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REPORT ON

**FINAL SCOPING REPORT FOR THE
NEW KOFFIEFONTEIN SLIMES
DAM DEVELOPMENT**

DESTEA Reference Nr: EMR/23(ii), 3, 15/14/11

NEAS Reference Nr: FSP/EIA/0000379/2014

Report No : 13034-46-Rep-002-FSR-Rev2

Submitted to:

Koffiefontein Mine JV
1 du Preez Street
Koffiefontein
9986

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April 2015

13034

YOUR COMMENT ON THE FINAL SCOPING REPORT

The Final Scoping Report (FSR) is available for comment from **Thursday, 30 April 2015 to Friday, 01 June 2015**. This FSR has been distributed to the authorities, and copies thereof are available at public places in the project area (see below).

List of public places where the Final Scoping Report is available:

VENUE	CONTACT DETAILS
Printed Copies	
Letsemeng Local Municipal Offices, 7 Groot Trek Street, Koffiefontein	Tel.: 053 205 9200
Koffiefontein Public Library, 29 Groot Trek Street, Koffiefontein	Tel.: 053 205 0147
Ditlhake Public Library, 429 Ttsane Street, Ditlhake, Koffiefontein	Tel.: 053 205 0383
Ethembeni Clinic, 100 Jacobsdal Road, Koffiefontein	Tel.: 053 205 0977
ELECTRONIC COPIES	
Zitholele Consulting Website	http://www.zitholele.co.za/eia-for-koffiefontein-slime-dam
Nicolene Venter	Available on CD on request via email Tel.: 011 207 2060 E-mail: publicprocess@zitholele.co.za

The Final Scoping Report is also available electronically from the Public Participation office or on the Zitholele website: <http://www.zitholele.co.za/eia-for-koffiefontein-slime-dam>, or the Koffiefontein Diamond Mine website <http://www.petradiamonds.com> (Koffiefontein Mine)

You may comment on the Final Scoping Report by **SENDING COMMENTS DIRECTLY** to the DESTEA case officer through the following means:

Case Officer: Ms NC Balithe

Postal Address: Private Bag X20801, Bloemfontein, 9300

Facsimile: 051 400 4842

E-mail: balithen@detea.fs.gov.za

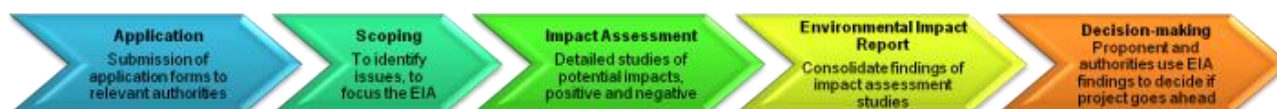
A COPY OF COMMENTS SUBMITTED DIRECTLY TO THE DESTEA MUST BE PROVIDED TO THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (I.E. ZITHOLELE CONSULTING).

DUE DATE FOR COMMENT ON THE FINAL SCOPING REPORT IS FRIDAY, 01 JUNE 2015

SEND YOUR COMMENTS TO THE PUBLIC PARTICIPATION OFFICE:

Nicolene Venter
Public Participation Office
Zitholele Consulting
P O Box 6002, Halfway House, 1685
Tel: (011) 207 2060
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SCOPING & ENVIRONMENTAL IMPACT REPORTING PROCESS CONSISTS OF FOLLOWING PHASES:



ZITHOLELE CONSULTING

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LIST OF ACRONYMS

<u>Acronym</u>	<u>Description</u>
AQMP	Air Quality Management Plan
CA	Competent Authority
CPA	Communal Property Association
DEA	Department of Environmental Affairs
DEIR	Draft Environmental Impact Report
DETEA	Department of Economic Development, Tourism and Environmental Affairs, Free State
DESTEA	Department of Economic, Small Business Development, Tourism and Environmental Affairs, Free State
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Programme
FEIR	Final Environmental Impact Report
FRSF	Fine Residue Storage Facility
FSE	Federation for Sustainable Environment
FSR	Final Scoping Report
GNR	Government Notice Regulation
I&APs	Interested and Affected Parties
IEM	Integrated Environmental Management
KMJV	Koffiefontein Mine Joint Venture
LLM	Letsemeng Local Municipality
LOM	Life of Mine
MPRDA	Mineral Petroleum Resources Development Act
NEM:WA	National Environmental Management: Waste Act
NEM:WAA	National Environmental Management: Waste Act Amendment
NEMA	National Environmental Management Act
PPP	Public Participation Process
RWD	Return water dam
S&EIR	Scoping and Environmental Impact Reporting
SABS	South African Bureau of Standards
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency

<u>Acronym</u>	<u>Description</u>
SANBI	South African National Biodiversity Institute
SIA	Social Impact Assessment
SLC	Sub Level Cave
SMME	Small Medium Micro Enterprise Development
SOE	State Owned Entity
SR	Scoping Report
ToR	Terms of Reference
TSF	Tailings Storage Facilities
WULA	Water Use Licence Application
XDM	Xhariep District Municipality

1 DOCUMENT ROADMAP

This document has been structured and collated to conform to Regulation 28 of the NEMA EIA Regulations 2010. The relevant document parts which addresses each of the aspects provided in Regulation 28 of the NEMA EIA Regulations 2010 is provided in Table 1-1.

Table 1-1: Document Roadmap

<u>Regulation 28 of the NEMA EIA Regulations 2010</u>			<u>Relevant document part</u>
<u>Regulation 28 (1)</u>	a	A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include - <u>(a) details of</u>	
		<u>(i) the EAP who prepared the report; and</u>	<u>Part 2.5</u>
		<u>(ii) the expertise of the EAP to carry out scoping procedures;</u>	<u>Part 2.5.2</u>
<u>Regulation 28 (1)(b)</u>		<u>A description of the proposed activity;</u>	<u>Part 5.3</u>
<u>Regulation 28 (1)(c)</u>		<u>A description of any feasible and reasonable alternatives that have been identified;</u>	<u>Part 6</u>
<u>Regulation 28 (1)(d)</u>		<u>A description of the property on which the activity is to be undertaken and the location of the activity on the property;</u>	<u>Part 5.1</u>
<u>Regulation 28 (1)(e)</u>		<u>A description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment;</u>	<u>Part 9</u>
<u>Regulation 28 (1)(f)</u>		<u>An identification of all legislation and guidelines that have been considered in the preparation of the scoping report;</u>	<u>Part 3</u>
<u>Regulation 28 (1)(g)</u>		<u>A description of environmental issues and potential impacts, including cumulative impacts, that have been identified;</u>	<u>Part 8</u>
<u>Regulation 28 (1)</u>	h	<u>Details of the public participation process conducted in terms of regulation 27(a), including—</u>	
		<u>(i) the steps that were taken to notify potentially interested and affected parties of the application;</u>	<u>Part 7.5</u>
		<u>(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given;</u>	<u>Part 7.5</u>
		<u>(iii) a list of all persons or organisations that were identified and registered in terms of Regulation 55 as interested and affected parties in relation to the application; and</u>	<u>Part 7.5</u>
		<u>(iv) a summary of the issues raised by Interested and Affected Parties, the date of receipt of and the response of the EAP to those issues.</u>	<u>Part 7.5</u>
<u>Regulation 28 (1)(i)</u>		<u>a description of the need and desirability of the proposed activity;</u>	<u>Part 4</u>

Regulation 28 of the NEMA EIA Regulations 2010		Relevant document part	
<u>Regulation 28 (1)(j)</u>	<u>a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;</u>	<u>Part 6</u>	
<u>Regulation 28 (1)(k)</u>	<u>copies of any representations, and comments received in connection with the application or the scoping report from Interested and Affected Parties;</u>	<u>Appendix C8</u>	
<u>Regulation 28 (1)(l)</u>	<u>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; and</u>	<u>Appendix C7</u>	
<u>Regulation 28 (1)(m)</u>	<u>any responses by the EAP to those representations and comments and views;</u>	<u>Appendix C8</u>	
<u>Regulation 28 (1)</u>	<u>(n)</u>	<u>a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include -</u>	
		<u>(i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;</u>	<u>Part 10</u>
		<u>(ii) an indication of the stages at which the competent authority will be consulted;</u>	<u>Part 10</u>
		<u>(iii) A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and</u>	<u>Part 10</u>
	<u>(iv) particulars of the public participation process that will be conducted during the environmental impact assessment process;</u>	<u>Part 10</u>	
<u>Regulation 28 (1)(o)</u>	<u>Any specific information required by the Competent Authority; and</u>	<u>Part 3.9</u>	
<u>Regulation 28 (1)(p)</u>	<u>Any other matters required in terms of sections 24(4)(a) and (b) of the Act.</u>	<u>Not Applicable</u>	

2 INTRODUCTION

2.1 Amendments made to Final Scoping Report

For ease of reference and all changes that have been made to the Scoping Report, subsequent to the public review period of the draft Scoping Report, are underlined. Similarly any text that has been removed from the Scoping Report, owing to further project planning are ~~stricken~~ through.

2.2 Context and objectives of this report

Zitholele Consulting has been appointed by Koffiefontein Diamond Mine to undertake an Environmental Impact Assessment (EIA) for this proposed additional slimes dam and associated infrastructure. The EIA will identify, propose and assess feasible sites for locating the preferred slime dam, different technologies for the managing of slime and possible designs for the disposal facility.

This Final Scoping Report (FSR) is a key component of the EIA authorisation process. The FSR is compiled for stakeholder review and comment; and to address the requirements for Scoping and the Plan of Study (PoS) for the EIA as outlined in the National Environmental Management Act 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations 2010. The aim of this FSR is to:

- Indicate the methodology followed to identify and evaluate alternatives;
- Provide details on the location of the activity;
- Describe the need and desirability of the project;
- Provide an identification of all legislation, policies, plans, guidelines and other tools considered during the scoping phase;
- Provide information to the authorities as well as Interested and Affected Parties (I&APs) on the proposed project as well as a description of the baseline environment;
- Indicate how I&APs have been afforded the opportunity to contribute to the project; to verify that their issues, raised to date, have been considered; and to comment on the findings of the impact assessments;
- Define the Terms of Reference (ToR) for specialist studies and Plan of Study to be undertaken in the EIA; and
- Present the findings of the Scoping Phase in a manner that facilitates decision-making by the relevant authorities.

This FSR is hereby submitted to the competent authority for acceptance.

2.3 Diamond Mining at Koffiefontein

The mining sector in South Africa contributes 5 % to its GDP and the Free State's contributes 12.6 % to its provincial GDP (Stats SA, 2012), respectively. Mining also

represents a major employer in the province. Approximately 160 000 people are employed in the gold mining sector alone (this represents 32 % of the mining sector).

The diamond industry in the Free State ignited after the founding of Jagersfontein where the some of the first diamonds in South Africa was found. The Jagersfontein Mine was developed by De Beers in 1870's and produced some of the world's largest diamonds. The Excelsior, a 995.2 carat stone was the largest in the world for 12 years after it was found in 1893. Today

Jagersfontein is the oldest and largest open mine in the South Africa and also a major tourism attraction.



Figure 2-1: Suspended bronze kettle at the entrance of the town of Koffiefontein.

Transport riders' habit of constantly making coffee is said to have led to the name Koffiefontein, so much so that upon entering the town tourists are welcomed by the vision of a suspended bronze kettle below the town name (see Figure 2-1). In 1870, one of the transport riders picked up a diamond near the fountain. This prompted a diamond rush and by 1882 Koffiefontein has become a booming town with four mining companies (DCGTA, 2014).

Koffiefontein forms part of the diamond region, which is one of the priority development regions in the Free State province. Most of the diamonds, gravel and clay are mined in this region of the Free State and also encompasses other nodes such as Jacobsdal, Jagersfontein and Fauresmith in the Xhariep District.

The mining operations at Koffiefontein started in the 1870s as open pits until 1981 when underground mining was introduced. Koffiefontein is one of the world's top kimberlite mines by average value per carat. The existing slimes dam at the Koffiefontein Diamond Mine (KDM) was constructed in 1970 along with the supporting infrastructure for the underground mining operations. The mine produces high-value diamonds, a regular proportion of which are beautiful white diamonds between 5 and 30 carats in size.

The Koffiefontein Diamond Mine is operated by the Koffiefontein Mine Joint Venture, which consist of Petra Diamonds and Re-Teng Diamonds (Pty) Ltd, under the mining right number FS 30/5/1/2/2/91MR C/2006/01/30/001. Petra Diamonds' expansion plan at Koffiefontein Diamond Mine is expected to increase production by the year 2017, and extend the Life of Mine by 28 years. The increased production is owed to the revised mining lay-out for the (Sub Level Cave) SLC, which will accelerate access to fresh kimberlite ore. Development work on the underground tunnel infrastructure is underway, while ore-handling conveyor installations servicing the SLC are in the final stages of commissioning. The production has

risen from about 35 000 carats per annum in 2013, to about 105 000 carats at present. Koffiefontein Diamond Mine currently holds an environmental authorisation for the existing mining operations, which includes the proposed development location for a new slime dam.

2.4 Project Proponent Who is the Proponent?

The KDM is owned by Petra Diamonds and Re-Teng Diamonds (Pty) Ltd, who has formed a joint venture called the Koffiefontein Mine Joint Venture (KMJV). Table 2-1 shows the project proponent / applicant name the delegated contact person on the proposed project:

Table 2-1: Project applicant

Project Applicant:	Koffiefontein Mine Joint Venture
Postal Address	P.O. Box 80, Koffiefontein, 9986
Project Manager:	Mr. Pieter Coetzee
Physical Address	Koffiefontein Mine
Postal Address	P.O. Box 80 Koffiefontein 9986
Telephone:	+2757 733 6203
Fax:	+2753 733 0010
Cell phone:	+27 81 037 9428
E-mail address:	Pieter.Coetzee@petradiamonds.com

Table 2-2: Project contact person

Company:	Koffiefontein Mine Joint Venture
Environmental Specialist	Ester van der Westhuizen-Coetzer
Physical Address	Koffiefontein Mine
Postal Address	P.O. Box 80 Koffiefontein 9986
Telephone	(0)53 205 5354
Cell phone	072 335 0273
Fax:	053 205 5028
E-mail address	estervdw-c@petradiamonds.com

2.5 Details of the Environmental Impact Assessment Practitioner

Zitholele Consulting Pty Ltd. (hereafter referred to as Zitholele) was appointed by the Koffiefontein Diamond Mine as the Environmental Assessment Practitioner (EAP) to carry out the mandatory environmental legislative process that is required to obtain Environmental Authorisation (EA) in terms of the National Environmental Management Act 107 of 1998 (as amended). In keeping with the Regulation 28(1)(a) of the NEMA EIA Regulations 2010, an overview of the expertise and details of the key project team member who prepared this Final Scoping Report is provided in and Part 2.5.2 of this report.

Table 2-3: Details of EAP

Name and Surname	Dr Mathys Vosloo
Highest Qualification	PhD (Zoology), Nelson Mandela Metropolitan University 2012
Professional registration	SACNASP (400136/12)
Company Represented	Zitholele Consulting (Pty) Ltd.
Physical Address	Building 1, Maxwell Office Park, Magwa Crescent West, Corner of Allandale Road & Maxwell Drive, Waterfall City, Midrand, 1685
Postal Address:	P O Box 6002, Halfway House, 1685
Telephone Number	011 207 2079
Fax Number	086 676 9950
E-mail address	mathysv@zitholele.co.za

2.5.1 Overview of Zitholele Consulting

~~In terms of the NEMA EIA 2010 Regulations, the proponent must appoint an Environmental Assessment Practitioner (EAP) to undertake the environmental assessment of an activity regulated in terms of NEMA. Koffiofontein Diamond Mine appointed Zitholele Consulting to undertake the EIA, for the proposed project, in accordance with relevant legislation.~~

Zitholele Consulting is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development.

Zitholele Consulting has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations. The details of the EAP representative are listed below.

2.5.2 Expertise of Environmental Assessment Practitioner

Dr Mathys Vosloo graduated from the Nelson Mandela Metropolitan University with a PhD in Zoology in 2012. Over the past few years Mathys has been involved in a variety of projects and has undertaken environmental authorisations for ranging from the construction of roads, rehabilitation of dam wall infrastructure, development of low cost housing, and electrical generation and transmission projects. Mathys has also been involved in the development of strategic environmental assessments and state of the environment reporting, and has developed numerous environmental management programmes during the course of his career. With more than 10 years of environmental and scientific field and more than 8 years in environmental consulting Mathys has gained an advanced and holistic understanding of environmental management in the built environment. A detailed CV of the Dr Mathys Vosloo is included in Appendix A to this report.

2.6 Department of Economic, Small business development, Tourism and Environmental Affairs Case officer contact details

The Department of Economic, Small business development, Tourism and Environmental Affairs (DESTE) (previous Department of Economic Development, Tourism and Environmental Affairs) (Free State Province) is the Competent Authority. The mandate and core business of the DESTE is underpinned by the Constitution and all other relevant legislation and policies applicable to the government.

Table 2-4: Details of the DESTE case officer

Name	Nonceba Balithe
Postal Address	Private Bag X 20801, Bloemfontein, 9300
Physical Address	Fountain Towers Building 1st Floor, Room 137 C/o Zastron & Markgraaf Street Bloemfontein
Telephone	051 400 4845/17
Fax	051 400 4842
E-mail	balithen@detea.fs.gov.za

~~Details of the Department of Mineral and Resources (DMR) case officer undertaking the assessment of the project is provided in Table 2-5 below.~~

~~**Table 2-5: Details of the DMR case officer**~~

Name	Mr Meshack Modau
Physical Address	The Strip, 314 c/o State way & Bok Street, Welkom, 9459
Telephone	057 357 1300/1302

2.7 KDM Reports considered

- Africa Geo-Environmental Services, 2013: Koffiefontein concept mine water study. Document Version 1.0 – Draft;
- Koffiefontein Diamond Mine, 2013: Water System explained Koffiefontein Diamond Mine.
- North West University, 2012: Avifaunal Survey of Petra Mines Koffiefontein, South Africa;
- North West University, 2013: Koffiefontein Mine JV Herpetological Survey;
- North-West University, 2011: Summer Assessment of the Avifauna of Petra Mines Koffiefontein, Western Free State, South Africa – Interim Project Report;
- North-West University, 2013: Winter and Summer Avifaunal Surveys of Petra Mines, Koffiefontein, South Africa;
- Rison Groundwater Consulting, 2011: Groundwater Quality Assessment, Koffiefontein Diamond Mine;
- Rison Groundwater Consulting, 2012: Hydrogeological Assessment at Koffiefontein Diamond Mine: Geophysics, Drilling, Aquifer Testing, Groundwater Flow And Hydrochemistry;
- Rison Groundwater Consulting, 2013: Dewatering Assessment at Koffiefontein Diamond Mine: Geophysics & Drilling at Ebenhaezer Open Pit; and
- Shangoni Management Services, 2011: Integrated Water and Waste Management Plan, Koffiefontein Empowerment Joint Venture.

3 LEGAL REQUIREMENTS

Environmental legislation in South Africa was promulgated with the aim of, at the very least, minimising and, at the most, preventing environmental degradation. The Acts and Regulations applicable to the Koffiefontein Slimes Dam Project are summarised in Table 3-1.

Table 3-1: Summary of relevant legislation

Legislation	Sections	Relates to
The Constitution Act (No 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property
	Section 27	Health care, food, water and social security
	Section 32	Administrative justice
	Section 33	Access to information
National Environmental Management Act (No 107 of 1998), as amended	Section 2	Defines the strategic environmental management goals, principles and objectives of the government. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
National Environmental Management: Waste Act (No 59 of 2008), as amended	Chapter 2, Part 2	National and provincial norms and standards, and waste service standards
	Chapter 4	Priority waste and waste management activities. Reduction, re-use, recycling and recovery of waste. Waste management activities and contaminated land.
	Chapter 5	Licensing of waste management activities.
South Africa. 2013. National Environmental Management: Waste Act, (59 of 2008) List of waste management activities that have, or are likely to have, a detrimental effect on the environment 2013. (Notice 921). Government gazette, 37083:3, 29 Nov.	Category B	Prior to the implementation of any Waste Management Activities listed in Category B of Government Notice 921 (2013), a Scoping and Environmental Impact Reporting Process must be carried out as part of the Waste Management License Application Process.

Legislation	Sections	Relates to
Mineral and Petroleum resources Development Act (No 28 of 2002), as amended	Section 102	A mining right, mining permit, production right work programme, mining work programme, environmental management programme, and environmental management plan may not be amended or varied (including by extension of the area covered by it) without the written consent of the Minister.
	Section 107	The Minister may make regulations regarding the conservation of the environment at or in the vicinity of any mine or works, the management of the impact of any mining operations on the environment at or in the vicinity of any mine or work, and the exploitation, processing, utilization or use of or the disposal of any mineral.
	MPRDA: mineral and petroleum resources development regulations	The Minister of Mineral Resources has gazetted regulations in terms of section 107 of the MPRDA (No 28 of 2002), as amended
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution.
	Section 20	Control of emergency incidents.
	Chapter 4	Use of Water and licensing.
National Environmental Management: Air Quality Act (No 39 of 2004)	Chapter 4	Air Quality Management Measures
	Chapter 5	Licensing of listed activities
	Section 32 of R. 827 of 1 November 2013	National Dust Control Regulations, to prescribe general measures for the control of dust in all areas
	Section 34	Control of Noise
	Section 35	Control of offensive odours
NEM: Protected Areas Act (No 57 of 2003)		The Act came into operation on 01 November 2004. The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. In 2004, the National Environmental Management: Protected Areas Amendment Act 31 of 2004 was promulgated to amend Act 57 of 2003 with regard to the application of that Act to national parks and marine protected areas. The NEM: Protected Areas Amendment Act was published for public information on 11 February 2005 and came into operation on 01 November 2005. The NEM: Protected Areas Act, as amended by the NEM: Protected Areas Act 31 of 2004 repeals sections 16, 17 & 18 of the ECA as well as the National Parks Act with the exception of section 2(1) and Schedule 1.
The Conservation of Agricultural Resources Act (No 43 of 1983) and regulations	Section 6	Implementation of control measures for alien and invasive plant species

Legislation	Sections	Relates to
National Heritage Resources Act (No 25 of 1999)	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
Atmospheric Pollution Prevention Act (No 45 of 1964) and regulations	Sections 27 – 35	Dust control
	Section 36 - 40	Air pollution by fumes emitted by vehicles
Occupational Health and Safety Act (No 85 of 1993) and regulations	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to persons other than their employees.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA)	Strategy for achieving the objectives of the United Nation's Convention on Biological Diversity, to which South Africa is a signatory.	
	Sections 65 - 69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species.
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.

Legislation	Sections	Relates to
National Forests Act (No 84 of 1998) and regulations	Section 7	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette.
	Sections 12 - 16	These sections deal with protected trees, with the Minister having the power to declare a particular tree, a particular group of trees, a particular woodland, or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.
Fencing Act (No 31 of 1963)	Section 17	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.
Hazardous Substances Act (No 15 of 1973) and regulations	Regulates the classification, use, operation, modification, disposal or dumping of hazardous substances.	
Free State Province - Provincial Spatial Development Framework 2014	The Free State PSDF is the first provincial SDF to be prepared in terms of the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA). Accordingly, it is an integral part of a national, provincial, and municipal plan-led system that aims to bring coherency to spatial planning and land-use, and allow long-term public interests to guide the development process.	
Xhariep District Municipality – Spatial Development Framework 2012	The Xhariep DM SDF provides detailed information regarding spatial development planning within the Xhariep DM. It further provides urban boundaries for each of the major towns within each of the local municipalities falling within the Xhariep DM.	
Xhariep District Municipality Integrated Development Plan 2014-15	The Integrated Development Planning is regarded as a tool for municipal planning and budgeting to enable municipalities to deliberate on developmental issues identified by communities.	

Legislation	Sections	Relates to
Letsemeng Local Municipality Integrated Development Plan 2012/2013		The IDP represents the five-year development blueprint for the Letsemeng Local Municipality. The IDP is the principal strategic planning instrument which guides and informs all planning, budgeting, investment, development, management and implementation in the medium-term decision-making.

A discussion of the most relevant legislation is given in the sections that follow.

3.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution of the Republic of South Africa, 1996 (hereafter referred to as "the Constitution") is the Supreme Law in South Africa. The Bill of Rights is included in Chapter 2 of the Constitution. The Environmental Right is set out Section 24 of the Constitution and states that – Everyone has the right -

- a) to an environment that is not harmful to their health or well-being; and
- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
 - i. prevent pollution and ecological degradation;
 - ii. promote conservation; and
 - iii. secure ecologically sustainable development and use of natural resources;
 - iv. while promoting justifiable economic and social development.

The National Environmental Management Act, 1998 (Act No. 107 of 1998) is the primary statute which gives effect to Section 24 of the Constitution. The Environmental Right contained in Section 24 of the Constitution also places responsibility on the Environmental Assessment Practitioner (EAP), Applicant and Competent Authority to ensure that this right is not infringed upon. The Sector Guidelines for Environmental Impact Assessment (2010) (Government Notice 654) describes a number of responsibilities which are placed on the EAP, Applicant and Competent Authority to ensure conformance with the statutory Environmental Right. These responsibilities include:

- All parties to the EIA Process have a duty not to infringe other persons' rights in terms of Section 24 of the Constitution.
- The Applicant must ensure that while the development incorporates measures that prevent or control environmental pollution or degradation, it also maximises the positive environmental impacts.
- There must be an equitable balance between the rights of the applicant and the broader public. In this regard, the consideration of need and desirability is critical as it requires the strategic context of the development to be considered with the broader societal needs and public interest.

- The provisions of the Bill of Rights are binding on decision-makers.
- Decision-makers must ensure that their decisions are in keeping with the environmental right and promote an environment that is not harmful to health or well-being.

3.2 National Environmental Management Act 107 of 1998

The EIA for this proposed project is being conducted in accordance with the EIA Regulations that were promulgated in terms of Section 24 (5) of the NEMA, as amended. The NEMA can be regarded as the most important piece of general environmental legislation. It provides a framework for environmental law reform and covers three areas, namely:

- Land, planning and development;
- Natural and cultural resources, use and conservation; and
- Pollution control and waste management.

This law is based on the concept of sustainable development. The objective of the NEMA is to provide for co-operative environmental governance through a series of principles relating to:

- The procedures for state decision-making on the environment; and
- The institutions of state which make those decisions.

The NEMA principles further serve as:

- A general framework for environmental planning;
- Guidelines according to which the state must exercise its environmental functions; and
- A guide to the interpretation of NEMA itself and of any other law relating to the environment.

3.2.1 What are the NEMA Principles?

Some of the most important principles contained in NEMA are that:

- Environmental management must put people and their needs first;
- Development must be socially, environmentally and economically sustainable;
- There should be equal access to environmental resources, benefits and services to meet basic human needs;
- Government should promote public participation when making decisions about the environment;
- Communities must be given environmental education;
- Workers have the right to refuse to do work that is harmful to their health or to the environment;
- Decisions must be taken in an open and transparent manner and there must be access to information;
- The role of youth and women in environmental management must be recognised;
- The person or company who pollutes the environment must pay for the rehabilitation;
- The environment is held in trust by the state for the benefit of all South Africans; and
- The utmost caution should be used when permission for new developments is granted.

3.2.2 Environmental Impact Assessment Regulations: GN 543-546 of 18 June 2010

In June 2010, an amended set of NEMA Environmental Impact Assessment Regulations was promulgated, GNR.543 – 546. These regulations govern the listing of activities that require Environmental Authorisation (EA), the authorisation procedures themselves, and the public participation process for authorisation procedures. It should be noted that although the main activity of the project triggers the need for a waste management license in terms of NEM:WA, certain activities that will be undertaken as part of the project are also listed activities in terms of NEMA, and therefore also require an EIA process prior to proceeding with the project. All listed activities that are triggered as a result of this project are described in Table 3-2.

Table 3-2: Relevant NEMA Listed Activities

Notice Number And Date	Activity Number	Description of the Listed Activity	Description
Construction of the slimes waste disposal facility and associated infrastructure will impact on an area larger than 20 ha.			
GN R. 545 of 2010	Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, industrial or institutional use where the total area to be transformed is 20 hectares or more.	The direct footprint of the slimes disposal facility is expected to range between 40 to 60 hectares.
Construction of a storm water infrastructure and pipelines for the transportation of the slimes slurry.			
GN R. 544 of 2010	Activity 9	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water – i) With an internal diameter of 0.36 metres or more; or ii) With a peak throughput of 120 litres per second or more.	Pipes with an internal diameter of 360 mm or infrastructure that allows a peak throughput of 120 litres per second may be used during the construction and operation of the slimes disposal facility.
The construction of access roads for the development and or long term servicing of all planned infrastructure for the project and/or the realignment and expansion of existing roads.			
GN R. 544 of 2010	Activity 22	The construction of a road outside urban areas (ii) where no reserve exists where the road is wider than 8 metres	Access and maintenance roads will need to be constructed around the developing slimes dam.

3.3 National Environmental Management: Waste Act 59 of 2008

Please refer to Part 3.9 of this document.

~~All Waste Management Activities are regulated by the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) and the regulations thereunder. In order to regulate waste management activities and to ensure that these activities do not adversely impact on human health and the environment, the NEM:WA (2008) introduced the licensing of waste management activities.~~

~~All waste management activities which are listed in Government Notice 921 (2013) in terms of the NEM:WA (2008) requires licensing from the Competent Authority before these activities may proceed. Prior to the implementation of any waste management activity listed in Category A, of Government Notice 921 (2013), a Basic Assessment Process as set out in the Environmental Impact Assessment Regulation made under Section 24(5) of the NEMA (1998) must be carried out as part of the Waste Management License Application Process.~~

~~However prior to the implementation of any Waste Management Activities listed in Category B of Government Notice 921 (2013), a Scoping and Environmental Impact Reporting Process must be carried out as part of the Waste Management License Application Process.~~

~~Each of the project activities, as well as the corresponding waste management activity, is provided in Table 3-3~~

Table 3-3: Description of applicable Waste Management Activities listed in Government Notice 921 (2013)

No.	Category	Waste Management Activity		Project Activity	Description
1.	Category B	7	The disposal of any quantity of hazardous waste to land.	Disposal of tailings in the slimes dam	The diamond mine tailings are transported in slurry to the slimes dam facility. Waste classification will be undertaken to determine the hazard class of the tailings, which will inform the liner system that is to be used.
2.	Category B	10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	Construction of the slimes dam	The tailings will be disposed of in slimes dam, which will specifically be constructed to receive the waste stream resulting from the processing of ore to extract diamonds.

The following regulations will be taken into consideration during conceptual design of the slimes dam:

- Government Notice 704. 1999. National Water Act, Act 36 of 1998
- ~~RSA (Republic of South Africa) (2013a) National Environmental Management: Waste Act (59/2008): Waste Classification and Management Regulations. Government Gazette 36784 No. R. 634 of 23 August 2013.~~
- ~~RSA (Republic of South Africa) (2013b) National Environmental Management: Waste Act (59/2008): National norms and standards for the assessment of waste for landfill disposal.~~

3.4 The Mineral and Petroleum Resources Development Act 28 of 2002, as amended

The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA), as amended, makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. One of the key objectives of the act is to give effect to the principle of the State's custodianship of the nation's mineral and petroleum resources.

As the custodian of the nation's mineral and petroleum resources, the State, acting through the Minister, may (a) grant, issue, refuse, control, administer and manage any reconnaissance permission, prospecting right, permission to remove, mining right, mining permit, retention permit, technical co-operation permit, reconnaissance permit, exploration right and production right.

Through this act the Minister must further ensure the sustainable development of South Africa's mineral and petroleum resources within a framework of national environmental policy, norms and standards while promoting economic and social development.

Amendment of the MPRDA with the Mineral and Petroleum Resources Development Amendment Act, No 49 of 2008, has allowed for the alignment of the EMP process under the MPRDA with the NEMA process. This process of alignment will eventually see the application for provisions under the MPRDA being integrated with the NEMA and the EIA regulations, with the competent authority responsibilities moving from the Minister of Minerals and Energy to the Minister of Environment.

3.4.1 Mineral and Petroleum Resources Development Regulations

The Minister of Minerals and Energy has, under section 107 of the MPRDA, as amended, made regulations to inform the application for any permission, right or permit made in terms of the act. The proposed development of a new slimes dam in close proximity to the existing slimes dams at the KDM may necessitate the need to amend the Environmental Management Programme and financial cost provision in terms of the current MPRDA regulations.

3.5 **The National Water Act (Act 36 of 1998)**

The activities associated with the proposed Koffiefontein Diamond Mine slimes dam project may trigger Water Uses that are defined in Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA). Accordingly these Water Uses may not be undertaken without being granted a Water Use License from the Department of Water and Sanitation (DWS). In accordance with Sections 40 and 41 of the NWA (1998), a Water Use License Application (WULA) Process will be carried out. The resultant documents from the WULA process will include completed WULA Forms as well as a Technical Report. These documents will be submitted to DWS for review and decision making. Although a joint PPP is often followed for the WULA within the EIA Phase, these two EA processes constitute separate applications and submissions are made to the respective Competent Authorities.

The Water Use Licence Application process for licencing of water uses that may be triggered as a result of the KDM slime dam development will be carried out ~~is being undertaken~~ by the proponent as a separate process to this EIA application.

3.6 **The National Heritage Resources Act 25 of 1999**

The objectives of the National Heritage Resources Act 25 of 1999 (NHRA) are to:

- Introduce an integrated and interactive system for the management of the National heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;
- Lay down general principles for governing heritage resources management throughout the Republic;
- Introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- Establish the South African Heritage Resources Agency (SAHRA) together with its Council to co-ordinate and promote the management of heritage resources at National level;
- Set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- Control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- Enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- Provide for the protection and management of conservation-worthy places and areas by local authorities; and to provide for matters connected therewith.

3.7 Applicable Standards and Guidelines

In order to ensure that a best practice approach is adopted for this EIA Process and to ensure that the Scoping report and EIR provides sufficient information required by the competent authority to reach a decision, the following guidelines have been considered in the compilation of this report:

- National Environmental Management Act, 1998 (Act 107 of 1998) Implementation Guidelines Sector Guidelines for Environmental Impact Assessment Regulations Government Notice 654 of 2010, published in Government Gazette 3333, dated 29 June 2010.
- National Environmental Management Act, 1998 (Act 107 of 1998) Publication of Need and Desirability Guideline in terms of the Environmental Impact Assessment Regulations, 2010, Government Notice 792 of 2012, Government Gazette 35746, dated 05 October 2012.
- Department of Water Affairs & Forestry, 1998. Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.
- DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria
- Department of Environmental Affairs, 2011. A user friendly guide to the National Environmental Management: Waste Act, 2008. South Africa. Pretoria.
- DEAT (2004) Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

3.8 The Competent Authority and co-operative governance

The Decision-Making Authority otherwise known as the Competent Authority (CA) for this EIA is the Department of Economic Development, Tourism and Environmental Affairs, (the DESTEA). Ms Nonceba Balithe has been assigned as the case officer. The applicant is not a State Owned Entity (SoE), nor a community based project funded by the government grant, thus the CA is the DESTEA. The Department of Environmental Affairs (DEA) and Department of Water and Sanitation (DWS) will however remain key commenting authorities. Approval of an amendment to the mine's EMP is also needed from the DMR in terms of the Mineral Petroleum Resources Development Act (MPRDA). Other commenting authorities include the Xhariep District Municipality (XDM), Letsemeng Local Municipality (LLM), the South African Resource Heritage Agency, (SAHRA) and the South African National Biodiversity Institute (SANBI).

3.9 Additional information requested by Competent Authority

In accordance with Section 43(1)(a) of the National Environmental Management Waste Act 59 of 2008 the "Minister is the licensing authority where unless otherwise indicated by the Minister by notice in the Gazette, the waste management activity involves the establishment,

operation, cessation or decommissioning of a facility at which hazardous waste has been or is to be stored, treated or disposed of". In correspondence received from the Competent Authority, dated 20 August 2014, the CA advised the EAP that all matters concerning hazardous waste falls within the ambit of the Minister (and therefore the National Department of Environmental Affairs).

Although Section 24L of the National Environmental Management Amendment Act 62 of 2008 allows for an Integrated Environmental Authorisation to be carried out if the carrying out of a listed activity is also regulated in terms of another law or a specific environmental management Act, this document provides information relating only to the activities defined in Listing Notice 1 (Government Notice No. R.544) that are triggered by the proposed project. The proponent has therefore opted to, at this time, proceed only with the Environmental Authorisation Process in terms of the NEMA (1998) (as amended). All matters relating to any aspect of the proposed project that falls within the ambit of the National Environmental Management Waste Act 59 of 2008, will constitute a separate EA (Waste Management Licensing) Process.

4 NEED AND DESIRABILITY OF THE PROPOSED DEVELOPMENT

In keeping with the requirements of Regulation 28(1) of the NEMA EIA Regulations 2010 this document section is intended to provide an overview of the Need and Desirability of the proposed project. As explained in the Guideline on Need and Desirability (DEA, 2010) the application of Environmental Management Instruments including Environmental Management Frameworks, Spatial Development Tools (such as Spatial Development Frameworks) as well as Integrated Development Frameworks should be considered when determining the need and desirability of proposed project. Furthermore in considering the need and desirability of the proposed project the strategic concept of the project along with the broader societal needs and public interest has been taken into account.

A number of questions formulated to guide the identification of the need and desirability of a proposed development is provided in the Guideline on Need and Desirability (DEA, 2010). The information provided in Table 4-1 and Table 4-2 provides answers specific to the project at hand for each of the guiding questions contained in Section 5 of the Guideline on Need and Desirability (DEA, 2010).

Table 4-1: Assessment of the Need of the proposed Koffiefontein Mine slimes dam development

No.	Question	Description	Answer
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant authority?	Koffiefontein forms part of the diamond region, which is one of the priority development regions in the Free State province and has been identified in the Free State Province Spatial Development Framework completed in 2014. Most of the diamonds, gravel and clay are mined in this region of the Free State and also encompasses other nodes such as Jacobsdal, Jagersfontein and Fauresmith in the Xhariep District.	Yes
2.	Should the development, or if applicable, expansion of the town / area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time.	Provincial strategic growth and development have been identified in the Free State Province Spatial Development Framework (2014) as an important goal to achieve. This goal is supported by a number of pillars, one of which deals with inclusive economic growth and sustainable job creation. The second driver for this pillar aims to minimise the impact of the declining mining sector and ensure that existing mining potential is harnessed. In order to achieve this the FSPSDF (2014) recommended that the mining sector be supported and allowed to extend the life of existing mines in the Free State and market new mining opportunities. The proposed activities being applied for on behalf of the Koffiefontein mine is one of these life of mine extension initiatives.	Yes

No.	Question	Description	Answer
3.	Does the community / area need the activity and the associated land use concerned (is it a societal priority)?	<p>The mining sector in South Africa contributes 5% to its GDP and the Free State’s contributes 12.6% to its provincial GDP (Census, 2011) respectively. Mining also represents a major employer in the province. Approximately 160 000 people are employed in the gold mining sector alone, which represents 32% of the mining sector.</p> <p>Diamond mining operations constitute one of the main social and economic functions of the Town of Koffiefontein, and also the Letsemeng Local Municipality and Xhariep District Municipality. Furthermore, spin-offs from diamonds mined at Koffiefontein by De Beers mines contribute a major part of the local economy (FSPSDF, 2014). As such, the mine employs approximately 550 people, the majority of whom are resident in Koffiefontein or the nearby Dithlake. The majority of the labour force is made up from the local community and neighbouring towns (KEJV IWWMP, 2011). The extension of the life of mine of the Koffiefontein mine through the establishment of an additional slimes dam to receive the slimes waste stream during the extended operations will therefore ensure the sustained livelihood of the employees from the local communities, as well as local businesses that benefit from the spin-off from the diamond mine in the area.</p> <p>The Industrial Development Corporation (IDC), Petra Diamonds and Letsemeng Local Municipality have signed a Memorandum of Agreement on the establishment of a LED Forum. The Committee is responsible for the formulation of feasibility studies and business plans of two possible high impact local economic development projects, which are a brick making factory and crusher plant. These projects are aimed at boosting the local economy and sustaining the economy after mine closure in about 15 to 20 years. The municipality has also joined the discussions on the Social and Labour Plan of Petra Diamonds for 2012 – 2017 which also focuses on local economic development projects within the municipal jurisdiction (Letsemeng LM IDP, 2013).</p>	Yes
4.	Are the necessary services with adequate capacity currently available or must additional capacity be created to cater for the development?	The proposed development activity constitutes a continuation of the existing mining operations therefore no new services is required by the Koffiefontein mine. A Water Use Licence Application is currently being undertaken to address additional water capacity that may be required.	Yes

No.	Question	Description	Answer
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	<p>Koffiefontein forms part of the diamond region, which is one of the priority development regions in the Free State province and has been identified in the Free State Province Spatial Development Framework completed in 2014.</p> <p>Provincial strategic growth and development have been identified in the Free State Province Spatial Development Framework (2014) as an important goal to achieve. This goal is supported by a number of pillars, one of which deals with inclusive economic growth and sustainable job creation. The second driver for this pillar aims to minimise the impact of the declining mining sector and ensure that existing mining potential is harnessed. In order to achieve this the FSPSDF (2014) recommended that the mining sector be supported and allowed to extend the life of existing mines in the Free State and market new mining opportunities. The proposed activities being applied for on behalf of the Koffiefontein mine is one of these life of mine extension initiatives.</p>	Yes
6.	Is this project part of a national programme to address an issue of national concern or importance?	Although the project is not directly mentioned as part of a national programme to address issues of national concern or importance, operation of the Koffiefontein mine contributes to a major part of the local economy through jobs and economic input into the local economy and infrastructure development, thus contributing to the eradication of poverty and provision of basic services.	No

Table 4-2: Assessment of the Desirability of the proposed Koffiefontein Mine slimes dam development

No.	Question	Description	Answer
1.	Is this development the best practicable environmental option for this land / site?	The expansion of the slimes dam will occur within the mine property which is already zoned for mining purposes. Given the proposed extension of the life of mine of the Koffiefontein mine, the proposed location of the slimes dam has taken into account the proximity of the town of Koffiefontein and communities on the urban edge. The proposed location of the slimes dam has also maximised the distance between the slimes dam and the local community through its placement on the west side of the Koffiefontein mine next to the existing slimes dams.	Yes
2.	Would the approval of this application compromise the integrity of this existing approved and credible municipal IDP and SDF as agreed by the relevant authorities?	Koffiefontein forms part of the diamond region, which is one of the priority development regions in the Free State province and has been identified in the Free State Province Spatial Development Framework completed in 2014. The Free State Province Spatial Development Framework (2014) has also identified provincial strategic growth and development as an important goal to achieve. This goal is supported by a number of pillars, one of which deals with inclusive economic growth and sustainable job creation. The second driver for this pillar aims to minimise the impact of the declining mining sector and ensure that existing mining potential is harnessed. In order to achieve this the FSPSDF (2014) recommended that the mining sector be supported and allowed to extend the life of existing mines in the Free State and market new mining opportunities. The proposed activities being applied for on behalf of the Koffiefontein mine is one of these life of mine extension initiatives. This development is therefore 100% in line with the existing municipal IDP and SDF.	No
3.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	The Koffiefontein falls within the earmarked mining area as identified within the FSPSDF (2014). This SDF identified protected areas, critical biodiversity areas and ecological support areas. The Koffiefontein mine does not fall within any of these environmental management priority areas.	No
4.	Do location factors favour the land use associated with the activity applied for at this place?	Koffiefontein forms part of the diamond region, which is one of the priority development regions in the Free State province and has been identified in the Free State Province Spatial Development Framework completed in 2014. The expansion of the slimes dam will occur within the mine property which is already zoned for mining purposes.	Yes
5.	How will the activity, and associated activities, applied for impact on sensitive natural or cultural areas (built and rural / natural environment)?	The impact of the proposed slimes dam development on the receiving natural and cultural environment will be investigated in the Environmental Impact Reporting phase of the EIA. Specialist studies to investigate sensitive aspects of the receiving environment have been identified and are listed in the Plan of Study included in this Scoping Report, together with the specific terms of reference for each specialist study.	To be determined during the EIA Phase.
6.	How will the development impact on people's health and wellbeing?	The impact of the proposed slimes dam development on the health and wellbeing of people living in close proximity to the development will be investigated in the Environmental Impact	-

No.	Question	Description	Answer
		Reporting phase of the EIA. Specialist studies to investigate sensitive aspects of the receiving environment have been identified and are listed in the Plan of Study included in this Scoping Report, together with the specific terms of reference for each specialist study.	
7.	Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	<p>Opportunity costs can be defined as the net benefit that would have been yielded by the next best alternative. For example, if farming is the next best alternative for a piece of land, then the foregone benefit of losing the farming option will be the opportunity cost of any other land use, or if not proceeding with the activity, then the foregone benefits of the proposed activity is the opportunity cost of not proceeding. A key part of considering opportunity costs is commonly to comparatively consider and assess the different alternatives in terms of the benefits and/or disadvantages associated with each alternative.</p> <p>The existing land use of the site on which the development of the slimes dam is proposed is already maximised to ensure high local and regional benefits. The next best alternative for the proposed land is likely to be agriculture. When compared to the proposed extension of life of mine the opportunity cost would be low.</p>	No
8.	Will the proposed land use result in unacceptable cumulative impacts?	<p>A cumulative impact is defined in the National Environmental Management Act, 1998 (Act No. 107 of 1998) Environmental Impact Assessment Regulations (2010) as meaning “the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area”.</p> <p>Cumulative impact of the proposed slimes dam development on the receiving environments will be investigated in detail in the Environmental Impact Reporting phase of the EIA. Specialist studies to investigate sensitive aspects of the receiving environment have been identified and are listed in the Plan of Study included in this Scoping Report, together with the specific terms of reference for each specialist study. These specialist studies will also consider cumulative impacts on the receiving environments.</p>	To be determined during the <u>EIA Phase</u>

5 PROJECT DESCRIPTION

5.1 Project Location

Koffiefontein is located in the Free State Province, 105 km SSE from Kimberley and approximately 138 km from Bloemfontein. The total property area amounts to 2817 ha of which 887 ha is utilised for mining and tailings storage and the rest (1930 ha) is a game farm. The study area included the game farm, the Tailings Storage Facilities (TSF's) and the Return Water Dam (RWD) (Figure 5-1). Mining infrastructure, includes open pits, underground mine infrastructure, plant infrastructure, waste rock dump, return water dam and slimes dams (West Dam, Middle Dam and East Dam). Currently mining activities include underground mining and Ebenhaezer Pit open pit mining.

Koffiefontein is situated in the Letsemeng Local Municipality, which falls within the bounds of the Xhariep District Municipality. Letsemeng LM forms the western part of Xhariep District and borders the Northern and Western Cape Provinces, the former via Jacobsdal.

The Xhariep DM is renowned for diamond, salt and slate mining as well as irrigation farming along the Orange Riet Canal and Van der Kloof Dam. It comprises five towns connected by a tarred road via Koffiefontein. The R705 links Jacobsdal with Koffiefontein, while the R48 links Petrusburg, Koffiefontein and Luckhoff. The R704 links Koffiefontein, Fauriesmith and Jagersfontien, with the latter linked to Trompsburg by a dirt road. To travel to Trompsburg from any of the towns in the district on a tarred road would necessitate going via Bloemfontein. The N8 route traverses the area to the north and links Kimberley and Bloemfontein via Petrusburg. The Port Elizabeth railway line starts at Koffiefontein and connects at Springfontein with the Johannesburg/Cape Town railway line to continue in an easterly direction towards Port Elizabeth. The distances to various neighbouring towns are as follows:

- 2 km from Dithlake,
- 3 km from Rooibult,
- 27 km from Oppermans,
- 38 km from Jacobsdal,
- 45 km from Luckhoff,
- 49 km from Fauresmith, and
- 50 km from Petrusburg.

Koffiefontein serves as the municipal administrative seat within the Letsemeng LM. It is situated approximately 125 km northwest of Trompsburg and an estimated 146 km east of Bloemfontein. Koffiefontein is a major social and economic hub in the area and house the main LM administrative centre, regional agricultural services centre, diamond mining operations, and regional social services centre.

The areas adjacent to the Koffiefontein Mine Operation are used primarily for residential and agricultural purposes. Residential areas in close proximity to the Koffiefontein Mine Operation are Koffiefontein town, Diamanthoogte, Dithake and Rooibult. Further infrastructure adjacent to the Koffiefontein Mine Operation is the airstrip and the municipal sewage treatment works with associated sewerage infrastructure.

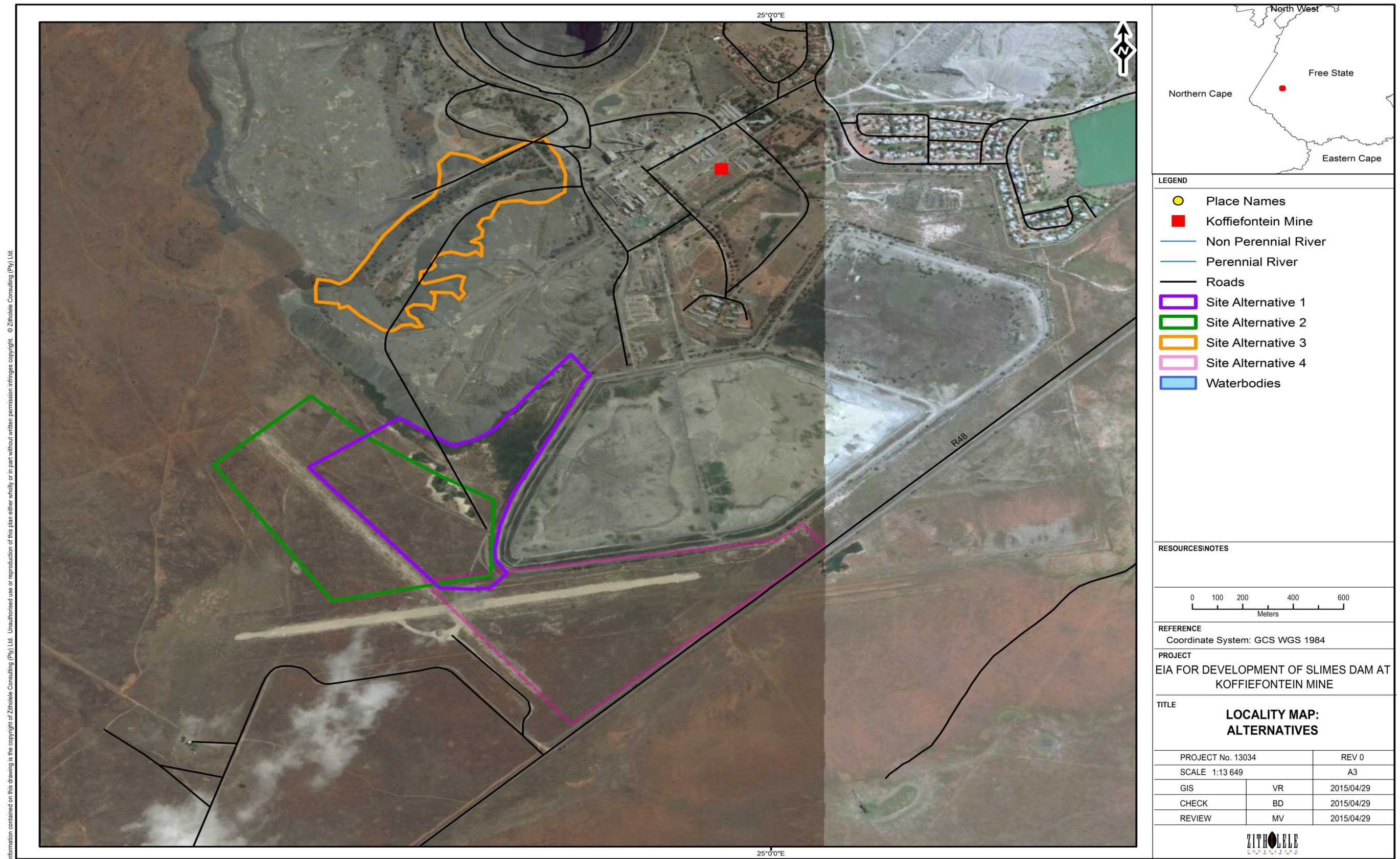


Figure 5-1: Overview of project location

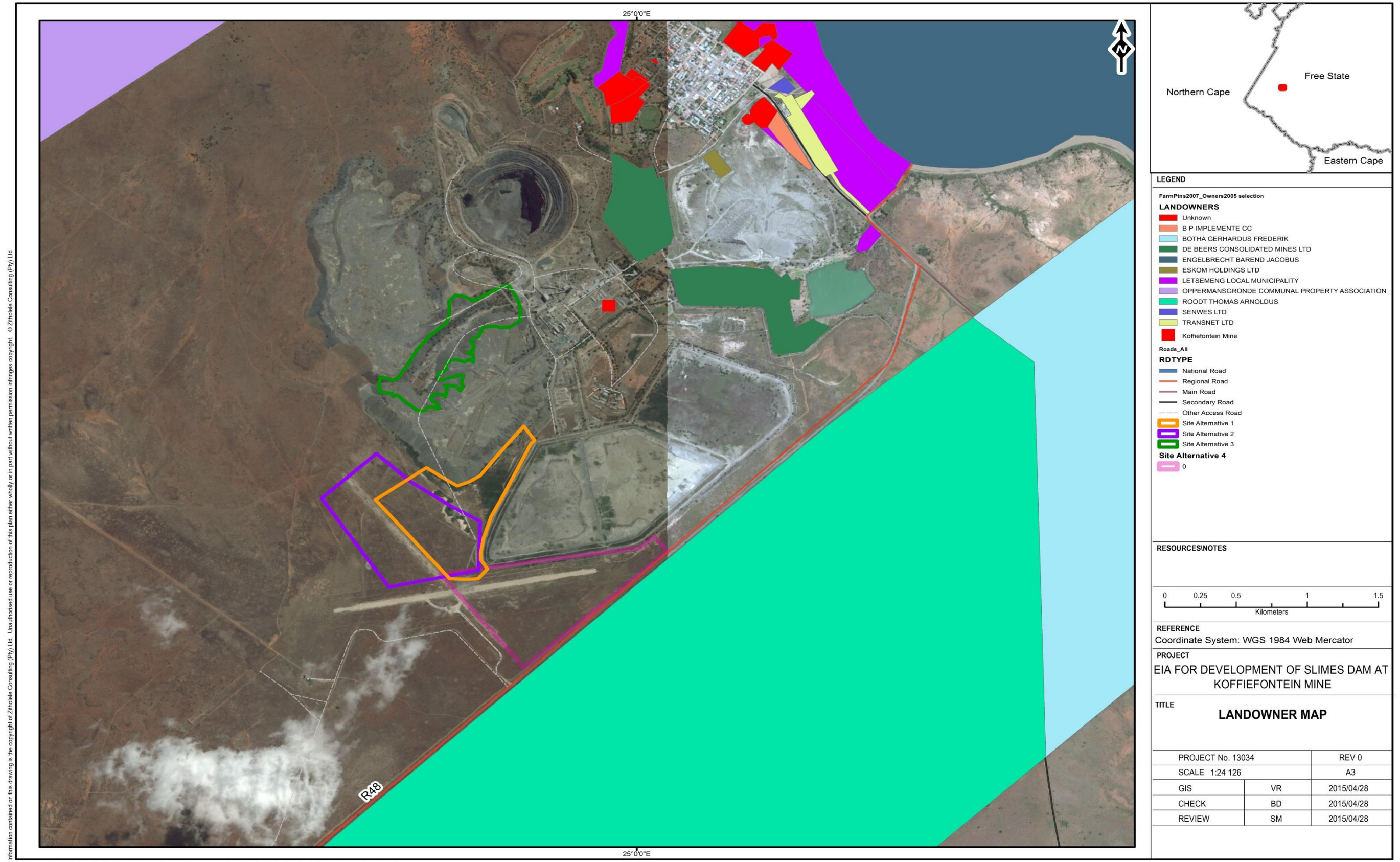
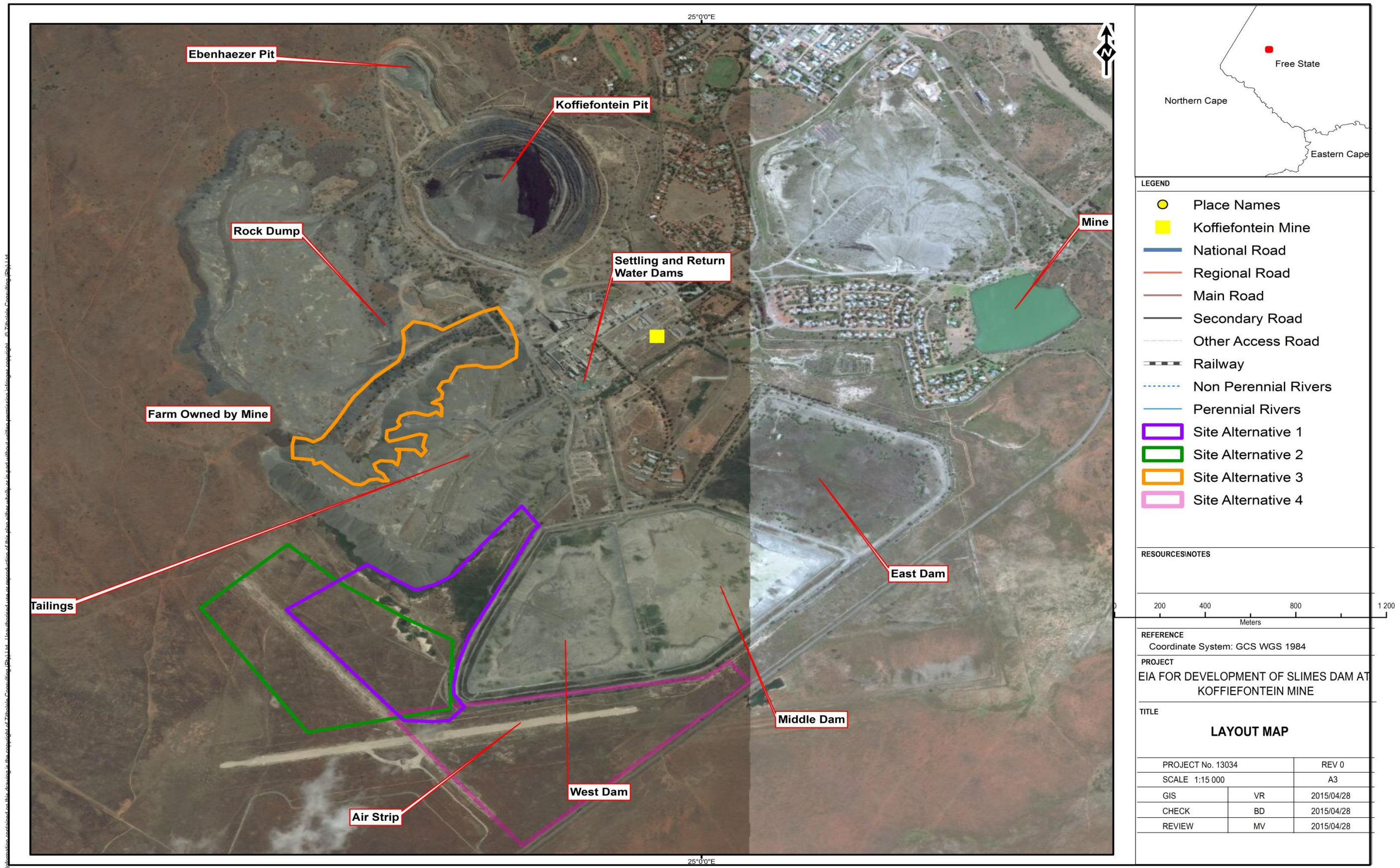


Figure 5-2: Land Owner map

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Figure 5-3: Layout of the Koffiefontein Diamond Mine operations

5.2 Description of existing activities

5.2.1 Existing Services

Roads and transportation

Roads applicable to the Koffiefontein Diamond Mine include the R705 connecting Koffiefontein with the N12 to Kimberly and the R48 connecting Koffiefontein with the N8 to Bloemfontein or Kimberly. The R704 and R706 are located to the south-east of Koffiefontein. On-site roads consist of both tarred and gravel surfaces, maintained on a regular basis. Gravel roads are treated with a bitumen product to aid dust suppression.

Electricity

Eskom supplies electricity to Koffiefontein Diamond Mine and adjacent residential communities. Koffiefontein Diamond Mine is not responsible for any power generation.

Current Water supply

The source of domestic / potable water for Koffiefontein Diamond Mine is from the local municipality (Letsemeng LM and Xhariep DM) network. The local municipality receives water from the Kalkfontein water canal. For approximately four weeks of the year the local municipality uses raw water from the Mine Lake. The local municipality is responsible for managing the domestic water quality in terms of the domestic water quality requirements. Groundwater is not abstracted for domestic use at Koffiefontein Diamond Mine.

Make-up water for the mine process is obtained from the Mine Lake (raw water from the Kalkfontein water canal) (Figure 5-3). The use of make-up water is minimised by re-use of recovered mine affected water, closed water system – no water is released into the environment at any given time, and thus complying with the domestic water quality requirements as stipulated by the Department of Water Affairs (DWA), now Department of Water and Sanitation (DWS). However, the last point of release of effluent from the mine was in the lake area which is currently used for recreational purposes as well as supplying water to the town of Koffiefontein for the three dry weeks in June when the Kalkfontein water Channel is being cleaned (Koffiefontein Diamond Mine¹, 2013).

(Koffiefontein Diamond Mine, 2013) further stated that currently water from 1 (Mining and plant) used in the plant for the process and it is then pumped to the slimes dams (5). Water from the slimes dams flows in to the first settling dam which is situated at the foot of the slimes dam where it flows in the channel indicated by the red arrow from the slimes dam to

¹ Koffiefontein Diamond Mine, 2013: Water System explained Koffiefontein Diamond Mine

either the settling dam (4) or the holding dam (2) from there the water is gravity feed to the mine lake area (7). Water from the lake is then used as make up water if there is not enough water from underground to be used in the process. Fresh water for the dam is obtained from Kalkfontein channel on a regular basis. Water from the lake can only over flow if the level of the lake is not managed with intake water from Kalkfontein. Figure 5-4, illustrates the current water system for Koffiefontein Diamond Mine (Koffiefontein Diamond Mine, 2013).



**Figure 5-4: Aerial photo of Water System Koffiefontein at Diamond Mine
(Data Source: Koffiefontein Diamond Mine, 2013).**

Table 5-1: Legend on Water System Koffiefontein at Diamond Mine.

Number on Figure	Representation
1	Plant and Mining area
2	Old Holding dam (Holding dam 1)
3	New Holding dam (Holding dam 2) Lined dam
4	Settling dam
5	Slimes dam
6	Paddocks
7	Lake
8	Inlet from Kalkfontein Channel
9	overflow

Future Water supply system

Area 3 as seen from is the new holding dam that has been lined with a polymer that is South African Bureau of Standards (SABS) approved to stop water from draining out of the dam. Number 6 is the old paddocks system from the early 1980's that has not been used since. The paddocks have been cleaned and excavated to the level of the channel. Sluice gates will be installed in the mine to Lake Channel to stop water from running into the lake and divert the water to flow into the paddocks system where the water can settle. Water will be pump out of the paddocks with six inch pumps via a pipe line to the new holding dam (3) in the plant area where it will be used in the process again.

5.2.2 Existing mining operations infrastructure at KDM

The Koffiefontein Diamond Mine Operation consists of the following existing infrastructure:

- Access control and Fencing;
- Service roads;
- Two shafts (Main rock shaft & decline shaft);
- Compressor rooms;
- Ore treatment plant;
- Overland pipe reticulation;
- Lighting infrastructure;
- Conveyor systems;
- Mine offices and change houses;
- Workshops and wash bay;
- An explosives magazine;
- Bulk storage facility for fuel and diesel;
- Salvage yard;
- Waste Storage Facilities for the temporary storage of hazardous and solid waste;
- Coarse tailings disposal facilities, ranging in size and footprint area and waste rock dump;

- Two opencast pits which include Koffiefontein Pit (not operational) and Ebenhaezer Pit (Operational),
- Water Management Structures;
 - Mine lake,
 - Two (2) plant reservoir dams,
 - Settling Dam No1,
 - Plant Return Water Dam,
 - New Plant Return Water Dam,
 - Silt trap / paddocks,
 - Storm water reticulation systems,
 - Three slimes dams - Slimes Dam no 1 (West dam), Slimes Dam no 2 (Middle dam), and Slimes dam no 3 (East dam), and
 - Koffiefontein Diamond Mine sewage pipelines,
- An airstrip located on the mine property;
- A number of mine owned houses;
- Game farm with accommodation; and
- Recreational areas.

5.2.3 Infrastructure associated with the disposal of slimes

Existing slime dams

The existing slimes dams (West dam, Middle dam, and East dam) forms part of a closed reticulation system (Figure 5-3).

Return Water Dam and Sediment Trap

Typically a RWD and Sediment Trap is located downstream of a slime dam as this allows a gravity decant system (Figure 5-3). In some instances the location of the RWD downstream of the slimes dam is not possible due to various reasons, including space shortage, and thus the RWD can be allocated upstream. The new Return Water Sump will be lined with an appropriate barrier system based on the classification of the waste stream and to comply with the National Environmental Management: Waste Act and relevant regulations. The basin and main embankment will have an underdrainage system to manage possible leaks but also to reduce the uplift pressure below the liner. The dam will be filled by pumping from the pool of the TSF with a floating barge pump system. The dam is further decanted with two outlet pipes through the main embankment.

5.2.4 Existing mining process

Mine residue in the form of fine tailings (slimes) is generated during the plant processes; a simplified diagram of the process is presented in Figure 5-5. After process usage the slimes affected water is pumped to the Slimes Storage Facilities.

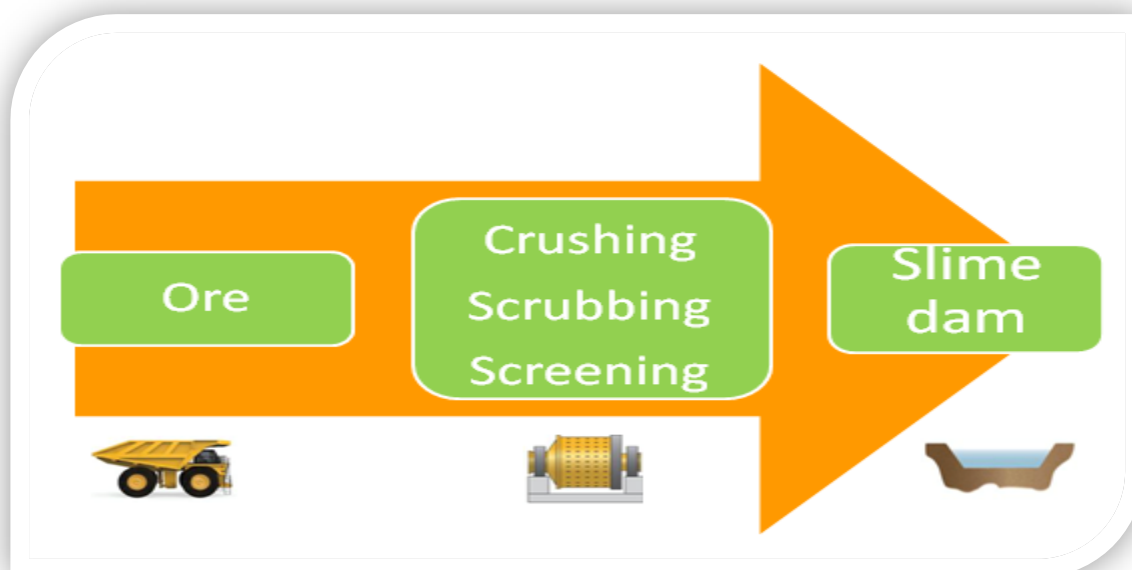


Figure 5-5: Plant processes

Transporting ore to the processing plant

This is done via a number of conveyer belts from the stockpile to the plant. The ore is extracted via the main shaft to the stockpile. Ore is uploaded onto the belts with trackless mobile machines. Ore from Ebenhaezer pit is transported with trucks to the stockpile.

Crushing/Scrubbing/Screening process

Mechanical and chemical processes are used to extract the desired product from the run of the mine ore and produce a waste stream known as slimes. This process of product extraction is never 100% efficient, nor is it possible to reclaim all reusable and expended processing reagents and chemicals. Ore moves through the crushers to size the ore to a treatable size. After this the ore moves via conveyer belts to the scrubbers. This is a washing process. The ore moves from the scrubbers to the screening process.

Disposal of waste products

Slimes consist of ground rock and process effluents that are generated in a mine processing plant. The unrecoverable and uneconomic metals, minerals, chemicals, organics and process water are discharged, normally as slurry, to a final storage area commonly known as a the Slimes Dam Facility (SDF). Process waste water (fine tailings), is pumped to the slimes dam, from where the fine tailings (slimes) settle, and recovery water pumped back to Holding Dam No 2. Thereafter the recovered water is pumped to the Return Water Dams, prior to being reused in the plant process. Recirculation of process water only occurs after slimes settled out of suspension. An approximation of 80 % of process water is re-used. Water loss occurs through evaporation, and some seepage. Raw water is pumped from the Mine Lake for make-up water in the plant operation when required.

5.2.5 Description of proposed new infrastructure

The following infrastructure is envisaged for the development of the new slimes disposal facility.

Pipes for the transportation of slimes to the slime dam

A piping system will be required to transport the slimes waste stream in the form of a slurry to the proposed disposal facility. The exact position of the pipeline will be confirmed in the EIA process and every effort will be made to stay out of the 1:100 year flood line.

Infrastructure for transport of water

Services required for the transport and supply of water in the form of pipe lines, and associated infrastructure i.e. pumps, will be required to ensure re-use of water and pollution prevention. A network of pipelines will be installed, amongst others, to transport water to and from the return water dams; transport water for dust suppression and to transport water collected from the new slime dam to the return water dam.

Access and maintenance roads to the slime dam

Access roads will be established, initially to allow for construction vehicles, but some of these roads may be retained post construction to allow for maintenance of the slime dam. The location of these access roads has not yet been determined, and will form part of the next phase of the EIA process.

Fencing and Access Control

It is envisaged that the access roads and the slime dam will be fenced off to limit access to the disposal facility, which is a key safety and security consideration.

Installation of a Mill

It is proposed to install an additional mill at the Koffiefontein Diamond Mine. Due the early stages of the planning and design of the proposed mill, limited information concerning the mill is available at this time. Detailed information pertaining to the mill, including identified feasible alternatives relating to the mill (e.g. technology alternatives, location alternatives) will be obtained and documented in the subsequent Environmental Impact Phase.

The subsequent sections provide information with regards to the Process Description and Process Considerations concerning the proposed mill:

Process Description

The following principal steps form the process that is undertaken from collection of the material to disposal of the mill effluent at the existing slimes dam facility:

- Material is received in the common collection bin ahead of the milling circuit, after which the material is then withdrawn at a controlled feedrate by an apron feeder and conveyed by a new conveyor to the existing conveyor feeding the existing bunker area;
- Material is withdrawn at a controlled feedrate from the bunker and conveyed (existing conveyor) to a new conveyor feeding the milling circuit. An overband magnet removes any tramp iron ahead of the mill. The mill feed conveyor is fitted with a weightometer for feedrate control and metallurgical accounting purposes;
- Mill dilution water is added (automated control system) to the feed of the mill. The mill discharge is screened on a double deck sizing screen. Spray water is added to the top and bottom decks of the screen to assist with the screening duty. No chemicals are added to the mill dilution water that is used throughout the process; and
- The top deck oversize (+25mm) is conveyed and stockpiled while the bottom deck oversize fraction is conveyed to the existing DMS surge and feed circuit. The mill effluent (-1.5mm) is pumped to the existing slimes dam facility.

Process Considerations

The following process design considerations will be taken into account during the finalisation of the Koffiefontein mill concept:

a) Mill Design Parameters

Various mill design parameters are used to classify the milling characteristics of an ore body. It is worth noting that the mill parameter data base for Kimberlites is not very extensive in comparison with other minerals such as platinum, gold and base metals. Given that the mill parameter data base for Kimberlites is not very extensive, the mill design parameters for each ore type and ore body prior should be determined prior to conducting a detailed design.

b) Mill Configuration Alternatives

It is anticipated that one of the following configurations will be selected for the proposed mill:

- Open circuit Autogenous Mill: The material goes through the mill once, no screening or treatment of the oversize; or
- Partially closed: This includes the introduction of a pebble crusher (typically a cone). The oversize is crushed and the crushed material is recirculated back to the mill feed.
- The pebble crusher assist with liberation as well as increases the mill throughput. This particular configuration allows more flexibility in the configuration of the mill ports.

The amount of pebble porting as well as pebble port aperture needs to be verified as it has a significant influence on the throughput of the mill as well as the mass splits on the mill discharge. If the test work suggests that the material at Koffiefontein is competent and that the desired throughput may not be achieved, the option of installing a pebble crusher can be investigated.

5.3 Major activities to be undertaken during project execution

The major phases for the proposed project (including the EIA), prior to and after construction, are explained in, Table 5-2 below.

Table 5-2: Major phases of the project

NO	PHASE	ACTIVITY DETAILS
PRECONSTRUCTION PHASE		
1	Application and Scoping	The Scoping Phase, as its name implies, determines the scope of the project appropriately (i.e. alternatives, consultation requirements, extent of specialist studies, impact assessment methodology and approach, issues / concerns to be addressed, and reporting for decision-making). This is undertaken through an inclusive stakeholder engagement process, which allows for all sectors of society to be involved, including the proponent, the various spheres of government, the regulator, the immediately affected parties, interest groups or individuals, the consulting team, and the public at large. This phase of the project is structured and minimum requirements are regulated through legislation.
2	Environmental Impact Assessment	An EIA is being undertaken to ensure that all environmental, social and cultural impacts are identified. During this phase the specialist studies as identified during the Scoping Phase are undertaken, and issues / concerns identified are addressed. This phase of the project is also undertaken in consultation with all stakeholder groups as identified during the Scoping Phase. This phase of the project is a necessary precursor to obtaining EA from the CA, without which the project cannot proceed any further.
3	Approval from authorities.	
4	Appeal	Once authorities have issued their decision an appeal process will commence. During this phase both the proponent and other stakeholders have the opportunity to appeal the decisions, or conditions thereof.
5	Property acquisition (if required)	Purchase of property if the chosen site is not on existing Koffiefontein Diamond Mine property.
6	Structure foundation investigation	Investigations will be undertaken to ensure that the foundation specifications are in line with the underlying geology.
CONSTRUCTION PHASE		
7	Site establishment	The first stage of the construction phase is the establishment of contractors on site. This must be undertaken in line with the conditions of EA.
8	Structures	Fencing - Provide a safe and secured waste disposal area to restrict access and prevent injuries to wild animals.
		Formation and lining - Provide a ground formation/lining compacted to the correct standard on which to build the slime dam.
		Drainage - Provide water drainage channels within the site.
9	Rehabilitate the construction area	The area where construction activities have taken place must be rehabilitated to minimise environmental degradation by following the Environmental Management Programme that is compiled in conjunction to the EIA.
OPERATIONAL PHASE		
10	Operations of the slime dam	Current operations to be continued onto the almost full existing slimes dam then into the new slime dam when completed.

11	Rehabilitation and closure of existing slime dam.	The current and new slime development shall be rehabilitated as required.
DECOMMISSIONING AND CLOSURE PHASE		
12	Decommissioning of the slime dam and its infrastructure	Once the slime dam is no longer in use and is no longer required a decommissioning process may commence, which includes transforming slime into building bricks.

6 CONSIDERATION OF ALTERNATIVES

The Koffiefontein Diamond Mine has preliminary investigated possible options for the disposal of the mine tailings resulting from their mining operations. Findings from the preliminary investigations indicate that most feasible manner in which to manage the slime was to develop a slime dam. Options for the slime dam were investigated within the premises of the mine.

6.1 Consideration of the available developable area

The Koffiefontein Diamond mine consist of two differing land use areas. The mining right area is located around and close to the existing kimberlite pipe deposit and resultant pit area. The authorised mining right area however extends westward to the edge of the Koffiefontein Diamond Mine Conservation Area / Game Farm area. The Koffiefontein Diamond Mine conservation area is managed as such and contain a range of fauna and flora as discussed in Section 9.7 of this report. The available developable area is located within the mining right area and is represented by the open space between the existing mining operations and the conservation area.

When suitable locations for a new slimes facility were investigated, areas were identified based on the following principles during consideration of preferred of alternative sites:

- Sites should be close to the existing operations to minimise capital expenditure on linking infrastructure from the existing operations;
- Sites should be close to the existing infrastructure to align with the existing impacts and minimise impact on undisturbed areas;
- Sites should be located away from the existing conservation area thus creating a buffer area to aid in minimising potential impacts from mining operations on the conservation area;
- Sites should be located away from existing communities and farmsteads to minimise nuisance impacts on these communities and households; and
- Sites should be located in an area/s that would not result in sterilisation of mining rights or prevent expansion of the mining infrastructure and operations.

Based on this approach the following alternative sites were identified that will be investigated further during the EIR phase of the project.

6.2 Site Alternatives

The extension of the Life of Mine for the KDM necessitates the need for an additional tailings disposal facility. The proponent has identified available land within the mine owned property where a disposal facility could be located. Based on the available land site alternatives are

proposed for further investigation during the EIA phase. These site alternatives are discussed below.

Following the commencement of the Conceptual Design Process, a number of additional alternatives specific to siting of the proposed slimes dam were identified. The additional site alternatives were identified and screened according to pre-determined criteria that was agreed upon by the mine environmental and engineering teams as well as the EAP and appointed design team.

6.2.1 Option 1 (Site Alternative 1)

Site alternative 1 (Figure 6-1) is located immediately west of the existing West Slimes Dam. A portion of the proposed alternative is wedged between the existing fine tailings dump and West Slimes Dam. The proposed alternative also extends south-westward up until the edge of the Northwest-Southeast runway of the small airfield located in the south of the mine property. This runway of the airfield is not in use anymore. The footprint of Site Alternative 1 covers an area of 41 hectares.

6.2.2 Option 2 (Site Alternative 2)

Site alternative 2 (Figure 6-2) is located west of the existing West Slimes Dam and south of the fine tailings dump. This alternative also covered the portion of the northwest-southeast runway of the small airfield located North of the East-West runway. The southern boundary thus borders the east-west runway, which is still in use. The footprint of Site Alternative 2 covers an area of 52 hectares.

6.2.3 Option 3 (Site Alternative 3)

Site alternative 3 (Figure 6-3) is unevenly shaped and is wedged between the existing fine tailings dump and the coarse rock dump. This alternative was included to maximise the remaining space between the two existing dumps, which is already heavily degraded due to the proximity of the two dumps and mining operations. Further detailed investigations regarding the volume of the area that will be available for slimes disposal will be undertaken in the EIR phase. The footprint of Site Alternative 3 covers an area of 27 hectares.

6.2.4 Option 4 (Site Alternative 4)

Site Alternative 4 (Figure 6-4 to) is located approximately 2 km from the plant, to the south of the existing Fine Residue Storage Facility (FRSF). The distance of Site Alternative 4 from the plant is based on the distance from the central part of the sites to the thickener of the plant. Furthermore the area earmarked for Site Alternative 4 also lies adjacent to road R48 and is located on the eastern section of the existing landing strip. The footprint of Site Alternative 4 covers an area of 53 hectares.

6.2.5 Additional Site Alternatives Option 5 (Modified Site Alternative 1 & Existing Option FRSF)

Assuming that the proposed facility can be raised safely to a maximum height of 40 metres (penstock to be designed accordingly) none of the above sites will be able to meet the required airspace for 20 years. As Option 5 is the current operating area, it was decided to make this site supplementary to the other four sites in order to achieve the desired airspace.

Options 5 to Option 8 considers raising the existing FRSF to a much higher elevation than currently planned and designed for, as well as constructing the additional (but modified) slimes dam. The existing FRSF is located approximately 1 km south west of the plant and covers an area of 87 hectares.

Based on the assumption that the proposed slimes dam can be raised safely to a maximum height of 40 metres, Site Alternatives 1 – 4 as standalone options will not meet the required airspace. Consequently, it was put forth that the raising the elevation of the existing FRSF would be considered as an alternative in conjunction with Site Alternative 1 -4, as follows:

- Option 5 (Modified Site Alternative 1 & Existing Option FRSF);
- Option 6 (Modified Site Alternative 2 & Existing Option FRSF);
- Option 7 (Modified Site Alternative 3 & Existing FRSF); and
- Option 8 (Modified Site Alternative 4 & Existing FRSF).

Note: The proposed Life of Mine does not allow for the raising of the existing FRSF to a higher elevation as a standalone option.

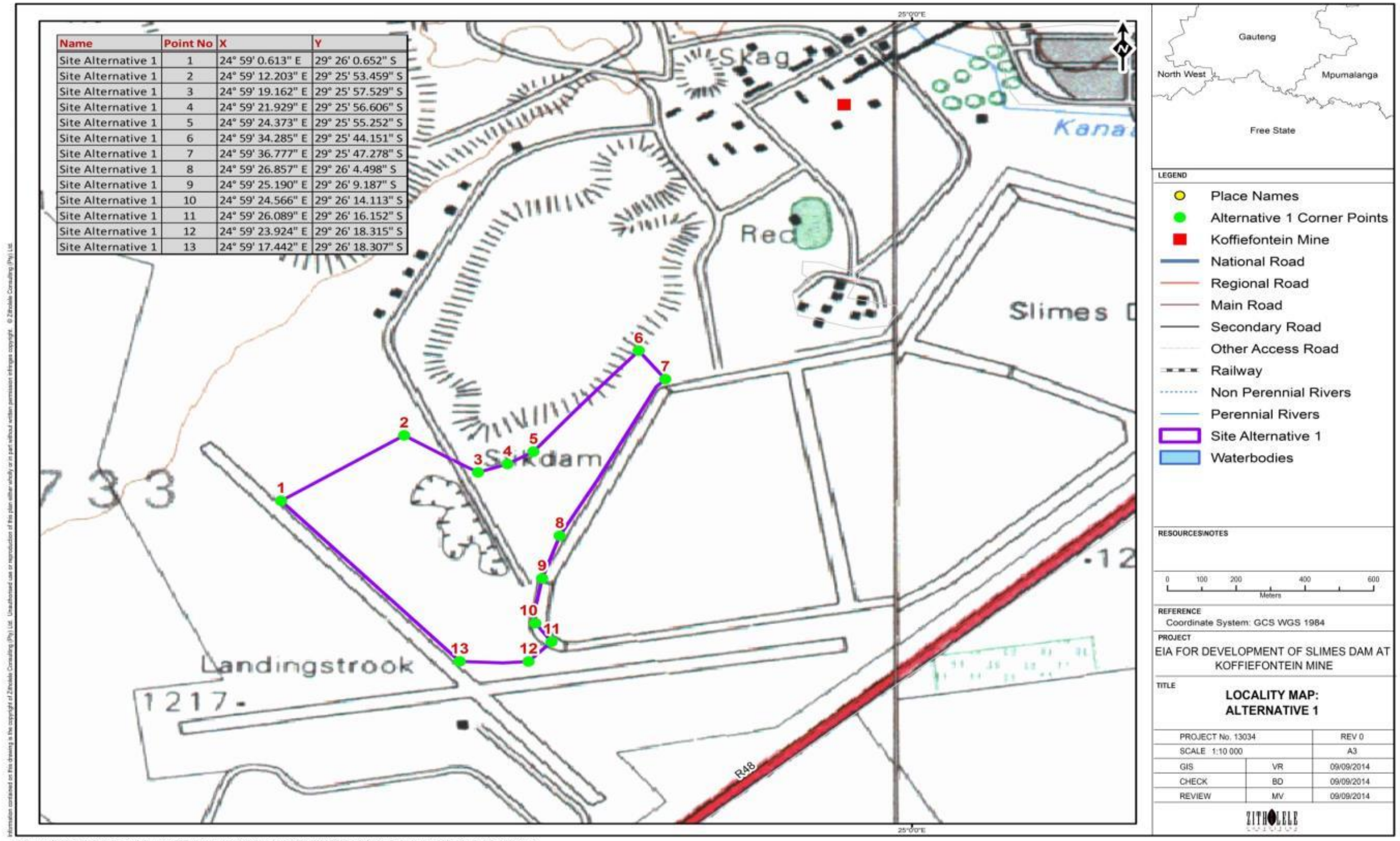


Figure 6-1: Locality map with corner point co-ordinates for Alternative 1

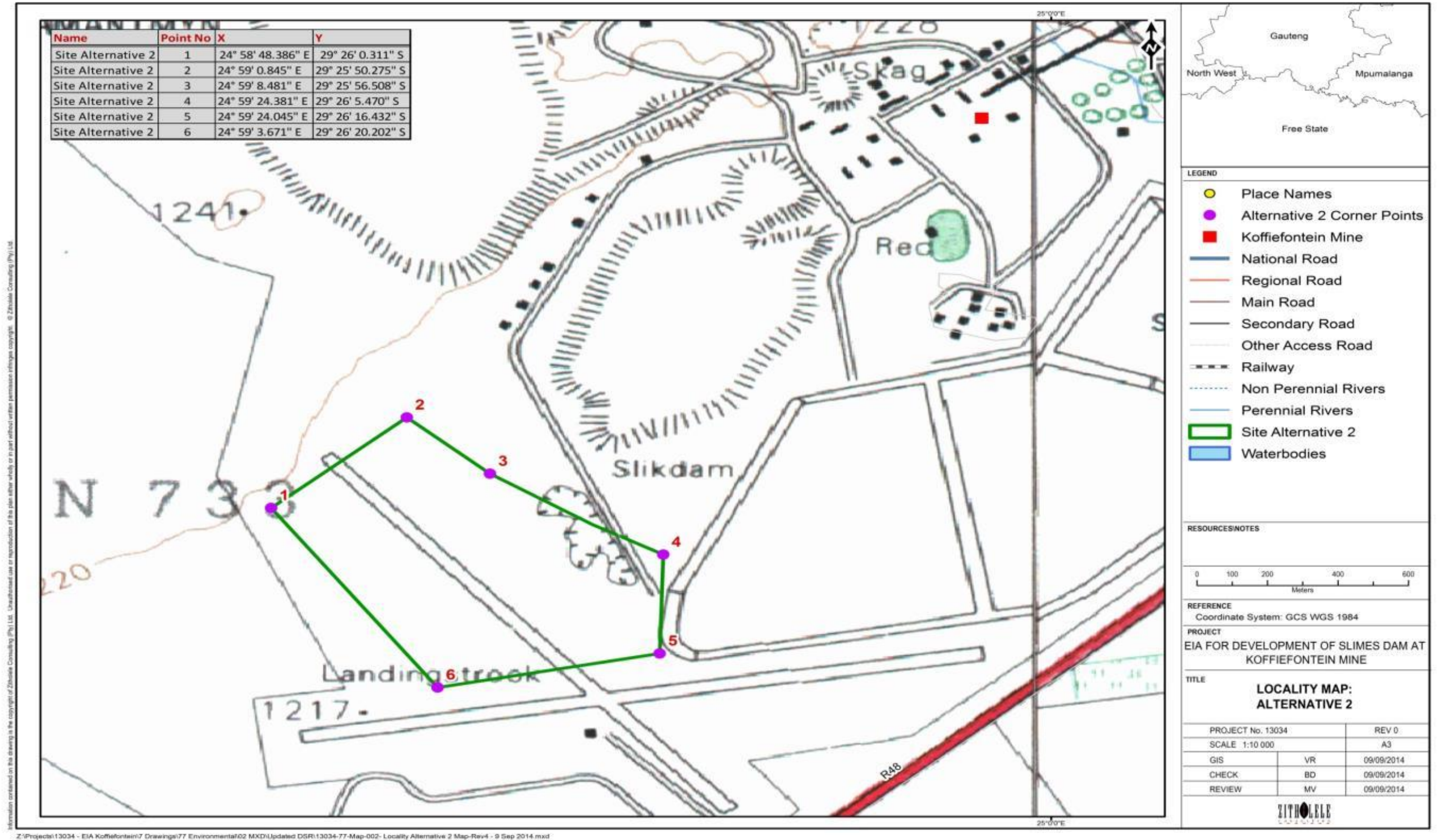


Figure 6-2: Locality map with corner point co-ordinates for Alternative 2

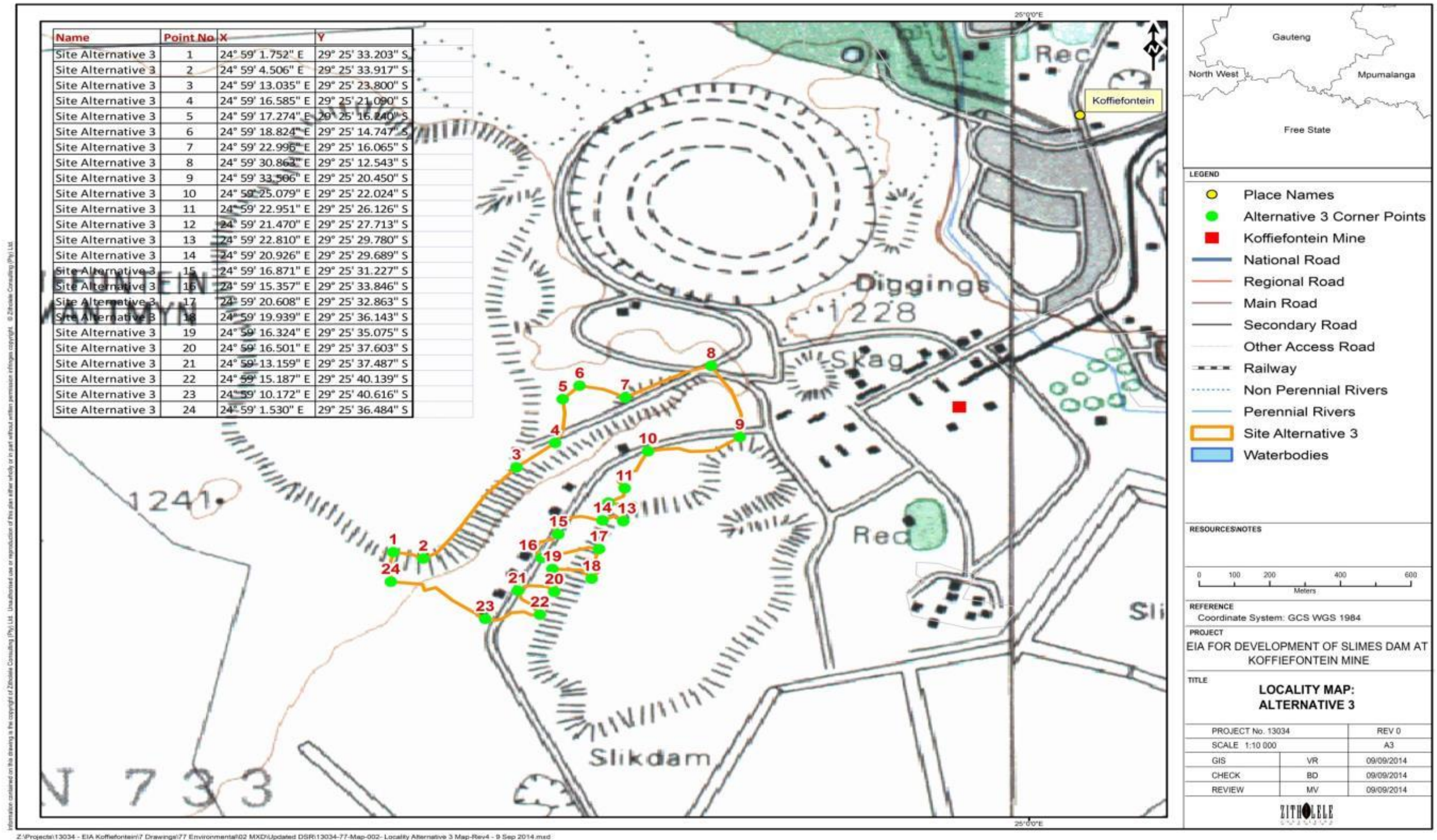


Figure 6-3: Locality map with corner point co-ordinates for Alternative

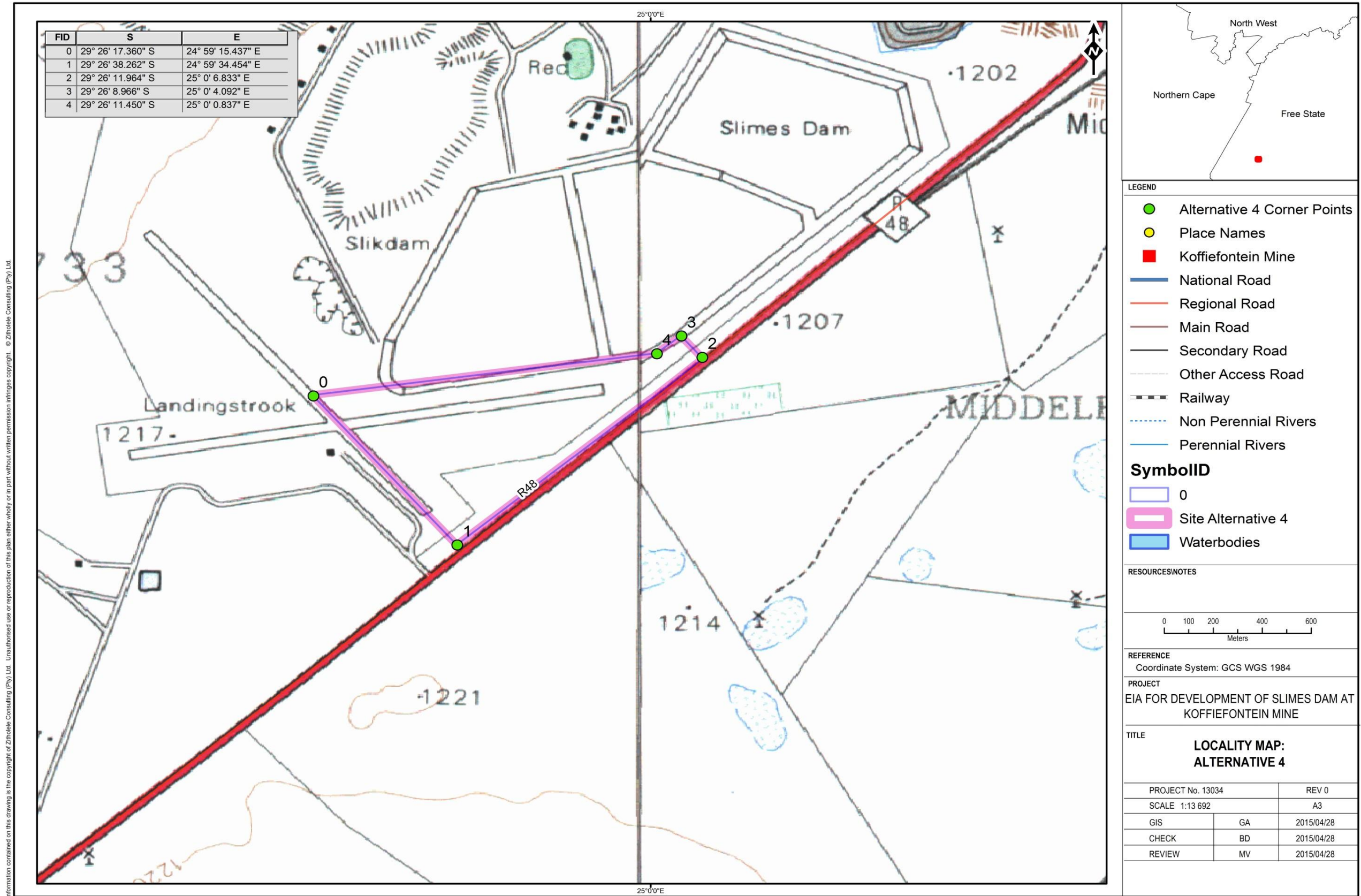


Figure 6-4: Locality Map with corner point coordinates for Alternative 4

6.3 Technology Alternatives

Technology alternative for this project relates to disposal technologies that can be utilised during the disposal process. The Life of Mine extension proposes an extension of the existing disposal technology used, which is disposal of fine tailings in a slurry form via a piped system from the operations plant to the disposal facility. No other technology alternatives were considered at the time of preparing this report.

Based on the preliminary conceptual engineering design, at this time it is recommended that the current disposal method (hydraulic disposal, spray bar method) is adopted for the new FRSF system because of the following:

- Changing the disposal method has the consequence of additional plant infrastructure meaning capital requirements for this infrastructure. For example, for thickened tailings, either a paste plant or a deep cone thickener, with associated pumps and pipelines would be required if this disposal method is adopted, even though the make-up water for the plant would be reduced;
- Additional training of Slimes Dam operating staff would require additional training on the different deposition method and risk associated with the facility;
- Utilising the existing slurry pumping system will be eliminated; and
- A well-established positioning methodology and proven technology, has been established on the mine's Slime Dam.

6.4 Layout Alternatives

Layout alternatives relate to the arrangement and placement of the slimes dam and associated infrastructure within the space available to house this infrastructure, and will be considered in the EIR phase. Such alternatives are however dependant on the outcome of specialist studies on site, therefore layout alternatives can only be considered after completion of the specialist studies.

The most effective placing of the infrastructure on site will be determined by the outcomes of the various specialist studies that will take place during the EIA phase. This should result in various layout alternatives being considered. The Geotechnical and Groundwater specialist studies area expected to have the most significant role in assisting with the design and layout of the proposed activities. Other studies that will help on making decision on the alternative will include the following:

- Ecological Assessment;
- Heritage Impact Assessment;
- Waste Classification Assessment;
- Geotechnical Assessment;
- Air quality assessment; and

- Groundwater Assessment.

6.5 Design alternatives

Design alternatives with regard to this project relates to alternative designs of the slimes disposal facility itself. The design for the new slime dam development will be based on the geotechnical conditions at the site and is also linked to the disposal technology used. It is also desirable from an environmental perspective that the footprint of the facility be reduced to the smallest possible footprint and as such the design alternatives will consider footprint optimisation in all feasible designs.

6.6 “NO-GO” alternative

This alternative proposes that the mine will not continue with disposing once the current slimes dam reaches capacity. The consequence of this alternative is that the mine will have to cease disposing of the slime, which would result in stopping mining operations all together. Should the “No-Go” alternative be the preferred alternative, KDM will have to shut-down the mine. With this scenario no contribution will be made towards the greater economy of this country, causing a negative impact from the National Development Plan (NDP), through the loss in revenue generated from the extraction and selling of diamond. The potential impacts on the ecological, heritage and visual environments will not take place.

6.7 Assessment of Alternatives during the EIA Phase

As part of the subsequent EIA Phase and in keeping with the provisions included in the NEMA EIA Regulations 2010 pertaining to the evaluation of alternatives, the alternatives discussed in Part 5 will be assessed. It is important to note that the approach to be adopted in the subsequent EIA Phase will also place emphasis on assessing alternatives relating specifically to the Listed Activities associated with the planned project activities. The proposed approach concerning assessing the alternatives is intended to determine the “most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts” (DEA, 2004).

7 SCOPING PROCESS

7.1 Approach to undertaking the scoping phase

An Environmental Impact Assessment (EIA) refers to the process involving the identification and assessment of direct, indirect and cumulative environmental impacts associated with the proposed project. The EIA process comprises two Phases: a Scoping Phase and an EIA Phase. The Scoping Phase culminates in the submission of a Final Scoping Report to the Department of Economic Development Tourism and Environmental Affairs as the competent authority for review and acceptance before proceeding onto the EIA Phase of the process.

The phases of the EIA process are as follows:



Figure 7-1: The phases of the EIA process

The Scoping Phase for the development of a new slime dam at Koffiefontein Diamond Mine has been undertaken in accordance with the EIA Regulations GNR543, published in Government Notice 33306 of 18 June 2010, in terms of Section 24(5) of the National Environmental Management Act (107 of 1998). This FSR aimed to identify and describe potential environmental impacts associated with the proposed project and to define the extent of the specialist studies required within the EIA process. This was achieved through an evaluation of the proposed project involving specialists (with expertise relevant to the nature of the project and the study area), the project proponent, as well as a consultation process with key stakeholders, relevant government authorities and Interested and Affected Parties (I&APs). This chapter outlines the process which was followed during the Scoping Phase of the EIA process.

7.2 Project inception phase

On appointment, Zitholele Consulting arranged a project meeting between Koffiefontein Diamond Mine and the Zitholele Consulting project team. The inception meeting was held on the 5th of March 2014, from the Koffiefontein Diamond Mine offices. During the inception meeting the following was discussed:

- Project Schedule;
- Project Scope and Requirements;
- Proposed sites
- Identification of key stakeholders and role players;
- Information on studies carried out was shared;

- Budget for the project
- Discussion about the development of the new slime dam, and;
- Project team to be assigned.

After the meeting, a drive around the site was undertaken in order to familiarise the project team with the study area.

7.3 Pre-application consultation with relevant authorities

Initial consultation with the DESTEA was undertaken through telecom and email correspondence. In this manner it was established that an EIA application form for the proposed project was submitted to the DESTEA. The project was also presented to the DESTEA during a pre-application meeting held at Fountain Towers Building (Bloemfontein) the DESTEA offices on the 4th of August 2014.

7.4 Compilation, submission and acknowledgement of application forms

An EIA application form for the proposed project was submitted to the DESTEA on 31 March 2014. Zitholele received confirmation of acceptance and the letter was signed on 15 April 2014 Appendix B.

7.5 Public Participation Process

Public participation is an essential and legislative requirement for environmental authorisation. The principles that demand communication with society at large are best embodied in the principles of the National Environmental Management Act (Act 107 of 1998, Chapter 1), South Africa's overarching environmental law. In addition, Section 24 (5), Regulation 54-57 of GNR 543 under the National Environmental Management Act, guides the public participation process (PPP) that is required for an Environmental Impact Assessment (EIA) process. The PPP undertaken during the scoping phase of the EIA also took the Integrated Environmental Management Guideline Series (Guideline 7) – Public Participation in the Environmental Impact Assessment Process, GN234, and promulgated 10 October 2012).

The public participation process for the proposed Koffiefontein Diamond Mine slimes dam development has been designed to satisfy the requirements laid down in the above legislation and guidelines. This section of the report highlights the key elements of the PPP to date.

7.5.1 Objectives of public participation in an EIA

The objectives of public participation in an EIA are to provide sufficient and accessible information to I&APs in an objective manner so as to:

- During Scoping:
 - Assist I&APs with identify issues of concern, and providing suggestions for enhanced benefits and alternatives.
 - Contribute their local knowledge and experience.
 - Verify that their issues have been considered and to help define the scope of the technical studies to be undertaken during the Impact Assessment.
- During Impact Assessment:
 - Verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere.
 - Comment on the findings of the EIA, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

The key objective of public participation is to ensure transparency throughout the process and to promote informed decision making.

7.5.2 Identification of stakeholders

The identification of stakeholders is ongoing and is refined throughout the process. As the “on-the-ground” understanding of affected stakeholders improves through interaction with various stakeholders in the area the database is updated.

The identification of key stakeholders and community representatives (land owners and occupiers) for this project is important as their contributions are valued. The identification of key stakeholders and interested and/or Affected Parties (I&APs) were done in collaboration with Koffiefontein Diamond Mine, through the I&AP databases for Basic Assessments (BAs) and EIAs previously conducted in the area, Letsemeng Local Municipality and other organisations in the study area. The Competent Authority was engaged in a briefing session, to further explain the nature of the project. The I&APs’ details are captured on Maximiser, an electronic database management software programme that automatically categorises every mailing to I&APs, thus providing an ongoing record of communications - an important requirement by the competent authority for public participation.

According to the NEMA EIA Regulations under Section 24(5) of NEMA, a register of I&APs (Regulation 55 of GNR 543) must be kept by the public participation practitioner. Such a register has been compiled and is being kept updated with the details of involved I&APs throughout the process (See Appendix C9).

7.5.3 Announcement of opportunity to become involved

The opportunity to participate in the EIA was announced on the 20th of June 2014 as follows:

- Site Notice: The Site Notice was erected at the main entrance to Koffiefontein Diamond Mine as per EIA Regulation 54(2)(a)(i) (Appendix C1) (Figure 7-2) on Friday 20 June 2014.



Figure 7-2: Site Notice at Koffiefontein Diamond Mine's public main entrance

- EIA process notices (A3 site notices) were placed at conspicuous and prominent public places, announcing the EIA process and inviting stakeholder to participate in the EIA process. These notices were erected on Friday, 20 June 2014, during the erections of the Site Notice (Figure 7-3 and Figure 7-4)



Figure 7-3: EIA Process Notices erected on the Notice Board of Letsemeng Local Municipality, Koffiefontein



Figure 7-4: EIA Process Notices erected at Letsemeng Local Municipality's Satellite Office, Jacobsdal

- Distribution of a letter of invitation to become involved, addressed to I&APs and organisations, accompanied by a Background Information Document (BID) (see Appendix C2) containing details of the proposed project, and a registration sheet were distributed on Friday 20 June 2014 and also send via e-mail, fax or post, depending on the contact details as per the database in June 2014 (Figure 7-5, Figure 7-6 and Figure 7-7) (Appendix C2).



Figure 7-5: BID distribution at Letsemeng Local Municipality, Koffiefontein



Figure 7-6: BID distribution at Dithlake Library, Koffiefontein



Figure 7-7: BID distribution to residents of Diamanthoogte, Koffiefontein

- The announcement of the EIA process was announced in the following newspapers (Appendix C1):

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Table 7-1: Advertisements placed during the announcement phase

Newspaper	Published Date
Volksblad	04 June 2014
Express Free State	04 June 2014

7.5.4 Notification of land-owners

Koffiefontein Diamond Mine is the sole owner of the property where the development of the new slime dam is proposed, and adjacent land owners were notified and more than 10km buffer area around the mine were targeted during notification of the project.

The privately owned property, Farm Rorichshoop, Ptn 191, owned by the Oppermans Communal Property Association (Chairman: Mr Phillip Louis Barnes) has been notified of this proposed project (Appendix C3).

7.5.5 Obtaining comment and contributions

The following opportunities are available during the Scoping Phase for I&APs to contribute to the finalisation of the Scoping Report:

- Completing and returning the BID registration/comment sheets on which space was provided for comment.
- Providing comment telephonically, by email or fax to the public participation office.
- Attending the public meetings that were advertised in the Express and Volksblad, public meeting posters were erected in Koffiefontein, Dithlake and Diamanthoogte at prominent public places i.e. public library, Letsemeng Local Municipal Office, etc.
- The minutes of all meetings held during the DSR review period is attached to the FSR (Appendix C7); and
- The comments / concerns / issues raised at these meeting will be included in the Comments and Response Report (CRR) of the DEIR as attendees need to review the draft minutes prior to finalising the minutes.

7.5.6 Comments and Response Report

Issues / comments / concerns raised in the announcement and scoping phase of the project, are captured in the Comments and Response Report (CRR) Version 2 and appended to this FSR (**Error! Reference source not found.**8). The contributions made by I&APs were cknowledged in writing. The CRR will be updated to include additional I&APs contributions that may be received after the submission of the Final Scoping Report to the competent authority and the updated CRR (Version 3) will be included in the DEIR. The following versions of the CRR shall be compiled (every version is an update of the previous version):

- Version 1 appended to the Draft Scoping Report and will include all comments received during the notification period.

- Version 2 appended to the Final Scoping Report and will include all comments received during the notification and draft scoping period
- Version 3 appended to the Draft Environmental Impact Assessment Report
- Version 4 appended to the Final Environmental Impact Assessment Report

7.5.7 Draft Scoping Report

The purpose of the PPP in the DSR is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted, and to raise further issues. At the end of Scoping, the issues identified by the I&APs and by the environmental technical specialists, will be used to define the Terms of Reference for the Specialist Studies that will be conducted during the Impact Assessment Phase of the EIA. A period 40 days was made available for public review of the DSR from Monday 29 September 2014 to Friday 07 November 2014).

In addition to the newspaper advertisement and site notices that announced the opportunity to participate in the EIA, the opportunity for public review of the DSR was announced as follows:

- Advertisement in the Express and Volksblad, see Appendix C1.
- In a letter to all registered I&APs on the project database, which was e-mailed to those with e-mail addresses, fax to those without e-mail addresses and post to those without an e-mail address or fax number.
- Stakeholders were also invited to visit the Zitholele Consulting website where all documents for public review are available – <http://www.zitholele.co.za/eia-for-koffiefontein-slime-dam>.

The DSR, including the CRR (Version 1), was distributed for review and comment as follows:

Left in public venues such as libraries within the vicinity of the project area (these are listed in Table 7-2 below);

- Courier to identified / relevant Organs of State (Commenting Authorities) who required hard copies of the DSR.
- Electronic copies to identified / relevant Organs of State (Commenting Authorities) who required an electronic copy of the DSR.
- Electronic copy to those I&APs who requested the DSR electronically.
- A copy will be available at the meetings to be held

I&APs can comment on the DSR in various ways, such as completing the comment sheet accompanying the DSR, submitting individual comments, in writing, by post or e-mail, and by attending the public meetings held.

Table 7-2: List of public places where the Draft Scoping Report was made available

VENUE	CONTACT DETAILS
Printed Copies	
Letsemeng Local Municipal Offices, 7 Groot Trek Street, Koffiefontein	Tel.: 053 205 9200
Koffiefontein Public Library, 29 Groot Trek Street, Koffiefontein	Tel.: 053 205 0147
Ditlhake Public Library, 429 Ttsane Street, Ditlhake, Koffiefontein	Tel.: 053 205 0383
Ethembeni Clinic, 100 Jacobsdal Road, Koffiefontein	Tel.: 053 205 0977
Electronic Copies	
Zitholele Consulting Website	http://www.zitholele.co.za/eia-for-koffiefontein-slime-dam
Nicolene Venter / Bongani Dhlamini	Available on CD on request via: E-mail: publicprocess@zitholele.co.za Tel.: 011 207 2060

7.5.8 Final Scoping Report

The Final Scoping Report (FSR) has been updated with the additional issues raised by I&APs during the DSR review period and may contain new information. The FSR will be submitted to the Competent Authority, identified Organs of State, key stakeholders, and to those individuals who specifically request a copy. I&APs will be notified of the availability of the FSR by means as per the DSR notification.

7.5.9 Public participation during the Impact Assessment

In the Impact Assessment Phase of the EIA Specialist Studies will be conducted to assess the potential positive and negative impacts of the proposed project, and to recommend appropriate measures to enhance positive impacts and avoid or reduce negative ones. I&APs will be kept informed of progress with these studies.

Public participation during the impact assessment phase of the EIA will mainly involve a review of the findings of the EIA, as presented in a Draft Environmental Impact Report (DEIR), mitigation measures as proposed in the Draft Environmental Management Programme (EMPr) and the volumes of Specialist Studies.

An EIA Newsletter will be distributed to all registered I&APs on the project database providing information such as:

- the DESTEA's acceptance of the FSR and approval of the Plan of Study for EIA;
- envisaged timeframes of the various specialists' studies to be undertaken;
- envisaged timeframes of the impact phase; and
- envisaged timeframes of the Public Participation activities.

I&APs will be advised in good time of the availability of the DEIR and FEIR and how to access them. The dates and venues of public and other meetings will be communicated to all registered I&APs on the project database.

7.5.10 Final Scoping Report

Using the comments received from stakeholders the DSR was updated and finalised into this Final Scoping Report (FSR). All comments received was added to the CRR version 2 and attached to the Final SR as Appendix C8.

The FSR will be reviewed internally by the consultant, Zitholele Consulting, as well as by the client prior to making this document available for public comment and submission to the DESTEA. It is envisaged at this stage of the process that the public comment period will run from about mid-January 2015 to March 2015. Should public comments been received by Zitholele Consulting, this will be considered for purposes of the DEIR.

8 ISSUES IDENTIFIED DURING THE SCOPING PHASE

The proposed project may have a range of impacts to the biophysical and socio-economic environment. The main purpose of the EIA process is to identify and evaluate potential impacts and to determine possible mitigation measures and management plans to address such impacts that may arise.

The potential environmental impacts identified during the Scoping Phase, which will be investigated further in the EIA phase of the project, are summarised in Table 8-1 below.

Table 8-1: Potential significant environmental impacts to be investigated in the EIA Phase.

Environmental Element	Potential Impact
Geology / Geotechnical aspects	Alteration of geological strata may be caused by: <ul style="list-style-type: none"> • Cut and fill operations resulting from installation of a liner system. The underlying geology and geotechnical features are also likely to impact the slimes dam design and will influence the optimisation of the designs.
Ground Water	Pollution of ground water resources caused by: <ul style="list-style-type: none"> • Leachate from the slime dam facility may percolate into, and contaminate, ground water features. • Depending on the hazardous rating of the slime – pollutants could have a human / animal health impact if groundwater that is used for consumption is contaminated. A groundwater assessment has been done and will be used as the basis for the groundwater assessment.
Terrestrial Ecology	Vegetation and habitat may be lost or the quality reduced because of the: <ul style="list-style-type: none"> • Construction of a slimes disposal facility; • Construction of associated infrastructure (e.g. roads, pipelines); • Propagation of alien invasive species • Health implications due to pollution/slimes deposition and • Impact on sensitive species / habitats.
Climate and Air Quality	Decrease in air quality as result of increased airborne dust particulates caused by: <ul style="list-style-type: none"> • Vehicles traversing dirt roads during construction and operation; • Dust from dry and exposed surfaces of the slime dam during operations.
Heritage and Paleontological Resources	No heritage resource information could be found for the KDM area. However, heritage resources may be found in the area and their presence of absence must be assessed by a heritage practitioner.
Waste Classification	The slimes waste will require classified in order to determine the type of liner, in order to ensure prevention of leachate pollution.

Environmental Element	Potential Impact
Facility Design	A practical <u>and feasible</u> conceptual design will have to be generated for the presentation to the Competent Authority <u>and Department of Water and Sanitation, followed by</u> the detailed design before any activity is carried out.

9 RECEIVING ENVIRONMENT

This section of the report presents an overview of the baseline environment within which the proposed project will be undertaken.

9.1 Climate

9.1.1 Data collection

Climate information was obtained from the Integrated Water and Waste Management Plan Assessment which was done by Shangoni Management Services² for the Koffiefontein diamond mine.

9.1.2 Regional Description

The climatic regime of the Koffiefontein area is known for its cold dry winters and relatively hot summers, which occur from December to March. The mean annual precipitation (MAP) is ~359 mm. Average climatic information for Bloemfontein is used for this report as it is the closest large weather station to the mine (Shangoni, 2011). The Mean Annual Evaporation (MAE) is ~2 196 mm (AGES³, 2013).

Table 9-1: Climatic data for Bloemfontein

Climate data for Bloemfontein													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °C	39	39	35	33	30	25	24	29	34	35	37	38	39
Average high °C	31	29	27	23	20	17	17	20	24	26	28	30	24
Average low °C	15	15	12	8	3	-2	-2	1	5	9	12	14	8
Record low °C	6	4	1	-3	-9	-9	-10	-10	-7	-3	0	3	-10

The difference in precipitation between the driest month and the wettest month is 56 mm. The average temperatures vary during the year by 15.3 °C. The average annual maximum temperature is 21 °C and the average annual minimum temperature is 8 °C⁴, which is illustrated in Figure 9-1.

The area further experiences extreme events on a regular basis, including cyclical droughts, frost during winter periods, and the winters are cold and dry with snow or sleet.

² Integrated Water and Waste Management Plan Volume I September 2011, Ref. no: KOFFIE/IWWMP/Sept 2011

³ Africa Geo-Environmental Services, 2013: Koffiefontein concept mine water study

⁴ Rison Groundwater Consulting, 2014: Koffiefontein Groundwater Flow and Mass Transport Model

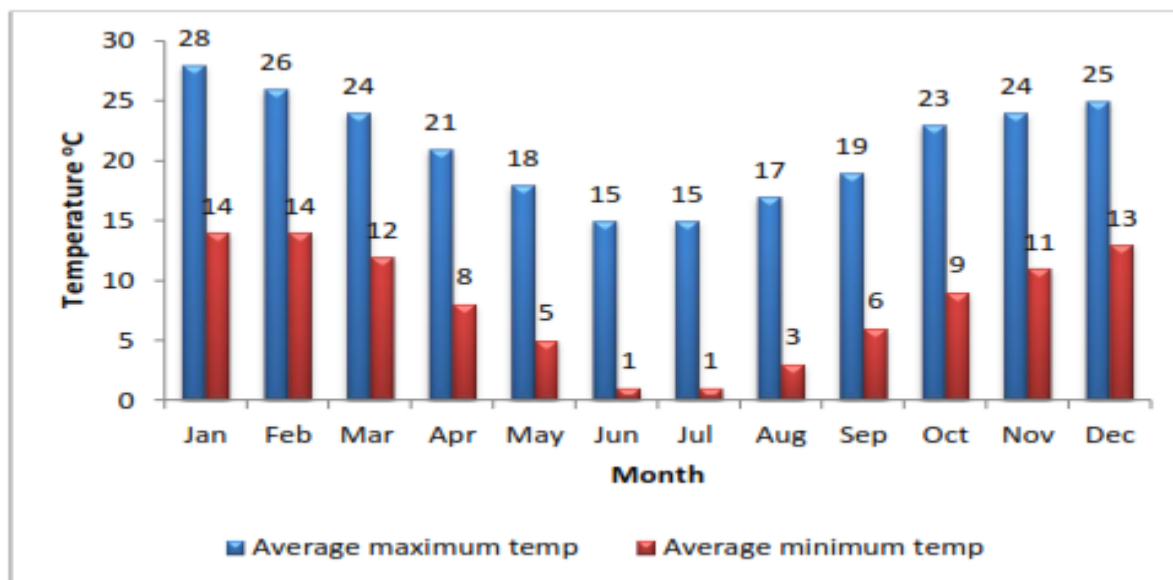


Figure 9-1: Average maximum and minimum temperatures measured per month

9.1.3 Rainfall

9.1.4 Data collection

Information on rainfall was obtained from Shangoni, 2011.

9.1.5 Regional Description

Rainfall in this area is highly unpredictable. Precipitation is strongly seasonal with the majority of rain (47 %) falling between January to March. The rainfall pattern is indicative of a summer rainfall area (Shangoni, 2011). Koffiefontein Diamond Mine receives 201 – 400 mm per year. The winters are cold and dry with precipitation in the form of snow or sleet. Evaporation figures as indicated for the area are reasonably high and indicate that the area is a water deficit area. The total annual evaporation for the area is 2196 mm. A summary of the evaporation and rainfall data is presented in Table 9-2.

Table 9-2: Monthly rainfall and evaporation quantity. Source: Data obtained from (Shangoni, 2011).

Date	Rainfall (mm)	Monthly Evaporation (mm)
January	47	183
February	56	183
March	62	183
April	39	183
May	21	183
June	6	183
July	6	183
August	9	183
September	12	183
October	28	183
November	35	183
December	38	183
Annual	359	2196

9.2 Wind regime

Wind blows predominantly in a north easterly direction (refer to Figure 9-2). Wind speeds ranging between 6.0 – 10.0 m/s are prevalent in the study area.

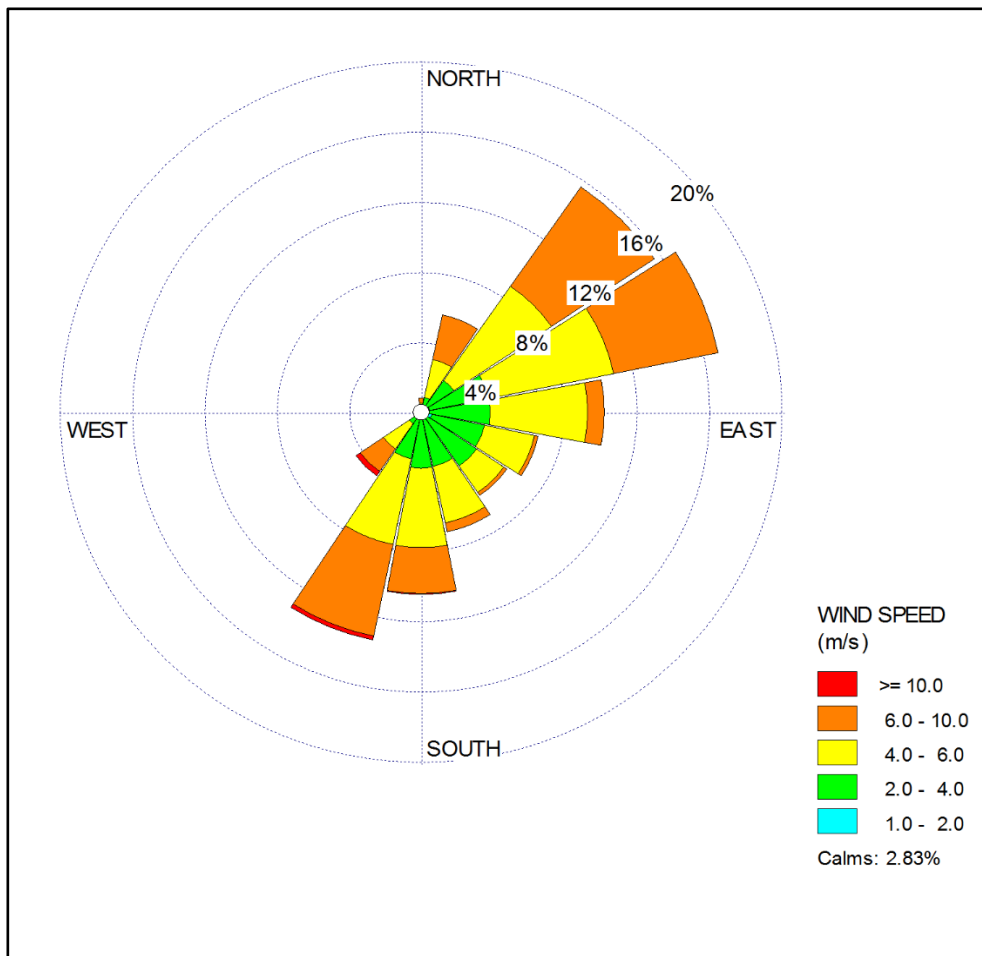


Figure 9-2: Wind Rose for Koffiefontein

9.3 Geology

9.3.1 Data Collection

The geological analysis was undertaken through the desktop evaluation using a Geographic Information System (GIS), and directly from existing specialist and other reports for Koffiefontein diamond mine.

9.3.2 Regional Description

The geology of the Free State Province is underlain by sedimentary rocks belonging to the Beaufort and Ecca Groups of the Karoo Supergroup. These constitute sandstone, shale and mudstone, which have been intruded by dolerite sills and dykes. They are part of the vast Karoo basin that covers almost two-thirds of South Africa, and were deposited between 200 and 300 million years ago (CGS, 2014). These rocks are known to host major coal and clay deposits. The former generally occur as fairly thick, flat, shallow-lying coal seams. Of the country's 18 principal coalfields, two occur in the Free State Province, these being the Vereeniging-Sasolburg and Free State fields.

9.3.3 Study area

The complex internal geology of the kimberlite ore body known as the Koffiefontein pipe has contributed to the marginal nature of the mine. The key to this is the presence of a large zone dominated by down-raftered country rock Karoo-age shale, carbonaceous shale and dolerites (Figure 9-3). The deposit is hosted as kimberlite ore body within the Koffiefontein pipe. The pipe, together with several other kimberlite pipes and dykes, forms a cluster that intrudes Dwyka Shale's and Karoo Dolerites. It is characterised by carbonaceous and Karoo age shale's besides intercalated dolerite that overlies the granite gneiss basement (AGES, 2013).

A second pipe, extending 6 ha on the surface, lies adjacent to the Koffiefontein pipe. Known as Ebenhaezer pipe, it also hosts kimberlite ore body. Fifteen other pipes are known within a 30 km radius of the Koffiefontein mine (Rison Groundwater Consulting, 2012).

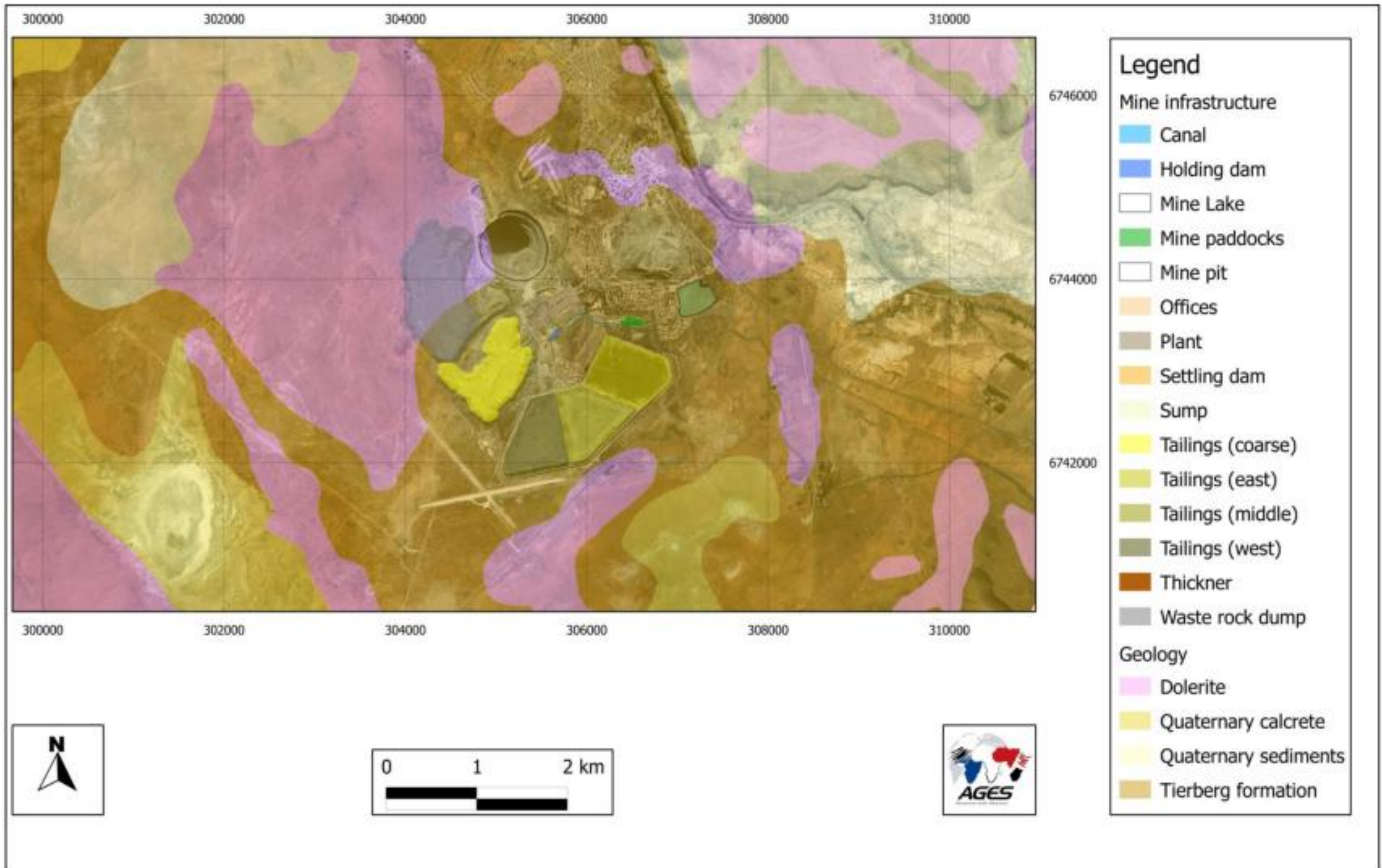


Figure 9-3: Simplified Geological Map of the Koffiefontein Mine area (map obtained AGES, 2013)

9.4 Soils and Land Capability

9.4.1 Data Collection

The Soils and Land capability analysis was undertaken through the desktop evaluation using a Geographic Information System (GIS) and relevant data sources. The soil data was taken from the Department of Water Affairs and Forestry.

9.4.2 Regional Description

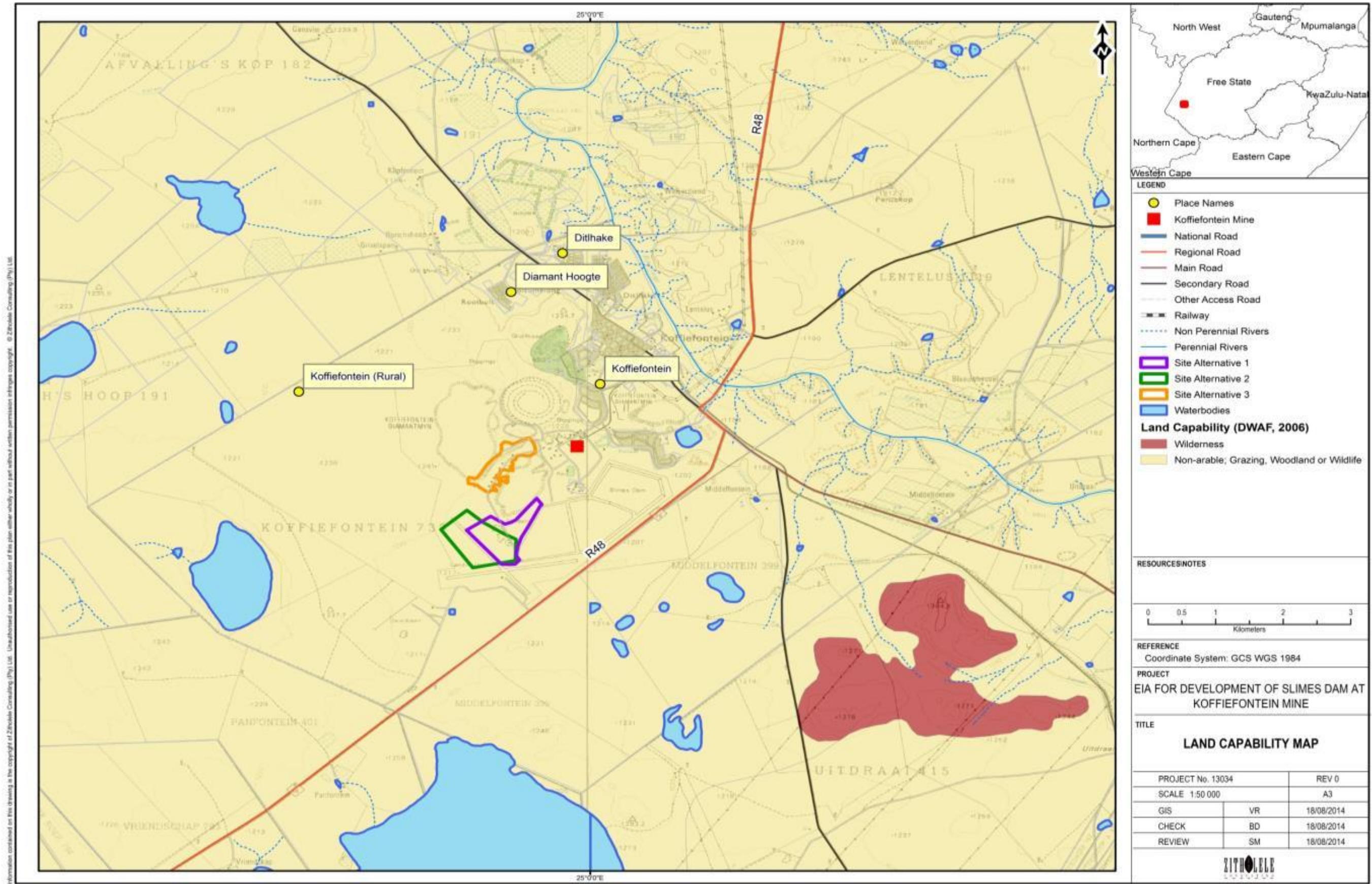
About 90 % of the land use in the Free State Province is dedicated to agricultural purposes while the remaining portion is used for the mining operations. Of the total land use, 57 % is used for stock farming, including beef and dairy cattle and sheep. Crops, which mainly occur on the grasslands of the Highveld, account for 33% of the land use and include maize, sorghum, wheat, groundnuts and sunflower crops. Only 1% of the land is set aside for conservation.

9.4.3 Study area

The soils in the region are mostly derived from the geology of the region (as described above) and are mostly sandy soils.

The soil types found in the area of Koffiefontein Diamond Mine was obtained from AGIS Comprehensive Atlas, and the soils shows resemblance to the geology as mentioned above. Most common soil in the Koffiefontein area is red soils with high base status. Soils in close proximity to the study area consist of red, yellow and / or greyish soils with high base content and rock with limited soils. Soils which are further away from Koffiefontein Diamond Mine but still in the Free State Province are soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Figure 9-4 below provides an illustration of the potential of the soils in the region, mostly suitable for extensive grazing, whether by livestock and game species as the soil depth excludes the possibility of intensive farming practices. Other areas maybe are used for residential purposes.

The overall grass species on the game farm section of the Koffiefontein Mine property indicates that there is a persistent medium grazing potential. Due to the high rainfall experienced in the previous months a lot of pioneer species was observed. The overall condition of the veld is very good for grazers (Van Deventer, 2011). A species list of grass species found within the game farm section of the Koffiefontein mine can be found in Appendix D.

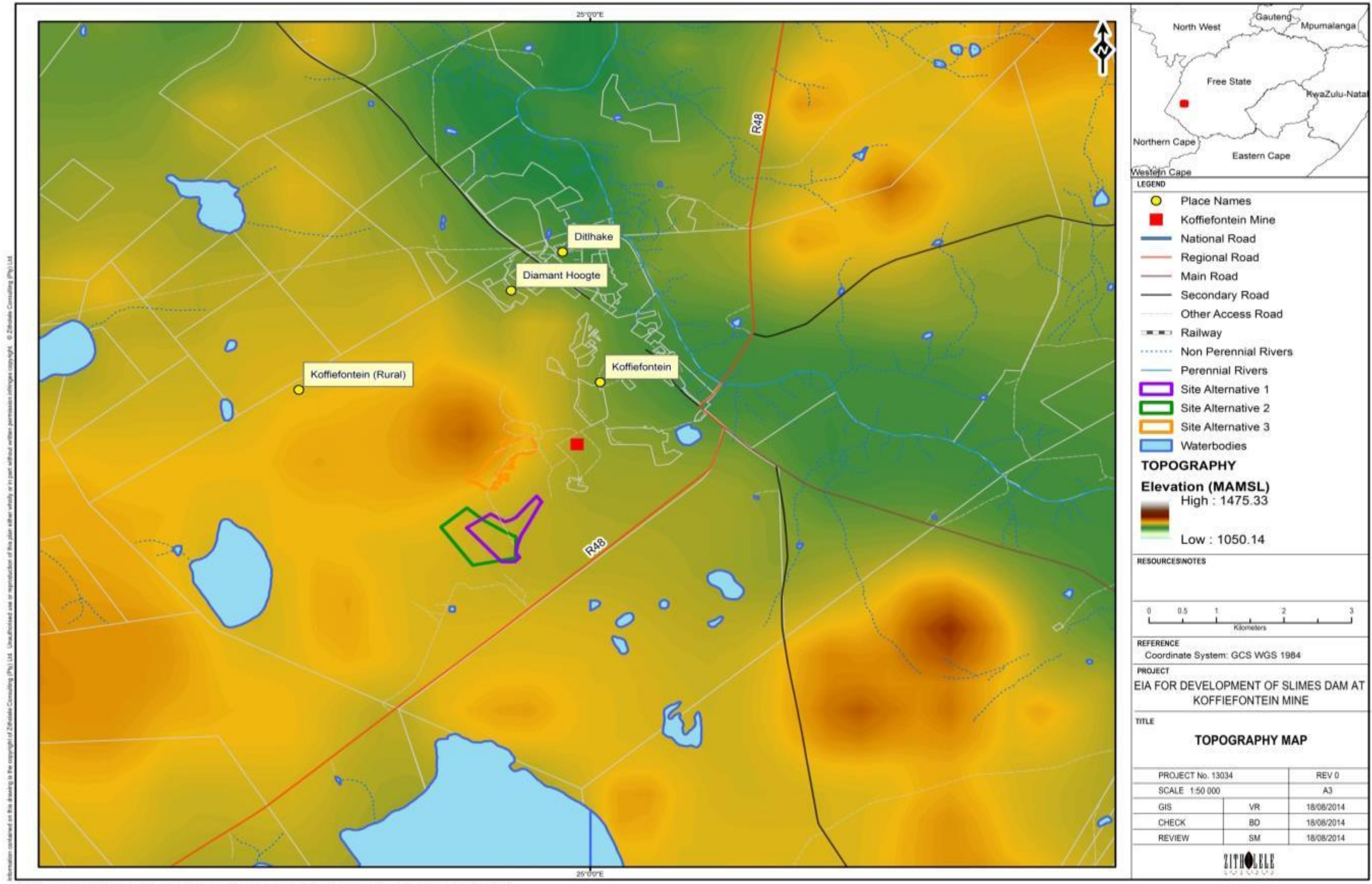


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Figure 9-4: Land Capability of the study area

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Figure 9-5: Topography of the study area

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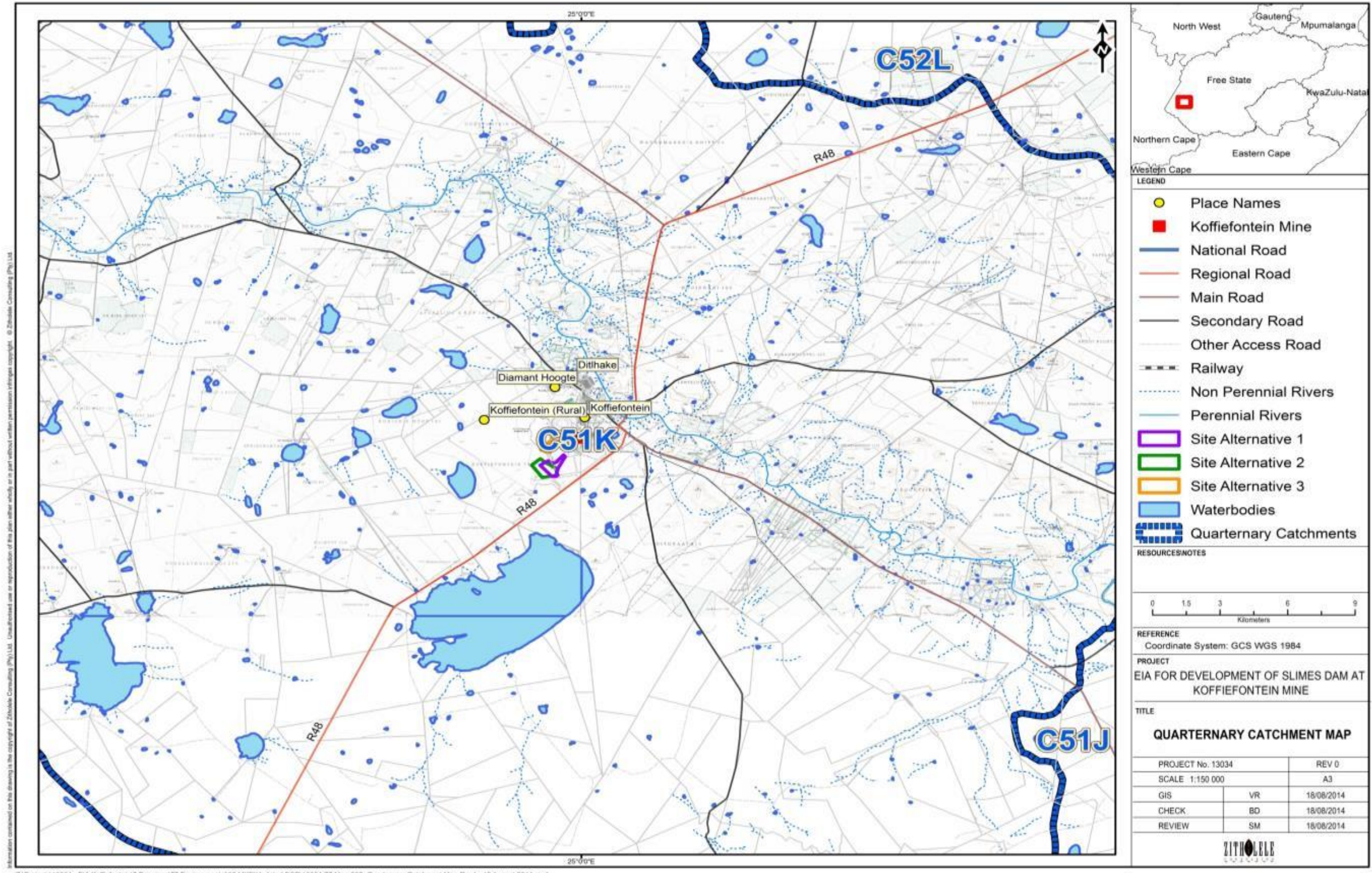


Figure 9-6: Catchment and water resources of the study area

9.5 Topography

9.5.1 Data Collection

The topography data was obtained from the Surveyor General's 1:50 000 toposheet data for the region, namely 2628 and 2629. Using the latest aerial photography of the area Zitholele Consulting was able to develop a digital elevation model of the region, showing also the ridges (Figure 9-5).

9.5.2 Regional Description

The topography of the region is a gently undulating to moderately undulating landscape of the Highveld plateau, dipping to the Riet River which flows to the North-East of the mine. Some small scattered wetlands and pans occur in the area, rocky outcrops and ridges also form part of significant landscape features in the area. The altitude ranges between 1050 to 1475 metres above mean sea level (mamsl). The mean annual runoff is approximately 3 mm/a (Rison Groundwater Consulting, 2014).

9.6 Surface and Groundwater Resources

9.6.1 Data Collection

Data and information on the water resources in the Koffiefontein area was obtained from the IWWMP produced for the Koffiefontein Diamond Mine (Shangoni, 2011), as well as the report titled: Rison groundwater consulting: Groundwater Quality Assessment: Koffiefontein Diamond Mine, Report No: RIS\110604, dated June 2011 and prepared by Rison Groundwater Consulting cc.

9.6.2 Regional Description

The Free State Department of Water and Sanitation is the responsible water authority, and the Kalkfontein Water Board supply potable water to the Mine. The Koffiefontein Diamond Mine is situated within the Upper Orange water management area. Koffiefontein Diamond Mine is situated in the Riet river primary catchment area and the C51K Tertiary Catchment Area. The mine is located on the western banks of the Riet River which flows in a north westerly direction. The mine is also located approximately 21 km northwest of Kalkfontein Dam.

Local catchment area that drains directly to and on the mining area of Koffiefontein Diamond Mine is 20 km². This catchment area is very flat with a 0.83 % slope. The catchment area was identified with a high permeable soil class and low runoff volume, therefore the 1:50 year flood runoff was estimated at 33 m³/s.

Groundwater resources can be divided into two distinct aquifers, namely a shallow perched aquifer in the weathered zone followed by a deeper fractured hard rock aquifer. The fractured rock aquifer occurs as transmissive fractures in consolidated bedrock of either the Karoo sediments or the basement granite that underlies the Karoo sediments. A third, deeper aquifer in the underlying basement granite can also occur. Little information is however available for this aquifer, though it will also be a secondary fractured rock type.

It is further estimated that the long term recharge of the aquifers in the Koffiefontein area is estimated at between 3 and 5 % of the mean annual precipitation. Open pit mining usually causes a significant increase in aquifer recharge percentage. Surface water features like dams (tailings, slurry, process water, storm water, return water etc.) will also usually increase the recharge to the aquifer but compacted or concrete surfaces and roads will decrease the recharge.

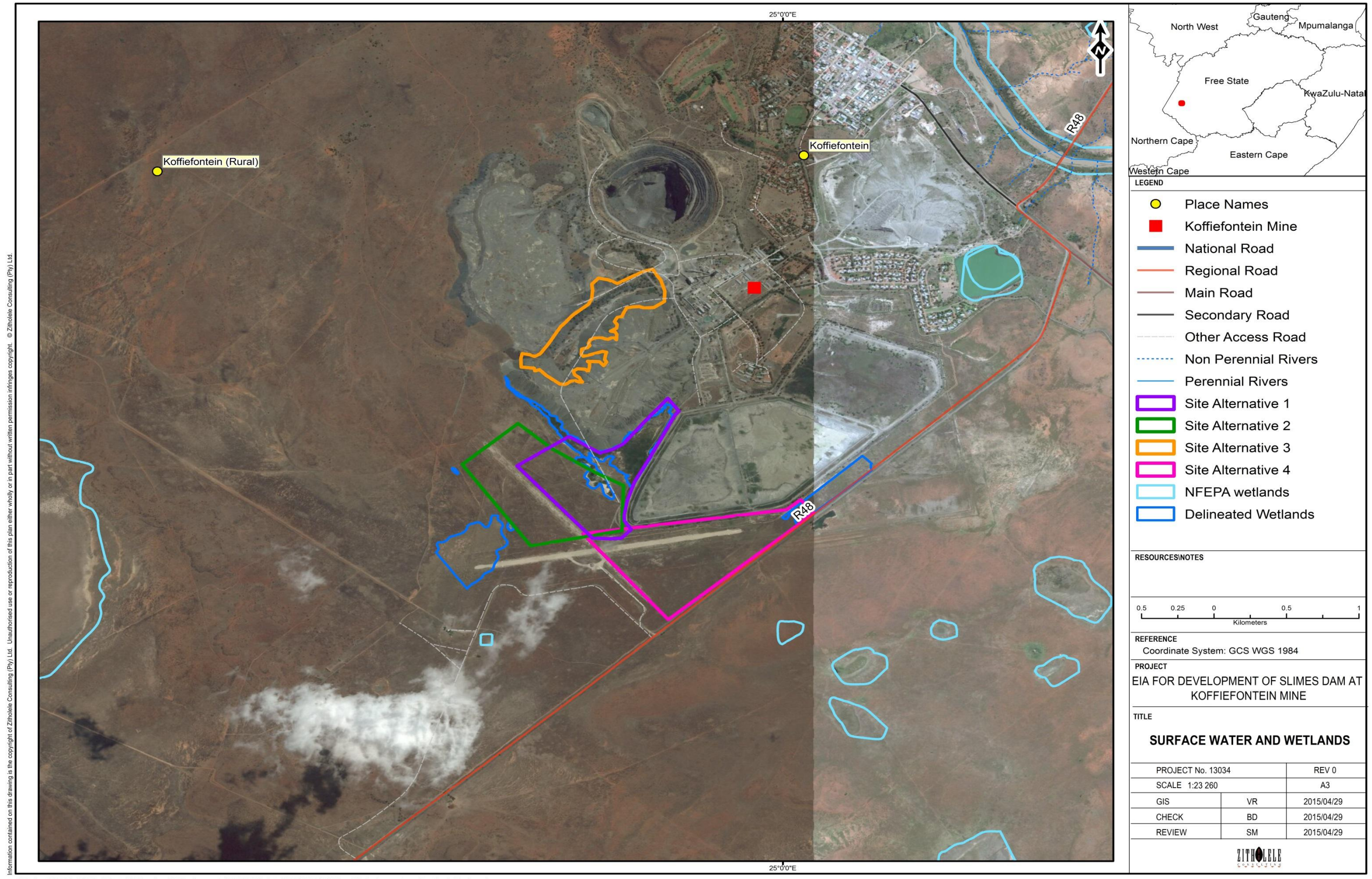
9.6.3 Study area

Groundwater and surface water quality was investigated by Rison Groundwater Consulting. All samples were compared with Class 1 drinking water standards as defined in the South African Drinking Water Standard, SANS 241 of 2006. A technical report prepared by the company, Groundwater Complete, in March 2011 demonstrated a 77 % correlation between surface topography and groundwater elevation. Therefore groundwater flows from topographic high's towards topographic low's. In the region of the mine, groundwater migrates in a northerly direction which immediately implies that groundwater seeping from the tailings dam and rock dumps moves in the direction of the Koffiefontein pipe.

Rison Groundwater Consulting was contracted to investigate the origin of chloride-rich groundwater that enters the underground workings. The ingressing water is highly corrosive which has a negative effect on the mines underground steel infrastructure and machinery. For this investigation an extensive water sampling program was performed at Koffiefontein and the surrounds. Samples were collected at various ingress points underground as well as at various points on surface in an attempt to use hydrochemistry to link surface sources to underground ingress water. Results indicated that most of the surface and underground samples have a chemistry dominated by Ca – SO₄ – Na – Cl. Sulphate concentration certainly seems to be elevated and more prominent in surface water. It was concluded that seemingly the origin of the high chloride concentrations is at the tailings dam complex. This conclusion was purely based on the fact that the groundwater flow directions are from the tailings dam complex towards the mining area and the seepage water at the base of the tailings dam has elevated sulphate, sodium and chloride concentrations.

Hydrocensus data and user surveys undertaken by KLM Consulting also indicated that groundwater from boreholes surrounding the mining area is used mainly for domestic supply, livestock watering and irrigation of domestic and small vegetable gardens.

The Riet River is situated to the North East (less than 2km in distance) and is considered a FEPA system with a Class C: Moderately Modified Status. The Kalkfontein Dam on the Riet River provides water for the towns of Jacobsdal and Koffiefontein. There is also the presence of numerous ephemeral pans with a FEPA wetland cluster approximately 700m south of the mine (refer to Figure 9-7).. The presence of any sensitive species will be confirmed by specialists during this EIA process.



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Figure 9-7: Map showing the wetlands including NFEPA wetlands and BGIS Data for the area

9.7 Terrestrial Biodiversity

9.7.1 Data Collection

A literature review of the faunal species that could occur in the area was conducted. Site descriptions of the vegetation at the Koffiefontein Mine was obtained from specialist studies and surveys undertaken for the Koffiefontein Mine property area. Site descriptions of the terrestrial biodiversity at the Koffiefontein Mine was obtained from:

- North-West University, 2013. Winter and Summer Avifaunal Surveys of Petra Mines, Koffiefontein, South Africa - June 2012/February 2013
- North-West University, 2013. Koffiefontein Mine JV herpetological survey – April 2013
- Vegetation survey for Koffiefontein Mine: An extensive vegetation survey for Koffiefontein mine and the adjacent game farm, prepared by Anja van Deventer and dated 2011.
- The following information was extracted from the document titled: “Koffiefontein Mine JV, Environmental Impact Assessment.” prepared by Petra Diamonds (Pty) Ltd, dated 2006.
- The field guide of Du Preez and Carruthers (2009) and the southern African frog atlas (Minter et al. 2004) were used to compile a species list of potential amphibian species that may occur at the Koffiefontein Mine conservation area.

9.7.2 Regional Description

The study area is located within the Nama Karoo Biome (Hoffman 1996), and more specifically, Northern Upper Karoo Vegetation (Mucina & Rutherford 2006). The Nama Karoo biome covers much of the central and western regions of the country. The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. Most of the grasses are of the C4 type¹ and, like the shrubs, are deciduous in response to rainfall events. The biome is dominated by a steppe-type vegetation, comprising a mixture of shrubs, dwarf shrubs and annual and perennial grasses. The vegetation type of Koffiefontein is that of Besemkaree Koppies Shrubland.

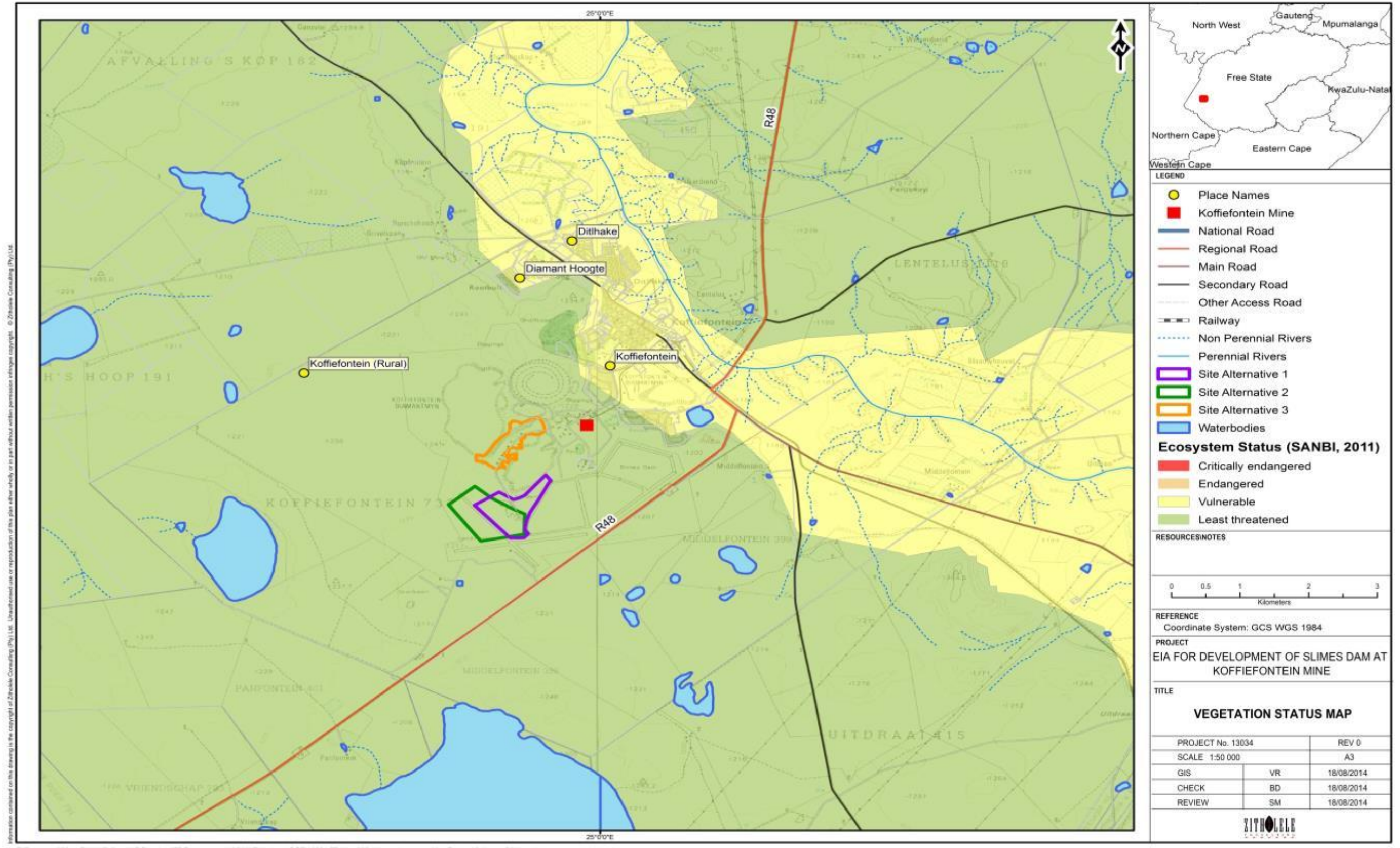


Figure 9-8: Vegetation status of the study area

The biome is associated with the moderate rainfall regions (250-450 mm per annum) and is suited to commercial sheep and goat production. The summer seasonality of the rainfall in the eastern parts of the biome means that there is often abundant grass production during the growing season. Graziers attempt to optimize production by sparing or resting grassy dwarf shrubland in the wet season. Herbivory by domestic livestock during the growing season has been shown to reduce grass cover and promote the growth of larger shrubs (species of *Rhus*, *Acacia* and *Euclea*) and dwarf shrubs. In the winter months, the dwarf shrubs maintain their crude protein at around 8 %, providing excellent forage. The nutrient-rich substrata provided by the mudstones, sandstones and dolerites mean that this production can be considered sustainable.

Frogs and toads in South Africa comprise almost 120 species and 33 genera from 9 families. Frogs occur throughout South Africa and their distribution is largely influenced by rainfall and temperature. The highest number of species is found in the eastern regions where high rainfall combines with warm year-round temperatures. The highest level of endemism, however, occurs in the Fynbos biome (particularly the Cape Fold Mountains) of the Western Cape. While some species are widely dispersed in a variety of localities and climate regions, most species are fairly restricted in type of habitat resulting in limited ranges. Habitat loss is cited as the most pervasive threat for South African amphibians and has been listed as a possible threat to all threatened species (Harrison et al., 2001). Agricultural development, afforestation, invasive plants and urban development are the main drivers of herpetofauna habitat loss.

9.7.3 Study area

The general farm area towards the south and west of the Koffiefontein mining property are covered with mixed grass and Karoo scrub. There is a grass pan in this area which is heavily grazed. The perimeter of the pan is lined with tall grass which then gives way to grass/scrub land. The soil in this area is calcareous, but gives way to red sandy soil towards the north-eastern parts. This gradual transition in soil type towards the central parts of the property is characterised by the addition of scattered trees (mostly *Acacia tortilis*). The North-eastern section is characterised, in addition to grass/karoo scrub, with bolder-strewn ridges and dense stands of *Acacia tortilis*. Other trees in this area include *Rhus lancea*, *Rhus leptodictya*, *Ziziphus mucronata*, and the exotic *Schinus molle*. Termite mounds are plentiful throughout the whole area, and are used as perches by some birds.

The proposed slimes dam alternatives occur in areas with least threatened, but hardly protected, vegetation status.

Within the mining area, the active TSF resembles mudflats, with large “beach” areas where *Phragmites* reeds grow abundantly. The wall of the TSF is covered by Karoo scrub and grasses, indigenous trees such as *Rhus lancea*, *Acacia tortilis*, *Ziziphus mucronata*, *Rhus pyroides*, while exotics includes *Melia azedarach*, *Schinus molle*, *Pyracantha angustifolia*, *Opuntia* sp and Pampas grass, *Cortaderia selloana*. Where the wall meets the surrounding

area, there is a parallel trench which follows the circumference of the wall. This gives the impression of a drainage-line component and is wetter than the surrounding area. *Phragmites* reeds grow inside the trench. The TSF under rehabilitation resembles the active TSF, but is wholly covered with vegetation and is dry. Karoo scrub, grasses and indigenous trees such *Acacia tortilis*, *Rhus lancea*, *Rhus pyroides*, and exotics *Tamarix ramosissima* and *Opuntia* sp are all present.

Sedges and wetland related species found within the gamefarm section of the Koffiefontein Mine include *Cyperus* spp., *Schoenoplectus corymbosus* and *Typha capensis* (Van Deventer, 2011). Shrubs, succulents and other species include *Albuca Gladoilus* sp., *Alternanthera pungens* (Papierduweltjie), *Amaryllidaceae Scilla* sp., *Anacampseros lanigera* (Haaskos, Rare species), *Argyrobolium zanonii*, *Asclepias fruticosa* (Milkweed), *Asparagus Africana* (Katstert), *Asparagus suaveolens* (Groot katstert), *Berkheya barbata*, *Brunsvigia radulosa*

A number of mammal species has been recorded in the Koffiefontein Mine area, with several other species expected to occur within the property. A list of mammal species that was encountered or expected can be seen in Appendix D. Several large to medium sized antelope species were encountered, e.g. Gemsbuck, Blue Wildebeest, Red Hartebeest, Zebra, Blesbuck, Springbuck and Eland. Their presence however is explained by the game farm, which approximately 1930 hectares in size that forms part of the Koffiefontein Mine property area.

With regards to herpetofauna, seven of the 12 possible amphibian species were found during at the Koffiefontein Mine property. These represent six families and include species that are primarily aquatic, semi-aquatic and semi-terrestrial. The species found included *Amietophrynus rangeri* (Raucous toad), *Amietia angolensis* (Common river frog), *Amietia fuscigula* (Cape river frog), *Cacosternum boettgeri* (Common caco), *Tomopterna cryptotis* (Tremelo sand frog), *Kassina senegalensis* (Bubbling kassina), and *Xenopus laevis* (African clawed frog). Distribution ranges is provided in Table 9-3.

Nine of the 37 possible reptile species were found within the Koffiefontein Mine property. These represent six families and subfamilies and include species that are primarily aquatic, semi-aquatic, terrestrial and arboreal. Species include *Stigmochelys pardalis* (Leopard tortoise), *Pelumodusa subrufa* (Marsh terrapin), *Psammophylax tritaeniatus* (Striped skaapstekker), *Trachylepis striata* (Eastern striped skink), *Trachylepis sulcata* (Western rock skink), *Pedioplanis lineocellata* (Spotted sand lizard), *Varanus niloticus* (Water monitor), *Cordylus polyzonus* (Karoo girdled lizard), and *Agama atra* (Southern rock agama).

Table 9-3: Distribution ranges of herpetofauna species found at the study site

Species	Distribution
<i>Amietophrynus rangeri</i>	Occurs in all provinces of South Africa, including Lesotho and Swaziland. This species is widespread, except for the Central Karoo region.
<i>Amietia angolensis</i>	This species is widely spread across southern Africa. It occurs mainly in the eastern half of South Africa, from the eastern border of the Western Cape Province, the eastern and southern Eastern Cape Province, the whole KwaZulu-Natal, Limpopo, Gauteng, Free State, North West Province and the Northern Cape Province.
<i>Amietia fuscigula</i>	Found at sea level in the Western and Eastern Cape provinces, but generally at higher elevations in the other provinces, but does not occur in Limpopo.
<i>Cacosternum boettgeri</i>	Wide distribution in southern Africa. It occurs widely in South Africa and occurs in all the provinces, except parts of the western Cape, Namaqualand, Mpumalanga escarpment and the Lesotho highlands.
<i>Tomopterna cryptotis</i>	Restricted to the central highlands of southern Africa. They are found in most of the Free State, North West, Gauteng, Limpopo, Mpumalanga, eastern Northern Cape and northern KwaZulu-Natal.
<i>Kassina senegalensis</i>	Common and widely distributed and is present in all the provinces except the Western Cape Province, the western part of the Eastern Cape Province and the central and western parts of the Northern Cape Province.
<i>Xenopus laevis</i>	Occurs widely in sub-Saharan Africa, and is present in all nine provinces of South Africa. They are absent in extreme arid areas, including parts of the Northern Cape Province. They are also absent in the low-lying parts of Limpopo and Mpumalanga.
<i>Stigmochelys pardalis</i>	Found throughout the savannahs of Africa, from Sudan to the southern Cape.
<i>Pelumodusa subrufa</i>	Most widely spread and most common terrapin in southern Africa. It occurs wherever suitable water bodies are present, but it is absent from the most arid parts of the Northern Cape Province, the southern half of Namibia and the south eastern parts of Botswana.
<i>Psammophylax tritaeniatus</i>	Found in open grass lands and savannah areas. The distribution of this species is From the Free State, through Gauteng and the Northern Provinces.
<i>Trachylepis striata</i>	Occurs in North Eastern Cape, through the former Transkei, Western KwaZulu-Natal, Free State, and the Northern Provinces.
<i>Trachylepis sulcata</i>	Occurs in Karroid areas of the Cape and adjacent Free State, through Namibia to South Angola.
<i>Pedioplanis lineocellata</i>	Occurs in the Western half of South Africa, but is absent from regions with deep sand, e.g. deserts
<i>Varanus niloticus</i>	Occurs in Sub Saharan Africa, from the Eastern Cape, KwaZulu-Natal, Free State, North West Province, Gauteng Province, Limpopo and the Mpumalanga Province.
<i>Cordylus polyzonus</i>	Range from the central and Western Cape into southern Free State and South Namibia.
<i>Agama atra</i>	Occurs in a variety of habitats, from semi-desert to fynbos, from sea-level to mountain tops.

9.8 Avifauna

9.8.1 Data collection

Avifauna surveys were undertaken at Petra's Koffiefontein mine by the School of Biological Sciences at North-West University since 2012. Winter and summer surveys were undertaken at six sampling strata in the farm area, and four areas in the mining section i.e. the active Tailings Storage Facilities (TSF), the outer wall of the TSF, the rehabilitated TSF, and the return dam used in the circulation of water used for mining operations (Figure 9-9).

The following reports were consulted:

- North-West University, 2013. Winter and Summer Avifaunal Surveys of Petra Mines, Koffiefontein, South Africa - June 2012/February 2013
- North-West University, 2012. Avifaunal Survey of Petra Mines Koffiefontein, South Africa - June 2012
- North-West University, 2012. Summer Assessment of the Avifauna of Petra Mines Koffiefontein, Western Free State, South Africa - Interim Project Report – January 2012

9.8.2 Regional description

The Karoo is home to a relatively rich avifaunal component with about 300 regularly recorded species and another hundred that occasionally or rarely occur (Harrison *et al.* 1997). It has been documented that land use changes in this area have not only altered avian species richness, but also mutualisms and plant-bird interactions. During the first Southern African Bird Atlas Project a total of 156 bird species were recorded in the quarter degree grid cell, 2925AC Koffiefontein (Harrison *et al.* 1997).

9.8.3 Study area

120 species were collectively recorded within the Petra Mine Koffiefontein property area, with 90 species present during the winter, and 94 species during the summer survey (see Appendix D). This includes all transects and incidental records for both seasons. Nineteen endemic, and twenty four near-endemic species, were recorded. The near endemic Ludwig's Bustard (LB) was the only vulnerable species recorded during the winter survey, with the migrant Lesser Kestrel (LK) and the endemic Blue Crane (BC) recorded during the summer. Black Harrier (BH) and Blue Korhaan (BK) were two endemic, near-threatened, species recorded during the winter, and Secretarybird (SB) a breeding resident and near-threatened species was recorded both seasons. A total of nine migrant species were recorded in summer, with three of those species being breeding migrants. The Common Myna (COM) was the only introduced species recorded, and that during the summer survey.

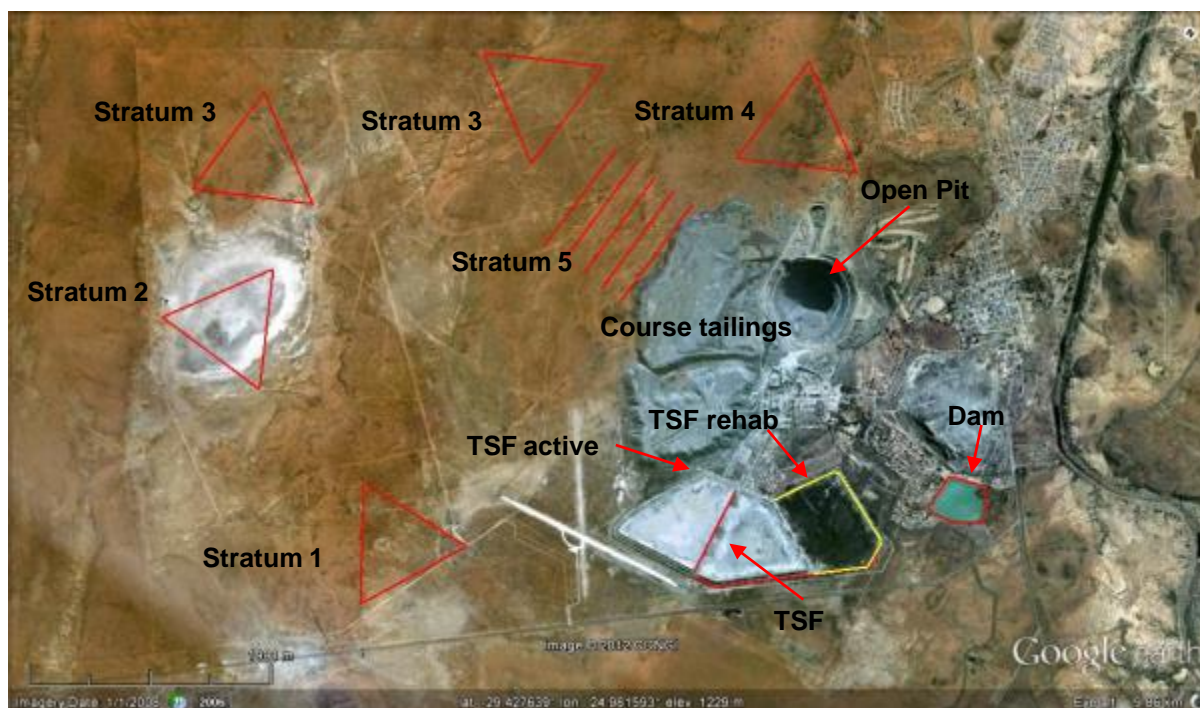


Figure 9-9: Petra Mine Koffiefontein indicating sampling strata

9.8.4 Findings

Findings suggest that Ant-eating Chat (AEC), African Pipit (AP), Northern Black Korhaan (NBK), Spike-heeled Lark (SHL), Karoo Scrub-Robin (KSR), Bokmakierie (B), Rufous-eared Warbler (REW), and Eastern Clapper Lark (ECL) could collectively serve as indicators of Karoo scrub/grassland which would help in assessing the degree to which rehabilitation of habitat in this particular area has occurred.

The relatively high summer density as well as the high species richness estimated on the Petra Mines Koffiefontein property area is probably a reflection of the great variety of habitat features to be found on the property area. In addition to the high species richness, the property also boasts a high incidence of endemic and near endemic birds.

Because of the low density of individual bird species in the area, no direct evidence could be obtained which would indicate negative impacts on birds on the farm area because of the proximity of mining operations.

9.8.5 Recommendations

Any planned expansion of the mine, whether infrastructure, TFS expansions or active mining, should not intrude into the woodland area (Stratum 4 and parts of Stratum 3 and 5 (see Figure 9-9). The woodland area covers only a small portion of the property, but contributes largely to the species richness. Also, it affords breeding opportunities to the resident pair of Secretary birds (near-threatened species).

9.9 Air quality

9.9.1 Data collection

Information relating to air quality was obtained from the draft Air Quality Management Plan produced for the Free State Province prepared by Zanokuhle Environmental Services.

9.9.2 Regional description

Air quality monitoring in the Free State is confined to a few local and district municipalities, and data is difficult to obtain. The Free State draft Air Quality Management Plan assessed data Mangaung Local Municipality (MLM), Sasolburg and Vaal Triangle networks. The MLM stations are situated in Bloemfontein while the DEAT and Sasolburg networks represent an area within the Vaal priority area, Fezile Dabi District Municipality. The MLM has four ambient monitoring station within the Bloemfontein Central Business District (CBD) that monitors meteorological parameters, Sulphur Dioxide (SO₂), Particulate Matter <=10µm (PM₁₀) and Particulate Matter <=2.5µm (PM_{2.5}). The Sasolburg network comprises four continuous monitoring stations while the Vaal Triangle Priority Area (DEAT) network has only one station that falls within the Free State.

The sources of airborne particulate matter in the Free State include:

- Agricultural activities which result in wind-blown soil dust that occur from bare fields, especially in dry periods,
- Vehicles, unpaved roads and construction,
- Mining including quarries,
- Domestic fuel burning,
- Industries including power plants and to lesser extent natural sources.

9.9.3 Study area

No site specific air quality data could be found to assess the air quality baseline conditions associated with the Letsemeng LM, the town of Koffiefontein or the Koffiefontein Diamond Mine. Windblown dust and particulate matter has been identified as a source of air pollution associated with slimes dams and tailings storage facilities. An air quality assessment will be undertaken to assess potential impacts associated with the KDM and recommend mitigation measures that will be effective in minimising identified air quality impacts.

9.10 Social Economic Profile

The following social information was extracted from the Integrated Development Plan 2014-15 for the Xhariep District Municipality. The IDP and most recent review for the Letsemeng Local Municipality had been evaluated – together with other relevant data sources – to determine inter alia the following pertaining to environmental matters:

- Education Profile;
- Health Profile;
- Socio-Grant per population group
- Types of dwelling per population enumerated;
- Economic Active population.

9.10.1 Education Profile

Definition

Functional literacy is defined as the number of persons aged 20 and above that has completed grade 7. For an investigation on no schooling and limited schooling (grade 5) global insight utilized population with age 15 and above in their count of no schooling and limited education (grade 5), as this is the legal school-leaving age.

Indicator

Grade 12 pass rate:

- Ten year target: 80%
- Twenty year target: 90%

An investigation of level of education identified the following specific geographic areas (district and local municipalities) with highest need, indicated in relation with Xhariep District Municipality and its local municipalities.

The number of persons aged 20 and above that has completed grade 7 in Xhariep in 2010 was 68 887, representing a percentage of 58.33% of residents and had less number in relation with other district and metro municipalities of the province.

Locally, Kopanong topped the other three local municipalities (Letsemeng, Mohokare and Naledi) with total number of functional literate people of 26 017 (61.29 % of LM residents). Letsemeng was the second highest with 18 683 (55.42 %), followed by Mohokare with 13 323 (55.07 %) and Naledi with 10 863 (61.22 %) functional literate people.

Accounting for people with no schooling and limited education, the district had 14 707 (10.81%) people aged 15 or more with no schooling and 22 523 (16.56%) people with limited

education in 2010. It had less number in relation with other district and metro municipalities with people that have no schooling and limited education (Table 9-4).

Table 9-4: Number of pupils per schooling category per LM (Data Source: Xhariep District Municipality, Integrated Development Plan 2014-15)

Local Municipality	Letsemeng	Kopanong	Mohokare	Naledi	Total
Pre-school including day care; crèche; Grade R and Pre-Grade R in an ECD centre	91	122	149	87	450
Ordinary school including Grade R learners who attend a formal school; Grade 1-12 learners & learners in special class	8847	12013	9372	7208	37440
Special school	25	42	17	63	147
Further Education and Training College FET	92	127	82	46	347
Other College	30	64	15	17	127
Higher Educational Institution University/University of Technology	147	289	184	98	719
Adult Basic Education and Training Centre ABET Centre	150	190	114	177	631
Literacy classes e.g. KhaRiGude; SANLI	63	36	33	61	193

9.10.2 Health profile

The Letsemeng has the second highest number of clinics operating in the municipality, however no hospitals are located within the boundaries of the LM (Table 9-5). Residents have to travel to Jagersfontein, Trompsburg, Smithfield or Zastron to access hospital services.

Table 9-5: Health profile of local municipalities in the Xhariep District Municipality (Data Source: Xhariep District Municipality, Integrated Development Plan 2014-15)

Local Municipality	Letsemeng	Kopanong	Mohokare	Naledi
Fixed Clinics	5	10	4	4
Mobile Clinics (weekly range)	6	6	6	
Vehicles	13 + 5 subsidised	11 + 8 subsidised	21 + 11 subsidised	
Ambulances	4	9	6	
Commuter Services	2	3	4	
Radio-graphic Services	1 X-Ray, 1 Sonar	2 X-ray, 1 Radiographer, 1 Supplementary Radiographer, 1 Community service Radiographer	2 X – Rays, 1 Community Service Radiographer	
District Hospitals (laundry, mortuary & theatre services)	0	Diamond hospital (Jagersfontein) - 32 bed; Trompsburg District Hospital - 300 beds	Stoffer Coetzee Hospital (Smithfield) - 23 beds; Embekweni Hospital (Zastron) - 25 beds	
Community Health care	1	1	0	

9.10.3 Social grant profile

Letsemeng LM has the second lowest overall grant and aid dependants in the Xhariep DM, while Kopanong has the highest number of grant and aid dependants in the Xhariep DM (Table 9-6).

Table 9-6: Social grant profile per population group (Data Source: Xhariep District Municipality, Integrated Development Plan 2014-15)

Municipality	Type of grant	Black	Coloured	Indian	White
Letsemeng Local Municipality	Old age pension	1 227	715	-	168
	Disability grant	1 763	589	-	84
	Child support grant	4 418	1 293	-	-
	Care dependency grant	-	150	-	-
	Foster care grant	20	-	-	-
	Grant in aid	155	-	-	-
	Social relief	-	-	-	-
	Multiple social grants	-	125	-	-
	Total grants / aid	7583	2872	0	252
Kopanong Local Municipality	Old age pension	3 322	392	-	534
	Disability grant	2 624	850	-	-
	Child support grant	6 027	1 551	-	-
	Care dependency grant	168	-	-	-
	Foster care grant	55	-	-	-
	Grant in aid	227	99	-	-
	Social relief	107	-	-	-
	Multiple social grants	-	-	-	-
	Total grants / aid	12530	2892	0	534
Mohokare Local Municipality	Old age pension	2 282	91	-	136
	Disability grant	1 376	-	-	-
	Child support grant	7 841	225	-	-
	Care dependency grant	226	-	-	-
	Foster care grant	32	-	-	-
	Grant in aid	162	-	-	-
	Social relief	-	-	-	-
	Multiple social grants	68	-	-	-
	Total grants / aid	11987	316	0	136
Naledi Local Municipality	Old age pension	1 785	37	-	23
	Disability grant	756	54	-	49
	Child support grant	4 121	66	-	-
	Care dependency grant	46	-	-	20
	Foster care grant	23	-	-	-
	Grant in aid	43	-	-	-
	Total grants / aid	6774	157	0	92

9.10.4 Housing conditions

The Letsemeng LM has the second lowest number of formal dwellings within the municipality (Table 9-7), but shows the highest number of informal dwellings still being occupied. This clearly indicates the need for the development of formalised dwellings in the Letsemeng LM.

Table 9-7: Types of dwelling per population

Type of dwellings	FS161: Letsemeng	FS162: Kopanong	FS163: Mohokare	FS164: Naledi
House or brick/concrete block structure on a separate stand or yard or on a farm	9016	13904	9027	6309
Traditional dwelling/hut/structure made of traditional materials	17	57	74	34
Flat or apartment in a block of flats	63	80	62	35
Cluster house in complex	12	11	5	42
Townhouse (semi-detached house in a complex)	36	31	1	9
Semi-detached house	76	20	97	106
House/flat/room in backyard	133	197	103	15
Room/flat let on a property or larger dwelling/servants quarters/granny flat	22	51	55	10
Total: Formal dwellings	9375	14351	9424	6560
Informal dwelling (shack; in backyard)	634	475	838	662
Informal dwelling (shack; not in backyard; e.g. in an informal/squatter settlement or on a farm)	1179	739	483	436
Caravan/tent	5	6	9	-
Total: Informal dwellings	1818	1220	1330	1098

9.10.5 Economically Active population

Definition

Economically active population is defined as the number of people that are able and willing to work from the age of 15 up to and including 64 years. It includes both employed and unemployed persons. In this regard, the official definition of Economically active population is utilized in that persons who consider themselves unemployed, but did not recently take active steps to find employment are not considered part of the economically active population. The economically active population is measured at the place of residence and thus represents the number of economically active persons residing within a specific region.

Table 9-8: Economically Active Population per Local Municipality

Local Municipality	Number	Percentage (%)
Kopanong	19472	29.54
Letsemeng	16639	30.53
Mohokare	12110	32.63
Naledi	8067	27.38

Letsemeng LM shows the second highest number of economically active persons when compared to the other LMs in the Xhariep DM.

9.10.6 Unemployment

According to the Letsemeng Local Municipality IDP, 2012-2013, 9 510 of the people are in formal employment in the Letsemeng Local Municipality, the remaining 27 563 need to be brought into the mainstream of the development and economy of the area. The balance of the population which is 27 563 derives their livelihoods from the informal sector including pensions, disability grants as well as seasonal work. The number of unemployment has most absolutely decreased during the past 11 years according to census statistics. The unemployment figures pose a mammoth challenge to Letsemeng Local Municipality which enforces upon us the need to develop more social support programmes and job creation initiatives that will reduce the unemployment rate significantly. The other endeavour will be to create a business enabling environment in the area to attract more private investors to the area to bring more sustainable economic growth to the municipal area. Self-employment initiatives and SMME development programmes will increase through the Local Economic Development Unit of Letsemeng Municipality, which has put a budget aside for Local Economic Development projects.

10 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

10.1 Introduction

In terms of Chapter 5 of the NEMA EIA regulations, EIA means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application. This includes an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed development as well as the cumulative impacts thereof. Mitigatory measures for each significant impact are to be determined. Alternative land uses or developments, their impacts and their cumulative impacts will also be considered and compared with those of the proposed development. Details of the Public Participation Process (PPP) followed during the course of the assessment will be given and it will be indicated how issues raised by stakeholders have been addressed. Knowledge gaps will be identified and descriptions of the arrangements for monitoring and management of the environmental impacts will be given.

10.2 Terms of Reference (ToR) for Specialist Studies

Based on the available data, the issues raised by stakeholders and the sensitivities identified the following specialist studies will be conducted in the EIA phase:

- Slime Waste Classification;
- Facility Design (conceptual design);
- Terrestrial Ecology Assessment (Fauna and Flora);
- Heritage Impact Assessment;
- Geotechnical Assessment;
- Air Quality Assessment; and
- Groundwater assessment.

The findings of these studies will be reflected in the EIA Report. The proposed Terms of Reference (ToR) for each of these specialist investigations is indicated below.

10.2.1 ToR: Slime Waste Classification

The process to extract diamonds from the mined ore produces among other fine tailings as a waste stream. The extraction process employed slurries the fine tailings when it comes out of the plant and deposited on it in the slimes dam facility. Due to the fact that some tailings from diamond mines may contain hazardous constituents due to the chemicals added to the extraction process and composition of the ore extracted, waste classification of the fine tailings will need to be undertaken to classify the waste stream.

The scope of work includes the following activities:

- Classification of the slimes dam tailings;
- Waste sample chemical analyses by a (South African Norms and Standards) SANAS accredited laboratory;
- Total chemical composition analysis for inorganic and organic compounds;
- Waste classification report with recommendations on the type of landfill barrier system, etc.
- The waste classification will have significant input towards the preferred alternative for waste disposal as well as the conceptual design of the required disposal facilities.

10.2.2 ToR: Slime Dam Design and Operating Manual

A design engineer will be appointed to undertake the conceptual design of the slime dam. The scope of work will include:

- Site visit of the project area;
- Commission and oversee the Topographical Survey of the site;
- Identification of applicable standards, legislation and guidelines which would constitute project adherence / compliance requirements;
- Generate conceptual layout alternative drawings for each of the three site alternatives;
- Compile design drawings for the preferred slime dam alternative for the 15 year life of the site to the design standard required for a waste management licence application;
- Undertake liner design for the slimes dam;
- Submit and present drawings to DESTEA and DWS for review and make any alternations required;
- Include any mitigation measures prescribed by specialist into the design;
- Investigate optimisation strategies to minimise the development footprint; and
- Review and amend current site operating manual to be relevant for the new site.

10.2.3 ToR: Topographic Survey (for concept design)

A specialist surveyor will be required to undertake a topographic survey, included in this scope is:

- Survey of the site at 0.5 meter contours;
- Identify all features and structures within the surveyed area;
- Produce 0.5 m contours and high-resolution aerial photography of the study area; and
- Submit the information in an electronic CAD format.

10.2.4 ToR: Terrestrial Ecology

An ecological investigation will be conducted on the three alternative sites and their associated infrastructure. The objectives of these studies will be to:

- Review existing ecological information available;
- Identification of applicable standards, legislation and guidelines which would constitute project adherence / compliance requirements;
- Conduct a site visit during the summer seasons to determine the general ecological state of the proposed site, determine the occurrence of any red data and/or vulnerable species, or any sensitive species requiring special attention.
- Compile a detailed description of the baseline environment;
- Provide a ranking assessment of the suitability of the proposed sites;
- Identify significant impacts that may cause detrimental impact to the environment;
- Undertake a comparative assessment of the various alternatives;
- Provide mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project;
- Advise on the legislated or best practice buffer zones around sensitive environments; and
- Compile an ecological report, indicating findings, preferred site recommendations and maps indicating sensitive and/or no-go areas.

10.2.5 ToR: Heritage Impact Assessment

A Heritage Impact Assessment will be conducted to comply with Section 38 of the National Heritage Resources Act (No 25 of 1999). Specific objectives of this study will be to:

- Undertake a desktop assessment (consulting heritage data banks and appropriate literature);
- Identify applicable standards, legislation and guidelines which would constitute project adherence / compliance requirements;
- Undertake a site visit of the project area;
- Determine whether any of the types and ranges of heritage resources as outlined in Section 3 of the Act (No 25 of 1999) do occur in the project area;
- Determine what the nature, the extent and the significance of these remains are;
- Determine whether any heritage resources (including graves) will be affected by the development project;
- Clearly identify possible archaeological, paleontological, cultural and historical sites within the study area;
- Identify the potential impacts of construction and operation of the proposed development on such resources, with and without mitigation;
- Offer an opinion on a preferred site in terms of this specialist field;
- Provide mitigation measures to ameliorate any negative impacts on areas of heritage significance;

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- Advise on the legislated or best practice buffer zones around sensitive environments; and
 - Compile a report and include a map illustrating the salient aspects of the report.

10.2.6 ToR: Geotechnical assessment

The Phase 2: geotechnical assessment undertaken on each of the three alternatives will consist of:

- Review and summary of existing and available geological, drilling and geotechnical information;
- Identify applicable standards, legislation and guidelines which would constitute project adherence / compliance requirements;
- A site visit to verify available aerial photographs and to investigate the depth and properties of regolith by excavations and soil sampling;
- Approximately 10 test pits will be excavated on each site to characterise land forms or terrain units and anomalies identified during the API. Samples of representative soils will be collected for laboratory testing;
- Dynamic penetration tests (DCP) will be carried out at the site of each test pit to determine the variation in in-situ stiffness over the upper 1m of the profile;
- Soil samples from the test pits will be tested for classification, compaction characteristics and strength/stiffness properties. Problem soils, if present, will be tested to quantify the degree of the problem condition (e.g. collapse potential).
- Compiling a map indicating features observed;
- Identifying and assessing significance of potential geotechnical constraints to the proposed development;
- Proposing mitigation measures that could reduce or eliminate the identified constraints;
- Advise on the legislated or best practice buffer zones around sensitive environments; and
- A report that will be compiled based on the findings of the study.

10.2.7 ToR: Air Quality Assessment

- The Air Quality Assessment will include a Baseline Characterisation and an Impact Assessment that will include the following:
 - A desktop literature review and information gathering exercise will be conducted to determine and/or describe the following in a technical report;
 - Description of the material characteristics of the slime material, where known;
 - Identification of expected sources air emissions and likely air quality parameters of potential concern at each site based on potential health effects to identified sensitive receptors;
 - Identification of applicable air quality standards, legislation and guidelines which would constitute project adherence / compliance requirements;

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- An assessment of regional baseline ambient air quality and climatic data / information. Depending on the availability of baseline monitoring data this assessment would involve quantitative (statistical) analysis of the available data and/or reliance on literature review information. GAA will purchase MM5 modelled climatic data for use in the modelling. If monitoring data of sufficient quality is available this will be used to verify the modelled data.
 - The methodology and findings of the site screening exercise based on air quality criteria. These findings will be consolidated into the motivation of a preferred project site and recommendations for forwarding the preferred site into the EIA phase.

Provided that the baseline and screening level air quality assessment findings support the requirement for a detailed air quality impact assessment, the following will be conducted and documented in an Air Quality Impact Report during the EIA phase of the project:

- Compilation of an emissions inventory for sources associated with the preferred slime dam.
- Emission sources surrounding the proposed development will also be included in the emissions inventory to determine potential cumulative health impacts on surrounding receptors.
- Dispersion modelling (using the AERMOD modelling code) will be conducted for the preferred site, covering the construction, commissioning, operating and decommissioning phases of the proposed project.
- Interpretation of the modelled baseline and project scenario results and a description of the air quality impacts using the assessment methodology adopted for the EIA process.
- Provision of a professional opinion in regards to:
 - Incorporation of air quality criteria into the Environmental Impact Report (EIR) and Environmental Management Plan (EMP) documents.
 - Management interventions to control and/or mitigate the identified project air quality impacts; and
 - Advise on the legislated or best practice buffer zones around sensitive environments.

10.2.8 ToR: Groundwater Assessment

The groundwater assessment undertaken on each of the three alternatives will consist of:

- Review and desktop assessment of existing information;
- Identify applicable standards, legislation and guidelines which would constitute project adherence / compliance requirements;
- Undertaking a site visit and hydrocensus;
- Groundwater sampling and analyses;
- Undertaking a gap analyses of existing groundwater monitoring network to identify possible additional monitoring points required;
- Developing an initial groundwater conceptual model;

- Review geochemical data;
- Updating exiting groundwater numerical model for Impact and risk assessment;
- Identifying and assessing significance of potential groundwater impacts resulting from the proposed development;
- Proposing mitigation measures that could reduce or eliminate the identified impacts;
- Advise on the legislated or best practice buffer zones around sensitive environments;
and
- A report that will be compiled based on the findings of the study.

10.3 Impact Assessment Methodology

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Magnitude;
- Spatial scale (Extent);
- Temporal scale;
- Probability;
- Significance of impacts; and
- Degree of certainty.

A combined quantitative and qualitative methodology will be used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in Table 10-1.

Table 10-1: Quantitative rating and equivalent descriptors for the impact assessment criteria

Rating	Magnitude	Extent Scale	Temporal Scale
1	VERY LOW	<i>Isolated sites / proposed site</i>	<u>Incidental</u>
2	LOW	<i>Study area</i>	<u>Short-term</u>
3	MODERATE	<i>Local</i>	<u>Medium-term</u>
4	HIGH	<i>Regional / Provincial</i>	<u>Long-term</u>
5	VERY HIGH	<i>Global / National</i>	<u>Permanent</u>

A more detailed description of each of the assessment criteria is given in the following sections.

10.3.1 Magnitude Assessment

Magnitude rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km²) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known or remain. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in Table 10-2 below.

Table 10-2: Description of the magnitude rating scale

Rating		Description
5	Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

10.3.2 Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in Table 10-3.

Table 10-3: Description of the significance rating scale

Rating		Description
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Area	The impact will affect an area not exceeding the Koffiefontein Diamond mine property.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the slime dam.

10.3.3 Temporal Scale (Duration)

In order to accurately describe the impact it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in Table 10-4.

Table 10-4: Description of the temporal rating scale

Rating		Description
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

10.3.4 Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in Table 10-5 below.

Table 10-5: Description of the degree of probability of an impact occurring

Rating	Description
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

10.3.5 Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale is used as discussed in Table 10-6. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

Table 10-6: Description of the degree of certainty rating scale

Rating	Description
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

10.3.6 Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 will be used for each of the assessment criteria. Thus the total value of the impact is described as the function of magnitude, spatial and temporal scale as described below:

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

Table 10-7: Example of Rating Scale

Impact	Magnitude	Spatial Scale	Temporal Scale	Probability	Rating
	LOW	<i>Local</i>	<i>Medium-term</i>	<i>Could Happen</i>	
Impact to air	1	1	1	2	0.2

Note: The significance, spatial and temporal scales are added to give a total of 3, that is divided by 3 to give a criteria rating of 1. The probability (1) is divided by 5 to give a probability rating of 0.2. The criteria rating of 1.0 is then multiplied by the probability rating (0.2) to give the final rating of 0.2.

The impact risk is classified according to five classes as described in the table below.

Table 10-8: Impact Risk Classes

Rating	Impact Class	Description
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore with reference to the example used for air quality above, an impact rating of 0.2 will fall in the Impact Class 1, which will be considered to be a very low impact.

10.3.7 Cumulative Impacts

It is a requirement that the impact assessments take cognisance of cumulative impacts. In fulfilment of this requirement the impact assessment will take cognisance of any existing impact sustained by the operations, any mitigation measures already in place, any additional impact to environment through continued and proposed future activities, and the residual impact after mitigation measures.

It is important to note that cumulative impacts at the national or provincial level will not be considered in this assessment, as the total quantification of external companies on resources is not possible at the project level due to the lack of information and research documenting the effects of existing activities. Such cumulative impacts that may occur

across industry boundaries can also only be effectively addressed at Provincial and National Government levels.

Using the criteria as described above an example of how the cumulative impact assessment will be done is shown below:

Table 10-9: Example of cumulative impact rating

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
Initial / Existing Impact (I-IA)	2	2	2	<u>1</u>	0.4
Additional Impact (A-IA)	1	2	1	<u>1</u>	0.3
Cumulative Impact (C-IA)	3	4	2	<u>1</u>	0.6
Residual Impact after mitigation (R-IA)	2	1	2	<u>1</u>	0.3

As indicated in the example above the Additional Impact Assessment (A-IA) is the amount that the impact assessment for each criterion will increase. Thus if the initial impact will not increase, as shown for temporal scale in the example above the A-IA will be 0, however, where the impact will increase by two orders of magnitude from 2 to 4 as in the spatial scale the A-IA is 2. The Cumulative Impact Assessment (C-IA) is thus the sum of the Initial Impact Assessment (I-IA) and the A-IA for each of the assessment criteria.

In both cases the I-IA and A-IA are assessed without taking into account any form of mitigation measures. As such the C-IA is also a worst case scenario assessment where no mitigation measures have been implemented. Thus a Residual Impact Assessment (R-IA) is also made which takes into account the C-IA with mitigation measures. The latter is the most probable case scenario, and for the purpose of this report is considered to be the final state Impact Assessment.

10.3.8 Notation of Impacts

In order to make the report easier to read the following notation format is used to highlight the various components of the assessment:

- Magnitude- IN CAPITALS
- Temporal Scale – in underline
- Probability – in *italics and underlined*
- Degree of certainty - in **bold**
- Spatial Extent Scale – in *italics*

10.4 Environmental Impact Reporting phase

10.4.1 Environmental Impact Report

Once the Scoping Report and the Plan of Study for the EIA is accepted by the DESTEA, Zitholele Consulting will begin the Environmental Impact Report.

The Environmental Impact Report will include the activity description, site / area and corridor assessments, public participation, a description of the issues, assessment of the alternatives, emergency and response plan, the closure and rehabilitation plan. The specialist studies results will be summarised and integrated into the Environmental Impact Report.

10.4.2 Environmental Management Programme

An Environmental Management Programme (EMPr), in the context of the Regulations, is a tool that takes a project from a high level consideration of issues down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. The objectives of an EMPr are to minimise disturbance to the environment, present mitigation measures for identified impacts, maximise potential environmental benefits, assign responsibility for actions to ensure that the pre-determined aims are met, and to act as a “cradle to grave” document. The EMPr will be drafted according to the findings in the Scoping Report and EIR.

10.4.3 Public Participation during the EIA Phase

The purpose of public participation during the Impact Assessment Phase is to present the findings of the EIA phase and to avail the Draft EIR to the public for comments. I&APs will be afforded an opportunity to verify that their issues have been considered either by the EIA specialist studies, or elsewhere. Also, I&APs will comment on the findings of the Draft EIR, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. An EA reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

The public participation process for the EIA will involve the following proposed steps:

- Announcement of the availability and public review of the Draft EIR;

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- Host a Key Stakeholder Workshop and two public meetings when a summary of the environmental findings as documented in the Draft EIR and mitigations measures as proposed in the Draft EMPr will be presented;
 - Announcement of the availability of the Final EIR; and
 - Notification of the authorities' decision with regard to EA

Below information is provided about each step.

Announcing the availability of the Draft EIR and the EMPr

A letter will be circulated to all registered I&APs on the project database, informing them in terms of progress made with the study and that the Draft EIR and EMPr are available for comment. The report will be distributed to public places and also presented at a stakeholder meeting. Advertisements will be placed in the same newspapers used in the scoping phase to announce the public review period of the Draft EIR.

Public review of Draft EIR and Draft EMPr

The EIA Guidelines specify that stakeholders must have the opportunity to verify that their issues have been captured and assessed before the EIA Report will be approved. The findings of the specialist assessment will be integrated into the Draft EIR. The report will be written in a way accessible to stakeholders in terms of language level and general coherence. The Draft EIR will have a comprehensive project description, motivation and alternatives being considered and also the findings of the assessment and recommended mitigation measures. It will further include the Comments and Responses Report (CRR), which will list every issue raised with an indication of where the issue was dealt with in the EIR. The findings of the assessment and recommended mitigation measures will also be incorporated into the EIR.

As part of the process to review the Draft EIR and Draft EMPr, a stakeholder workshop and two public meetings will be arranged to afford stakeholders the opportunity to obtain first-hand information from the project team members and also to discuss their issues and concerns. Contributions at this meeting will be considered in the Final EIR.

Announcing the availability of the Final EIR and EMPr

A letter will be circulated to all registered I&APs, informing them in terms of progress made with the study and that the Final EIR and EMPr are available for comment. The reports will be distributed to the same public places (See Section 5 with the venues) as the previous reports for I&APs to review.

Progress feedback

After comments from I&APs have been incorporated, all stakeholders on the database will receive a letter to report on the status of the process, to thank those who commented to date and to inform them that the Final EIR and EMP_r have been submitted to the lead authority for consideration. I&APs will be advised on the next steps in the process.

Announce Competent Authority's decision

Registered I&APs will be notified by letter of the Environmental Authorisation issued, including the reason for the Competent Authority's decision and the appeal process. An advertisement will be placed in the same newspapers which were used during the scoping and impact assessment phases.

10.5 Submission of Final EIR and Decision Making

Using the comments generated by the PPP the Draft EIR will be updated and finalised. All comments received will be added to the CRR and attached to the Final EIR as an appendix.

The Final EIR once updated with additional issues raised by I&APs may contain new information. The Final EIR will be submitted to the DESTEA for decision making, and will be distributed to those I&APs who specifically request a copy. I&APs will be notified of the availability of the report by letter, advertisements and e-mail.

10.5.1 Overall EIA Project Schedule

Table 10-10: Primary milestones of the Project

Milestones	Date
Submission of Final Scoping Report to Competent Authority	April 2015
Undertake Specialist Studies	November 2014 – April 2015
Stakeholder Engagement on EIR / EMP _r	February – beginning April 2015
Finalise EIR and Draft EMP	May 2015 – June 2015
Submission of draft EIR and EMP to Competent Authority	June 2015 – July 2015
Submission of final EIR and EMP to Competent Authority	End August 2015
Environmental Authorisation	August 2015 – December 2015

11 CONCLUSION AND WAY FORWARD

The Koffiefontein Mine Joint Venture (KMJV) appointed Zitholele Consulting to undertake the EIA application for the proposed new slimes dam development at the Koffiefontein Diamond Mine. This Scoping study was undertaken with the aim of identifying potential aspects of concern (both positive and negative) on the biophysical environment and identifying issues, concerns and queries from I&APs. This FSR documents the process followed, the findings and recommendations of the Scoping study, and the proposed Plan of Study for the EIA Phase to follow.

This FSR is therefore submitted to the competent authority for approval. The EIR phase will continue with specialist investigations and reporting, identification of the preferred alternatives and assessment and rating of all significant impacts.

Public and authority consultation will continue during the EIR phase including providing opportunity to comment on the environmental impact report through public meetings, key stakeholder workshops and written submissions to the EIA project team.

This report provides accurate information as provided by the client, appropriate literature and EAP investigation.

ZITHOLELE CONSULTING (PTY) LTD

Mrs Shandr  Laven
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Appendix A: EAP CV

**Appendix B: Application Form and EAP Declaration and the
DESTEA Acceptance Letter**

Appendix C 1: Site Notice and Advertisement

Appendix C 2: Background Information Document

Appendix C 3: Communication to I&APs

Appendix C 4: Communication to Authorities

Appendix C 5: Communication from I&APs

Appendix C 6: Communication from Authorities

Appendix C 7: Minutes of Meetings

Appendix C 8: Comments & Response Report

Appendix C 9: I&APs Database

**Appendix D: List of Terrestrial Fauna and Flora Species
encountered at Koffiefontein Diamond Mine**