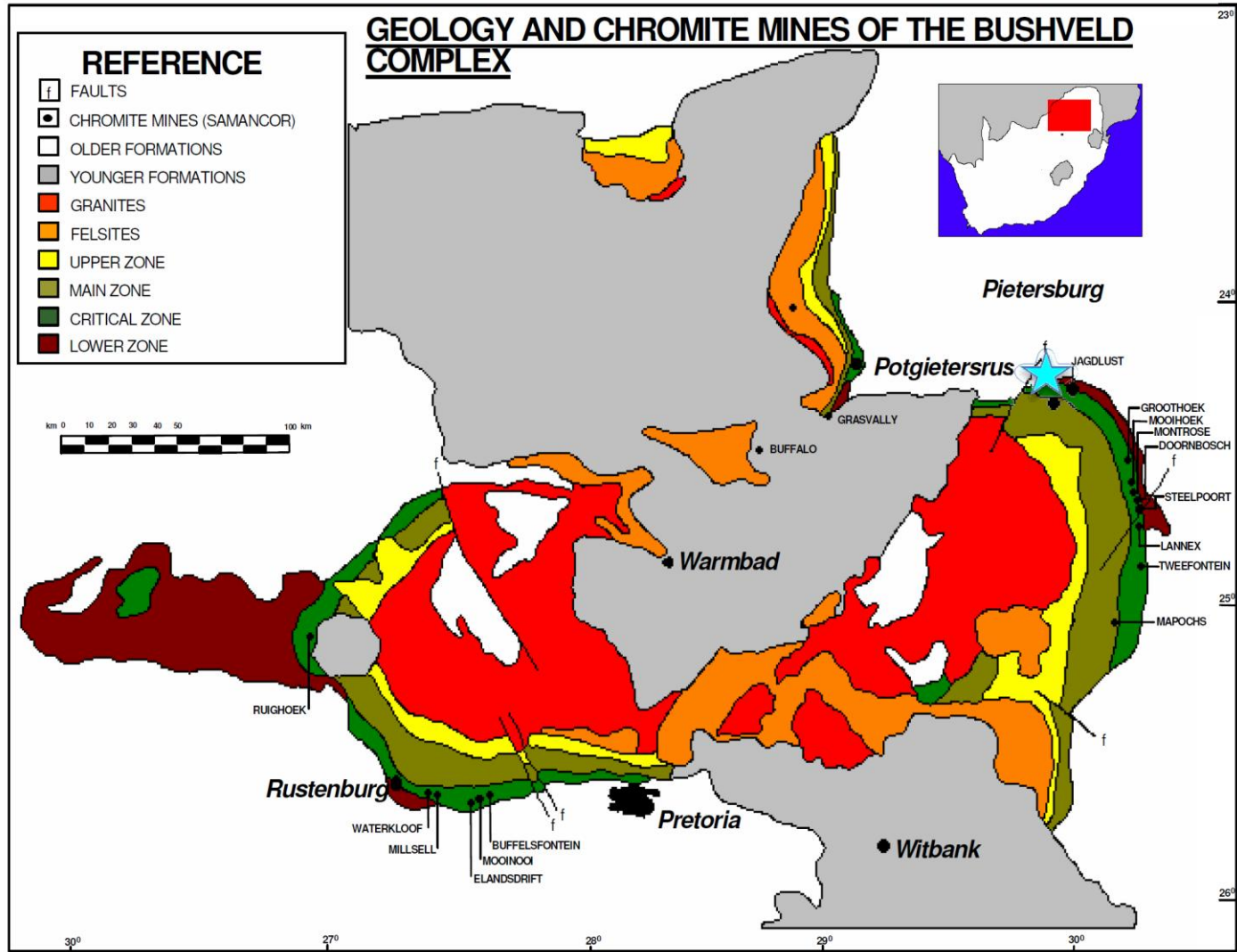


Figure 6: Regional geological map indicating the Jagdlust Sector and Scheiding 407 KS.

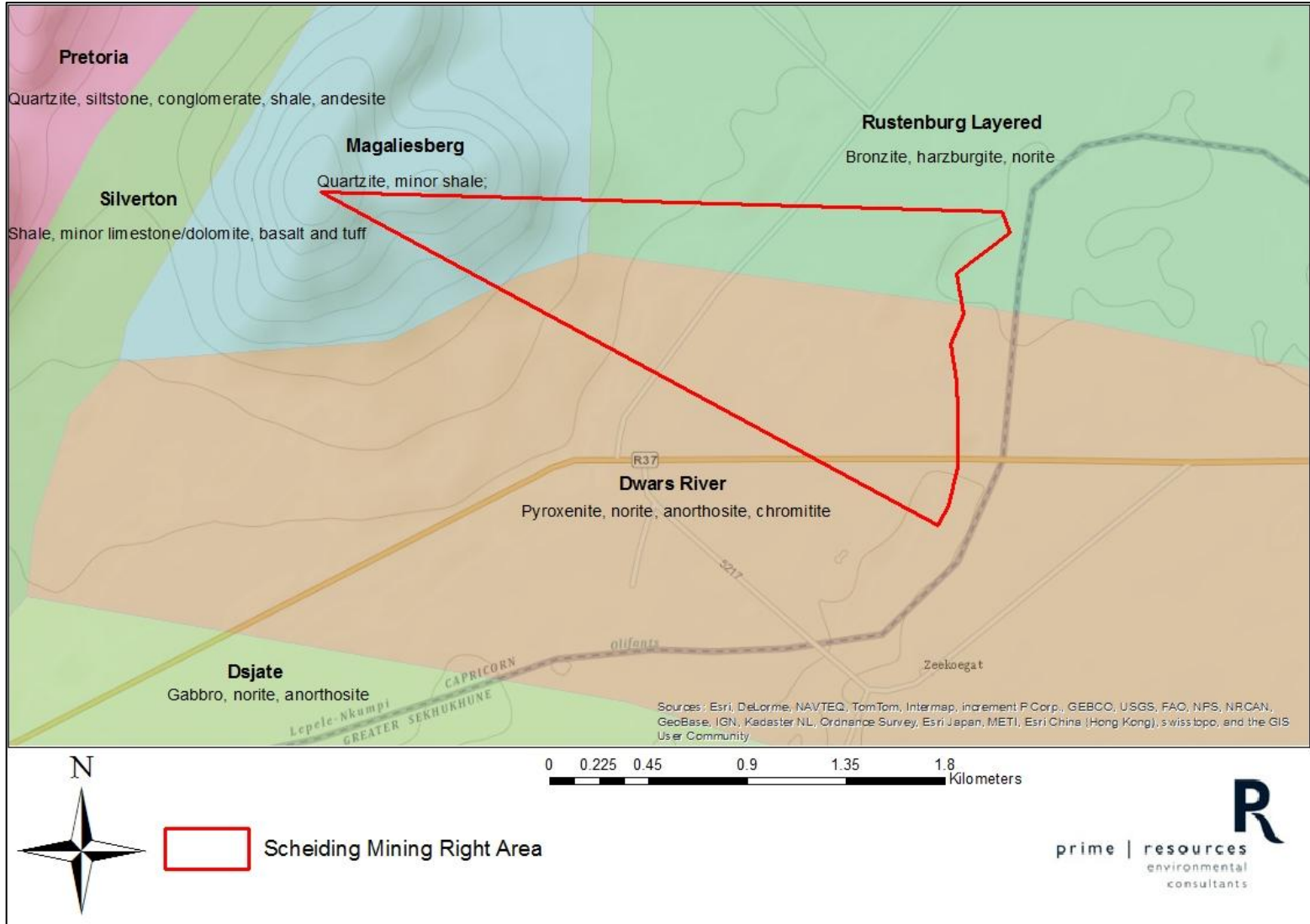


Figure 7: Geology of the target area of this application.

3.4.2 Local Geology

The Rustenburg Layered Suite is well exposed in the Jagdlust Sector and displays a prominent LG1-LG7 chromitite sequence. These chromitite seams are hosted in the ruighoek pyroxenite. The LG6 chromitite layer can be traced north west – south east across the farm Scheiding 407 KS and dips on outcrop to the south – south - east at 30 to 38 degrees, with steeper dips at the north west end of the farm. From outcrop and diamond drilling results, measurements show the thickness of the LG6 seam to vary in thickness from 1.10 meters to about 1.5 m. The LG6A chromitite layer averages 0.29 m in thickness and occurs about 1.5 m above the LG6 seam. The LG6A seam, the middling pyroxenite and the LG6 seam forms the LG6 Package, and is the target of mining on Scheiding 407 KS, Portion 2.

There are various faults on the property with the largest being the Wonderkop Fault, which cuts the critical zone off from the BC, this is to the north western boundary of the farm. From the LG5 chromitite layer upwards, Lower Group rocks consist of pyroxenite and chromitite layers. Of particular significance is the LG6 chromitite seam, which will be the target to be mined at Scheiding. The LG6 chromitite seam is separated from the LG6A and LG7 chromitite layers above by pyroxenite partings. The thicknesses of the different layers are summarised in Table 3 below.

Table 3: Scheiding stratigraphy

LAYER	MEAN THICKNESS (m)
LG7	0.25
Pyroxenite between LG6A and LG7	25.00
LG6A	0.29
Pyroxenite between LG6 and LG6A	1.70
LG6	1.47
Pyroxenite below LG6	5.80

The opencastable resource will consist of the mineable seams, LG6 and LG6A. The LG6 forms the principle seam of economic interest based on its chrome content and thickness, the LG6 consists of 0.19 million tons in situ to a mineable depth of 30 m below surface, with an average thickness of 1.39 m and a chrome grade of 41.55% Cr₂O₃. The LG6A is located 1.47 m above the LG6A in the stratigraphy and is thinner in thickness than the LG6. The LG6A consists of 0.03 million tons in situ to a mineable depth of 30 m below surface, with an average grade of 42.32% Cr₂O₃.

3.5 Soils and Land Capability

The following information was obtained from a specialist soil assessment undertaken by Strategic Environmental Focus in 2013 for the proposed project (attached as Appendix 3). Soil samples were collected for physical and chemical analysis. Two samples were taken at four sampling sites (Figure 8), one at 0-30 cm depths and the second at 30-60 cm depths, totalling eight samples. Physical parameters including soil type, texture (% clay), effective depth and soil colour (value and chroma) were assessed. The following chemical parameters were also assessed; pH, electrical

conductivity, sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), silver (Ag), aluminium (Al), arsenic (As), boron (B), barium (Ba), beryllium (Be), bismuth (Bi), cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), iron (Fe), lithium (Li), manganese (Mn), molybdenum (Mo), nickel (Ni), lead (Pb), sulphur (S), antimony (Sb), selenium (Se), silica (Si), tin (Sn), strontium (Sr), titanium (Ti), vanadium (V), tungsten (W), zinc (Zn), zirconium (Zr).

3.5.1 Soil Classification

The dominant soil types within the proposed project area comprised of well drained red apedal and yellow-brown apedal loamy sands. The soil forms were classified as Hutton (Hu) and Clovelly (Cv). The Hutton soil form dominated most of the proposed project area, with Clovelly soil forms identified towards the bank of the Olifants River. Two family types of Hutton soils were identified; Hu 2200 Suurbekom (Hu1) and Hu 2100 Hayfield (Hu2) (Figure 8).

The Hu1 soil form is relatively deep (800 – 1000 mm), characterised by red loamy sands occurring on fairly flat land. The Hu2 soil form is shallow (200 – 300 mm), characterised by red loamy sands, underlain by consolidated rock material, occurring on convex crest and gently sloping hillslopes of a small hill. The soil surface for the Hu2 soil form has approximately 60-75% stone volume. The Cv soil form is relatively deep (800 – 1000 mm) and is characterised by yellow-brown loamy sands occurring on footslopes along the Olifants River.

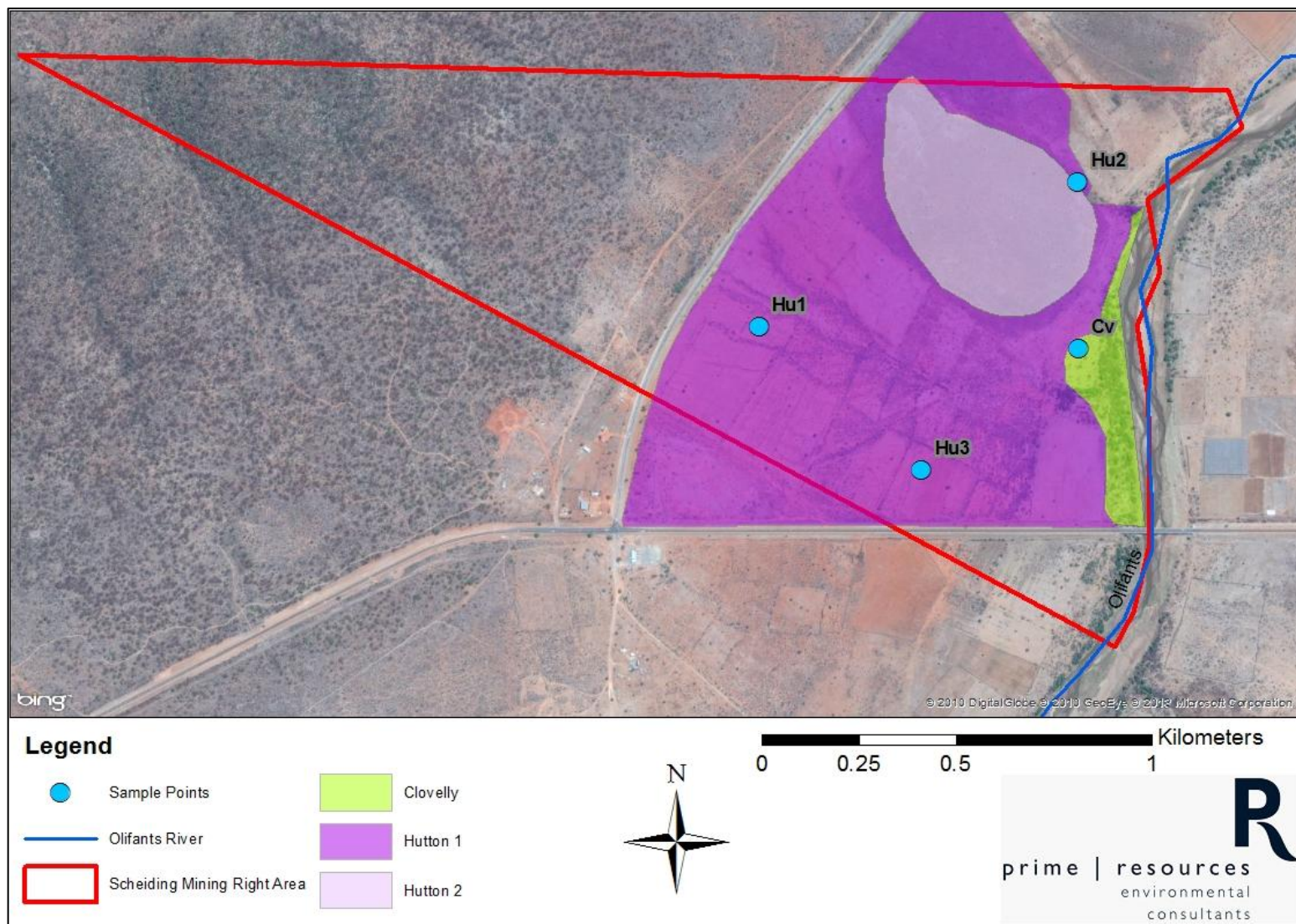


Figure 8: Soils within the proposed project area.

3.5.2 Soil Erosion Sensitivity

Both the Hutton and Clovelly soil forms have low-moderate erosion susceptibility, except around where these soils occur along the drainage lines and/or the river, where they are more prone to erosion (Figure 9).

3.5.3 Soil Fertility

The chemical soil analysis (refer to Appendix 2 for the detailed chemical analysis results) revealed that the soil pH of the sampled soils falls within the optimum range ($5.5 < \text{pH} < 7.5$) for most crops. The electrical conductivity of the soils sampled was in the range of 1.8 to 14.5, which is very low compared to the agricultural norm of 400 mS/m for saline soils. Therefore, the soils are considered to be non-saline.

From the analysis of macronutrients; carbon, hydrogen, oxygen, nitrogen, phosphorous and sulphur concentrations for most of the sampled soils were considered to be sodic as they contain high concentrations of sodium relative to the other exchangeable cations (calcium, magnesium and potassium), while the Exchangeable Sodium Percentage (ESP) is greater than 15% and/or the Sodium Adsorption Ratio (SAR) is greater than 13. This imbalance in base cations induces deflocculation (dispersion), which results in poor soil structure, which is susceptible to erosion during intense rainfall or irrigation cycles. The imbalance may be attributable to overgrazing and scarcity of stabilizing agents, particularly clay and organic matter. The analysis of the micronutrients; Al, Fe, Mn, B, Zn, Cu and Ni revealed that most of the soils had below-detection limit concentrations of most of the microelements, which may be attributed to overgrazing, as it reduces organic matter cycling.

3.5.4 Agricultural Potential

Deep Hu1 soils were classified as moderate agricultural potential soils, whereas the shallow Hu2 soil forms associated with the ridge on-site, as well as some Cv soils towards the bank of the Olifants River, exhibited low agricultural potential (Figure 10). Although the majority of the soils as well as the terrain within the proposed project area are suitable for agriculture, seasonal soil water availability is the most limiting factor to arable agriculture in this area. The agricultural potential was thus classified as moderate, primarily attributable to climatic constraints. Furthermore, shallow rooting depth, and high erosion risk further reduced the agricultural potential for Hu2 and some Cv soils, respectively.

As mentioned above the majority of the proposed project area is moderately suitable for agricultural land use, although management practices would require considerable improvement in order to sustain longevity of agricultural practices on the land. For instance, cultivation for crop production would require installation of an irrigation system to meet crop water demands and produce sustained crop yields. These soils are also well suited to other less intensive agricultural land uses such as cultivated pastures, natural grazing, and wildlife.

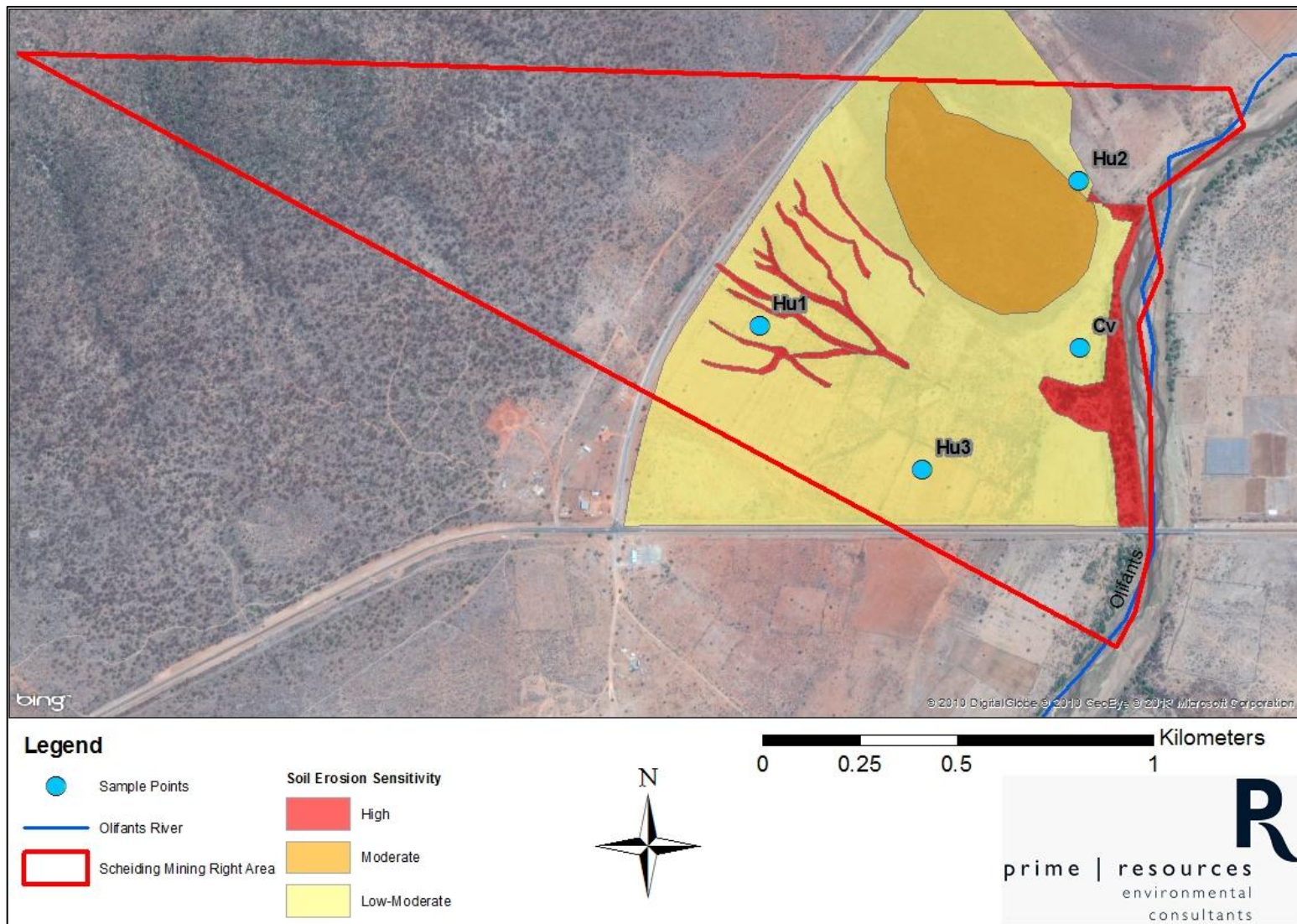


Figure 9: Erosion potential of the proposed project area.

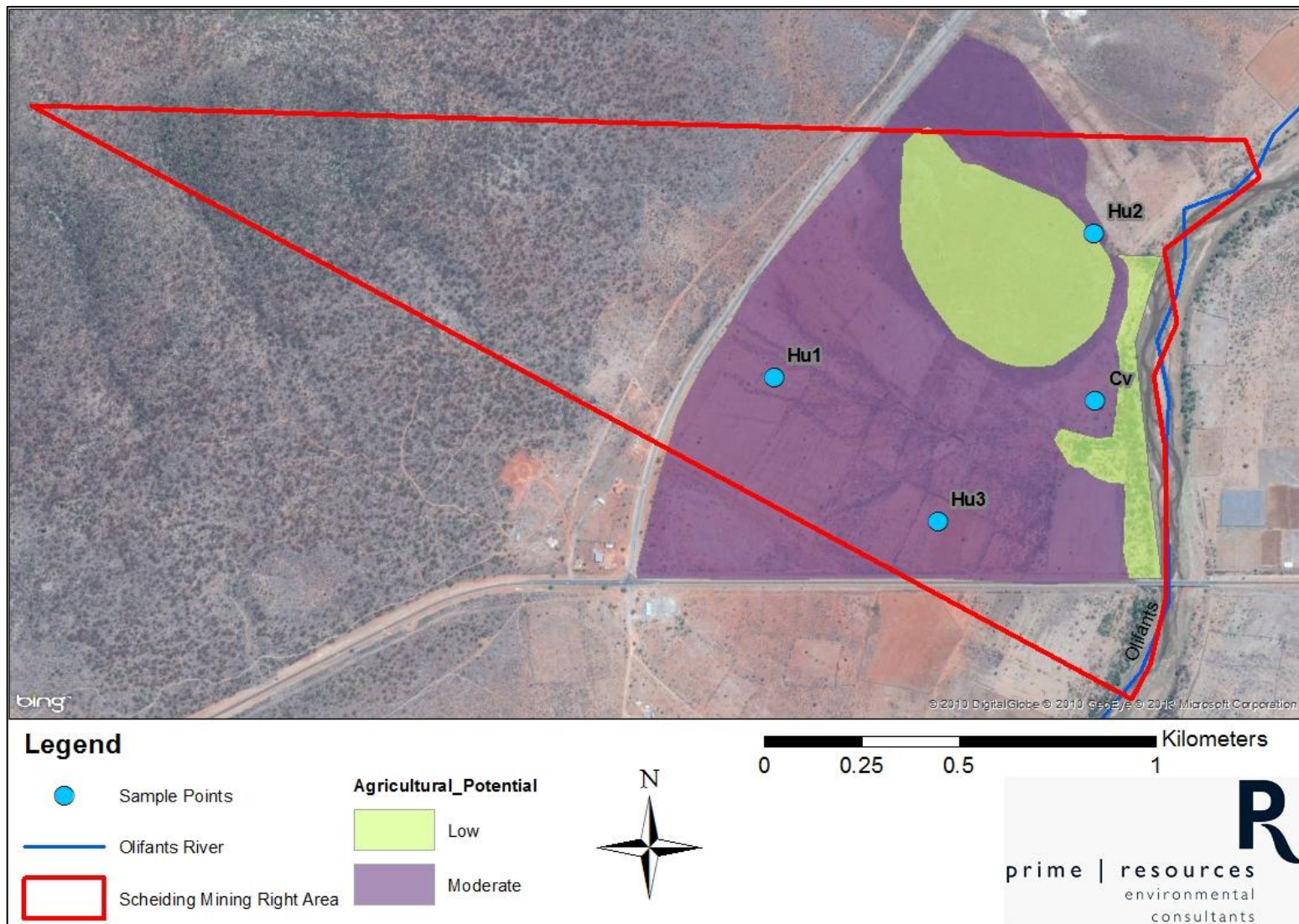


Figure 10: Agricultural potential of the proposed project area.

3.6 Land Cover and Land Use

The proposed project is located over the farm Scheiding 407, Portion 2 which is currently vacant, with no formal/defined land use. The land is state owned and under custodianship of the Mphahlele Tribal Authority. Three land claims have been lodged against the land in question by the Bakgaga Ba Mphahlele Tribe, the Ditlou Ntsong Tribe and the Mathabatha Community. The land surrounding the proposed project area is currently occupied by members of both the Mathabatha and Mphahlele communities.

The proposed project area is characterised by a mix of land uses. Sections thereof comprise natural land (refer to Photo 1) currently used for the grazing of livestock and subsistence farming (refer to Photo 2) by local residents. There is a paved road (to Mafefe) bisecting the proposed project area (refer to Photo 3) which joins the R37. It was also noted that a small informal building (refer to Photo 4) is currently under construction within the proposed project area (refer to Figure 11). Current land uses in the area surrounding the proposed project area include livestock grazing, subsistence farming, conservation and residential areas (Figure 11).



Photo 1: Proposed project area can be defined as natural land.



Photo 2: Subsistence farming within the proposed project area.



Photo 3: Paved road to Mafefe which bisects the proposed project area.



Photo 4: Small informal building being constructed within the proposed project area.

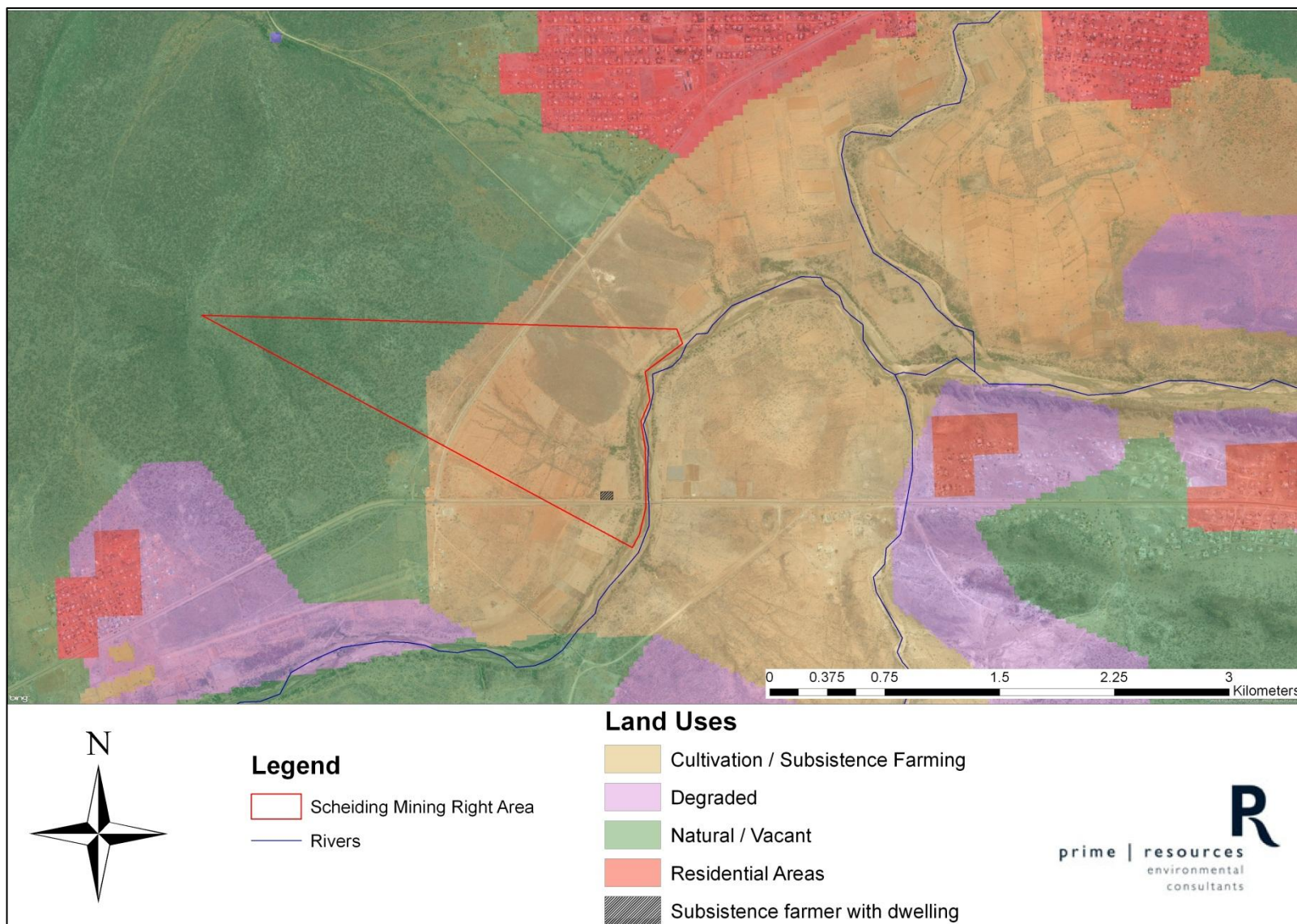


Figure 11: Land uses of the proposed project area and surroundings.

3.7 Terrestrial Ecology

A specialist ecological assessment was conducted by Strategic Environmental Focus in 2013 for the proposed project (attached as Appendix 4) from which the following baseline information was obtained.

3.7.1 Flora

According to the specialist ecological assessment conducted the proposed project area is situated within the Savanna Biome which is characterised by a grassy ground layer and a distinct upper layer of woody plants. Only one vegetation type, Sekhukhune Plains Bushveld (Figure 12) occurs in the proposed project area.

Sekhukhune Plains Bushveld consists mainly of semi-arid plains and open valleys between hills and small mountains running parallel to the escarpment. Important taxa in this vegetation type includes the nationally protected trees, *Acacia erioloba*, *Combretum imberbe* and *Philenoptera violacea* as well as smaller trees such as *Acacia mellifera* subsp. *detinens*, *A.nilotica*, *A.tortilis* subsp. *heteracantha*, *Commiphora glandulosa*, *Ptaeroxylon obliquum* and *Ziziphus mucronata*. The area is rich in succulent diversity and includes species such as *Euphorbia tirucalli*, *Aloe cryptopoda*, *Euphorbia enormis*, *Kleinia longiflora*, *Aloe castanea*, *A.globuligemma* while the grass layer includes species such as *Cenchrus ciliaris*, *Enneapogon cenchroides*, *Panicum maximum*, *Urochloa mosambicensis*, *Aristida adscensionis* and *Tragus berteronianus*. Erosion is widespread associated with this vegetation type and there is a high risk of donga formation while extensive infestation by alien species such as *Agave*, *Caesalpinia decapetala*, *Lantana camara*, *Melia azedarach* and various *Opuntia* species is present.

The proposed project area falls in the Sekhukhuneland centre of endemism. There are at least 30 endemic plant taxa in the Sekhukhuneland centre of endemism.

The proposed project area supports a variety of vegetation communities which included rocky outcrops, Acacia-dominated plains, and riparian areas and drainage lines.

Rocky outcrops

The rocky outcrops were present in the northern portion of the proposed project area and are heavily impacted on by long-term overgrazing causing dense *Acacia mellifera* stands. Succulent species including *Euphorbia shinzii*, *Euphorbia enormis*, *Huernia sp.*, *Aloe cryptopoda* and *Kleinia longiflora* were identified within the rocky outcrops. Small trees and shrubs associated with the rocky outcrops included *Commiphora neglecta* (Green-stem Corkwood), *Hippocratea longipetiolata* (Bushveld Paddle-Pod), *Karomia speciosa* (Southern Chinese Hats) and *Ptaerocylon obliquum* (Sneezewood). *Adenia fruticosa* (Sekhukhune Greenstem; currently listed as Declining) was also recorded. No grass species were identified within the rocky outcrops at the time of the survey.

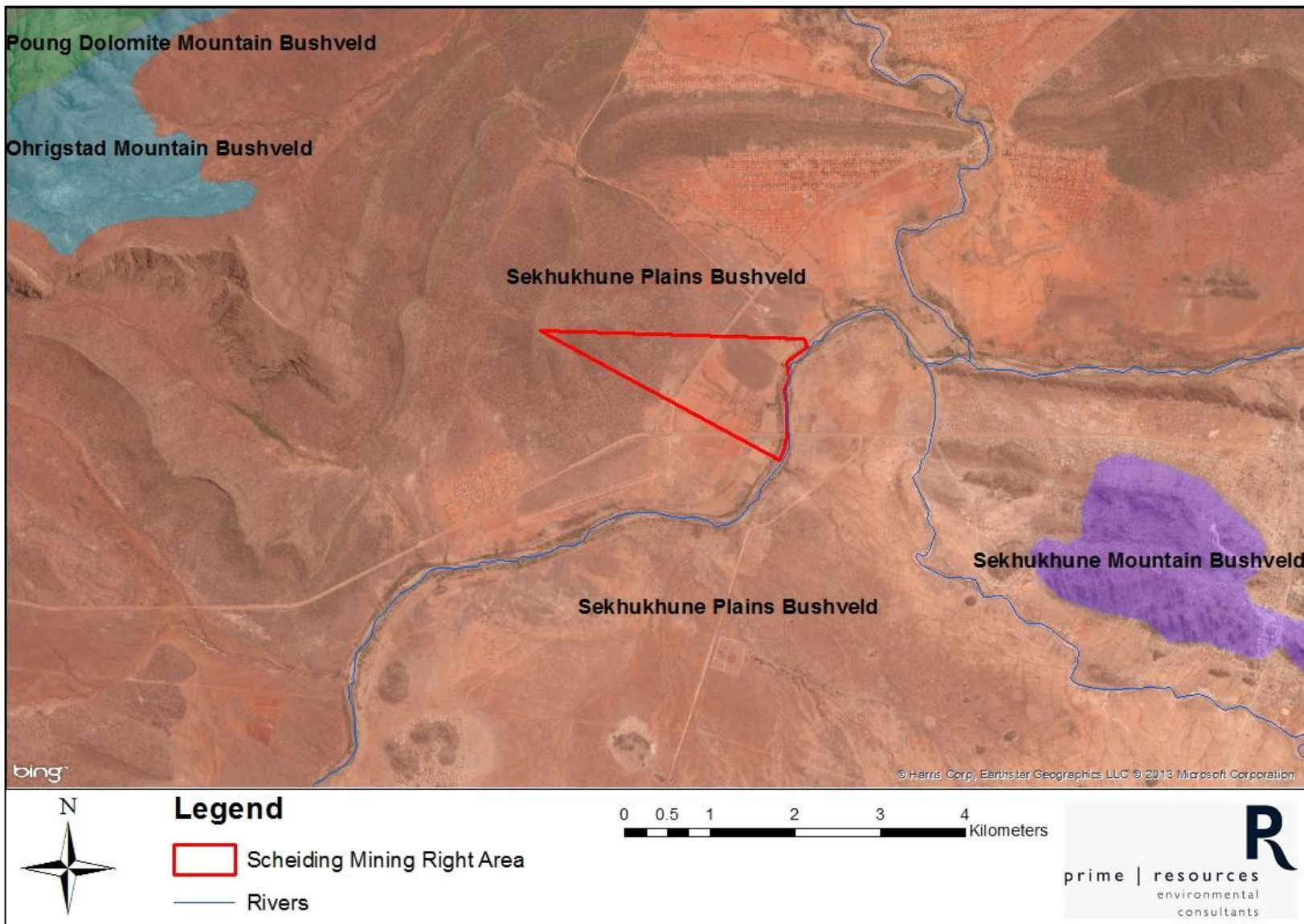


Figure 12: Vegetation type within the proposed project area.

Acacia-dominated plains

The Acacia-dominated plains were also impacted on by long-term overgrazing and dominated by various Acacia species. *Dichrostachys cinerea* (Sickle Bush) were recorded throughout the remainder of the area. Two Nationally Protected tree species namely, *Sclerocarya birrea* (Marula) and *Balanites maughamii* (Green Thorn) were recorded within this area. One species of conservation concern, *Crinum stuhlmannii* (Orange River Lily) as well as one provincially protected species, *Stapelia sp.*, were also recorded in the Acacia-dominated plains. Grass species recorded included *Eragrostis superba* (Sawtoot Love Grass), *Brachiaria brizantha* (Common Signal Grass), *Digitaria velutina* (Long-plumed Finger Grass) and the introduced species, *Bromus catharticus* (Rescue Grass).

Riparian areas and drainage lines

Small drainage lines were identified to the south of the rocky outcrops towards the centre of the proposed project area. The areas in the vicinity of the drainage lines were also disturbed and the area supported similar species as those identified in the Acacia-dominated plains. *Additional species recorded in the drainage lines included Spirostachys africana (Tamboti), Berchemia zeyheri (Red Ivory) and large populations of Crinum stuhlmannii (Orange River Lily), which is currently listed as Declining. The riparian vegetation along the banks of the Olifants River included species such as Croton megalobotrys (Giant Fever Berry), Acacia robusta (Robust Thorn), Pavetta zeyheri (Grey-leaved Bride's Bush), Combretum erythrophyllum as well as Phragmites australis (Common Reed) and Persicaria sp. within the river itself.*

In addition to long-term overgrazing the indigenous vegetation within the proposed project area has also been impacted upon by the harvesting of plants for fuel and medicinal purposes as well as by fires.

Plants of conservation concern

A minimum of ten plant species of conservation concern could occur within the proposed project area. These species including habitat requirements and likelihood of occurrence in the proposed project area is listed in Table 4. Two species were confirmed during the survey namely *Adenia fruticosa* and *Crinum stuhlmannii*.

Table 4: Plant species of conservation concern which may occur within the proposed project area

SPECIES	CONSERVATION STATUS	LIKELIHOOD OF OCCURRENCE
<i>Adenia fruticosa</i>	Near threatened	Confirmed
<i>Aneilema longirrhizum</i>	Near threatened	Highly likely
<i>Asparagus sekhukhuniensis</i>	Endangered	Unlikely
<i>Boophone disticha</i>	Declining	Unlikely
<i>Crinum stuhlmannii</i>	Declining	Confirmed
<i>Euphorbia sekhukhuniensis</i>	Rare	Highly unlikely
<i>Lydenburgia cassinoides</i>	Near threatened	Unlikely
<i>Plectranthus porcatus</i>	Vulnerable	Highly unlikely
<i>Plectranthus venterii</i>	Rare	Highly unlikely

SPECIES	CONSERVATION STATUS	LIKELIHOOD OF OCCURRENCE
<i>Searsia sekhukhuniensis</i>	Rare	Likely

Provincially protected plant species

Five species that were identified within the proposed project area during the assessment are not threatened, but are protected under Schedule 11 of the Limpopo Environmental Management Act (Act No.7 of 2003). These are summarized in Table 5.

Table 5: Provincially protected plants recorded in the proposed project area

SPECIES	PROTECTION LEVEL	OCCURRENCE WITHIN PROPOSED PROJECT AREA
<i>Aloe cryptopoda (A.wickensii)</i>	Species	Confirmed (rocky areas)
<i>Huernia spp.</i>	Genus	Confirmed (rocky areas)
Orchidaceae	Genus	Confirmed (<i>Eulophia sp.</i> in the rocky areas)
<i>Spirostachys africana</i>	Species	Confirmed (drainage lines)
<i>Stapelia spp.</i>	Genus	Confirmed (low laying areas)

Nationally protected tree species

Two protected tree species, in terms of the National Forest Act, 1998 (No. 84 of 1998), *Sclerocarya birrea* (Marula) and *Balanites maughamii* (Green Thorn) were confirmed in the proposed project area while suitable habitat exists for at least another two species, *Combretum imberbe* (Leadwood) and *Philenoptera violaceae* (Apple Leaf).

Alien invasive species

Alien species in the proposed project area were largely confined to the riparian areas associated with the Olifants River and included species such as *Lantana camara* (Wild Lantana), *Datur stramonium* (Thorn Apple), *Ricinus communis* (Castor Oil) and *Canthium strumarium* (Large Cocklbur). Small numbers of *Agave sisalana* (Sisal) and *Opuntia ficus-indica* (Prickly Pear) were also recorded in the *Acacia* dominated plains.

Medicinal plants

As mentioned above, there is evidence that the indigenous vegetation within the proposed project area has been impacted upon through the harvesting of medicinal plants by the local resident. Eight medicinal plant species were identified within the proposed project area. These are listed in Table 6 below.

Table 6: Medicinal plants identified within the proposed project area.

SPECIES	CONSERVATION STATUS
<i>Acacia karroo</i> (Sweet Thorn)	None
<i>Adenia fruticosa</i> (Sekhukhune Green Stem)	Near threatened
<i>Asparagus spp.</i> (Wild Asparagus)	None
<i>Balanites maughamii</i> subsp. <i>Maughamii</i> (Green Thorn)	Nationally protected
<i>Crinum stuhlmannii</i> (Orange River Lily)	Declining
<i>Leonotis leonurus</i> (Wild Dagga)	None

SPECIES	CONSERVATION STATUS
<i>Sansevieria hyacinthoides</i> (Mother-in-law's tongue)	None
<i>Solanum lichtensteinii</i> (Grey Bitter Apple)	None

3.7.2 Fauna

Mammals

According to the specialist ecological baseline study conducted, the region displays a high diversity of mammals with approximately 117 species expected to occur within the Quarter Degree Square (QDS). Low mammal activity was, however, observed in the proposed project area with no burrows, holes or termite mounds recorded. This could be attributed to the small size of the proposed project area, high level of disturbance and close proximity of human settlements and roads. Only three mammal species were confirmed in the proposed project area during the field survey namely, *Chlorocebus pygerythrus* (Vervet Monkey), *Sylvicapra grimmia* (Common Duiker) and *Atilax paludinosus* (Water Mongoose). However, a further ten species are "Highly Likely" to occur in the proposed project area based on the presence of suitable habitat. These are listed in Table 7. None of the mammal species confirmed to be present or those that are highly likely to be present are of conservation concern (i.e. with a status higher than Least Concern).

Table 7: Mammal species which are highly likely to occur in the proposed project area.

SPECIES	CONSERVATION STATUS
<i>Acomys spinosissimus</i> (Spiny Mouse)	Least concern
<i>Aethomys ineptus</i> (Tete Veld Rat)	Least concern
<i>Canis mesomelas</i> (Black-backed Jackal)	Least concern
<i>Civettictis civetta</i> (African Civet)	Least concern
<i>Galago moholi</i> (Southern Lesser Galago)	Least concern
<i>Lepus saxatilis</i> (Scrub Hare)	Least concern
<i>Mus musculus</i> (House Mouse)	Least concern
<i>Neoromicia capensis</i> (Cape Serotine)	Least concern
<i>Neoromicia zuluensis</i> (Zulu Serotine)	Least concern
<i>Rattus rattus</i> (Black Rat)	Least concern

Avifauna

The area is high in avifaunal diversity with approximately 441 bird species expected to occur within the QDS. During the field survey, 40 bird species were confirmed to occur within the proposed project area including the riparian area associated with the Olifants River. No bird species of conservation concern were recorded at the time of the survey, although at least six species of conservation concern are likely to use the proposed project area for foraging or nesting. These species are listed in Table 8.

Table 8: Bird species of conservation concern which are likely to occur in the proposed project area.

SPECIES	CONSERVATION STATUS
<i>Vanellus albiceps</i> (White-crowned Lapwing)	Near threatened
<i>Aquila rapax</i> (Tawny Eagle)	Vulnerable

SPECIES	CONSERVATION STATUS
<i>Polemaetus bellicosus</i> (Martial Eagle)	Vulnerable
<i>Sagittarius serpentarius</i> (Secretary bird)	Vulnerable
<i>Falco biarmicus</i> (Lanner Falcon)	Near threatened
<i>Buphagus erythrorhynchus</i> (Red-billed Oxpecker)	Near threatened

Reptiles

Fourteen reptile species are expected to occur within the QDS, none of which are of conservation concern as their conservation status has not yet been evaluated. These species are listed in Table 9. Two reptile species, *Cordylus vandami* (Van Dam's Girdled Lizard) and *Trachylepis margaritifera* (Rainbow Skink) were confirmed in the rocky outcrops of the area of the study site during the field surveys. Suitable habitat does, however, exist within the proposed project area for many of the other species expected to occur.

Table 9: Reptile species which may occur in the proposed project area.

SPECIES	CONSERVATION STATUS	LIKELIHOOD OF OCCURRENCE
<i>Agama atra</i> (Southern Rock Agama)	Not evaluated	Highly likely
<i>Cordylus vittifer</i> (Common Girdled Lizard)	Not evaluated	Highly likely
<i>Heliobolus lugubris</i> (Bushveld Lizard)	Not evaluated	Highly likely
<i>Lygodactylus nigropunctatus</i> subsp. <i>igropunctatus</i> (Black-spotted Dwarf Gecko)	Not evaluated	Highly likely
<i>Nucras holubi</i> (Holub's Sandveld Lizard)	Not evaluated	Highly likely
<i>Pedioplanis lineocellata</i> subsp. <i>Lineocellata</i> (Spotted Sand Lizard)	Not evaluated	Likely
<i>Philothamnus semivariiegatus</i> (Spotted Bush Snake)	Not evaluated	Highly likely
<i>Platysaurus orientalis</i> subsp. <i>Fitzsimonsi</i> (FitzSimons' Flat Lizard)	Not evaluated	Likely
<i>Platysaurus orientalis</i> subsp. <i>orientalis</i> (Sekhukhune Flat Lizard)	Not evaluated	Likely
<i>Psammobates oculifer</i> (Serrated Tent Tortoise)	Not evaluated	Likely
<i>Smaug (Cordylus) vandami</i> (Van Dam's Girdled Lizard)	Not evaluated	Confirmed
<i>Trachylepis margaritifera</i> (Rainbow Skink)	Not evaluated	Confirmed
<i>Trachylepis varia</i> (Variable Skink)	Not evaluated	Highly likely
<i>Varanus albigularis</i> subsp. <i>albigularis</i> (Rock Monitor)	Not evaluated	Highly likely

Amphibians

There are eight amphibian species expected to occur within QDS, which are listed in Table 10. Although no amphibian species were recorded at the time of the survey, suitable habitat mostly associated with the Olifants River exists for all eight species, none of which are of conservation concern.

Table 10: Amphibian species which may occur in the proposed project area.

SPECIES	CONSERVATION STATUS	LIKELIHOOD OF OCCURRENCE
<i>Breviceps adspersus</i> subsp. <i>Adspersus</i> (Bushveld Rain Frog)	Least concern	Highly likely
<i>Amietophrynus garmani</i> (Eastern Olive Toad)	Least concern	Highly likely
<i>Amietophrynus gutturalis</i> (Guttural Toad)	Least concern	Highly likely
<i>Hyperolius marmoratus</i> (Painted Reed Frog)	Least concern	Highly likely

SPECIES	CONSERVATION STATUS	LIKELIHOOD OF OCCURRENCE
<i>Kassina senegalensis</i> (Bubbling Kassina)	Least concern	Unlikely
<i>Ptychadena anchietae</i> (Plain Grass Frog)	Least concern	Highly likely
<i>Tomopterna cryptotis</i> (Tremolo Sand Frog)	Least concern	Highly likely
<i>Tomopterna natalensis</i> (Natal Sand Frog)	Least concern	Highly likely

Invertebrates

Lepidoptera species have been recorded in Limpopo Province of which nine species are of conservation concern namely *Telchinia induna salmontana*, *Dingana clara*, *Dingana jerinae*, *Pseudonympha swanepoeli*, *Alaena margaritacea*, *Aloeides stenvensoni*, *Anthene juanita*, *Erikssonia acraeina*. Although these species may occur within the proposed project area, it is considered unlikely.

One Arachnid from the family Theraphosidae (baboon spiders) was confirmed in the proposed project area during the field survey. Members of the Theraphosidae are classified as Commercially Threatened in terms of the IUCN system and some genera are protected by Schedule 10 of the Limpopo Environmental Management Act. Although the genus could not be determined, based on the burrow found during the field survey, it is important to note that three genera, *Ceratogyrus* (Horned Baboon Spiders), *Harpactira* (Common Baboon Spider) and *Pterinochilus* (Golden Baboon Spiders) are also protected according to the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Threatened or Protected Species Regulations. Four genera in the Theraphosidae family namely *Ceratogyrus darlingi*, *Harpactira gigas*, *Idiothele nigrofulva* and *Pterinochilus lugardi* are also likely to occur in the proposed project area and the first three species mentioned are provincially or nationally protected.

3.7.3 Ecological sensitivity

The proposed project area has been impacted on by overgrazing and the close proximity of settlements and roads. Due to the disturbed nature of the proposed project area no areas containing pristine vegetation or areas supporting a high number of threatened or protected species were identified. Therefore, there are no areas of high sensitivity within the proposed project area.

The rocky outcrops are of medium-high sensitivity despite being disturbed through long-term overgrazing as they provided suitable habitat for a large number of succulent plant species including provincially protected species such as *Aloe cryptopoda* and *Huernia sp.* It is also likely that higher species diversity will be recorded in this area during the scheduled early summer season survey. The Acacia-dominated plains, including the small drainage lines, as well as the riparian vegetation along the banks of the Olifants River were marked as medium sensitivity. Areas of low ecological sensitivity in the proposed project area included areas which have been historically transformed through agriculture. Refer to Figure 13 for the ecological sensitivity of the area.

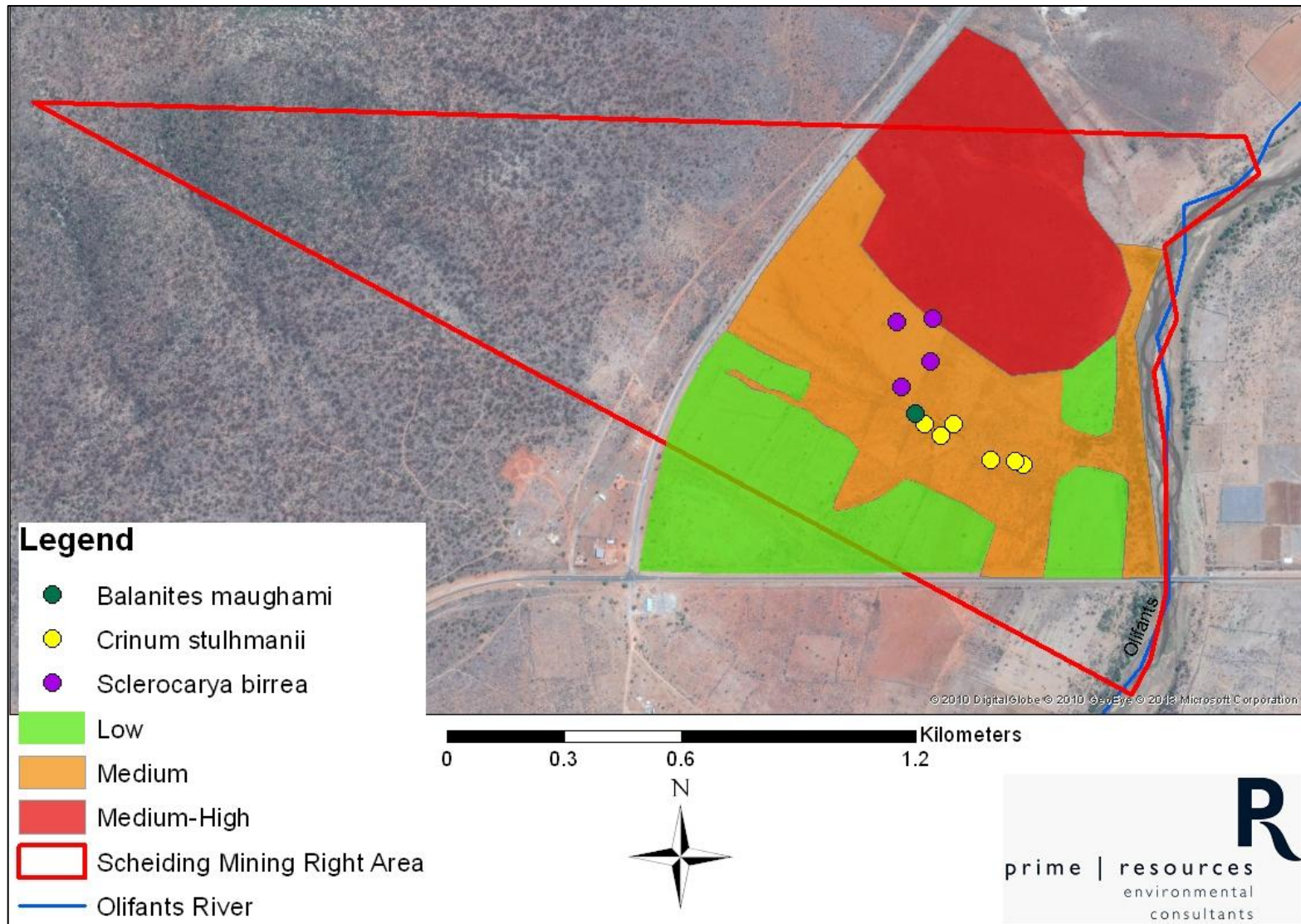


Figure 13: Ecological sensitivity of the proposed project area.

3.8 Surface Water

3.8.1 Catchment Description

According to a hydrological specialist study undertaken by African Environmental Development in 2013 for the proposed project (attached as Appendix 2) the only surface water resource associated with the project area is the Olifants River, which falls within the B52J quaternary catchment within the Olifants River Water Management Area (Figure 14). The Olifants River catchment is 32 434.92 km² and comprises of 59 quaternary catchments, grouped into four secondary catchments. The Olifants River forms the eastern boundary of the proposed project area. Quaternary catchment B52J has a mean annual rainfall of 569.83 mm but, due to the fact that a significant part of this catchment falls in the higher rainfall, mountainous regions to the north of the proposed project area, the rainfall at the proposed project area is much lower at 441 mm/a. The mean annual run-off for this catchment is 19.6 mm/a.

The flow of water in the Olifants River in the proximity of the proposed development cannot be accurately gauged or estimated on account of the presence of the several large upstream dams and the manner in which water is released from these into the river.

All surface water runoff from the proposed project area drains directly towards the Olifants River. All surface water off the LG6 reef outcrop and surrounding areas will reach the Olifants River within a distance of approximately 250 m either up or downstream from the point where the reef outcrop crosses the Olifants River. Presently the proposed project area is covered with relatively dense vegetation for an area with relatively little annual rainfall. This vegetation is presently adequate to prevent excessive erosion. Using the surface run-off value of 19.6 mm/a, it can be calculated that each hectare of the project surface would contribute a volume of 196 m³ per annum to the flow in the Olifants River.

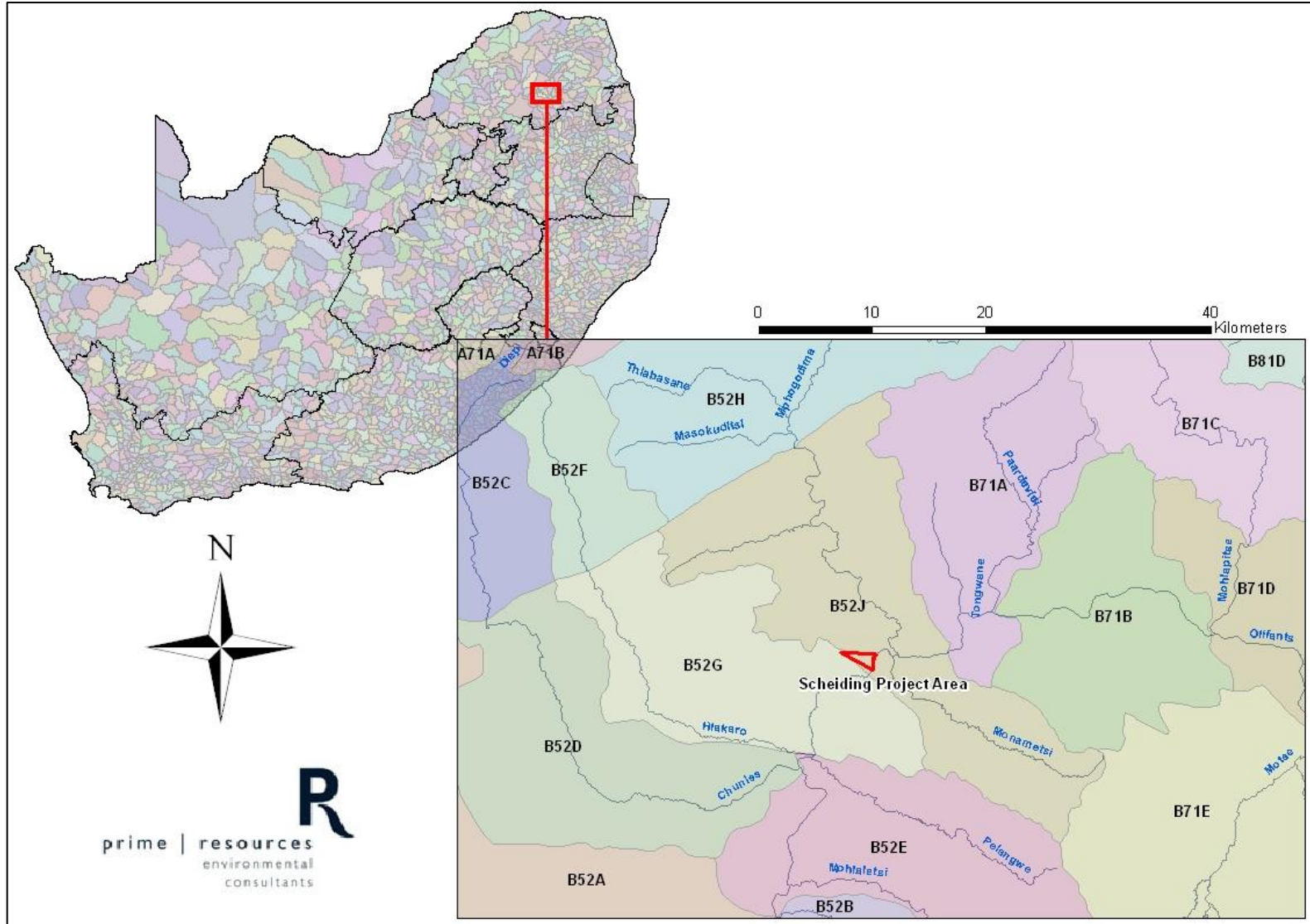


Figure 14: Quaternary catchments.

3.8.2 50- and 100- Year Flood Lines

In both cases (50- and 100-year flood models), storms with durations of 64 hours produced the highest discharge at the proposed project area. The discharges were 1 892.4 m³/s and 2 771.4 m³/s respectively for the 50- and 100-year floods.

According to a flood hydrology model, storms with durations of 64 hours produced the highest discharge at the proposed project area for both the 50- and 100-year flood models. A 50-year flood from a storm with a duration of 64 hours will produce a discharge of 1 892.4 m³/s, while the 100-year flood from a storm with the same duration will produce 2 771.4 m³/s. The 1:50 and 1:100 floodlines are represented in Figure 15.

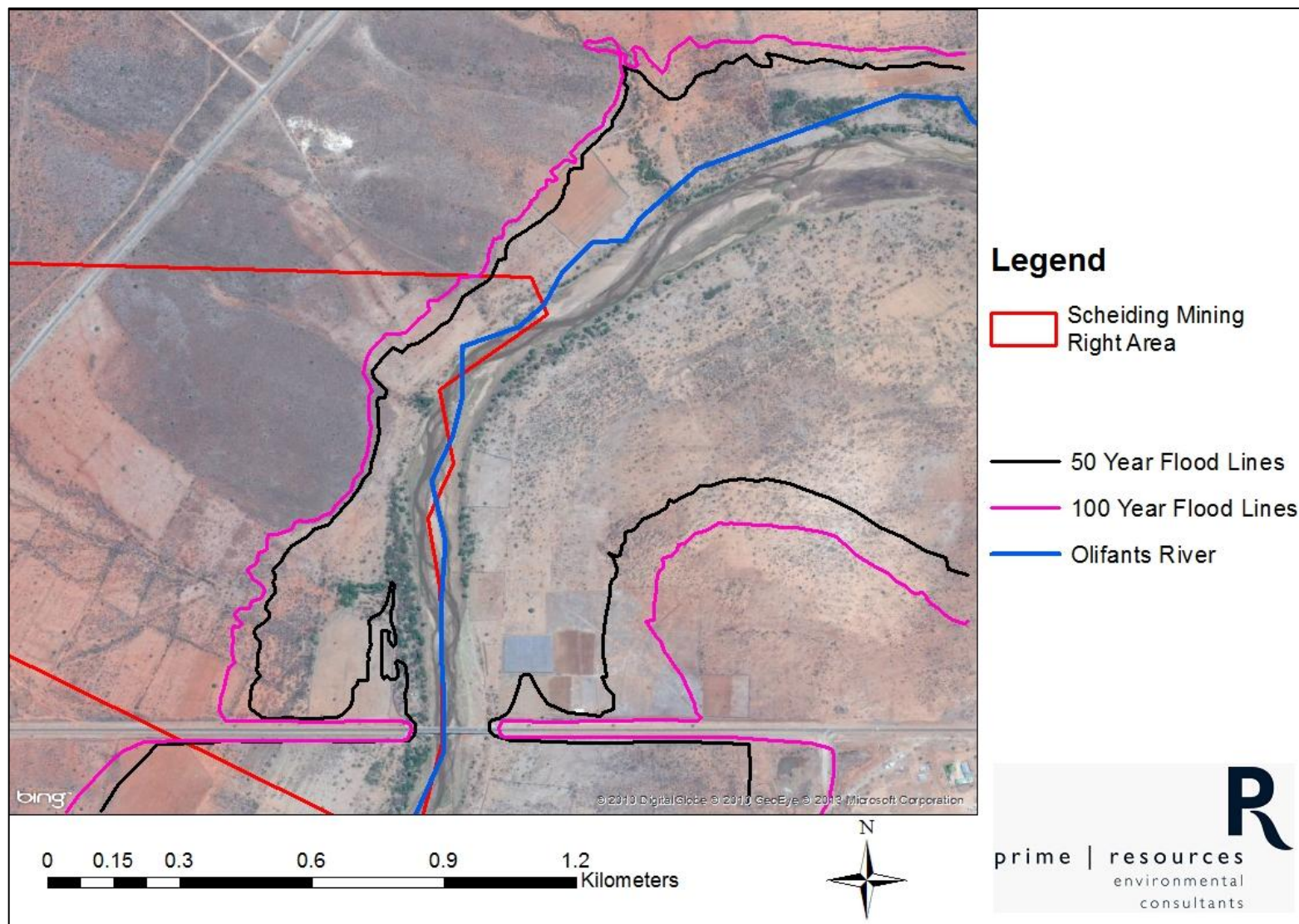


Figure 15: Olifants River floodlines.

3.8.3 Surface Water Quality

A single sample of the Olifants River was collected for the baseline water quality analysis as the water quality up and downstream from the proposed project area would likely be the same considering that there are presently no mining activities at the proposed project area. The sample was obtained upstream from the proposed project area, at the bridge where the R37 roadway passes over this river (refer to Figure 16). The results of the analysis were compared with the South African National Standard, SANS 241:2011 – Edition 1.0 (the official South African drinking water standard).

Table 11: Water quality baseline of the Olifants River near the proposed project area.

VARIABLE	UNIT	VALUE	SANS 241:2011 GUIDELINE VALUE	
			STANDARD LIMITS	RISK
Sodium	(mg/l)	82.0	≤200	Aesthetic
Potassium	(mg/l)	5.4	<50	(SANS 241;2006 Class I)
Calcium	(mg/l)	38.0	<150	(SANS 241;2006 Class I)
Magnesium	(mg/l)	26.0	<70	(SANS 241;2006 Class I)
Iron	(mg/l)	<0.1	0.3 and 2.0	Chronic Health: ≤2.0 Aesthetic: ≤0.3
Total Hardness	(mgCaCO ₃ /l)	202.0	≤11	
Sulphate	(mg/l)	67.0	250 and 500	Acute Health: ≤500 Aesthetic: ≤250
Manganese	(mg/l)	<0.1	0.1 and 0.5	Chronic Health: ≤0.5 Aesthetic: ≤0.1
Nitrate	(mgN/l)	0.6	≤11	Acute Health
Chloride	(mg/l)	86.0	≤300	Aesthetic
Total Alkalinity	(mgCaCO ₃ /l)	162.0		
Total Dissolved Solids	(mg/l)	507.0	≤1200	Aesthetic
pH	@25°C	8.2	≥5.0 - ≤9.7	Operational
Conductivity	(mS/m) @25°C	78.0	≤170	Aesthetic
Aluminium	(µg/l)	68.0	≤300	Operational
Antimony	(µg/l)	0.10	≤20	Chronic Health
Arsenic	(µg/l)	1.00	≤10	Chronic Health
Barium	(µg/l)	77.00		
Beryllium	(µg/l)	0.03		
Bismuth	(µg/l)	<0.1		
Cadmium	(µg/l)	0.02	≤3	Chronic Health
Chromium	(µg/l)	<0.1	≤50	Chronic Health
Cobalt	(µg/l)	1.80	≤500	Chronic Health
Copper	(µg/l)	5.50	≤2000	Chronic Health
Lanthanum	(µg/l)	0.01		
Lead	(µg/l)	0.07	≤10	Chronic Health

VARIABLE	UNIT	VALUE	SANS 241:2011 GUIDELINE VALUE	
			STANDARD LIMITS	RISK
Lithium	(µg/l)	3.80		
Mercury	(µg/l)	1.30	≤6	Chronic Health
Molybdenum	(µg/l)	2.00		
Nickel	(µg/l)	14.00	≤70	Chronic Health
Platinum	(µg/l)	<0.1		
Selenium	(µg/l)	0.76		
Tellurium	(µg/l)	<0.2		
Thallium	(µg/l)	0.16		
Tin	(µg/l)	0.49		
Titanium	(µg/l)	<0.3		
Vanadium	(µg/l)	6.00	≤200	Chronic Health
Zinc	(µg/l)	0.98	≤5000	Aesthetic
Uranium	(µg/l)	<0.1	≤15	Chronic Health

The water quality of the Olifants River sampled (Table 11) complied with all the SANS 241:2011 standards indicating that the water in the Olifants River near the proposed project area is of a high quality.

In terms of downstream water use there is an irrigation scheme 15 km downstream in the vicinity of the towns of Ebenhaeser, Moleke and Grootfontein. There are no functioning weirs in the Olifants River for approximately 51 km downstream from the proposed project area, which confirms that human water use is minimal. The first functioning weir is at the confluence of the Motse River with the Olifants River where a mine abstracts water for mining purposes.

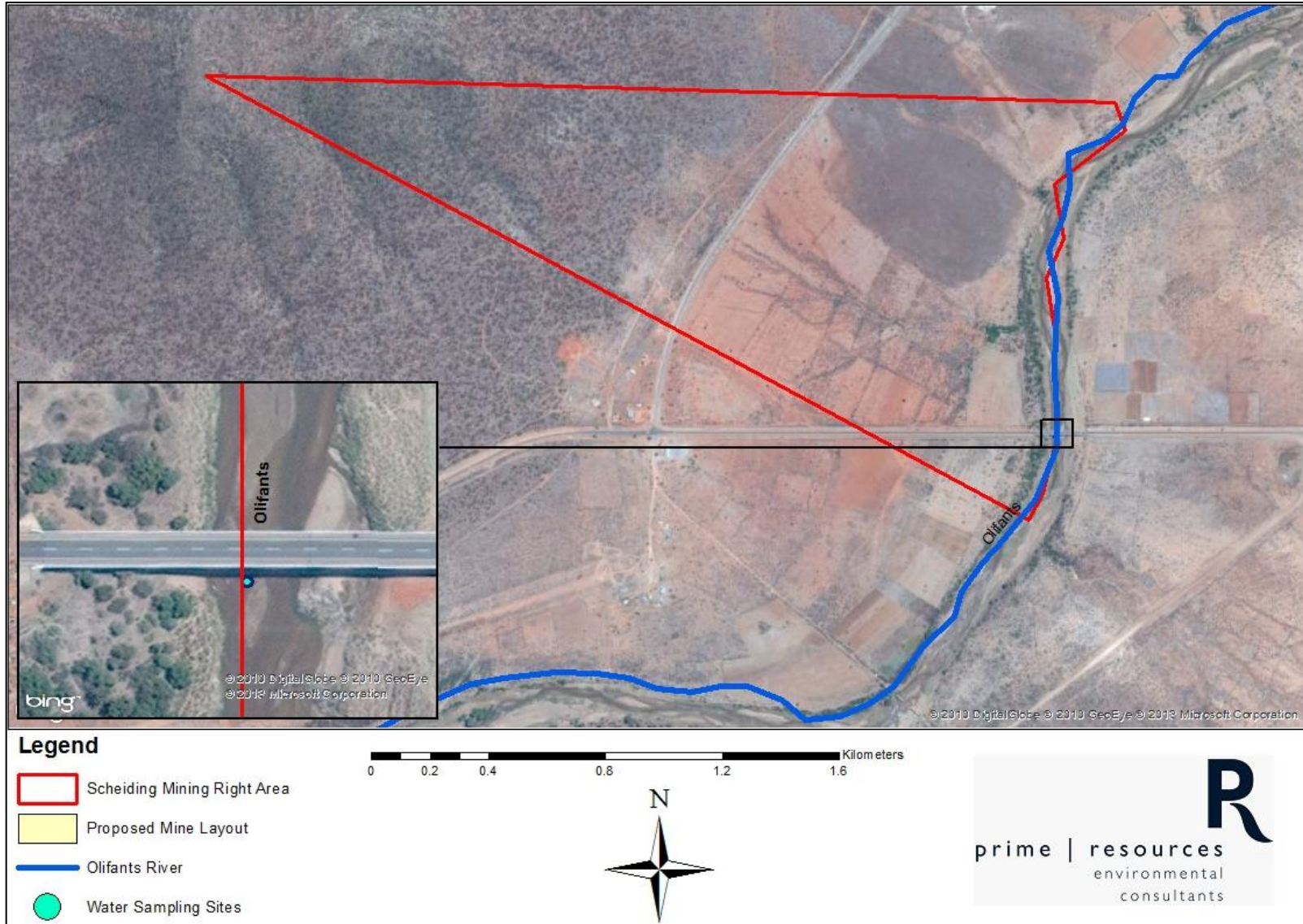


Figure 16: Water sampling point.

3.9 Wetlands

According to the SANBI GIS database, the only wetland within the proposed project area is the wetland associated with the riparian zone of the Olifants River. A wetland specialist assessment conducted by Strategic Environmental Focus in 2013 for the proposed project (attached as Appendix 5), however, identified that no wetland features are associated with the floodplain of the Olifants River within the proposed project area, with the floodplain instead being regarded as an alluvial floodplain. Considering the broader project area, no wetlands were identified.

3.10 Aquatic Ecology

A specialist aquatic ecology baseline study was undertaken by Strategic Environmental Focus in 2013 for the proposed project (attached as Appendix 6) during which a field survey was conducted. Three sampling sites were selected so as to identify any possible trends and existing impacts on the aquatic biota within the environment associated with the proposed operational area of the mine. Refer to Figure 17 for the location of the sampling sites.

3.10.1 Water Quality

The water quality was measured in situ at each of the three sampling sites. The results can be seen in Table 12 below. The water quality conditions at the three sampling sites were acceptable for most aquatic biota that occurs in natural South African freshwater systems.

Table 12: Water quality conditions at the three aquatic sampling sites.

SITE	TEMPERATURE (°C)	PH	ELECTRICAL CONDUCTIVITY (mS/m)	TOTAL DISSOLVED SOLIDS (mg/ℓ)	DISSOLVED OXYGEN (mg/ ℓ)	DISSOLVED OXYGEN (% sat)
Site 1	25.0	8.33	80.8	525	9.69	116.9
Site 2	30.3	8.42	79.3	515	9.02	122.1
Site 3	21.7	8.46	82.9	539	9.55	109.5

3.10.2 Aquatic Habitat

Using the Invertebrate Habitat Assessment System (IHAS) the habitat at each of the sampling sites was determined. Habitat values obtained at Site 1 (56) and Site 3 (58) reflected adequate or fair habitat conditions. All three biotopes (stones, vegetation and gravel, sand and mud (GSM)) were present at these two sites, with varying degrees of diversity and quality. Site 2 obtained a habitat value of 49 which reflected poor habitat conditions, with limited abundances and varieties of all three biotopes present.

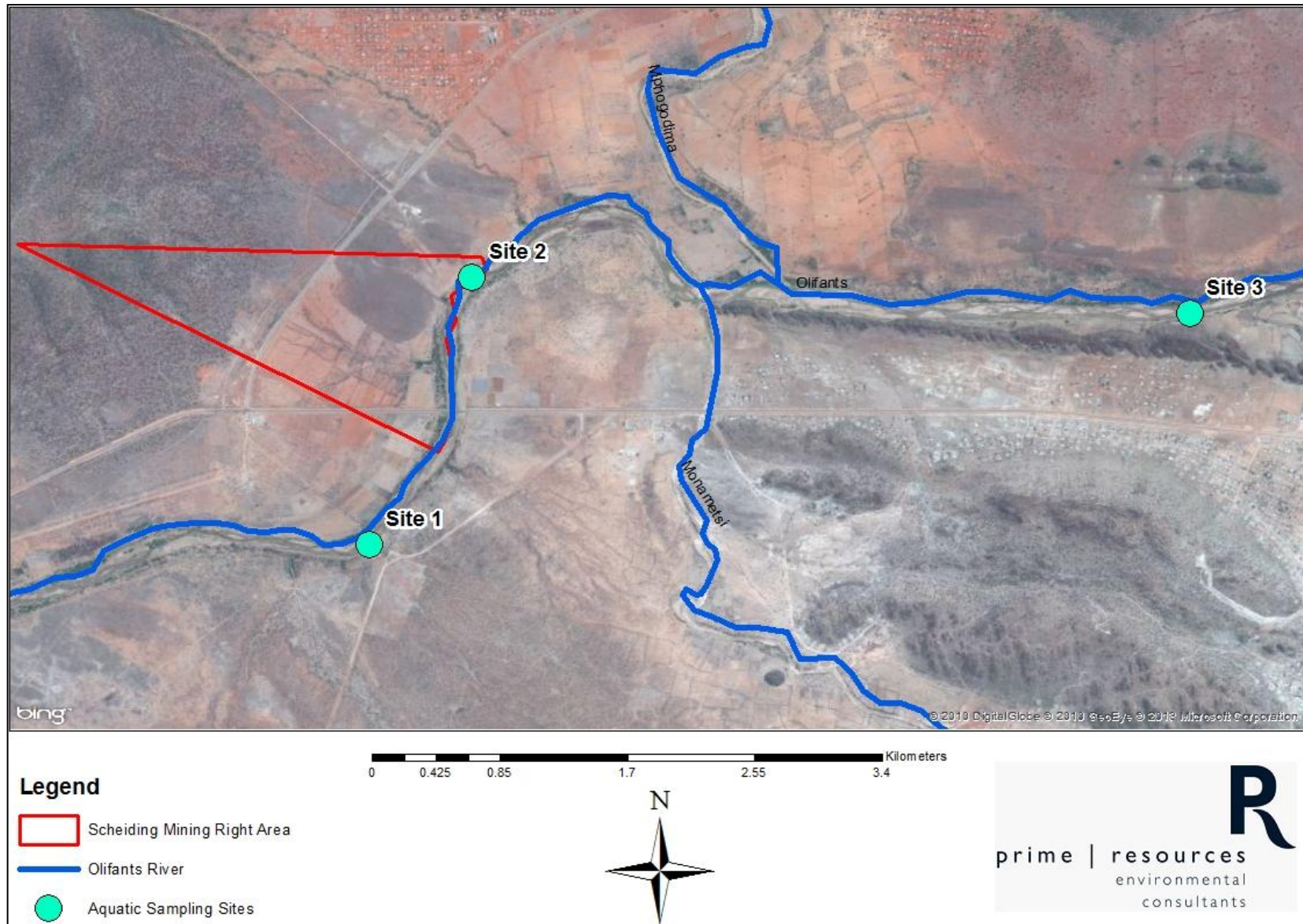


Figure 17: Aquatic sampling sites.

3.10.3 Macroinvertebrates

South African Scoring System 5 (SASS5) surveys were undertaken at each of the three sites and a total of 23 different aquatic macroinvertebrate taxa were collected, ranging between 13 and 18 taxa per site. The SASS Scores ranged between 54 and 96, whilst the associated Average Score per Taxon (ASPT) values ranged between 4.15 and 5.33. In addition, a number of taxa regarded as moderately and highly sensitive to water quality impairment were collected at several sites, including Aeshnidae (Hawker and Emerald Dragonflies), Atyidae (Freshwater Shrimps), Heptageniidae (Flatheaded Mayflies) and Leptophlebiidae (Prongills).

Based on the above results obtained from the SASS5 surveys used in the Macroinvertebrate Response Assessment Index (MIRAI) the Present Ecological Status (PES) of each of the sites, in terms of macroinvertebrates, was determined. Site 1 was defined to be in a fair to poor condition and largely to seriously modified from its natural state (PES Category D/E), whereby most intolerant species were observed to be absent and an extensive loss of basic ecosystem function has occurred. Site 2 and Site 3 showed slightly worsened ecological condition, and defined to be in a poor state (PES Category E).

This is further characterised as a seriously impaired system with few aquatic families present. However, the aquatic macroinvertebrate taxa sampled were regarded as resilient in nature and typical of lowland alluvial systems. The sites were characterised by the presence of dynamic alluvial beds and are often represented by a lower diversity of taxa.

3.10.4 Ichthyofauna

Based on current known localities, only approximately 38 fish species may occur within aquatic habitat associated with the proposed project area (a full species list is contained in Appendix 6). Two fish species of conservation concern were determined to have a high probability of occurrence within the Olifants River associated with the proposed project area, namely *Oreochromis mossambicus* (Mozambique Tilapia), currently listed as Near Threatened and *Marcusenius pongolensis* (Southern Bulldog), currently listed as Data Deficient. During the field survey a total of 13 species were identified to be associated with the proposed project area, among them one species of conservation concern, the Mozambique Tilapia.

The PES of the fish assemblage of the Olifants River within the proposed project area was determined using the above data and employing the Fish Response Assessment Index (FRAI). The Present Ecological State of the fish assemblage associated with the proposed project area is in a largely modified state (PES Category D) with a potential absence of several intolerable species (some species may, however, have been absent due to seasonal movement patterns).

3.11 Groundwater

The following baseline information was obtained from a study conducted by Future Flow in 2013 for the proposed project (attached as Appendix 7).

3.11.1 Aquifer Classification

Four aquifers occur in the area. These four aquifers are associated with the alluvial aquifer material, the underlying shallow weathered fractured rock material, the upper weathered fractured rock aquifer and the deeper, more competent, less weathered, fractured rock. These four aquifers are detailed in the paragraphs below.

Alluvial Aquifer

The alluvial aquifer is composed of unconsolidated layers of sand and silt deposits. The aquifer is unconfined and laterally discontinuous, localised within the immediate vicinity of the river banks and the floodplains, and therefore does not extend regionally throughout the total proposed project area. These aquifers are usually fairly high yielding due to their interaction with the surface water bodies, coupled with the relatively high storage capacity of the unconsolidated sediments. The interaction between the alluvial aquifer and the river depends on the differences between the surface water and groundwater levels and the presence or absence of an impervious streambed which would affect the hydraulic connection

Shallow Weathered Material Aquifer

The shallow aquifer forms due to the norite which weathers preferentially along bands of magnetite, bronzite and anorthosite to form a variably permeable, fractured and porous rock mass from surface to depths of 8 m. Groundwater collecting above the weathered material contact migrates down gradient along the contact to lower lying areas. The average thickness of the topsoil and weathered material is approximately 5 to 9 m. It is considered that effectively 1 to 3 % of the mean annual rainfall eventually reaches the groundwater table. Aquifer transmissivities are in the order of 0.8 to 1.5 m²/day.

Upper Weathered Fractured Rock Aquifer

The average thickness of the upper weathered zone is calculated to range between 11 and 20 m. Groundwater flows in the lower aquifer are associated with the secondary fracturing in the slightly weathered rock that was formed by the major north / south striking faulting seen from the geological maps and confirmed by the ground geophysical survey. Groundwater flows and contaminant transport will be along discrete pathways associated with the fractures. The general transmissivity of the upper fractured rock material is around 50 m²/ day as calculated from the aquifer tests performed on the groundwater boreholes. Aquifer testing completed on boreholes targeting the faulting that could act as preferential groundwater flow paths indicates transmissivities ranging between 65 and 110 m²/day.

Lower Fractured Rock Aquifer

The lower fractured rock aquifer is associated with the competent fractured rock below 25 m where there is little indication of weathering. Recharge is from the upper fractured rock aquifer through discrete fractures and faults. Transmissivities are considered to range between 0.1 to 0.8 m²/day. The average depth of this layer is expected to be approximately 80 m where the weight of the overlying rocks will close the fractures.

Aquifer test data indicated that the shallow weathered aquifer has a hydraulic conductivity ranging between 0.8 and 1.5 m²/ day and the general transmissivity of the upper fractured rock material is around 50 m²/ day. The transmissivities along faulting acting as preferential groundwater flow paths ranged between 65 and 110 m²/day. The lower fractured rock aquifer indicates a hydraulic conductivity of between 0.1 and 0.8 m²/day. Fractured and weathered zones within the aquifers have the capability to yield higher hydraulic conductivity making the groundwater flow unpredictable in specific zones and therefore the possibility of higher flow rates that might not have been encountered by drilling. In general the aquifers in this area have a low hydraulic conductivity.

3.11.2 Groundwater Level and Flow Patterns

The depth to groundwater level in all the boreholes that are accessible were measured during the 2013 hydrocensus (refer to Figure 18 for borehole positions). The depth to groundwater level generally ranged between 9 and 20 mbgl. The depth to groundwater level in the weathered material aquifer was approximately 19 mbgl (boreholes BH2, BH3 and P01), while the alluvial aquifer appears to have had an impact on P02, where the groundwater level was recorded as 9 mbgl. Groundwater level elevation versus topographical elevation for this area yields a 58.8 % correlation. Groundwater flows are expected to be directed from the high lying areas toward the topographical lows where the perennial and non-perennial streams occur (refer to Figure 18 for groundwater level and flow patterns).

3.11.3 Groundwater Use

Groundwater is not the sole source of water supply to the local landowners as the municipality supplies water services to the area. The groundwater usage in the area was recorded during the hydrocensus and is used mainly for domestic supply. From the available data it was calculated that approximately 2 285 litres of water is abstracted from the boreholes on a daily basis.

3.11.4 Groundwater Quality

A total of four groundwater quality samples were collected. Two were collected during the hydrocensus from the accessible boreholes, and another two during the drilling and aquifer testing of the two new monitoring boreholes. From Table 13 it can be seen that the regional groundwater quality in general is good with almost all elements within the SANS 241:2011 guidelines. The elements identified in concentrations exceeding the guidelines were chloride and nitrate.

Two water types exist in the area where the study was conducted. Samples from boreholes P01, P02 and BH2 are representative of recently recharged and shallow groundwater with its chemical character attributed to silicate mineral weathering processes associated with the Bushveld Complex. BH1 has slightly different groundwater chemistry than the remaining three boreholes, it is more chloride dominant which displays higher mineralisation, irrigation return flows could be an additional source of mineralisation.

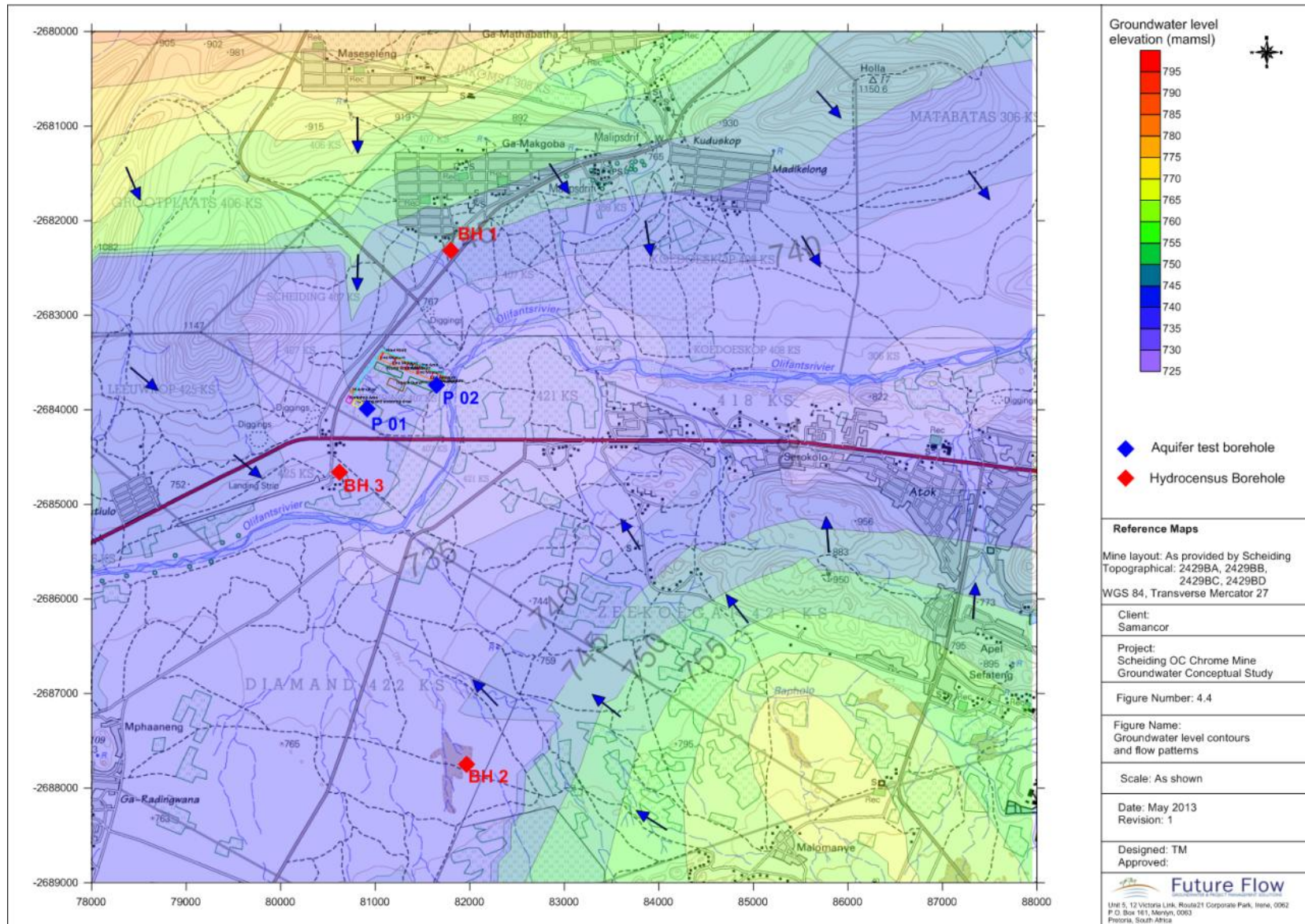


Figure 18: Groundwater level elevation, flow pattern and borehole positions.

Table 13: Groundwater chemical analysis results.

ANALYSIS	UNITS	SANS 241:2011 GUIDELINE VALUE	P01	P02	BH1	BH3
pH		5-9.7	8.13	7.97	8.12	8.01
Electrical Conductivity (EC)	mS/m	<170	75.6	98	217	101
Alkalinity (Alk)	mg/L	N/L	267	424	293	371
Chloride (Cl)	mg/L	100	49.7	46.9	462	79.5
Sulphate (SO ₄)	mg/L	240	23.4	37.7	90.8	52.3
Nitrate (NO ₃)	mg/L	11	19.6	27.7	53.5	23.4
Ammonium (NH ₄)	mg/L	1.5	<0.005	0.007	<0.005	<0.005
Phosphate (PO ₄)	mg/L	N/L	0.026	0.032	0.019	0.030
Fluoride (F)	mg/L	1.5	0.307	0.303	0.359	0.223
Calcium (Ca)	mg/L	N/L	59.5	40.3	95.1	110
Magnesium (Mg)	mg/L	N/L	46.8	88.8	190	56.3
Sodium(Na)	mg/L	200	50.3	46.9	106	37.3
Potassium (K)	mg/L	N/L	2.59	2.36	6.19	1.59
Aluminium (Al)	mg/L	0.3	<0.003	<0.003	<0.003	<0.003
Iron (Fe)	mg/L	0.3	<0.003	<0.003	<0.003	<0.003
Manganese (Mn)	mg/L	0.1	<0.001	<0.001	<0.001	<0.001
Total Chromium (Cr)	mg/L	0.05	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	mg/L	2	<0.001	<0.001	<0.001	<0.001
Nickel (Ni)	mg/L	0.07	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	mg/L	5	<0.002	<0.002	<0.002	<0.002
Cobalt (Co)	mg/L	0.5	<0.001	<0.001	<0.001	<0.001
Cadmium (Cd)	mg/L	0.003	<0.001	<0.001	<0.001	<0.001
Lead (Pb)	mg/L	0.01	<0.004	<0.004	<0.004	0.008

A total of 9 samples were submitted for acid-base-accounting testing. The sulphide percentages in all the samples fall below 0.3 %. For sustainable long-term acid generation, at least 0.3 % sulphide-S is needed. Values lower than 0.3 % can yield acidity but only in the short-term. The final net acid generation pH values for the target mineable material ranged between 8 and 9. This corresponds to the acid potential/ net neutralisation potential (NPR) ratios of between 11 and 36.7 which are much greater than the guideline value of 3, indicating that the rock material is acid neutralising.

From the above, it is concluded that it is unlikely that the material will be acid forming. Should some acid conditions form it will be buffered and neutralised by the high neutralising capacity of the rock material. In addition, any such acid conditions that form will only be sustainable in the short term due to the very low Sulphur-S percentages.

3.12 Sensitive Areas

The proposed project falls within 5 km of the Bewaarkloof Nature Reserve which is a formal protected area according to SANBI. The proposed mining activities are also located within 500 m of the Olifants River and vegetation species of conservation concern as well as an area of medium-

high ecological sensitivity were identified within the proposed project area. Refer to Figure 19 below for the location of the proposed project area in relation to the above mentioned sensitive areas.

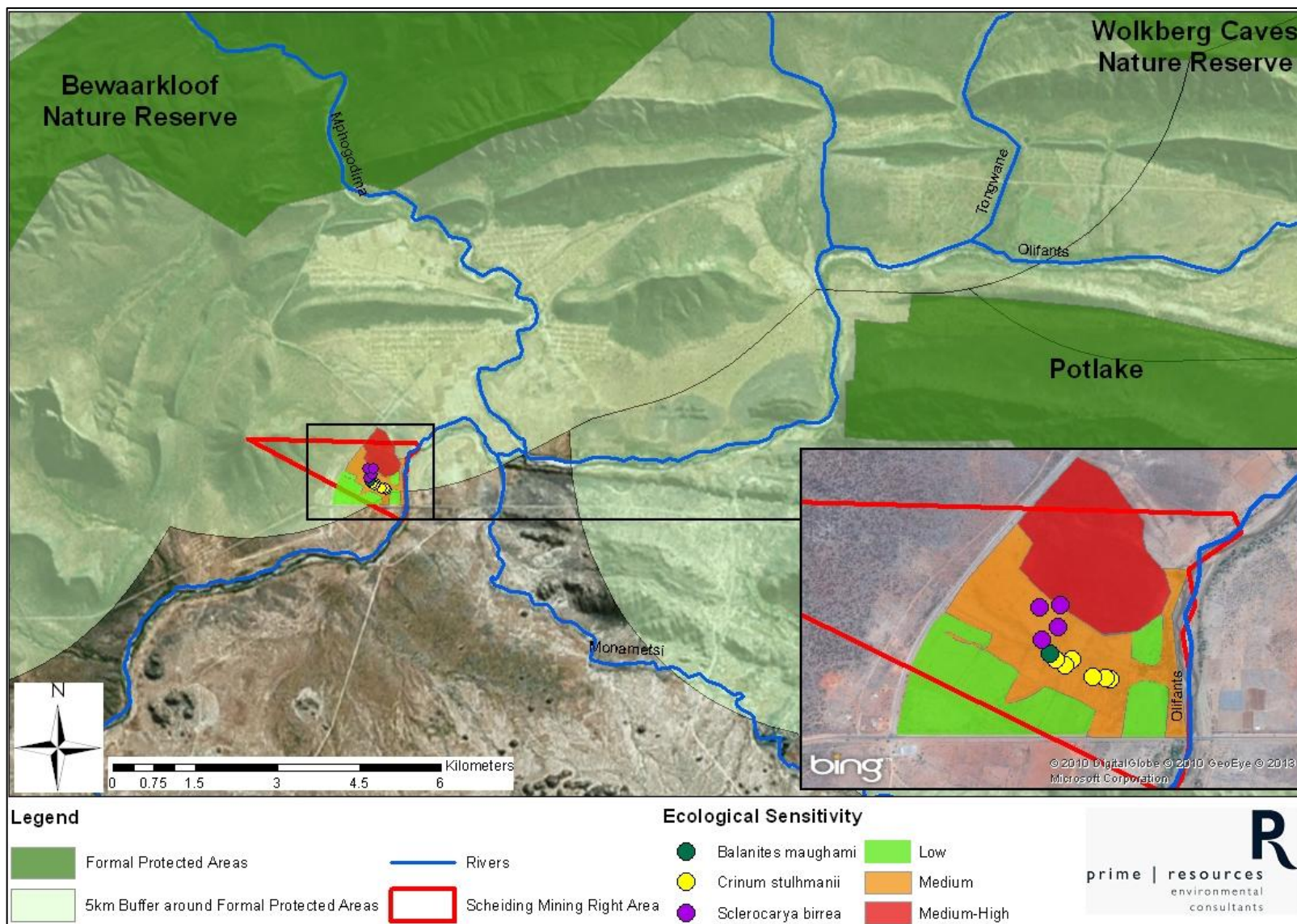


Figure 19: Sensitive areas within the proposed project area.

3.13 Archaeology, Cultural and Heritage

According to the Lepelle-Nkumpi Local Municipality 2011-2016 Reviewed Integrated Development Plan (IDP), large areas of land in the municipality (approximately 95% of the land) forms part of the former Lebowa homeland and is now held in trust for tribal and community authorities. These traditional authorities play a very important role in terms of their culture and have a major influence in the manner in which land is made available to individuals for settlement, as well as the use thereof for economic purposes (e.g. agriculture, tourism, etc.).

Medicinal plants which occur in the proposed area are also harvested and utilised by the local residents. Refer to Section 3.7.1 for a detailed description of the medicinal plants which occur within the proposed project area.

According to a cultural and heritage assessment conducted by R&R Cultural Resource Consultants in 2013 for the proposed project (attached as Appendix 8), the Olifants River drainage system hosts a large number of archaeological sites, from the Earlier Stone Age to the Late Iron Age.

According to the most recent archaeological cultural distribution the proposed project area falls within the distribution area of various cultural groupings originating out of both the Urewe Tradition (eastern stream of migration) and the Kalundu Tradition (western stream of migration). The facies that may be present are:

Urewe Tradition:

Kwale branch - Mzonjani facies AD 450 – 750 (Early Iron Age)

Moloko branch - Icon facies AD 1300 - 1500 (Late Iron Age)

Marateng facies AD 1650 – 1840 (Late Iron Age)

Kalundu Tradition:

Happy Rest sub-branch - Doornkop facies AD 750 - 1000 (Early Iron Age)

Eiland facies AD 1000 – 1300 (Middle Iron Age)

Klingbeil facies AD 1000 - 1200 (Middle Iron Age)

Letaba facies AD 1600 - 1840 (Late Iron Age)

None of the above mentioned archaeological remains were, however, noted within the proposed project area during the survey conducted. This is likely due to the close proximity of the proposed project area to the Olifants River. Alluvial sands may have covered the Stone Age period material. Therefore, some of the archaeological cultures referred to above may be present as obscured subterranean deposits. The Local Traditional Authority in Ga-Makgoba village also indicated that they have no knowledge of any heritage resources that would be negatively impacted on by the proposed development.

3.14 Air Quality

No ambient air quality data exists for the proposed project area. The background concentrations/fallout for the area could therefore not be assessed. A specialist air quality assessment will be conducted during the assessment phase to detail the current sources of pollution and sensitive receptors surrounding the proposed project area.

The following baseline information was obtained from an air quality investigation conducted by Gondwana Environmental Solutions for the Jagdlust Chrome Mine located on the farm adjacent to the proposed project area.

The existing sources of pollution, detailed in the paragraphs that follow, in the vicinity of the proposed project area include:

- Emissions from various mining facilities;
- Vehicle emissions;
- Fuel burning;
- Crop residue burning and veld fires; and
- Fugitive dust.

Fugitive emissions from quarrying and mining operations mainly comprise of land clearing operations (i.e. scraping, dozing, and excavating), materials handling operations (i.e. tipping, off-loading and loading, conveyor transfer points), entrainment from vehicles on haul roads, wind erosion from open areas and drilling and blasting. These activities mainly result in fugitive dust releases with small amounts of oxides of nitrogen (NO_x), carbon monoxide (CO), sulphur dioxide (SO₂), methane, carbon dioxide (CO₂) being released during blasting operations. Existing mining projects in the vicinity of the proposed project area include Atok, Twickenham, Marula, ASA and Maandagshoek.

Air pollution from vehicle emissions containing CO₂, CO, hydrocarbons, SO₂, NO_x, particulates and lead is another source of pollution in the vicinity. The main road in the vicinity of the proposed project area is the R37. In addition there is a paved road joining the R37 which bisects the proposed project area and numerous smaller unpaved roads in the proximity of the proposed project area.

It is likely that certain households within local communities/settlements utilise wood or coal for space heating and/or cooking purposes. Pollutants arising due to wood burning include inhalable particulates, CO and SO₂ with trace amounts of polycyclic aromatic hydrocarbons. Coal burning emits a large amount of gaseous and particulate pollutants including SO₂, total and inhalable particulates including heavy metals and inorganic ash, CO, polycyclic aromatic hydrocarbons, NO₂ and various toxins.

Crop-residue burning and general wild fires (veld fires) represent significant sources of combustion-related emissions associated with agricultural areas, with carbon monoxide, methane and nitrogen dioxide being emitted during the process.

Fugitive dust emissions may occur as a result of vehicle entrained dust from local paved and unpaved roads, wind erosion from open areas and dust generated by agricultural activities (e.g. tilling) as well as mining.

3.15 Traffic

The following information was obtained from the Capricorn District Municipality 2012/2013 Integrated Development Plan (IDP) and the Lepelle-Nkumpi Local Municipality 2011-2016 IDP. The Capricorn District Municipality is situated at the core of economic development in the Limpopo Province and includes the capital of the province, the City of Polokwane. One national and various major provincial roads pass through the district municipal area, i.e. the N1 - National Road from Gauteng to Zimbabwe and the rest of Africa, the P33/1 (R37) from Polokwane to Burgersfort/Lydenburg, the P94/1 (R521) from Polokwane to Alldays and Botswana and the P17/1 (R71) from Polokwane to Tzaneen and Phalaborwa.

Most roads in Lepelle- Nkumpi Local Municipality are indicated as being in a poor state of repair. The rural roads are poorly designed and not maintained regularly, generally with poor storm water drainage. Minibus taxis are the most popular form of transport, however, approximately 87% of the population of the Lepelle-Nkumpi Municipal area travel by foot to their various destinations due to a lack of public transport services or a lack of money to pay for public- or private transport.

The roads associated with the proposed project area are the R37 from Polokwane to Burgersfort/Lydenburg and an unnamed paved road to Mafefe which joins to the R37 and bisects the proposed project area (refer to Figure 5).

A specialist traffic assessment will be conducted during the assessment phase to detail the current state of the roads and traffic volumes in the proposed project area.

3.16 Noise

A specialist noise assessment will be conducted during the assessment phase to detail the current ambient noise levels, the noise character of the proposed project area and the surrounding sensitive receptors. The following ambient noise baseline information was obtained from a noise impact assessment conducted for the Jagdlust Chrome Mine prepared by M2 Environmental Connections which included the proposed project area. The daytime ambient background noise levels for the proposed project area are displayed in Figure 20, with the night time ambient background noise levels displayed in Figure 21. The average daytime background ambient noise levels were recorded between 40 - 49 dB(A), which is in line with the relevant SANS guideline as the limit for a rural area (being 45 dB(A)). There are, however, a few areas on the paved road bisecting the proposed project area where the average levels increase to between 50 - 59 dB(A) due to vehicle movement and domestic activity thereon. The average night time ambient noise levels for the proposed project area are between 30 - 39 dB(A), which is also in line with the relevant SANS guideline for a rural area.

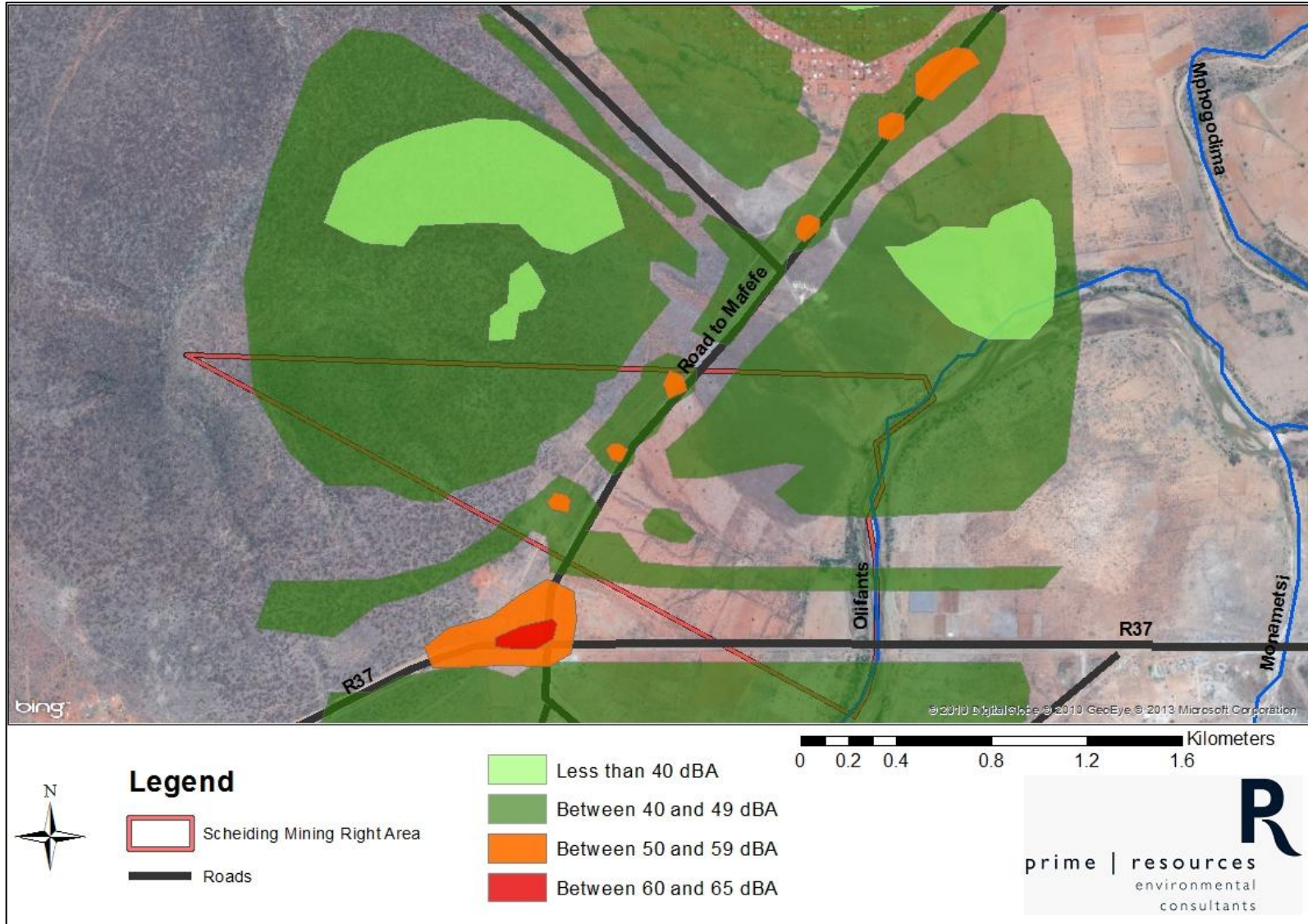


Figure 20: Daytime ambient noise levels for the proposed project area.

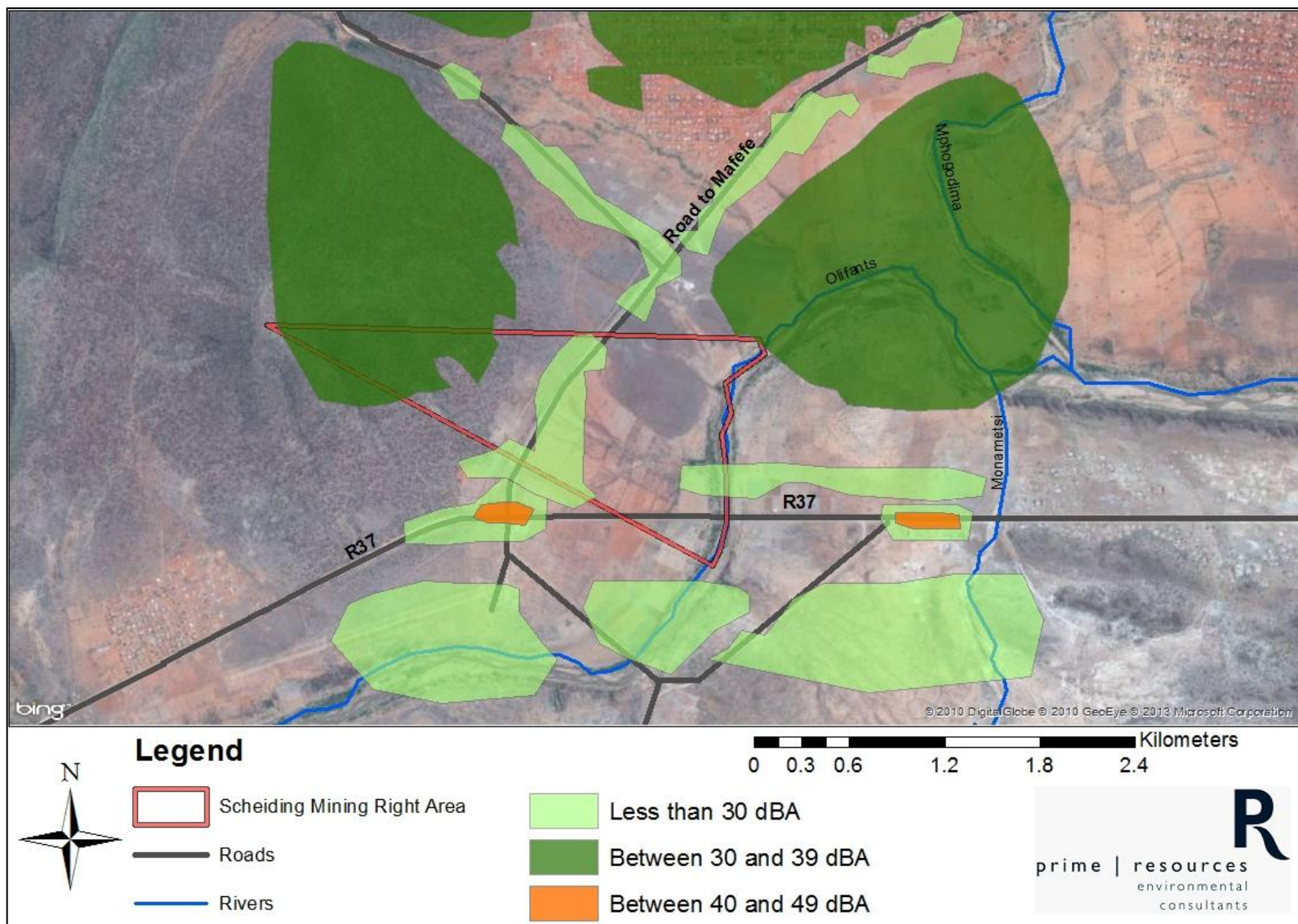


Figure 21: Night time ambient noise levels for the proposed project area.

3.17 Socio-Economic Conditions

The proposed project area (Farm Scheiding 407 KS, Portion 2) falls within Ward 27 of the Lepelle-Nkumpi Local Municipality. The following information was obtained from the Lepelle-Nkumpi Local Municipality 2011-2016 Reviewed IDP.

The municipal area is pre-dominantly rural with a population of approximately 241 414 people and covers a surface area of approximately 3 455 km², which represents 20.4% of the District's total land area. The municipality is divided into 29 wards which comprises a total of 110 settlements. About 95% of its land falls under the jurisdiction of Traditional Authorities. The municipality has six Traditional Authorities namely Mathabatha, Seloane, Ledwaba, Moletlane, Mphahlele, and Mafefe. The proposed project area falls under the jurisdiction of both the Mathabatha and Mphahlele tribal authorities (refer to Figure 22). Sepedi is the most spoken language with 85.9% of inhabitants speaking this language.

Statistics show that 49% of the Lepelle-Nkumpi population is under 19 years of age and 6% is elderly residents. These figures imply that the municipal area has a high dependency ratio as few people possess the ability to bring income into households. Within the economically active age group (15 – 64 years), Lepelle-Nkumpi has an unemployment rate of 15.5% and an employment rate of 21.4%. The number of economically inactive person(s) in the employable age groups is significant as 63.1% are not economically active. The reason for the difference in this rate is unclear, but this high rate puts a major strain on employed individuals.

The Municipality has a high number of functionally illiterate people with 20% having no schooling, 31% only attending school up to primary level, while 30% only attained secondary level. There is also a high rate of unemployment (43%) in the municipal area. The major employment sectors are community, social and personal services; wholesale and retail trade; manufacturing; construction; financial; insurance; real estate and business services as well as mining and quarrying.

Lepelle-Nkumpi is the third largest contributor to the district Gross Geographic Product (GGP) at 13.6% and is the first largest contributor to mining, second largest in community services and third largest contributor in terms of construction.

Facilities in the municipal area include: a total of 21 health facilities within the municipality (19 primary health care clinics and 3 hospitals), these facilities are supplemented by the operation of six mobile clinics; 116 primary schools, 81 secondary schools and 1 Further Education and Training College; four police stations and one magisterial court.

Currently 68% of households have access to water above the Reconstruction and Development Programme (RDP) standard, only 27% of households have sanitation facilities to RDP standard and all villages have access to the electricity grid, albeit with approximately 6927 households still requiring electricity connections. Approximately 24% of households in Lepelle-Nkumpi have access to a municipal solid waste disposal service (restricted to the urban areas of Lebowakgomo, Mathibela and Rakgoatha). Most people who reside within rural areas dig their own refuse dumps

within their yards or on unoccupied land. Telkom's public telephone service provides telecommunication network facilities to approximately 60% of villages in the municipal area. A small percentage of households (10%) do not have access to public telephone within a 500 m radius.

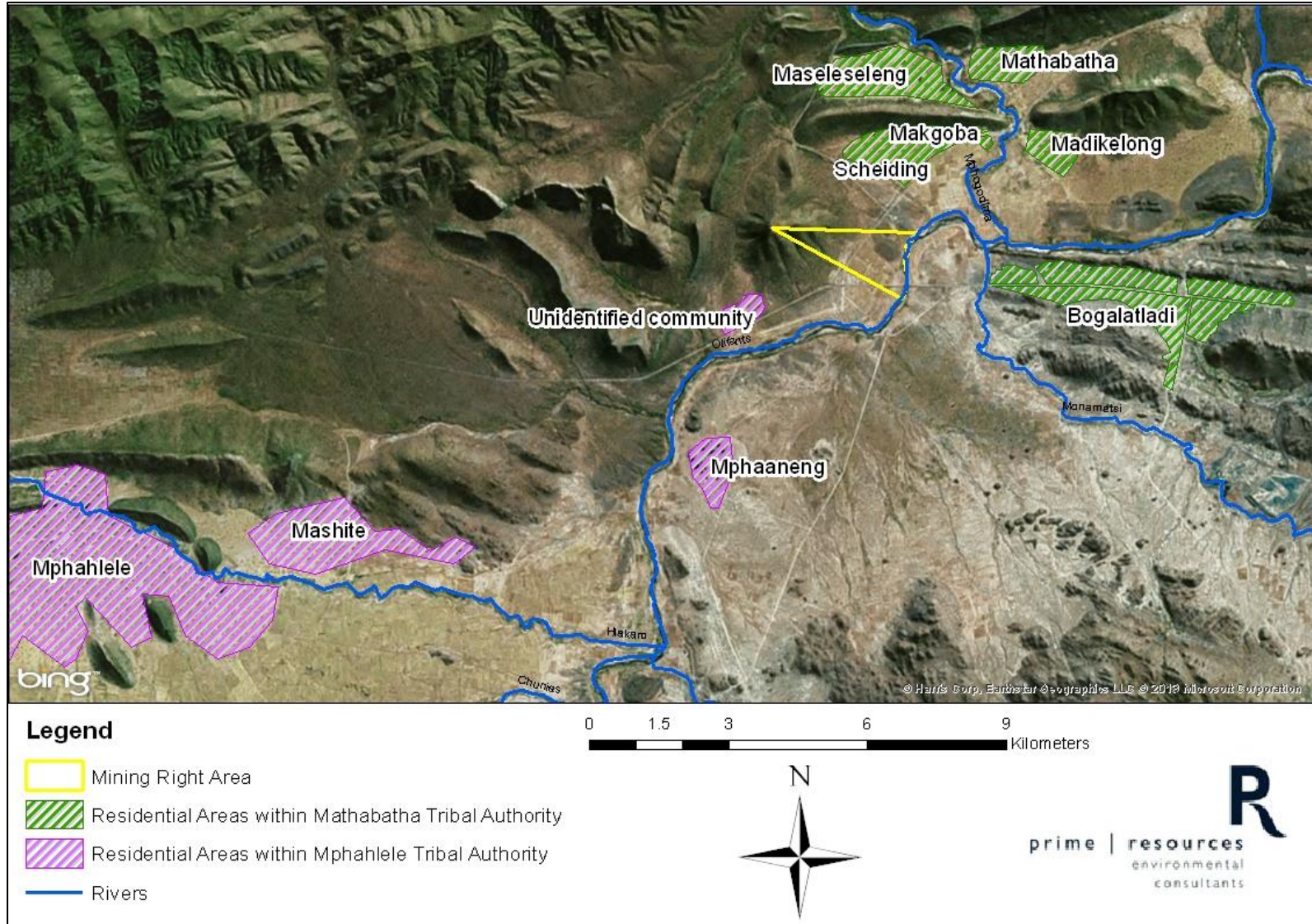


Figure 22: The jurisdiction of the two relevant tribal authorities.

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The construction phase of the proposed mine (including site establishment, installation of the engineering and surface infrastructure and provision of bulk services such as water and electricity) will likely occur over a period of 2 to 3 months once all necessary permits / approvals are in place. Water to the proposed mining site will be obtained from the Lebalelo Pipeline and / or the Olifants River, these alternatives are still being investigated. The majority of water required will be used for dust suppression other uses include drinking and cleaning purposes. Make-up water for dust suppression will be sourced from opencast pit water including rainwater and groundwater seepage. Electricity will be sourced from diesel generators as a permanent power line is not required due to the length of the life of mine.

Once operational, it is envisaged that open pit mining operations will take place over a period of 12 to 16 months. The open pit will extract the principle LG6 chromitite layer present and the mining of the LG6A is subject to favourable market conditions which would make it feasible over the life of mine (LoM). Two alternative mining configurations have been considered for the opencast operations, with each one having a different LoM:

- LG6 chromitite layer only - approximately 12 months; or
- LG6 + LG6A chromitite layers – approximately 16 months.

(The above is based on a steady state production rate of 15,000 tons of run of mine (ROM) ore per month).

Open pit mining was selected to mine the shallow ore on Scheiding 407 KS, Portion 2, so as to make ore available as early as possible. Following the initial removal and stockpiling of topsoil, conventional truck and shovel mining is planned with drill and blast development using the single benching method as per the blast design described below. It is foreseen that three benches will be blasted, with the first bench drilled to a depth of 18 m and blasted. Once this bench is mined out (after several cuts to 18m depth), the second bench will be drilled and blasted downwards for a further 12 m - this bench will be mined out after several cuts to the final bench. The final bench will be drilled and blasted downwards for a further 10 m, which will be the final depth of the opencast pit. This bench will be mined, after which the decommissioning and rehabilitation phase will commence. The size of the final void will be 158 000 m³ and the total surface area of the pit will be 50 000 m².

Waste from processing (crushing and screening) as well as all overburden material arising will be moved to the waste rock dump located on the final pit perimeter, where it will be backfilled directly into the opencast void (concurrent backfilling whilst mining). Backfilling of mined out areas will commence as soon as possible to minimize dust and aid in rehabilitation as well as minimize haulage costs and double handling.

Articulated dump trucks will be used to transport the ROM ore from the opencast pits to the stockpile area, where after the ore will be processed. There will be no beneficiation plant for this

application. Mined ore will be processed by crushing and screening, using a mobile crushing plant and mobile triple deck screen, to produce the various saleable products. Processing will consist of:

- A mobile / moveable crushing unit will crush the oversized ROM ore that exceeds +100mm after it has passed over the screen;
- Front-end loaders and articulated dump trucks will be used to transport the ROM ore and products in the following three main areas:
 - ROM ore from opencast to the ROM screening area;
 - between the different sizing / screening steps; and
 - Final products to the various product stockpiles based on size and quality.
- Front loaders will be used to feed ROM material onto conveyor to the screen; and
- Screens will be used to separate the ROM material into different sizes as final product.

The product will then be trucked from the beneficiation operations either to national customers within the Mpumalanga Province or to the Durban and Richards Bay terminals for export.

The following associated mine infrastructure will be constructed:

- Workshop upon a hard-stand area; and
- Containerised administration offices.

The following equipment will be utilised at the proposed mine:

- Dump trucks for the transport of ore from the pit to the stockpile area;
- Utility vehicles for the transport of material and explosives;
- Drill rigs for the drilling of the benches;
- Excavators for the stripping of ore and waste;
- Bulldozers for the profiling of waste;
- Graders for the maintenance of access roads and haul roads; and
- Water bowsers for dust suppression of roads and waste dumps and screening areas.

Refer to Figure 23 below for a map showing the proposed layout plan.

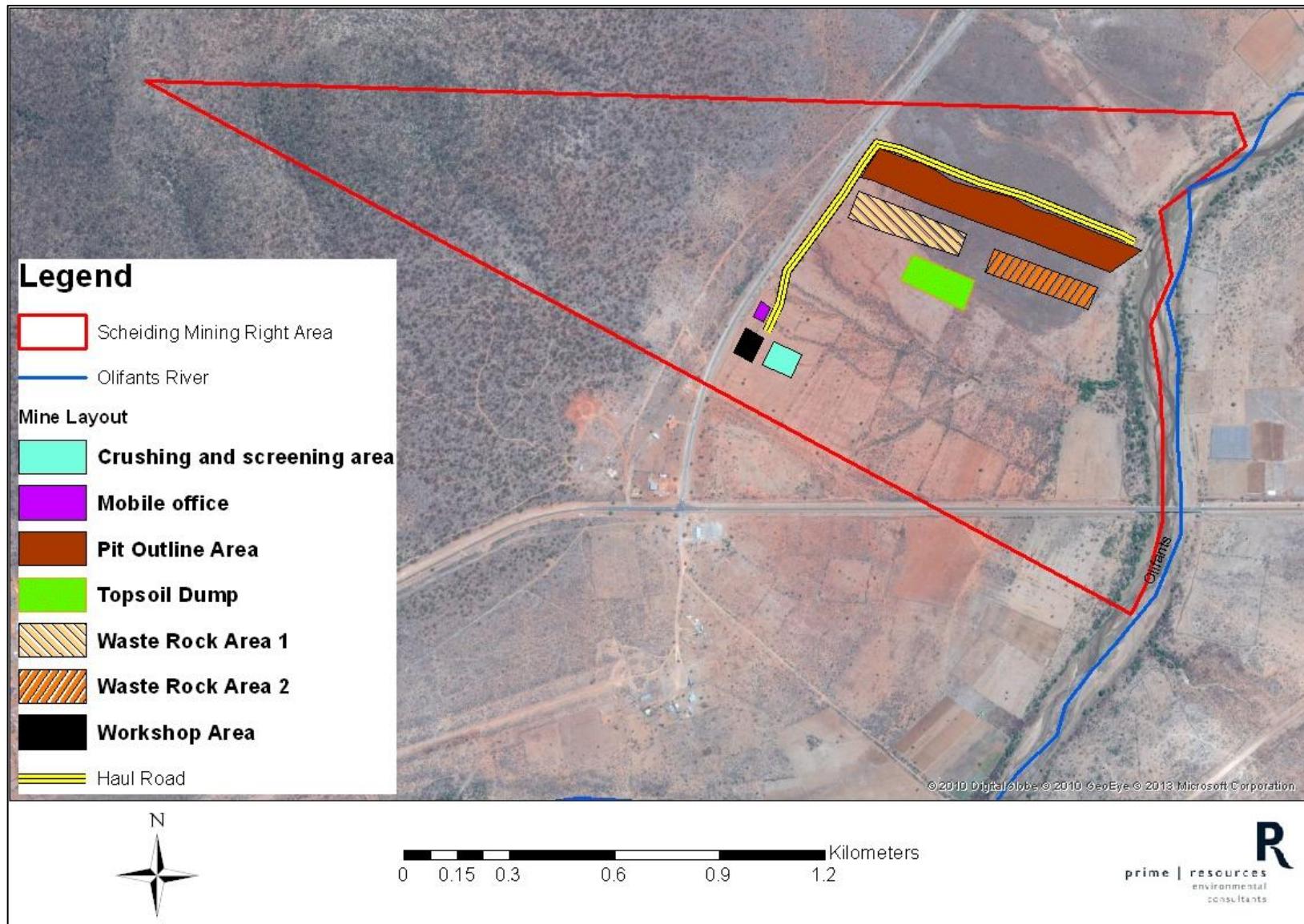


Figure 23: Spatial locality of infrastructure, extraction area and associated activities for the proposed project.

5 PROJECT ALTERNATIVES

5.1 Introduction

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

5.2 Alternative Locations / Techniques

Due to the fixed position of the mineral resource there are no possible location alternatives for the opencast pit. Considering that the majority of infrastructure will be portable due to the short duration of the life of mine, alternative locations for infrastructure haven't been considered but will be shifted if the scoping process identifies any immovable areas of high sensitivity which should be avoided.

It is not economically feasible to mine the resource using a mining method other than the opencast method described due to the shallow depth of the mineral resource. Two alternative mining configurations (12 months vs 16 months) have been considered, which is dependent on whether market conditions are favourable which would make it feasible to mine the LG6A chromite layer.

5.3 No Project' Alternative

Should the proposed opencast pit and associated infrastructure not be constructed, the chromite 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 as described in Section 6.1 below 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

6.1 Benefits of the Project

The Scheiding Chrome Mine will employ approximately 38 people (permanent and the core contactor), which will have a multiplier effect as employee households will be positively impacted through direct and indirect income. Considering that the proposed Scheiding Chrome Mine has an expected life of mine of 2 years, these benefits should be sustainable for a short term period. In order to mitigate the loss of the positive impacts upon closure, the mine will plan towards their eventual closing and put mitigation measures in place, which will assist their employees in finding alternative sources of income.

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

Besides the positive impact the mine will have on the livelihoods of the households of its future employees in the neighbouring and labour sending communities, the mine will contribute to the upliftment of the local communities surrounding the operation. In addition to a contribution to the economy, the mine will also pay significant amounts in annual taxes, which will be used by the Government for social upliftment.

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

The mine will also provide Local Economic Development (LED) initiatives in the surrounding villages (Mathabatha and Mphahlele) by implementing the Masimela High School infrastructure and nutritional support project. This project will involve infrastructure renovations at the high school as well as a food security garden.

6.2 Disadvantages

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

7 PUBLIC PARTICIPATION

7.1 Introduction

This Chapter details the plan for the Public Participation process to be followed. The public consultation process to be followed will be aligned to meet the requirements in terms of both the NEMA and MPRDA processes.

7.2 Scoping Phase Public Participation Process

7.2.1 Identification of Stakeholders

The relevant authorities identified as stakeholders included:

- Department of Mineral Resources (as the Competent Authority as regards the Mining Right Application);
- Department of Land Affairs and Limpopo Department of Rural Development and Land Reform (as representatives of the State as regards land-ownership);
- Limpopo Department of Economic Development, Environment and Tourism (as the Competent Authority for activities at the proposed Mine listed in terms of the National Environmental Management Act, No. 107 of 1998 "NEMA");
- Department of Water Affairs (as the custodians of water resources and the Competent Authority in terms of Water Uses at the proposed Mine listed in terms of Section 21 of the National Water Act, No. 36 of 1998);
- South African Heritage Resources Agency (as custodians of all cultural and heritage resources);
- Lepelle-Nkumpi Local Municipality;
- Capricorn District Municipality;
- Mathabatha Tribal Authority (as claimants of the land); and
- Mphahlele Tribal Authority (as custodians of the land).

The following surrounding communities were identified as stakeholders:

- Bogalatladi;
- Scheiding;
- Ga-Makgoba;
- Maseleseleng;
- Madikelong;
- Gamathabatha; and
- Mphaaneng.

The Lebowa Platinum Atok Mine was also identified as a possible stakeholder. A Copy of the IAP database is attached as Appendix 9.

7.2.2 Background Information Document

A Background Information Document (BID) in both English and the relevant local language of the communities in the area, namely Sepedi, which briefly describes the background to the project, the proposal in brief, the environmental process, where the draft SR can be viewed, information regarding the public meetings to be held and the contact details of whom to contact should queries arise, will be distributed to the authorities and key stakeholders via email or registered mail. BIDs will also be made available to any IAPs requesting further information. BIDs will also potentially be made available at the offices of the Tribal Authority and will be distributed at all meetings held.

7.2.3 Media Notices

A media notice, in both English and Sepedi, which provides a brief description of the proposed project, the environmental process to be followed, as well as contact details for the EAP, how to register as an IAP, where further information could be obtained, locations where the draft SR can be viewed and information regarding the public meetings to be held, will be published in the Daily Sun newspaper.

7.2.4 Site Notices

A2 Site notices in both English and Sepedi, describing the proposed project, the environmental process to be followed, as well as contact details for the EAP, how to register as an IAP, where further information could be obtained, locations where the draft SR can be viewed and information regarding the public meetings to be held will be posted up for display at the proposed project site and at visible public locations within the surrounding communities.

7.2.5 Public Meetings

A focus group meeting will be held with each of the Tribal Authorities (Mathabatha Tribal Authority and the Mphahlele Tribal Authority). A public meeting will then be arranged to which invitees and IAPs will be notified through the channels described above. The meeting will be held for one day at a venue centrally situated between the tribal authorities' (Mathabatha Tribal Authority and the Mphahlele Tribal Authority) jurisdictions for all IAPs to attend. A presentation will be made to inform the public of the proposed project. Members of the environmental, applicant and technical teams will attend the meeting and all IAPs will be given the opportunity to raise any concerns or questions they may have and add their details to the IAP database.

7.2.6 Commenting Period

The initial commenting period will commence on the day the media notice is published, site notices are posted and BIDs are distributed. The media notice, site notices and BID all provided information on how to contact the EAPs and indicated that comments should be submitted before the end of the commenting period. The commenting period will provide authorities 40 calendar days and IAPs 30 calendar days during which they can register as an IAP and during which any

comments, concerns, issues and requests for more information could be raised. After the commenting period, the draft scoping report prepared in terms of NEMA will be revised to include any comments, issues or queries received during the commenting period. This final scoping report will be submitted to LEDET and the availability thereof will be indicated to all registered IAPs who must provide comments to LEDET and Prime Resources within 21 days.

7.2.7 Comments and Issues Trail

A database will be compiled detailing the name and contact details of all IAPs / stakeholders and all comments raised. Once the commenting period has closed, the final scoping report in terms of NEMA will be completed along with the updated issues trail. All comments received, minutes from meetings, representations made and the overall outcomes from the public consultation process will be utilised to prepare a Comments and Responses Report which will be provided to the Department.

7.3 Assessment Phase Public Consultation

A feedback BID will be prepared which will provide an overview of the impacts identified in the EIAR. This will be distributed to all registered IAPs along with a letter informing IAPs of the availability of the draft EIAR / EMP for perusal and comment. The letter to registered IAPs will also inform IAPs of the feedback public meetings. The presentation will include a synopsis of the impacts identified, issues raised by IAPs / stakeholders, the specialist studies conducted and the environmental management measures and mitigation measures laid out in the EIAR / EMP. The draft EIAR / EMP will be made available to Authorities and registered IAPs for a an initial commenting period (40-days for State Departments and 30 days for IAPs) in terms of the NEMA process, 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 IMPACTS IDENTIFIED

8.1 Introduction

This section outlines the potential impacts (including cumulative impacts) associated with the proposed development, which will be fully investigated during the EIA phase with specialist input as required and management measures ascertained accordingly.

8.2 Blasting and Vibrations

Blasting activities during the excavation of the opencast pit have the potential to impact upon wildlife, local residents, livestock and surrounding infrastructure through the generation of ground vibrations, fly-rock, dust and air blasts.

8.3 Soil and Land Capability

The construction of the opencast pits will require the stripping of topsoil followed by the removal of overburden material in order to access the resource to be mined. Topsoil will also be stripped for the construction of surface infrastructure (such as haul and access roads, stockpile footprints, or foundations for temporary structures such as containerised offices) or compacted (by vehicle movements on surface). This disturbance of the soil horizons will result in physical changes to the soil structure and chemical changes in terms of the soil composition. Soils may be lost from erosion caused by uncontrolled runoff and there is also the possibility that soils may be contaminated by hydrocarbon spills from vehicles, equipment or storage areas. The above mentioned potential impacts may have an effect on the future land capability of the area.

8.4 Terrestrial Biodiversity (Flora and Fauna)

The integrity of terrestrial habitat in terms of fauna and flora within the proposed project area may be negatively impacted upon by the proposed mining activities. These impacts will be assessed by a specialist during the assessment phase.

8.5 Groundwater

Dewatering of the opencast pits can potentially impact on groundwater levels in the area. Mining activities may also result in the contamination of groundwater resources through the seepage of contaminated surface water from industrial chemical or hydrocarbon spills. The impacts on groundwater quantity and quality will be assessed by a groundwater specialist during the assessment phase.

8.6 Surface Water

The proposed development is situated closer than 100m and the 100-year floodline of the Olifants River. If the correct management measures are not implemented for clean and dirty water management, there is the potential for contamination of the water resource by polluted run-off and increased silt loads from erosion. There also exists the potential for the proposed development to be influenced by runoff from the Olifants in a suitably large storm event. Impacts to this end will be assessed by a specialist during the assessment phase.

8.7 Archaeology, Cultural and Heritage

Although no visible archaeological, cultural or heritage resources were identified within the proposed project area, which could potentially be affected by the proposed development. Subterranean heritage material may be present which may be damaged or destroyed if unearthed.

8.8 Air Quality

Particulate matter (PM10) as well as fugitive dust can potentially be generated from vehicle movement, blasting, stockpiles, materials handling as well as crushing and screening activities and may potentially result in a localised reduction in air quality. The quantification of impacts and areas most likely to be affected must be assessed and management measures proposed accordingly.

8.9 Traffic

The transport of men and materials during the life of the mine will result in a slight increase in traffic on the surrounding roads in the area which may pose an increased road safety risk to residents, pose a nuisance to the surrounding communities and result in the degradation of roads in the area.

8.10 Noise

The operation of vehicles and equipment, blasting and the crushing and screening of material will generate noise which will have an impact on noise levels in the area especially as the area has a rural noise character. The increase in ambient noise levels may be a nuisance to the surrounding communities.

8.11 Socio-Economic Environment

The development of the proposed project (and related infrastructure) could potentially result in the loss of:

- Grazing land;
- Land utilised for subsistence farming; and

- Natural vegetation utilised for fuel and medicinal purposes.

The above may have a negative impact on socio-economic conditions in the area should the local community derive an income there from, while local residents who rely on the land for grazing their livestock and fuel for cooking and heat. The loss of will only be temporary (12-16 months) on account of the fact that, once mining has ceased and the land has been rehabilitated to the pre-mining state, the land will again be made available to the local residents for use. If improperly managed, however, the mining activities could potentially affect the land capability of the area for a period of time, while it is further possible that the land may never return to pre-mining capability.

8.12 Cumulative impacts

The air quality in the area has been compromised by emissions from various mining facilities, vehicle emissions, fuel burning, fugitive dust, crop residue burning and veld fires. The proposed mining activities may further reduce the air quality in the area. The water quality of the Olifants River has been compromised by upstream activities. The pre-existing impact may be exacerbated by the proposed mining activities. The land capability of the proposed project area has also been impacted upon by overgrazing, which could be worsened by the proposed mining activities. 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 will include:

An air quality study will be conducted to:

- Detail the current sources of pollution and sensitive receptors in the area;
- Assess the impacts the proposed activities may have on the ambient air quality; and
- Propose mitigation, management and monitoring measures.

A traffic study will be conducted to:

- Detail the current state of the roads and traffic volumes in the area;
- Assess the impacts the proposed activities may have on the roads and traffic in the area; and
- Propose mitigation, management and monitoring measures.

A noise study will be conducted to:

- Detail the current ambient noise levels, the noise character of the area and the sensitive receptors;
- Assess the impacts the proposed activities may have on the ambient noise levels; and
- Propose mitigation, management and monitoring measures.

A blasting and vibrations study will be conducted to:

- Detail sensitive receptors in the area;
- Assess the impacts the proposed activities may have on the sensitive receptors; and
- Propose mitigation, management and monitoring measures.

Follow up specialist studies will also be conducted during the assessment phase. These studies will further detail the current baseline environment at the proposed Scheiding Chrome Mine and assess the potential impacts the proposed activities will have as well as propose mitigation and management measures for the identified impacts. These studies will include:

Follow up terrestrial and aquatic ecology studies to:

- Assess the impacts the proposed activities may have on both terrestrial and aquatic ecology; and
- Propose mitigation, management and monitoring measures.

A follow up soil study to:

- Assess the impacts the proposed activities may have on the soil; and
- Propose mitigation, management and monitoring measures.

A follow up 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 the nature of any influences on groundwater quality; and
- Provide management and monitoring measures.

A follow up surface water study to:

- Determine the potential reduction to mean annual rainfall within the catchment;
- Investigate potential management measures related to mining in close proximity to watercourses;
- Determine the potential reduction in water quality of associated water resources;
- Assess capacity of water management structures;
- Determined peak runoff from areas; and
- Provide management and monitoring measures.

The outcomes of the above mentioned specialist reports will be incorporated into a draft EIAR which will then be prepared and 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 EIAR / EMP will then be amended to incorporate any public feedback before submitted to the departments.

9.2 Methodology Proposed for the Assessment of Impacts

All identified impacts will be assessed according to the following rating methodology:

$$\text{SIGNIFICANCE} = (\text{MAGNITUDE} + \text{DURATION} + \text{SCALE}) \times \text{PROBABILITY}$$

The maximum potential value for significance of an impact is 100 points. Environmental impacts can therefore be rated as high, medium or low significance on the following basis:

- | | |
|-------------------------------------|-----------------|
| ▪ High environmental significance | 60 – 100 points |
| ▪ Medium environmental significance | 30 – 59 points |
| ▪ Low environmental significance | 0 – 29 points |

Magnitude (M)	Duration (D)
10 – Very high (or unknown)	5 – Permanent
8 – High	4 – Long-term (ceases at the end of operation)
6 – Moderate	3 – Medium-term (5-15 years)
4 – Low	2 – Short-term (0-5 years)
2 – Minor	1 – Immediate
Scale (S)	Probability (P)
5 – International	5 – Definite (or unknown)
4 – National	4 – High probability
3 – Regional	3 – Medium probability
2 – Local	2 – Low probability
1 – Site	1 – Improbable
0 – None	0 – None

9.3 Stages at which the Competent Authority will be consulted

The competent authority (LEDET) will be consulted when a draft SR and Final SR is available for comment as well as when a draft EIAR / EMP is available for comment and when the final EIAR / EMP is submitted.

10 REFERENCES

- Samancor Chrome (Pty) Ltd. Eastern Chrome Mines. Jagdlust Chrome Mine EMPR.
- Samancor Chrome (Pty) Ltd. Scheiding Mining Works Programme.
- Lepelle-Nkumpi Local Municipality (2011-2016) Reviewed Integrated Development plan.
- River Health Programme (2006) State Of the Rivers Report, Olifants/Doring and Sandveld Rivers.