Application for a Prospecting Right and Associated Environmental Authorisation for the proposed prospecting of Diamond (General and Kimberlite) on the farms Klein Karee Pan 111, Weltevrede 117 and Farm Spitskop 115, in the Kimberley Magisterial District, Northern Cape Province.

Draft Basic Assessment Report

DMR REFERENCE NUMBER: NC12871PR

Report Prepared for

Manzhanga Investments (Pty) Ltd

Report Prepared by

GEOLOGICAL CONSULTING SERVICES PTY (LTD)

August 2021

Title:	*Draft Basic Assessment and Environmental Management Programme (BAR/EMPr) Report for the proposed prospecting of Diamond located on the farms Klein Karee Pan 111, Weltevrede 117 and Farm Spitskop 115, in the Kimberley Magisterial District, Northern Cape Province.*
Status of report:	*Draft Report*
First Issue:	*August 2021*
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Applicant	*Manzhanga Investments (Pty) Ltd* *Unit 11 Ridgeview Office Park,* *248 Kent Avenue,* *Randburg* *2194* *Tel: 0722779664* *khangi@negota.co.za*

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

DMR Ref: NC12871PR

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT:	Manzhanga Investments SA (Pty) Ltd
TEL NO:	0722779664
FAX NO:	N/A
POSTAL ADDRESS:	Unit 11 Ridgeview Office Park, 248 Kent Avenue, Roodepoort, Gauteng, 1709
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FILE REFERENCE NUMBER SAMRAD:	NC30/5/1/1/2/12871PR

1 IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has considered any minimum requirements applicable, or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2 Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process─

a. determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
b. identify the alternatives considered, including the activity, location, and technology alternatives;
c. describe the need and desirability of the proposed alternatives,
d. through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the aspects to determine:

    (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

    (ii) the degree to which these impacts—

        (aa) can be reversed;

        (bb) may cause irreplaceable loss of resources; and

        (cc) can be managed, avoided or mitigated;

e. (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

    (i) identify and motivate a preferred site, activity and technology alternative;

    (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and

    (iii) identify residual risks that need to be managed and monitored.

General Project Overview

Manzhanga Investments (Pty) Ltd (Manzhanga) appointed Ndi Geological Consulting Services (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to facilitate the environmental authorisation process for its proposed diamond prospecting project located in the Magisterial District of Kimberley.

The proposed prospecting project will cover an area of 9335.53 hectares and located at a distance between 15 - 20km southwest of Kimberley and +/- 23km north-northwest of Ritchie in the Northern Cape Province.

Manzhanga requires a prospecting right in terms of the Mineral and Petroleum Resources Development Act (Act No. 22 of 2002) (MPRDA). Before the prospecting right will be granted, Manzhanga must undertake an environmental authorisation process in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The competent authority for the environmental authorisation process is the Northern Cape Department of Mineral Resources (DMR).

The Department of Environmental Affairs (DEA) has identified the need for the alignment of environmental authorisations and has promulgated a single environmental management system under NEMA whereby the DMR has become the competent authority for the authorisation of mining-related projects under the NEMA Environmental Impact Assessment (EIA) Regulations. This will result in simultaneous decisions in terms of NEMA and other environmental management Acts.

Since the proposed prospecting project triggers activities listed in Listing Notice 1 of the NEMA, a Basic EIA authorisation process in terms of NEMA Government Notice Regulation (GNR) 982 (as amended by GNR325 of 7 April 2017) will be required.

Manzhanga applied for an environmental authorisation to the DMR in respect of a prospecting right application and DMR accepted the application on 22 July 2021.

Before a diamond mining process can be planned and built, several tests and surveys must be conducted to ensure that the project is economically viable, technically feasible, and environmentally sound. Assessment of the geological information available has determined that the area in question may have good quality diamond reserves. To ascertain the above and determine the nature, location and extent of the reserves within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the diamonds.

The proposed prospecting project will consist of non-invasive and invasive (drilling sampling) activities. On surface, invasive methods include 20 Reverse Circulation (RC) and 10 diamond core drill boreholes. Non-invasive methods will include analytical desktop studies, geological mapping and decision-making on the viability of the project.

Most of the rehabilitation will be conducted while prospecting activities are undertaken. The final rehabilitation will be done once the prospecting activities have been completed at a site and before the drilling team leaves the site.

The stakeholder engagement process, as part of the Environmental Authorisation process, is conducted in terms of NEMA (as amended) which provides clear guidelines for stakeholder engagement during an EIA. One of the general objectives of integrated environmental management set out in Section 23(2) of NEMA is to ensure the “adequate and appropriate opportunity for public participation in decisions that may affect the environment”.

The stakeholder engagement process is primarily aimed at affording Stakeholders and Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the project. In addition, the

purpose of consultation with the landowner, affected parties and communities is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether and to which degree the project will affect them. In addition, the purpose of consultation with the Stakeholders and I&APs is to provide the competent authority with the necessary information for them to make informed decisions.

Before an EAP submits a final report, they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval.

Stakeholders were therefore provided with an opportunity to participate in the public review period of the Draft BAR from 23 August 2021 – 23 September 2021 to ensure that the assessment of impacts and proposed management of impacts have addressed their concerns. Comments received during the 30-day comment period (from the Draft BAR review) will be incorporated into the Final BAR/EMPr that will be submitted to the DMR for decision making.

This BAR/EMPr has been compiled in terms of the provisions of Appendix 1 and Appendix 4 of December 2014 GNR 982 of the NEMA. These requirements are cross-referenced to the various sections in this report where these requirements are addressed (Table 2-1 and Table 2-2).

Table 2-1: Requirements of Appendix 1 of GNR 982 for a BAR

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
Appendix 1: 3 (1) (a)	Details of – the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae	Section 5.1
Appendix 1: 3 (1) (b)	The location of the activity, including – The 21-digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties.	Section 6
Appendix 1: 3 (1) (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken; or.	Section 6 Figure 7-1
Appendix 1: 3 (1) (d)	A description of the scope of the proposed activity, including – All listed and specified activities triggered and being applied for; A description of the activities to be undertaken, including associated structures and infrastructure.	Section 7.5 Section 7
Appendix 1: 3 (1) (e)	A description of the policy and legislative context within which the development is proposed including- an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development	Section 8

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
	planning frameworks and instruments that are applicable to this activity and have been considered in the preparation of the report; and how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	
Appendix 1: 3 (1) (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 9
Appendix 1: 3 (1) (g)	A motivation for the preferred site, activity and technology alternative.	Section 10
Appendix 1: 3 (1) (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including-	Section 11
	Details of all alternatives considered;	Section 11.1
	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 11.2
	A summary of the issues raised by interested and affected parties, and an indication of the way the issues were incorporated, or the reasons for not including them;	Section 11.5
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 12
	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated.	Section 13
	The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 14
	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 15
	The possible mitigation measures that could be applied and level of residual risk;	Table 13-1, Table 13-2 and Table 13-3
	The outcome of the site selection matrix;	N/A
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Section 17

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
	A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 18
Appendix 1: 3 (1) (i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— a description of all environmental issues and risks that were identified during the environmental impact assessment process; and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	 Section 18.1 Section 13
Appendix 1: 3 (1) (j)	An assessment of each identified potentially significant impact and risk, including— cumulative impacts; the nature, significance and consequences of the impact and risk; the extent and duration of the impact and risk; the probability of the impact and risk occurring; the degree to which the impact and risk can be reversed; the degree to which the impact and risk may cause irreplaceable loss of resources; and the degree to which the impact and risk can be avoided, managed or mitigated;	Section 13
Appendix 1: 3 (1) (k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	N/A
Appendix 1: 3 (1) (l)	an environmental impact statement which contains— a summary of the key findings of the environmental impact assessment; a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 21 Figure 21-1
Appendix 1: 3 (1) (m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed [impact management objectives and the impact management outcomes for the development for inclusion in the EMPr;	Table 13-1, Table 13-2 and Table 13-3

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
Appendix 1: 3 (1) (n)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 23
Appendix 1: 3 (1) (o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 24
Appendix 1: 3 (1) (p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 25
Appendix 1: 3 (1) (q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 26
Appendix 1: 3 (1) (r)	An undertaking under oath or affirmation by the EAP in relation to- The correctness of the information provided in the report; The inclusion of the comments and inputs from stakeholders and interested and affected parties; The inclusion of inputs and recommendations from the specialist reports where relevant; and Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	Section 27
Appendix 1: 3 (1) (s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 28
Appendix 1: 3 (1) (t)	Any specific information required by the competent authority.	Section 29
Appendix 1: 3 (1) (u)	Any other matter in terms of Section 24(4)(a) and (b) of the NEMA	Section 29.3

Table 2-2: Requirements of Appendix 4 of GNR 982 for a an EMPr

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EMPr	Section where addressed in the EMPr
Appendix 4 (a)	details of i. the EAP who prepared the EMPr; and ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 5
Appendix 4 (b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 7
Appendix 4 (c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers	Figure 7-2

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EMPr	Section where addressed in the EMPr
Appendix 4 (d)	a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- i. planning and design; ii. pre-construction activities; iii. construction activities; iv. rehabilitation of the environment after construction and where applicable post closure; and v. where relevant, operation activities;	Section 31
Appendix 4 (e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 31
Appendix 4 (f)	a description of proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to: i. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; ii. comply with any prescribed environmental management standards or practices; iii. comply with any applicable provisions of the Act regarding closure, where applicable; and iv. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Section 36
Appendix 4 (g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Section 36
Appendix 4 (h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Section 38.2
Appendix 4 (i)	an indication of the persons who will be responsible for the implementation of the impact management actions	Section 38.3
Appendix 4 (j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 38.4
Appendix 4 (k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 38.5
Appendix 4 (l)	a program for reporting on compliance, considering the requirements as prescribed by the Regulations;	Section 38.5
Appendix 4 (m)	an environmental awareness plan describing the manner in which- i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 40

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EMPr	Section where addressed in the EMPr
	ii. risks must be dealt with to avoid pollution or the degradation of the Environment.	
Appendix 4 (n)	Any specific information that may be required by the competent authority.	None

YOUR COMMENT ON THE BASIC ASSESSMENT REPORT

This Draft Basic Assessment Report (Draft BAR) will be available for comment for a period of 30 days from 23 August 2021 to 23 September 2021. Copies of the Draft BAR been made available at the following public place for review:

Public Place	Locality	Telephone
Ndi Geological website	http://www.ndigeoservices.co.za/	053 842 0687

I&APs are requested to provide comments and information on the following aspects of the proposed project:

1. Information on how I&APs consider that the proposed activities will impact on them or their socio-economic conditions;
2. Written responses stating their suggestions to mitigate the anticipated impacts of each activity;
3. Information on current land uses and their location within the area under consideration;
4. Information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied; and
5. How to mitigate the potential impacts on their socio-economic conditions and to make proposals as to how the potential impacts on their infrastructure can be managed avoided or remedied.

DUE DATE FOR COMMENT

23 September 2021

Please submit comments to the EAP:

Ndivhudzannyi Mofokeng
Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street
Kimberley, 8301
Cell: 082 760 8420
Tel: 053 842 0687
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atshidzaho@gmail.com
ndi@ndigeoservices.co.za

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List of abbreviations

BAR:	Basic Assessment Report
C Plan:	Conservation Plan
CBAs:	Critical Biodiversity Areas
CPR:	Competent Person's Report
CRR:	Comments and Responses Report
CV:	Curriculum Vitae
DEA:	Department of Environmental Affairs
DM:	District Municipality
DMR:	Department of Mineral Resources
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Economic Active Population
EAP:	Environmental Assessment Practitioner
ECO:	Environmental Control Officer
EHS:	Environmental Health and Safety
EIA:	Environmental Impact Assessment
EMF:	Environmental Management Framework
EMPr:	Environmental Management Programme
ESA:	Ecological Support Area
GA:	Generally Authorised
GIS:	Geographic Information Systems
GNR:	Government Notice Regulation
GSSA:	Geological Society of South Africa
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plans
LM:	Local Municipality
LUDS:	Land Use Development System
MPRDA:	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
NEM:BA:	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEM: WA:	National Environmental Management Waste Act (Act No. 59 of 2008)
NEMA:	National Environmental Management Act (Act No. 107 of 1998)
NFEPA:	National Freshwater Ecosystem Priority Areas
NGA:	National Groundwater Archive

NHRA:	National Heritage Resources Act, 1999 (Act 25 of 1999)
NWA:	National Water Act, 1998 (Act 36 of 1998)
PM:	Particulate Matter
RDP:	Reconstruction and Development Programme
SAHRA:	South African Heritage Resources Agency
SAHRIS:	South African Heritage Resources Information System
SANBI:	South African National Biodiversity Institute
SANS:	South African National Standards
SAPD:	South African Police Department
SCC:	Species of Conservation Concern
SDF:	Spatial Development Framework
SDF:	Spatial Development Framework
WMA:	Water Management Area
WUL:	Water Use Licence

3 Project background

Manzhanga Investments (Pty) Ltd (Manzhanga) appointed Ndi Geological Consulting Services (Pty) Ltd (Ndi Geological Consulting) as the independent Environmental Assessment Practitioner (EAP) to facilitate the environmental authorisation process for its proposed diamond project located in the magisterial district of Kimberley.

The proposed prospecting project will cover an area of 9335.53 hectares and located at a distance between 15 - 20km southwest of Kimberley and +/- 23km north-northwest of Ritchie, on the farms Klein Karee Pan 111, Weltevrede 117 and Spitskop 115 in the Kimberly Magisterial District, Northern Cape Province.

Manzhanga requires a prospecting right in terms of the Mineral and Petroleum Resources Development Act (Act No. 22 of 2002) (MPRDA). Before the prospecting right will be granted, Manzhanga must undertake an environmental authorisation process in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The competent authority for the environmental authorisation process is the Northern Cape Department of Mineral Resources (DMR).

The Department of Environmental Affairs (DEA) has identified the need for the alignment of environmental authorisations and has promulgated a single environmental management system under NEMA whereby the DMR has become the competent authority for the authorisation of mining-related projects under the NEMA Environmental Impact Assessment (EIA) Regulations. This will result in simultaneous decisions in terms of NEMA, the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and other environmental management Acts.

Since the proposed prospecting project triggers activities listed in Listing Notice 1 of the NEMA, a Basic EIA authorisation process in terms of NEMA Government Notice Regulation (GNR) 982 (as amended by GNR325 of 7 April 2017) will be required.

Before a diamond operation can be planned and built, several tests and surveys must be conducted to ensure that the project is economically viable, technically feasible, and environmentally sound. The proposed prospecting project will consist of non-invasive and invasive (drilling sampling) activities. On surface, invasive methods include drilling of 20 Reverse Circulation (RC) and 10 diamond core drillholes. Non-invasive methods will include desktop studies, geological mapping and decision-making on the viability of the project.

Most of the rehabilitation will be conducted while prospecting activities are undertaken. The final rehabilitation will be done once the prospecting activities have been completed at a site and before the drilling team leaves the site.

The total duration of the prospecting and evaluation activities is planned for two (2) years.

Most of the rehabilitation will be conducted while prospecting activities are undertaken. The final rehabilitation will be done once the prospecting activities have been completed at a site and before the drilling team leaves the site.

The stakeholder engagement process, as part of the Environmental Authorisation process, is conducted in terms of NEMA (as amended) which provides clear guidelines for stakeholder engagement during an EIA. One of the general objectives of integrated environmental management set out in Section 23(2) of NEMA is to ensure the "*adequate and appropriate opportunity for public participation in decisions that may affect the environment*".

The stakeholder engagement process is primarily aimed at affording Stakeholders and Interested and Affected Parties (I&APs) the opportunity to gain an understanding of the project. In addition, the purpose of consultation with the landowner, affected parties and communities is to provide them with

the necessary information about the proposed project so that they can make informed decisions as to whether and to which degree the project will affect them. In addition, the purpose of consultation with the Stakeholders and I&APs is to provide the competent authority with the necessary information for them to make informed decisions.

Before an EAP submits a final report, they must have given registered I&APs access to, and an opportunity to comment on the report prior to the submission of the final report to the competent authority for approval.

Stakeholders are therefore invited to participate in the public review period of the Draft Basic Assessment Report (Draft BAR) from 23 August 2021 to 23 September 2021 to ensure that the assessment of impacts and proposed management of impacts has addressed their concerns. After the public review period, the report will be updated with comments received from stakeholders on the Draft BAR.

The updated Final BAR will be submitted to the competent authority (DMR) and other commenting authorities for review once the comments from the stakeholders have been incorporated into the Draft BAR. The DMR will consider the findings in consultation with various authorities and decide whether environmental authorisation should be granted for the proposed prospecting project.

4 Purpose and context of this document

The project triggers activities listed in terms of Listing Notices 1 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and will require an Environmental Authorisation (EA) from the Department of Mineral Resources (DMR), Northern Cape Province.

This document serves as the draft Basic Assessment Report (Draft BAR) and includes the following objectives as a minimum:

- To comply with the requirements of NEMA and associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of activities associated with decommissioning and closure of the cement-ash mixing plant. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the possible negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMPr; and
- Provide the decision-making authorities with sufficient and accurate information to make a sound decision on the proposed development and set conditions that must be adhered to.

All activities that trigger activities listed in GNR 983 require that a Basic Assessment (BA) process be followed. The BA process will entail:

- Compilation of an Initial Draft BAR and draft EMPr for the public to comment on before the submission of the application to DMR.
- Submission of the EA Application to the DMR.
- Finalisation of the Draft BAR and EMPr for the official public participation comment period of 30 days.
- Incorporation of stakeholder comments into the final BAR and EMPr.
- Public Participation Process (PPP).

The BA process will follow the procedure as prescribed in Regulations 19 to 20 and is summarised in Figure 4-1.

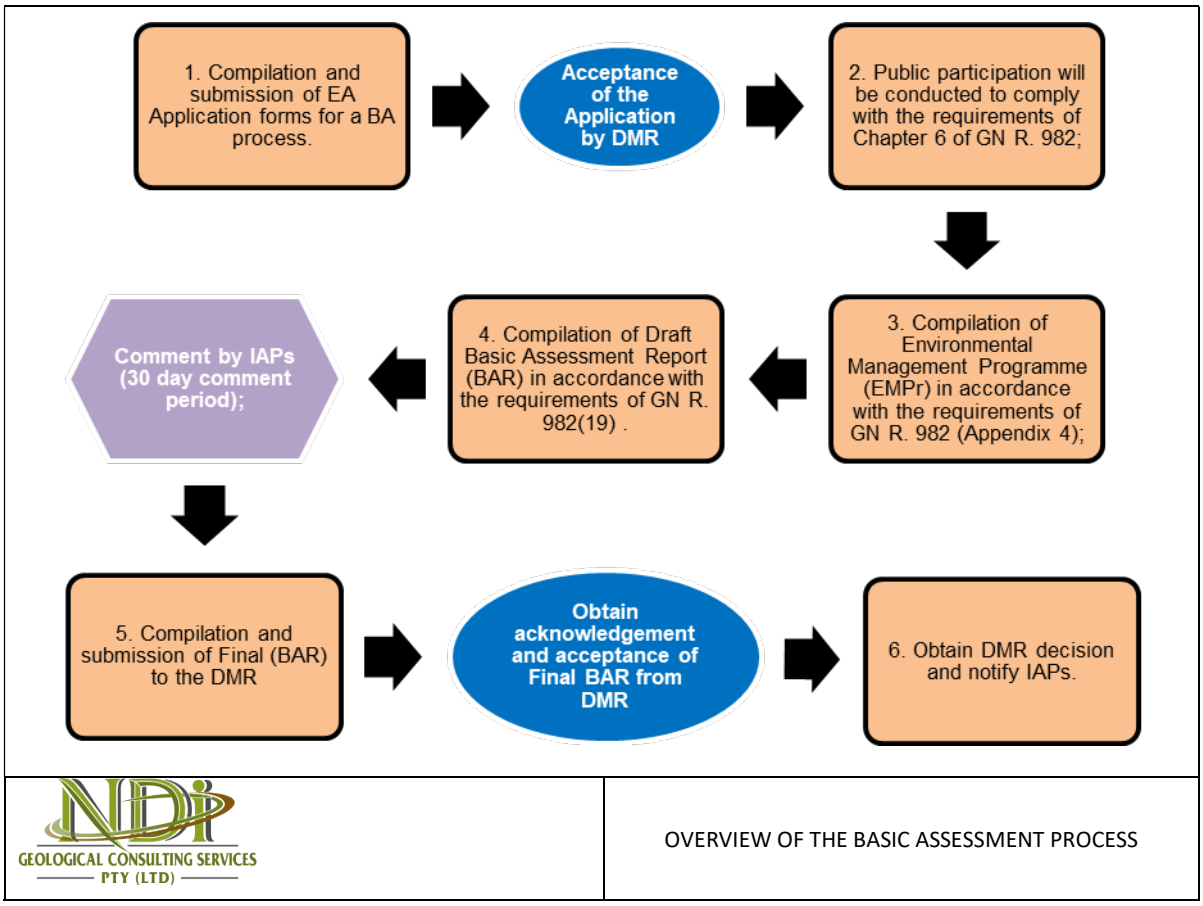


Figure 4-1: Overview the Basic Assessment Process

5 Contact Person and Correspondence Address

5.1 Details of EAP who prepared the report

The EAP involved in the compilation of this BAR and her contact details are provided in Table 5-1 below:

Table 5-1: EAP Contact Details

EAP Name	Contact Number	Fax Number	Email Address
Ndivhudzannyi Mofokeng	053 842 0687	086 538 1069	atshidzaho@gmail.com

5.2 Expertise of the EAP

5.2.1 Qualifications of the EAP

The qualifications of the EAP are provided for in Table 5-2 below, and copies of the qualifications are provided in Appendix 1.

Table 5-2: EAP Qualifications

EAP Name	Qualifications	Professional registration	Years' Experience
Ndivhudzannyi Mofokeng	BSc (Hons) Earth Sciences in Mining and Environmental Geology	GSSA EAPASA	10

5.2.2 Summary of EAPs experience

Ndivhudzannyi holds BSc (Hons) Earth Sciences in Mining and Environmental Geology. She has close to 10 years' experience in the exploration and open cast work in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation (RC) and percussion drilling). She has proven working experience in field exploration and mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, handling of GPS, supervisory duties within the field, geological report and progress report writing, including Prospecting Work Programmes and Environmental Management Plans, handling the Department of Mineral Resources (DMR) documents in general. Ndivhudzannyi has as a solid technical background in GIS ArcView software, Rockworks, Turbo-Cad and Turbo-Sketch, and Global Mapper 9 Application.

A detailed Curriculum Vitae (CV) of the EAP is provided for Appendix 2.

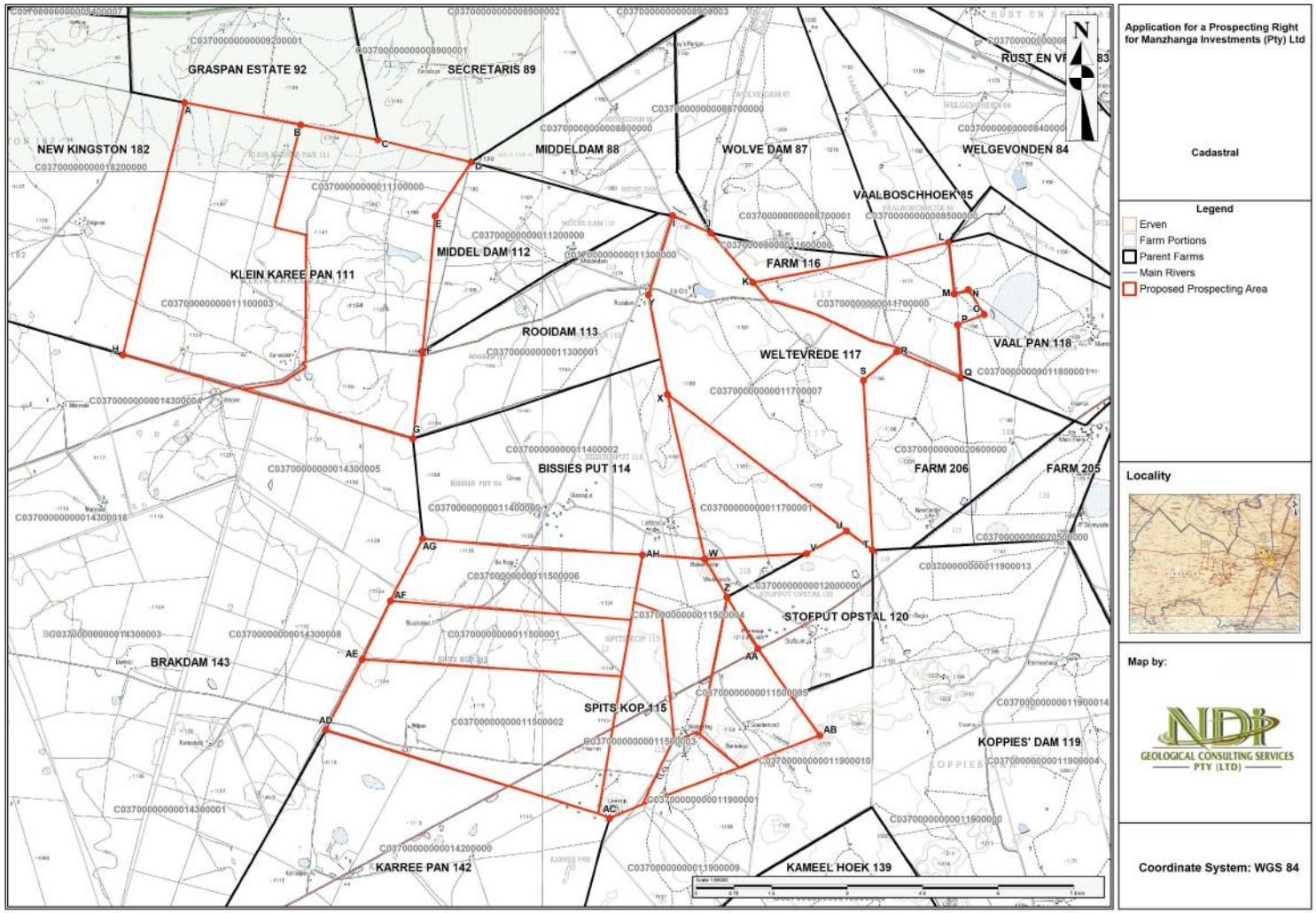
6 Project Location

6.1 Property Description

The description of the affected property is provided in Table 6-1 and map showing the affected properties is provided in Figure 6-1.

Table 6-1: Description of Properties affected by the Manzhanga Project.

Farm Name:	Klein Karee Pan 111, Weltevrede 117 and Farm Spitskop 115		
Application area (Ha)	9335.53 ha		
Magisterial district:	Kimberley		
Distance and direction from nearest town	Between 15 - 20km southwest of Kimberley and +/- 23km north-northwest of Ritchie		
21-digit Surveyor General Code for each farm portion	**Farm**	**Portion**	**SG Code**
	Klein Karee Pan 111	Remaining extent	C03700000000011100000
		Portion 3	C03700000000011100003
	Weltevrede 117	Remaining extent	C03700000000011700000
		Portions 1	C03700000000011700001
		Portions 7	C03700000000011700007
	Spitskop 115	Remaining extent	C03700000000011500000
		Portions 1	C03700000000011500000
		Portions 2	C03700000000011500002
		Portions 3	C03700000000011500003
		Portions 4	C03700000000011500004
		Portions 5	C03700000000011500005
		Portions 6	C03700000000011500006



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

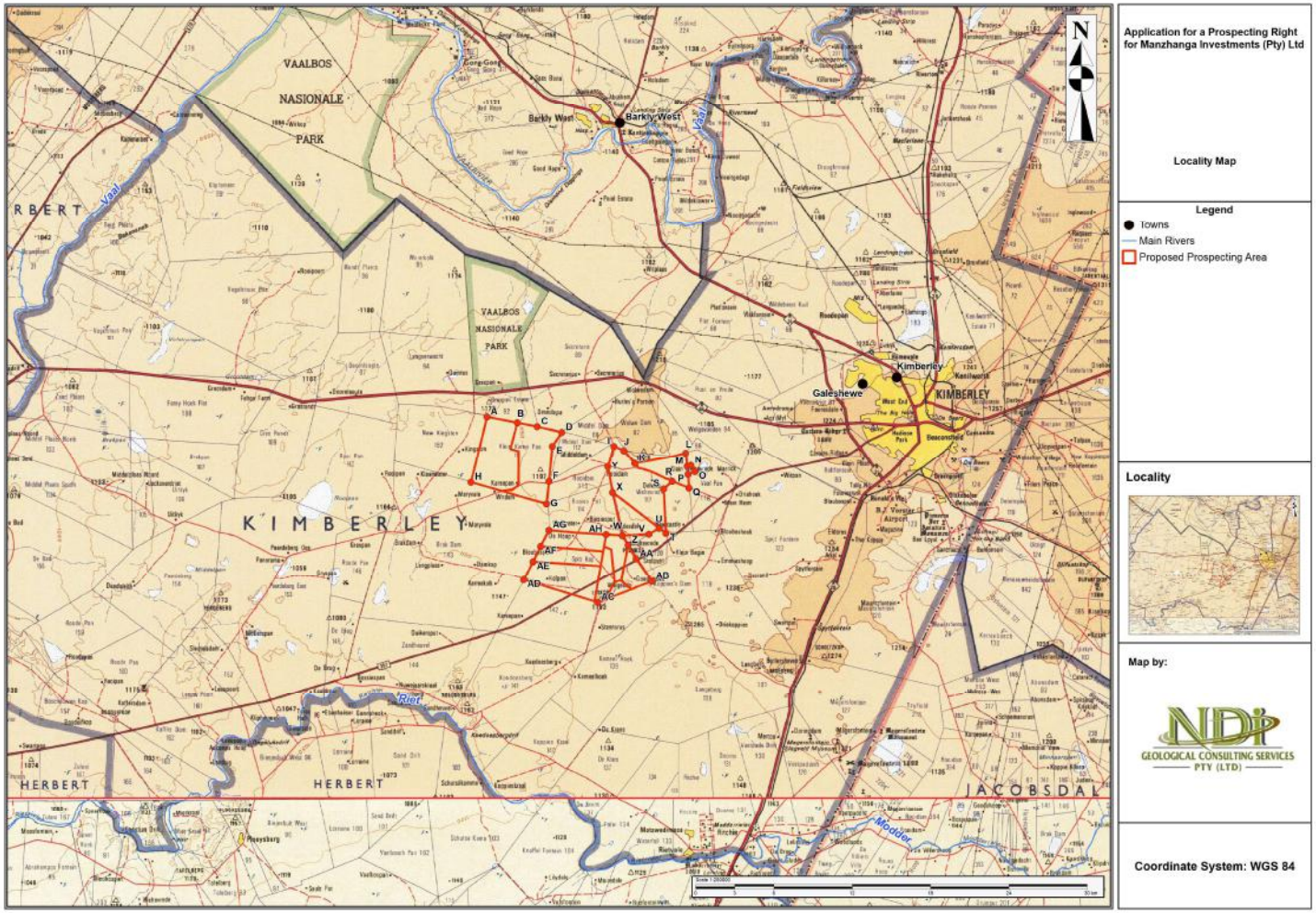
CADASTRAL MAP

Figure 6-1: Cadastral Map

6.2 Locality map

The proposed Manzhanga Project is in the Northern Cape Province of South Africa, between 15 - 20km southwest of Kimberley and +/- 23km north-northwest of Ritchie. The Vaalbos National Park is located 2.5 km north of the study area, particularly farm Klein Karee Pan 111 (Figure 6-2).

A copy of the locality map is provided in Appendix 3.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	LOCALITY MAP

Figure 6-2: Locality Map

7 Description of the Scope of the Proposed Overall Activity

7.1 Overview

This prospecting will consist of non-invasive and invasive (drilling & sampling) activities. The review of available information that exists over the area of interest will be undertaken by means of conducting a literature review from satellite images and other available information.

Prospecting will be conducted over a period of two years and will be categorized into phases, wherein Phase 1 will be desktop study followed by RC and diamond drilling in Phase 2. Phase 3 will be a completion studies and pre-feasibility. The machines and vehicles that will be used have been proven to be trusted to carry out the prospecting activities optimally. These machines and vehicles make use of hydrocarbon fuels such as diesel, petrol and oil.

7.2 Phase 1 (Literature Review)

Existing data on the area of study with relation to the topography, geology, mineralogy, geophysics, hydrology etc. will be to be analysed. This data will aid in determining the amount of potential that area carries in terms of mineralisation and the factors that affect it and its extraction thereof. The report that will be produced from this study will inform the next stage which is geological mapping.

The non-invasive prospecting work will take approximately six (6) months and will compile the relevant data and observations from the recent and historical work done on site. The deliverables will be a detailed report and maps highlighting areas with the best potential to contain targeted minerals.

Once this information has been assessed in detail, it will be used to further develop and refine the ongoing prospecting activities. Aerial photographs and a high-resolution satellite image will be acquired for the prospecting right application so that a target identification process using both desktop study and geological mapping can be executed. Both desktop study and geological mapping interpretations will be used to focus future prospecting activities.

After the Desktop Study, a site geological mapping excursion will be undertaken.

This is a process of physically locating the targeted ore body outcrop while obtaining detailed information about it. This information includes the strike and dip of the outcrop, the colour, the grain size and shape amongst others. The result of this stage will be a detailed geological map of the study area which will be correlated with the other maps obtained during the desktop study.

7.3 Phase 2 (Drilling)

This phase of drilling will consist of RC and diamond drilling (DD) and will consist of drilling approximately 20 RC boreholes. The prospecting drilling campaign will be aimed at defining the extent of mineralisation and will demonstrate geological continuity of the mineralized zone across the entire area under investigation (application area). Numerous samples will be collected and tested in a registered laboratory.

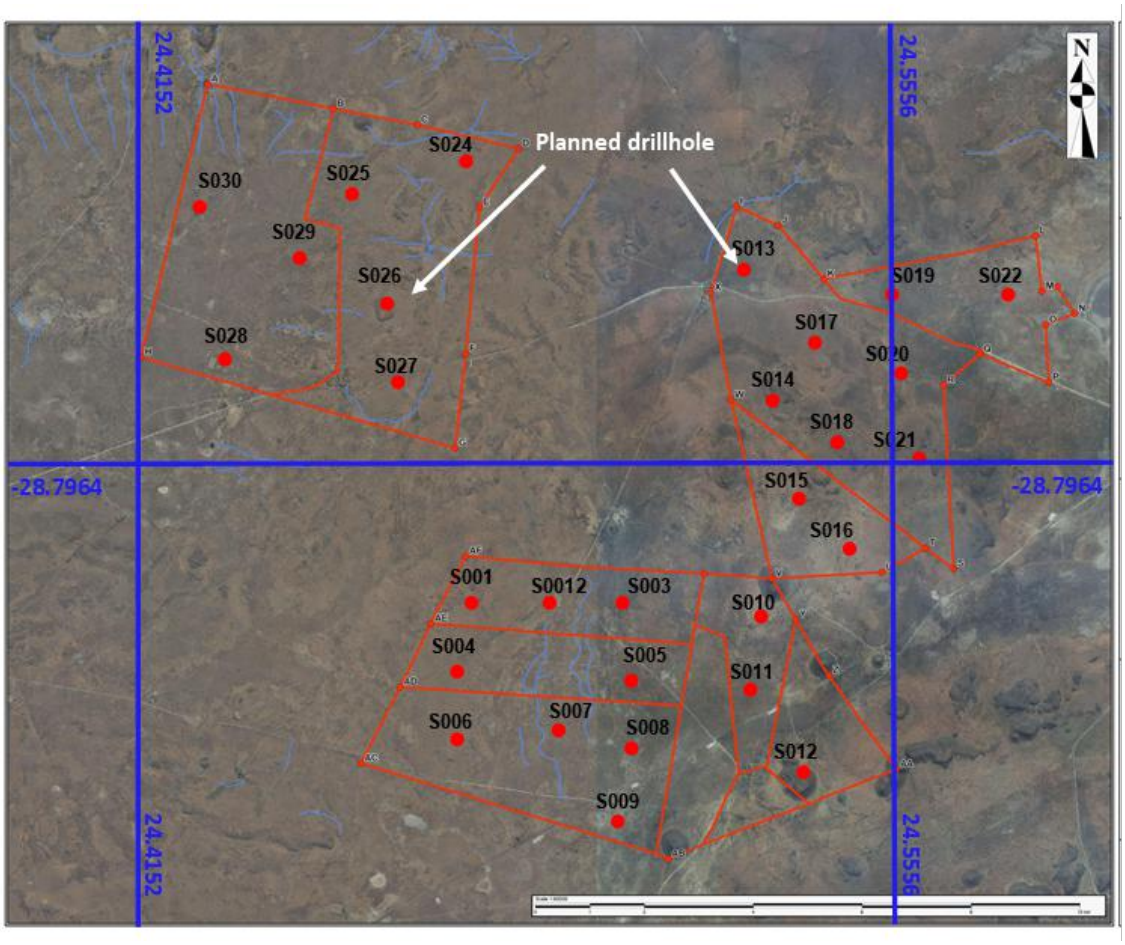
RC drilling involves the process of crushing the rock material into fragments. Using air pressure, the rock fragments are lifted up the hole into the cyclone where they are collected into sample bags. A rifle splitter is used to homogenize the sample and to split it into two. The weights of the samples are recorded. Part of the one sample is washed and placed into a labelled chip tray after logging by the Field Geologist. This sample is stored for future reference. The remainder of the logged sample is

labelled while still in the sample bag and taken to an accredited laboratory for analysis. Detailed geological, grade resource models and mineral resource estimates will be the result of this phase.

It is estimated that ten (10) diamond core drilling will be conducted for petrological studies. Diamond drill boreholes will be split and quartered where assaying is warranted. One quarter will be dispatched to the assay lab, one quarter kept for a permanent record, and the halves utilized for petrological studies.

Borehole collars will be covered by labelled slabs, and the position measured by GPS.

Each drill borehole and sample site will be rehabilitated as prospecting proceeds. Figure 7-1 shows the location of planned drillholes.



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LOCATION OF PROSPECTING BOREHOLES

Figure 7-1: Prospecting boreholes location

7.4 Phase 3: Analytical Desktop Studies and Decision Making

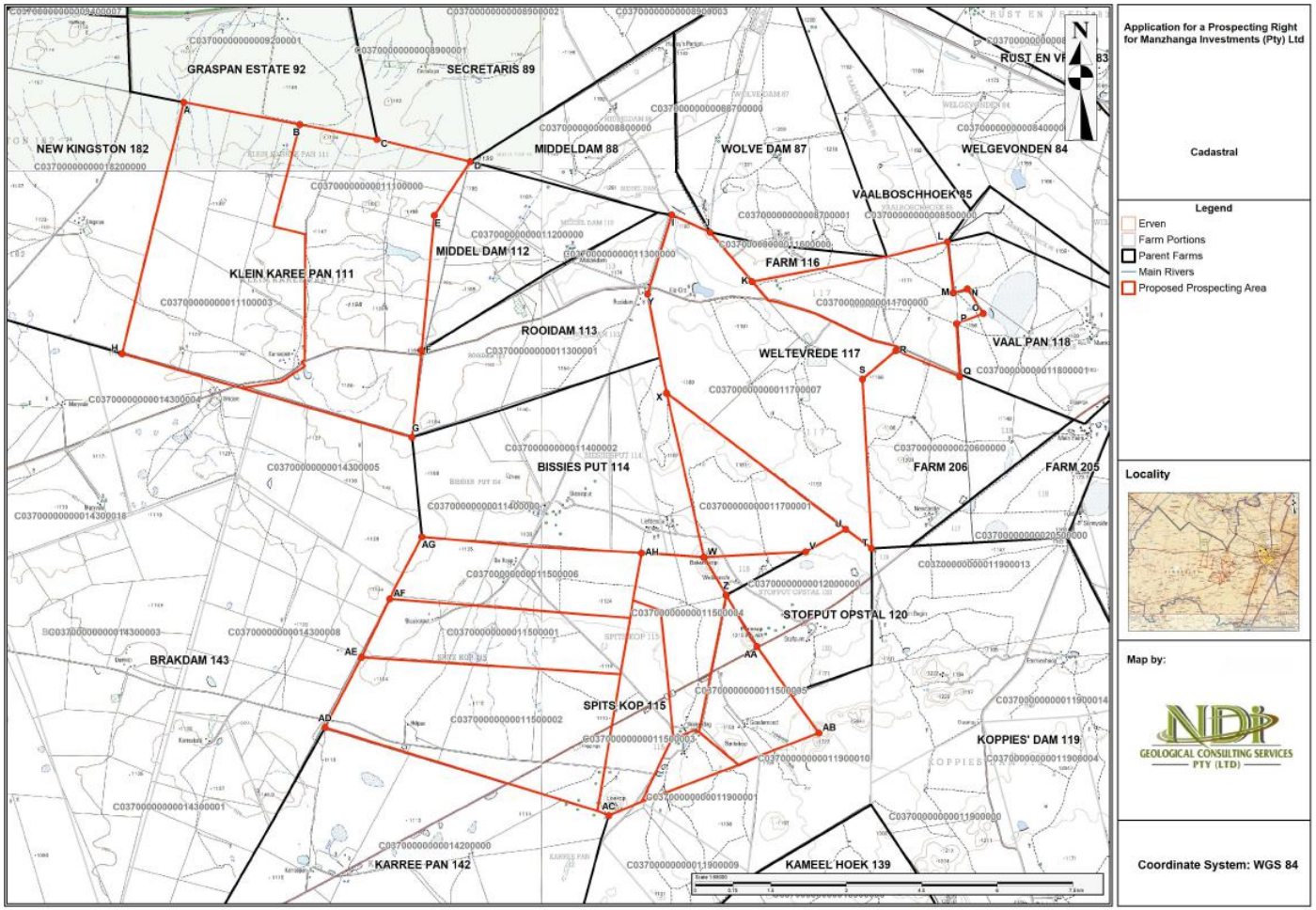
The project geologist monitors the programme, consolidates and processes the data and amends the programme depending on the results. This is a continuous process throughout the programme and continues even when no prospecting is done on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the way the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

A GIS based database will be constructed capturing all exploration data.

Table 7-1: Project Phases and Requirements

Phase	Activity (What are the activities that are planned to achieve optimal prospecting)	Skill(s) required (Refers to the competent personnel that will be employed to achieve the required results)	Timeframe (In months) for the activity)	Outcome (What is the expected deliverable, e.g., Geological report, analytical results, feasibility study, etc.)	Timeframe for outcome (Deadline for the expected outcome to be delivered)	What technical expert will sign off on the outcome? (E.g., geologist, mining engineer, surveyor, economist, etc.)
1	Setup	Contractors	Month 1	Prospecting ready	Month 1	Surveyor
	Non-invasive: Desktop Study including a Literature Survey of remotely sensed data	Geologist	Month 1-3	Geological Report	Month 3	Geologist
	Geological mapping and drillholes' positions planning and layout	Geologist	Month 4-6	Detailed progress report.	Month 6	Geologist
	Equipment moving and setup (transporting of drilling machines)	Contractors	Month 6		Month 6	Geologist and Contractor
2	**Invasive:** Diamond and Reverse Circulation drilling, including core and chip logging, sampling and dispatch	Geologist Qualified Drilling Contractors Metallurgist	Month 7-19	Detailed Geological and Grade Resource Models, Mineral Resource Estimates to Indicated level of confidence	Month 19	Geologist
	Rehabilitation	Contractors	Month 19	Rehabilitated Land	Month 19	Surveyor
3	**Non-Invasive** Feasibility Studies	Multi-disciplinary team of consultants	Month 20-24	Feasibility Study report	Month 24	Professional Competent Person



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

LAYOUT PLAN

Figure 7-2: Layout Plan showing the location and area of the Prospecting Rights Project

7.5 Listed and specified activities

Section 16 of the MPRDA requires, upon request by the Minister that an Environmental Management Programme (EMPr) be submitted, and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that listed activities, which may potentially affect the environment negatively, must obtain an environmental authorisation from a relevant authority before the activities may commence.

Such activities are listed under the EIA Regulations (2014 which has been amended in 2017) and consist of:

- EIA Process (Government Notice Regulation (GNR) 982);
- Listing Notice 1 GNR 983 – Basic Assessment process,
- Listing Notice 2 GNR 984 – Scoping and EIA process;
- Listing Notice 3 GNR 985 – Activities in specific identified geographical areas only.

GNR 982, 983, 984 and 985 have been amended in 2017 through GNR 324, 325, 326 and 327, respectively.

The purpose of these regulations is to avoid negative impacts on the environment, and where these cannot be avoided, ensure the mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

The proposed prospecting activity triggers activities listed in NEMA GNR 983: Listing Notice 1 as follows:

Activity 20: “Any activity including the operation of that activity which requires a prospecting right in terms of Section 16 of the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002), including associate infrastructure, structures and earthworks, directly related to prospecting of a mineral resource”.

It is noted that no activities will be undertaken within 32 metres of a watercourse.

Table 7-2 provides a summary of the identified NEMA listed activities that will be triggered by the prospecting project.

Table 7-2: Applicable Activities

Name of the activity (All activities including activities not listed)	Aerial extent of the activity in Ha or m²	Listed activity mark with an x where applicable or affected	Applicable listing notice *(GNR 983, GNR 984 or GNR 985 or NOT LISTED*
Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002) (Act No. 28 of 2002).	9335.53ha	X	GNR 983 as amended by GNR 327, Listing 1, Activity 20
Drill boreholes (20 RC,10 core)	0.2ha	X	GNR 983 as amended by GNR 327, Listing 1, Activity 20
Vegetation clearance	0.4ha	X	GNR 983 as amended by GNR 327, Listing 27
Access and Mine Roads	1000m²	X	GNR 983 as amended by GNR 327, Listing 1, Activity 20
Topsoil	0.01ha	-	GNR 325, Listing 2, Activity 19
Mobile Office	-	-	-
Vehicle parking	0.002ha	-	GNR 983 as amended by GNR 327, Listing 1, Activity 20
Domestic Waste Facility	-	-	GNR 983 as amended by GNR 327, Listing 1, Activity 20

7.6 Activities to be undertaken

7.6.1 Prospecting

Please refer to Sections 7.1 to 7.3 for a detailed description of the prospecting activities to be undertaken.

7.6.2 Establishment of Temporary Access Roads

Temporary roads will be opened where necessary but will not exceed 1000m^2 in size.

7.6.3 Power

Diesel powered vehicles and machinery will be used for the proposed project.

7.6.4 Water Supply

It is anticipated that water will be brought onto site and trucked to the identified drill sites. Water bowsers will be deployed to the sites as and when required.

RC drilling in general does not require water. Additional water requirements relate to the potable water supply for diamond drilling of 10 holes and prospecting personnel.

7.6.5 Ablution Facilities

Portable chemical toilets will be used for the management of sewage waste generated on site.

7.6.6 Temporary Site Office Area

A site office will not be necessary, equipment for logging such as chip and core, such as logging sheets, papers, pens and trays will be transported to and from site daily.

7.6.7 Accommodation

Drillers and other staff working on the project will travel to and from site daily.

7.6.8 Blasting

The Prospecting Works Programme does not allow for bulk sampling therefore no blasting will take place.

7.6.9 Waste Management

Hazardous Waste

Hazardous waste to be generated includes mineral residue, hydrocarbon wastes (oil and liquid fuel wastes) and sewage waste. Hydrocarbon waste will be collected in drums for storage. The removal of the drums or any other appropriate receptacle will be undertaken by a registered waste disposal company, for disposal at a registered licensed waste disposal site. The drums will be placed on protected ground.

Mineral residue will include muds and drilling chips generated during the drilling of the exploration boreholes. The mineral residue will be removed from the site and disposed of at a registered waste disposal site.

Oil waste and liquid fuel waste include used oils from mine machinery and vehicles and diesel/petrol waste.

General Waste

General waste to be generated from the proposed project area will include domestic waste which includes food containers, smoked cigarette. These will be collected daily to be disposed of at a registered domestic waste disposal site.

Storage of Dangerous Goods (Hydrocarbons)

No diesel fuel, oil and lubricants will be stored on site. These will be transported daily or when required.

7.6.10 Topsoil Stockpiling

Topsoil removed during the construction phase will be stockpiled for later use in the rehabilitation process.

7.6.11 Vegetation Clearance

Vegetation clearance will be necessary where prospecting and construction activities will be taking place. This will be done only in areas where it is required, unnecessary vegetation clearance will be discouraged.

7.6.12 Ablution Facility

This will be necessary for the site staff and the workers residing on site.

7.6.13 Vehicle Parking

Staff vehicles and other vehicles working on the project will have a demarcated parking.

8 Policy and legislative context

Table 8-1 provides a summary of the applicable legislation, policies and guidelines identified as relevant to the proposed project. In addition, a description of how the proposed activity complies with and responds to the legislation and policy context, is provided. This list is not exhaustive but rather represents an indication of the most applicable pieces of legislation relevant to the project.

Table 8-1: Applicable legislation, policies and guidelines

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) (As amended)	Application for Prospecting in terms of Section 16	A prospecting right application was submitted and DMR accepted it on 22 July 2021.
National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA)	The project may trigger the requirements under Section 38 of the NHRA. However, the requirements for the permits have not yet been established.	The Environmental Management Programme (EMPr) will regulate the applicant to apply for tree removal permits from the South African Heritage Resources Agency (SAHRA) prior to removal or relocation of any heritage resources. The BAR and EMPr will also be submitted to the SAHRA through the South African Heritage Resources Information System (SAHRIS) to determine whether any permits will be required.
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA)	This Basic Assessment Report (BAR) and Environmental Management Plan (EMP)	An application for an Environmental Authorisation was submitted to the DMR. The BAR and EMPr will be submitted to the DMR once finalised and have been subjected to a public participation process as required by Chapter 6 of the NEMA.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEM:BA)	The possibility of the presence of protected flora	The EMPr will regulate the applicant to apply for tree removal permits prior to removal of any sensitive and/or protected species.
National Environmental Management: Protected Areas Amendment Act (Act 15 of 2009)	The presence of protected areas	This act creates a national system of protected areas to protect and conserve ecologically viable areas representative of biodiversity in the country. This will be applicable to the Vaalbos National Park that is located in the vicinity of the project.
National Water Act, 1998 (Act 36 of 1998) (NWA)	Sampling and drilling site establishment within 100 m of a watercourse or 500m of a wetland	The South African National Biodiversity Institute (SANBI) National Wetlands database shows that there are no wetlands in the prospecting area. There are also watercourses and drainage lines that may be affected by the project. In terms of the NWA, any activities undertaken within 500 m of a wetland or within 100 m of a watercourse require a Section 21 (c) and (i) Water Use Licence (WUL). Should the impacts of the activities be

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
		of low significance, the activities may also be Generally Authorised (GA). Clarification is required from the DWS on whether a WUL or GA will be required. Northern Cape Nature Conservation Act 9 of 2009.
Municipal Integrated Development Plans (IDPs)	Land Claims	One of the key issues identified by the IDPs is to facilitate the land claims.
Francis Baard Spatial Development Framework (SDF)	Alternatives	The Francis Baard DM Spatial Development Framework shows that the area is not earmarked for any development by the Francis Baard DM.

9 Need and Desirability

For years, mining has been the driving force behind South Africa's economy and continues to make a valuable contribution to the country's economy. This economy is built on gold and diamond mining, with gold accounting for over a third of the country's exports. South Africa's diamond mining industry was recognised as one of the largest in the world in the year 2009. It is predicted that mining will still play an important role to the economy, most notably through foreign exchange earnings and employment provision. It is also one of the primary sectors that provide employment opportunities for unskilled and semi-skilled people. According to the Minerals Council in South Africa, in 2018 the mining sector contributed R351 billion to the South African Gross Domestic Product (GDP) A total of 456 438 people were employed in the mining sector in 2018 and each person employed in the mining sector has up to nine indirect dependants. Diamond mining's contribution to the GDP of South Africa is estimated to be at 18 % of the annual GDP.

The definition of prospecting in terms of the MPRDA states: "intentionally searching for any minerals by means of any method which disturbs the surface or sub-surface of the earth, including any portion of the earth that is under the sea or under other water…". Prospecting is the physical search for minerals, fossils, precious metals, or mineral specimens, which allows a company to survey or investigate an area of land for the purpose of identifying an actual or probable mineral deposit, before investments are made into the mining activities.

Assessment of the geological information available has determined that the area in question may have good quality diamond reserves. To ascertain the above and determine the nature, location and extent of the reserves within the proposed prospecting area, it will be necessary that prospecting be undertaken. The prospecting will also determine if there are any features that may have an impact on the economic extraction of the diamonds.

The information that will be obtained from the prospecting to be undertaken will be necessary to determine, should diamond reserves be found, how and where the diamonds will be extracted and how much economically viable reserves are available within the proposed prospecting area.

Should good quality diamond reserves be found in the project area, Manzhanga will be able to mine the available reserves. This will result in job creation and boost to local businesses is continued.

Manzhanga expects that benefits from the project will accrue to the immediate project area, the sub-region, and the province of the Northern Cape. This prospecting activity has a potential to temporarily contribute to decreasing unemployment rates in the surrounding areas, particularly during the construction and decommissioning phases of the project.

These potential benefits must be offset against the costs of the project, including the impacts to landowners and land occupiers. Further to the above, it has been determined that the prospecting project activities will not have a conflict with the spatial development plans for the Sol Plaatje LM and Francis Baard DM, the Integrated Development Plans and the Environmental Management Framework (EMF) for the affected municipalities.

A process that ensures consultation with Interested and Affected Parties (I&APs) for the project is being undertaken. The stakeholder engagement process is being conducted in a way to provide all interested and affected parties with an opportunity to comment on the project, with several platforms that allow public commenting opportunities to be offered to the I&APs. All issues raised by the interested and affected parties will be recorded and addressed in the BAR and EMPr.

10 Motivation

10.1 Preferred Site

The proposed project site is preferred due to its location where sand, calcrete and dolerite occur on the prospecting right. The geology type has potential for hosting diamonds. Desktop studies which took into consideration the existing historical data of proposed project location, has indicated the potential for diamond mineralisation on the application area.

10.1.1 Regional Geology

There are three kimberlite pipes being mined for diamond in Kimberley. The three operating pipes are Bultfontein, Dutoitspan and Wesselton. The kimberlite pipes are all Group-I varieties and, and in each of the pipes, a number a different kimberlite types are present. In the Kimberly region it is estimated that approximately 1400m of erosion has taken place since emplacement (Hawthornr, 1975). The emplacement ages for the pipes have been radiometrically determined as between 84 and 87 Ma. All the pipes were in diatreme zone at present day surface, and the gradation into the rootzone takes place at depths 400 and 800m below surface. Between 90 and 120m of Dwyka Group sediments overlie porphyritic lavas and quartzite horizons of the Ventersdorp Supergroup in the Kimberley area. Other diamondiferous kimberlite intrusions in the Kimberley area include the Kamfersdam, Otto's Kopje and Belgravia pipes (Anhaueusser and Wilson, 1998).

10.1.2 Local Geology

The geology of the study area is generally dominated by sand and calcrete. Klein Karee Pan 111 is mostly characterised by sand with some dolerite on the eastern part of the farm. Calcrete or surface limestone also form majority of the lithology towards the northwest and east portions of the farm. Sand is also observed in the middle of the farm. A small portion of andesite is observed towards the northwest part of the farm. Calcrete and sand are the majority lithologies on Spitskop 115. In this area the dolerite occurs widely spread as dykes, sills and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies. They occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. A kimberlite pipe is also observed on the farm. Weltevrede 117 is dominated by dolerite which is coated by shale. Calcrete and sand are also prevalent on the same farm. The geology of the application area is shown in Figure 10-1.

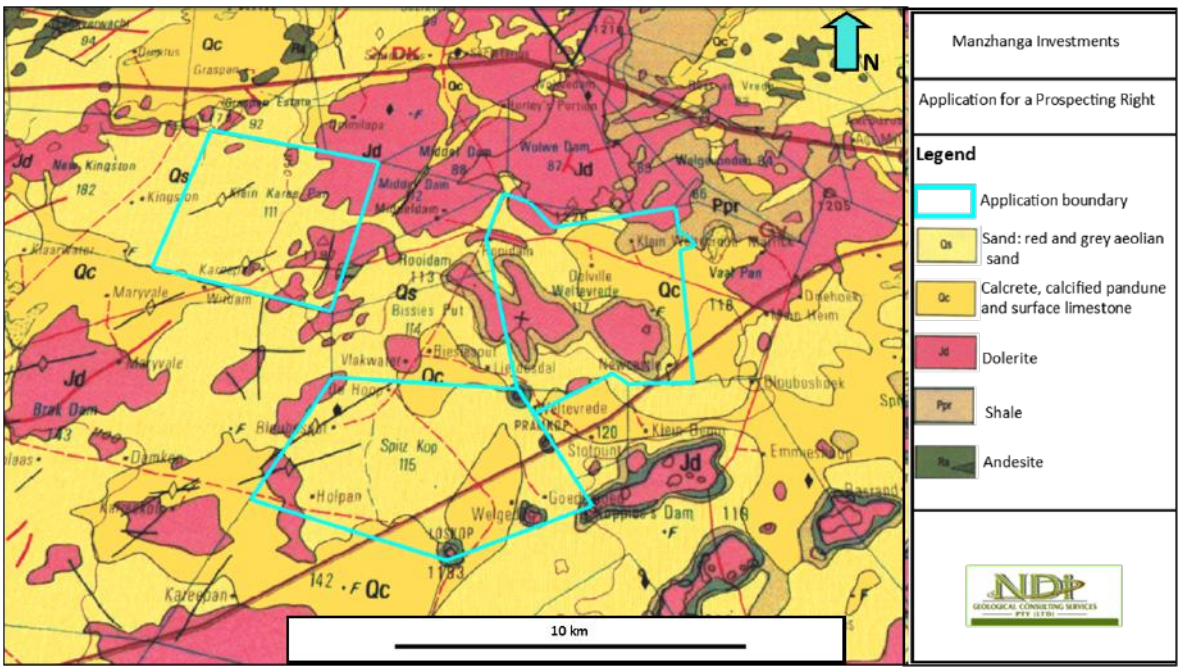


Figure 10-1: Geology of the Prospecting Area

10.2 Technologies

Due to the nature of the proposed prospecting activities, future land use alternatives will not be compromised. Once the viable reserve has been confirmed, a comprehensive social and environmental impact assessment will be required (according to legislation), during which alternative land use to mining of the aggregate stone will be investigated.

In terms of the proposed technologies, these have been chosen based on long term proven success in prospecting. The prospecting activities proposed in the Prospecting Works Programme are dependent on the preceding phase (desktop studies), therefore no alternatives have been indicated. The location of the intrusive drilling activities has been determined as provided in Figure 7-1. All infrastructure will be mobile.

10.3 Design/Layout

Since no complicated surface infrastructure will be required for this project no design and layout alternatives for the proposed project were determined.

11 Full description of the process followed to reach the proposed preferred alternatives within the site.

The invasive prospecting phase will be dependent of the results of the preceding phase. The location and extent of the drilling sites cannot be determined at this stage, therefore comprehensive mapping of the specific prospecting activity site could not be undertaken at this stage. For the purposes of this report, the overall prospecting site is presented in Figure 7 and location of the drilling boreholes presented in Figure 7-2.

The stakeholder consultation process has not been finalised at this stage, and therefore the comments raised by the I&APs have not been incorporated in this section. This will be updated as part of the final report.

11.1 Details of the Development Footprint Alternative Considered

The property to which the application relates has potential for diamond mineralisation due to the nature of the geology in the area.

The proposed area is generally dominated by sand calcrete and dolerite. Dolerite outcrops are observed in some places of the study area. These lithologies have potential for hosting diamonds. The site is therefore regarded as the preferred site and alternatives are not considered.

11.1.1 The type of activity to be undertaken

The application is for prospecting rights and no alternatives were considered. The activity will be conducted in phases. The physical phase of the Prospecting Works Programme will be dependent on the findings of Phase 1 of the process. Phase 1 will entail a desktop study, geochemical surveys, geological mapping, geophysical surveys data interpretation as well as compilation of data. Phase 2 will consist of drilling of both RC and diamond core, metallurgical sampling, rehabilitation and environmental aspects. The last phase will be a pre-feasibility study.

11.1.2 The design or layout of the activity

The location of the infrastructure will be determined based on the location of the prospecting activities, which will only be determined during Phase 1 of the Prospecting Works Programme, as well as the presence of sensitive environmental attributes such as wetlands, watercourses, protected flora and graves. All infrastructure will be mobile (Refer to Section 7.6 of this report).

11.1.3 The technology to be used in the activity

The proposed technologies have been chosen based on long term proven success in prospecting. This technology will be in the form of drilling machines and vehicles transporting staff and general equipment required in the drilling process.

11.1.4 The operational aspects of the activity

No permanent services in terms of water supply, electricity, access routes and or sewage facilities will be required. The activities will commence with Phase 1, during which desktop studies will be conducted. After the desktop studies, geological mapping will be undertaken. This phase will also include planning for the drilling survey.

Phase 2 will entail the invasive prospecting drilling campaign where the extent of mineralisation will be defined and the geological continuity of the geological continuity of the mineralised zone will be determined. Numerous samples will be collected and tested at a registered laboratory.

Phase 3 of the process will entail desktop studies involving interpretation and modelling of all data gathered. These studies will determine the way the work programme is to proceed in terms of activity, quantity, resources, expenditure and duration.

11.1.5 The option of not implementing the activity

The option of not implementing the activity will result in a loss of valuable information regarding the mineral status of the diamonds present on the affected properties. In addition to this, should economical reserves be present, and the applicant does not have the opportunity to prospect, the opportunity to utilise the reserves will be lost.

11.2 Details of the Public Participation Process Followed

The Public Participation Process (PPP) was conducted in terms of Chapter 6 of the National Environmental Management Act, 1998 (Act 107 of 1998).

The stakeholder engagement process forms an important part of the impact assessment process. The stakeholder engagement process is primarily aimed at affording I&AP's the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key stakeholders, and I&AP's is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether the project will affect them and provide the EIA team with local knowledge of the area and raise concerns relating to the biophysical, socio-economic and cultural impacts that may arise.

The stakeholder engagement process is conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA. Chapter 1 of the NEMA outlines the principles of environmental management, several pertaining to public consultation (e.g., Chapter 1, subsections (2), (3), (4) (f), (g), (h), (k), (q) and (r). Chapter 6, Regulations 39 – 44 of the amended EIA Regulations GNR) 982, promulgated on 8 December 2014, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA. In 2017, the Minister of Environmental Affairs published, in terms of Section 24J of the NEMA, Public Participation Guidelines which guide the Public Participation Process (PPP) to give effect to Section (2)(4)(f), (o) and 24 (1A) (C) of the NEMA.

Figure 11-1 provides a summary of the stakeholder engagement process followed for the proposed project.

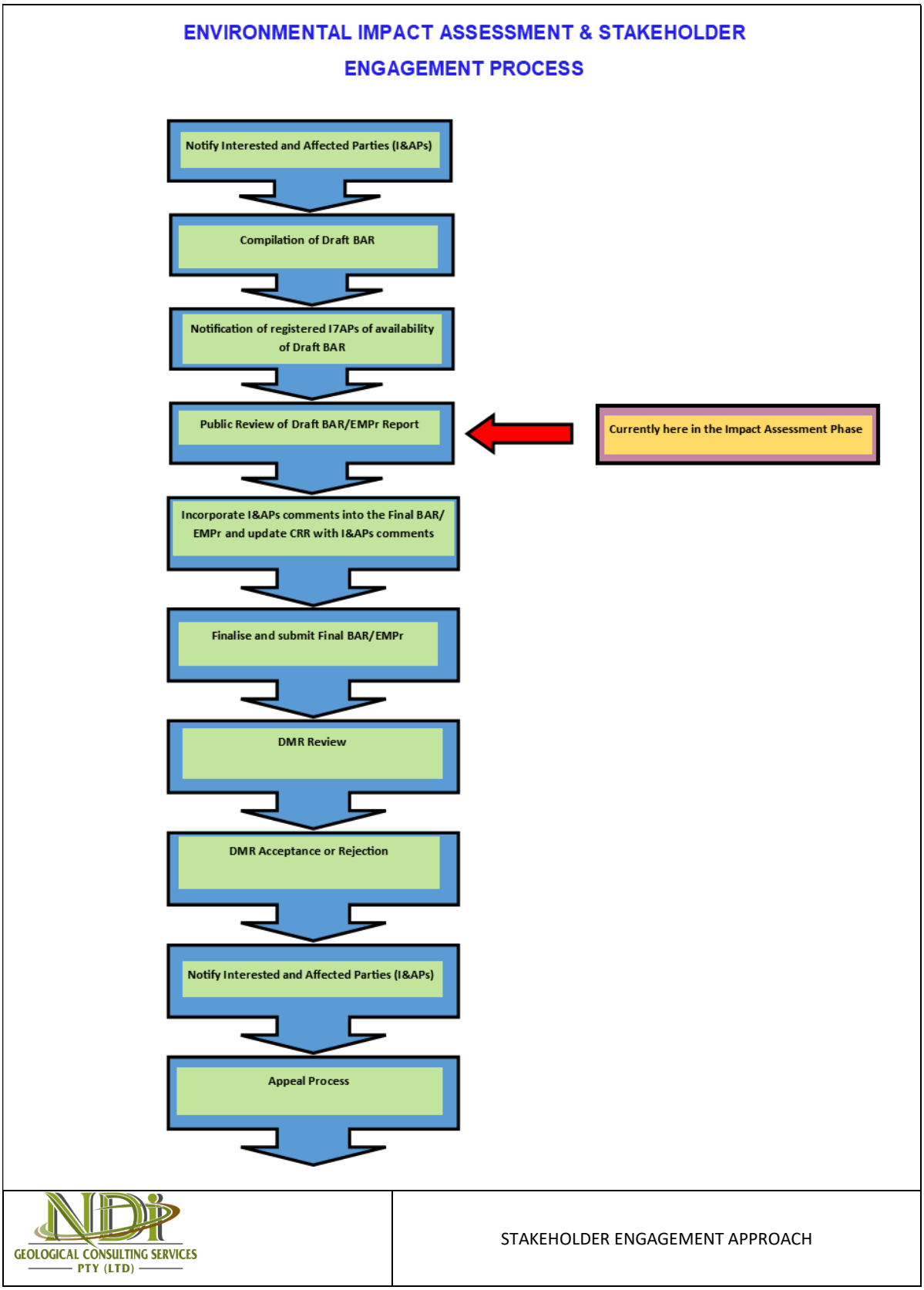


Figure 11-1: Summary of the Stakeholder Engagement Process followed

All the above guidelines have been incorporated into this stakeholder engagement process. This application will be submitted to the DMR for authorisation as the competent authority. Identified commenting authorities on this application include:

- DWS – Regional Office;
- SAHRA – Provincial;
- Sol Plaatje Local Municipality;
- Francis Baard District Municipality;
- Northern Cape Department of Nature Conservation (DENC)) ; and
- Department of Rural Development and Land Reform

All stakeholder engagement documents have been included in Appendix 4.

11.2.1 Stakeholder Identification Interested and Affected Parties

An I&APs register was developed using information from the Surveyor General's office and from stakeholders that responded to the project announcement that was conducted through placement of newspaper advertisements, on-site notices and notification letters sent to the adjacent and affected landowners.

The I&APs register will be maintained for the duration of the study where the details of stakeholders are captured and automatically updated upon communication to the EAP. The identification, registration, and comments from I&APs will be an on-going activity.

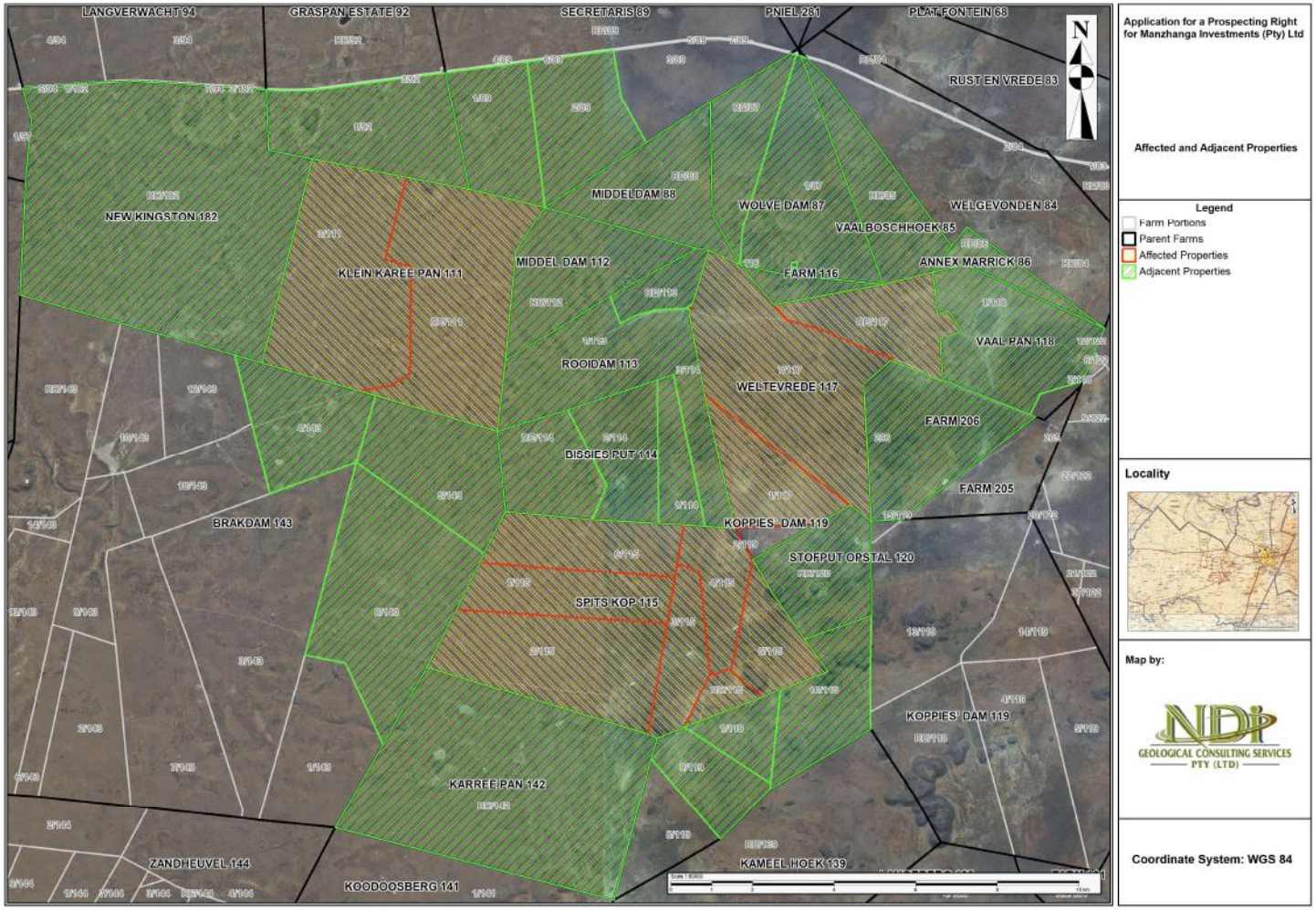
The affected properties are provided in Table 11-1.

Table 11-1: List of Affected and Adjacent Properties

Farm	Portions	21 Digit Survey General Code
Klein Karee Pan 111	RE/111	C03700000000011100000
	Portion 3	C03700000000011100003
Weltevrede 117	RE/117	C03700000000011700000
	Portions 1	C03700000000011700001
	Portion 7	C03700000000011700007
Spitskop 115	RE/115	C03700000000011500000
	Portions 1	C03700000000011500001
	Portions 2	C03700000000011500002
	Portions 3	C03700000000011500003
	Portions 4	C03700000000011500004
	Portions 5	C03700000000011500005
	Portions 6	C03700000000011500006
Rooidam 113	1/113	C03700000000011300001
Vaalpan 118	1/118	C03700000000011800001
Koppies Dam 119	1/119	C03700000000011900001
	9/119	C03700000000011900009
	10/119	C03700000000011900010
Karee Pan 142	RE/142	C03700000000014200000
Brakdam 143	4/143	C03700000000014300004
	5/143	C03700000000014300005
	8/143	C03700000000014300008
Graspan Estate 92	Portion 1	C03700000000009200001
Annex Marrick 86	RE/86	C03700000000008600000
Vaalboschhoek 85	RE/85	C03700000000008500000
Wolvedam 87	Portion 1	C03700000000008700001
	RE/87	C03700000000008700000
Secretaris 89	Portion 2	C03700000000008900002
	Portion 1	C03700000000008900001

Farm	Portions	21 Digit Survey General Code
Middel Dam 112	RE/112	C03700000000011200000
Middel Dam 88	RE/88	C03700000000008800000
Farm 116	RE/116	C03700000000011600000
New Kingston 182	RE/182	C03700000000018200000
Stofput Opstal 120	RE/120	C03700000000012000000
Farm 206	RE/206	C03700000000020600000
Rooidam 113	RE/113	C03700000000011300000
Biesies Put 114	RE/114	C03700000000011400000
	Portion 1	C03700000000011400001
	Portion 2	C03700000000011400002
	Portion 3	C03700000000011400003

A map of the affected and adjacent farm portions and farm portions of the site are illustrated in Figure 11-2.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	AFFECTED AND ADJACENT PROPERTIES

Figure 11-2: Affected and Adjacent Properties

11.2.2 Project Announcement

Stakeholders were informed of the proposed prospecting project as well as Manzhanga Investments' intention to undertake the required and environmental processes and EA application through various methods. Stakeholders were provided with the opportunity to participate and register as I&AP's during the announcement phase of the project.

- Distribution of Notification Letters: Notification letters were sent to identified I&APs on 20th August 2021, informing them of the proposed project.
- Site Notice Placements: Sites notice boards (Size A2: 600 mm X 420 mm) notifying stakeholders and I&APs of the proposed prospecting were placed at conspicuous places in the project area.
- Newspaper Advertisements: Newspaper advertisements notifying stakeholders about the proposed project and the opportunity to participate in the EIA process were placed in the local newspapers.

11.3 Public Review of the Draft Basic Assessment Report

The Draft BAR was compiled in terms of the requirements of GNR 326. All comments received during the announcement phase of the stakeholder engagement process will be incorporated into Draft BAR and collated into a Comments and Responses Report (CRR) which will form an appendix to the draft BAR.

The availability of the Draft BAR will be announced by means of SMSs, letters and emails and newspaper advertisement to registered I&APs.

Copies of the draft BAR will be made available at the venues listed in Table 11-2.

Table 11-2: List of places the Draft BAR will be place for public review

Public Place	Locality	Telephone
Ndi Geological Services Website	http://www.ndigeoservices.co.za/	053 842 0687

The draft BAR will also made available to the competent and commenting authorities during the 30-day review and comment period.

11.4 Stakeholder Consultation Meeting

Due to the Covid-19 EIA Regulations (GNR 650) that were promulgated on 5 June 2020, no face-to-face meetings will be conducted with stakeholders. Stakeholders are however welcome to call or email the EAP on the contact details above to discuss the findings of the impact assessment process.

11.5 Summary of Issues Raised by I&APs

Table 11-3 provides a summary of the comments received to date following the newspaper adverts, site notices, written notification of the project and the Draft BAR review period.

Table 11-3: Summary of issues raised by Interested and Affected Parties

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
AFFECTED PARTIES					
Landowner/s					

TO BE COMPLETED AFTER THE DRAFT BAR COMMENT PERIOD

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Municipal councillor	X				
Municipality					
No comments received to date.					
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS					
Communities					
Dept. Land Affairs					
No comments received to date.					
Traditional Leaders					
No comments received to date.					
Dept. Environmental Affairs					
No comments received to date.					
Other Competent Authorities affected					
No comments received to date.					
OTHER AFFECTED PARTIES					

TO BE COMPLETED AFTER THE DRAFT BAR COMMENT PERIOD

12 Environmental Attributes Associated with the Alternatives

12.1 Baseline Environment

12.1.1 Geographical

The proposed project area is situated in the Sol Plaatje Local Municipality's area of jurisdiction, within the Frances Baard District Municipality, Northern Cape Province. The affected properties are located approximately 15-20km outside Kimberley town.

12.1.2 Topography

Kimberley is set in a relatively flat landscape with no prominent topographic features within the urban limits. The only "hills" are debris dumps generated by more than a century of diamond mining. From the 1990s these were being recycled and poured back into De Beers Mine (by 2010 it was filled to within a few tens of metres of the surface). Certain of the mine dumps, in the vicinity of the Big Hole, have been proclaimed as heritage features and are to be preserved as part of the historic industrial landscape of Kimberley.

The surrounding rural landscape, not more than a few minutes' drive from any part of the city, consists of relatively flat plains dotted with hills, mainly outcropping basement rock (andesite) to the north and northwest, or Karoo age dolerite to the south and east. Shallow pans formed in the plains. Figure 12-1 shows the topography of the project area.

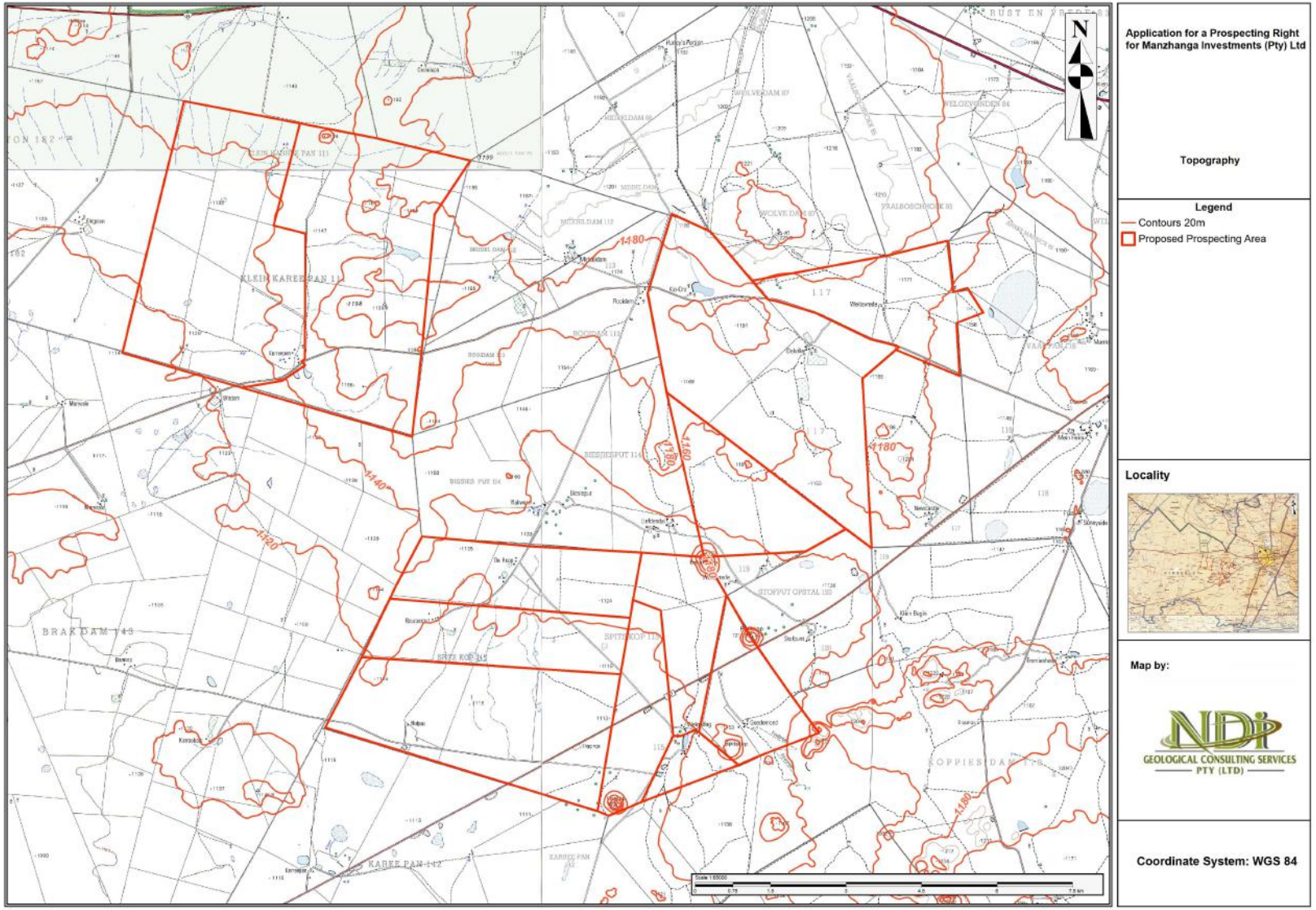


Figure 12-1: Topography

12.1.3 Climate

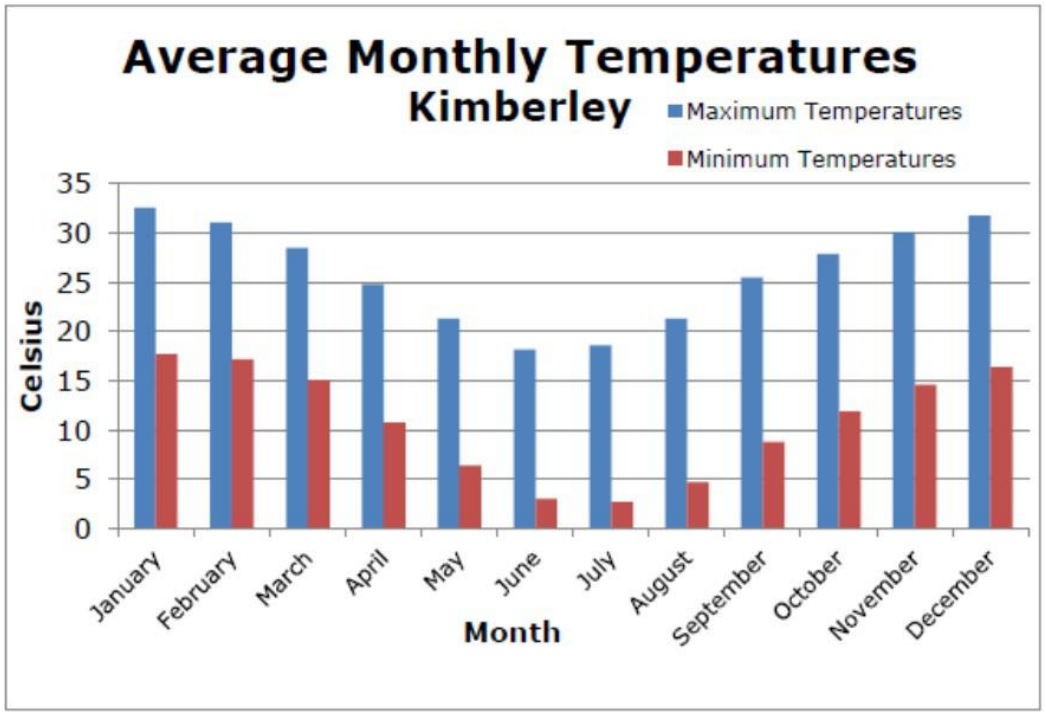
Average Monthly Temperatures

The average monthly temperatures (Minimum and Maximum) as received from Kimberley are indicated in Figure 12-2.

The figure indicates that:

- The highest maximum temperature is experienced during November, January and February.
- The average maximum goes beyond 33 °C.
- The coldest months of the year are June and July, where the average temperature drops well below 20 °C.

Figure 12-3 indicates the average monthly rainfall for the region.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

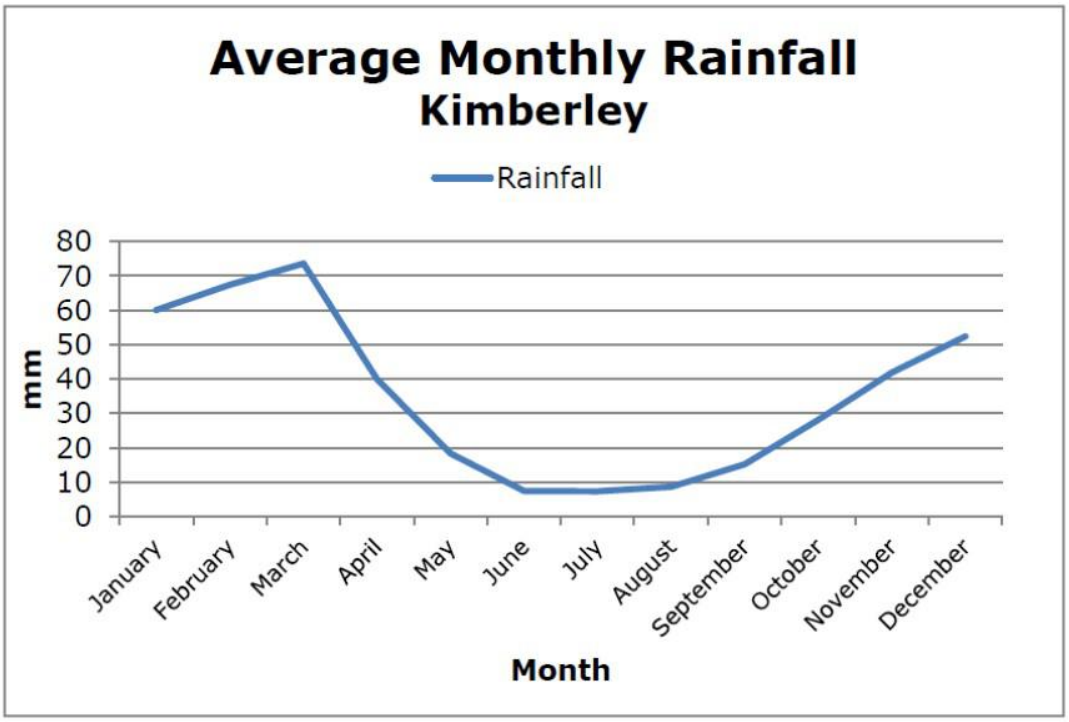
MONTHLY TEMPERATURES

Figure 12-2: Average Monthly Temperatures for Kimberley (Source: Weather SA.)

The average monthly rainfall data indicates that:

- *The highest rainfall months are February to March with an average of ±75mm;*
- *November/December has a higher peak with just over 50mm;*
- *While the dry months are June and July with an average of below 10mm.*

Figure 12-3 indicates the average monthly rainfall for the region.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

MONTHLY RAINFALL

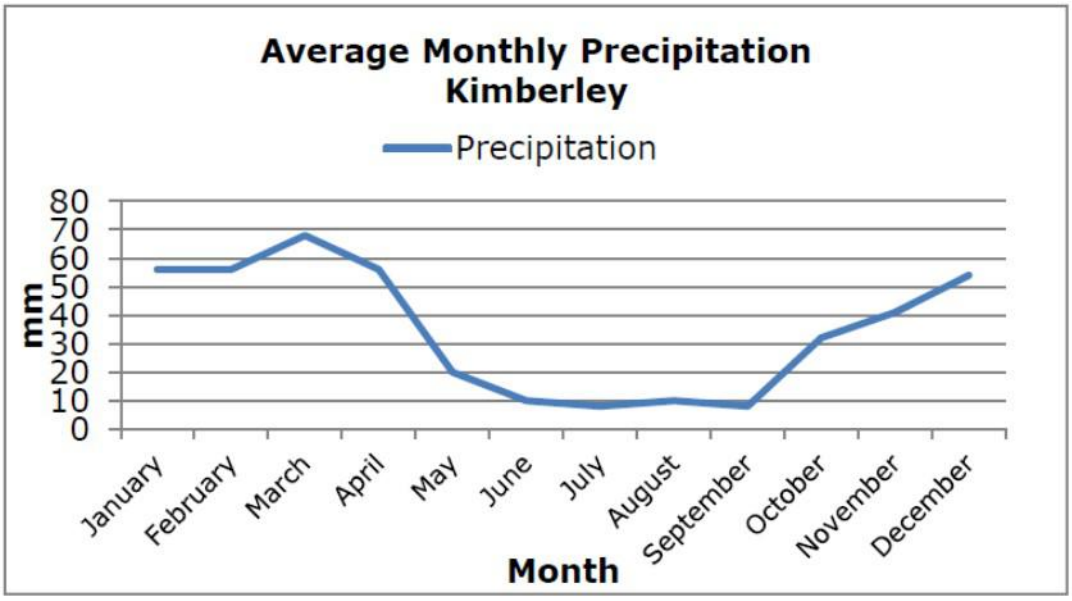
Figure 12-3: Average Monthly Rainfall for Kimberley (Source: Weather SA.)

Average monthly Precipitation

The information available indicates the average monthly precipitation and indicates the following:

- The highest precipitation is in March (70mm) while;
- The lowest is in June to September with an average under 10mm.

Figure 12-4 indicated the average monthly precipitation



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

MONTHLY RAINFALL

Figure 12-4: Average Monthly Precipitation for Kimberley. (Source: Weather SA)

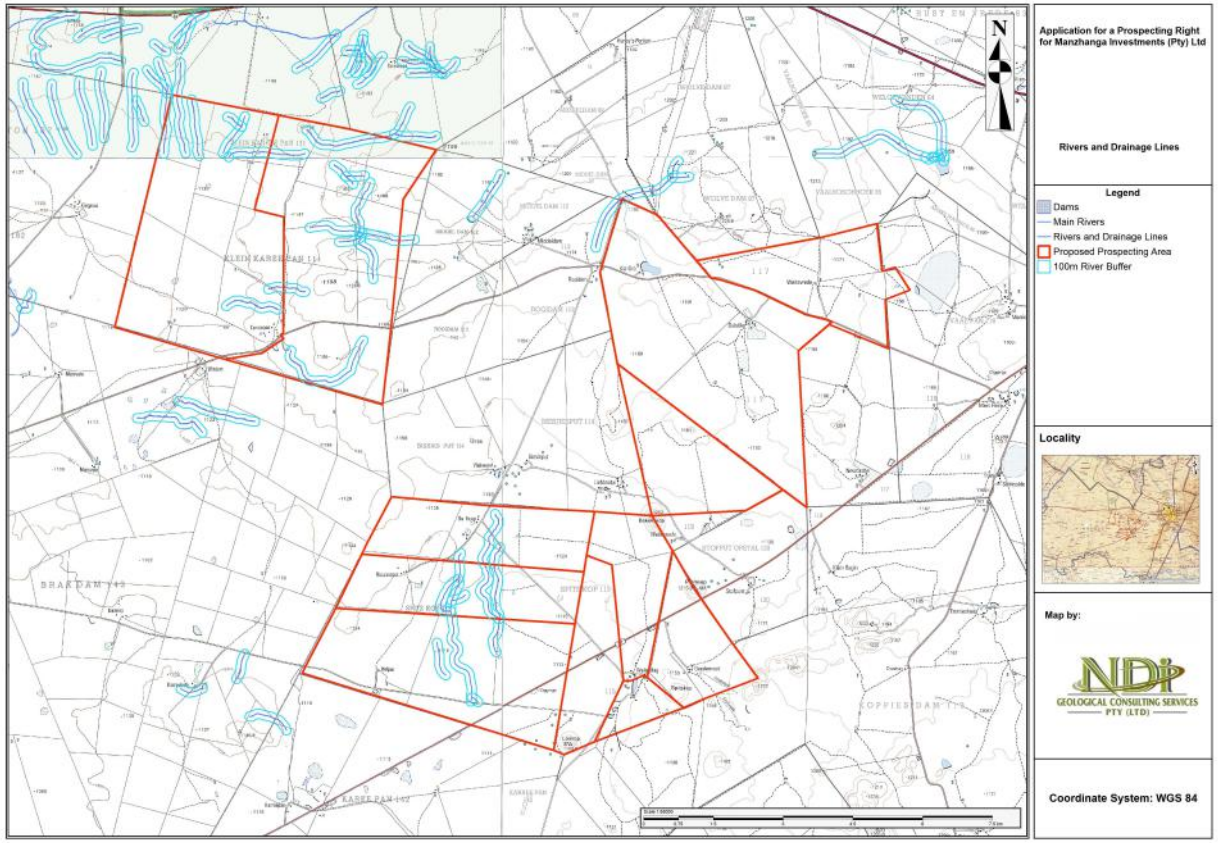
12.1.4 Geology

The regional geology is characterised by:

- The Archaean age rocks which are found in the area are the Ventersdorp Supergroup, the Grinqualand West Sequence and the Karoo Sequence.
- The Ventersdorp Supergroup: The rocks in this group are quarts porphyry and quartz-feldspar pophyry of Makwassie Formation at the base, andesitic lava, volcanic breccia, tuff and chert of the Rietat Formation which forms the top of the sequence. The rocks in this group are mainly volcanic.
- The Grinqualand West Sequence: The Grinqualand West sequence unconformably follows the Ventersdorp Supergroup It comprises a concordant sequence which grades from the coarse to fine grained clastic rocks of the Vryburg Formation at the base through alternating stromatolitic dolomite, limestone, sandstone and shale of the Schimdtsdrift Formation to limestone and dolomite of the Ghaaplato Formation.
- Karoo Sequence: The Karoo Sequence stratigraphically lies above the older formations unconformably. At the base the Dwyka Formation comprises glacial and fluvioglacial rocks which include tillite, varved shale, mudstone with pebbles and conglomerate. The Ecca Group, which follows concordantly on the Dwyka, consists almost exclusively of deep-water, fine grained clastic sediments and the lithological monotony of this sequence is only interrupted by the characteristic black, carbonaceus shale of the Whitehill Formation which is underlain and overlain respectively by dark-grey mudstone and shale of the Prins Albert and Tierberg Formation.

12.1.5 Water Resources

The project is located within quaternary catchments, which include C91E (located within the Upper Orange Water Management Area (WMA)) (Figure 12 5). Figure 12-6 indicates the Water Management Areas and Quaternary Catchment Areas.



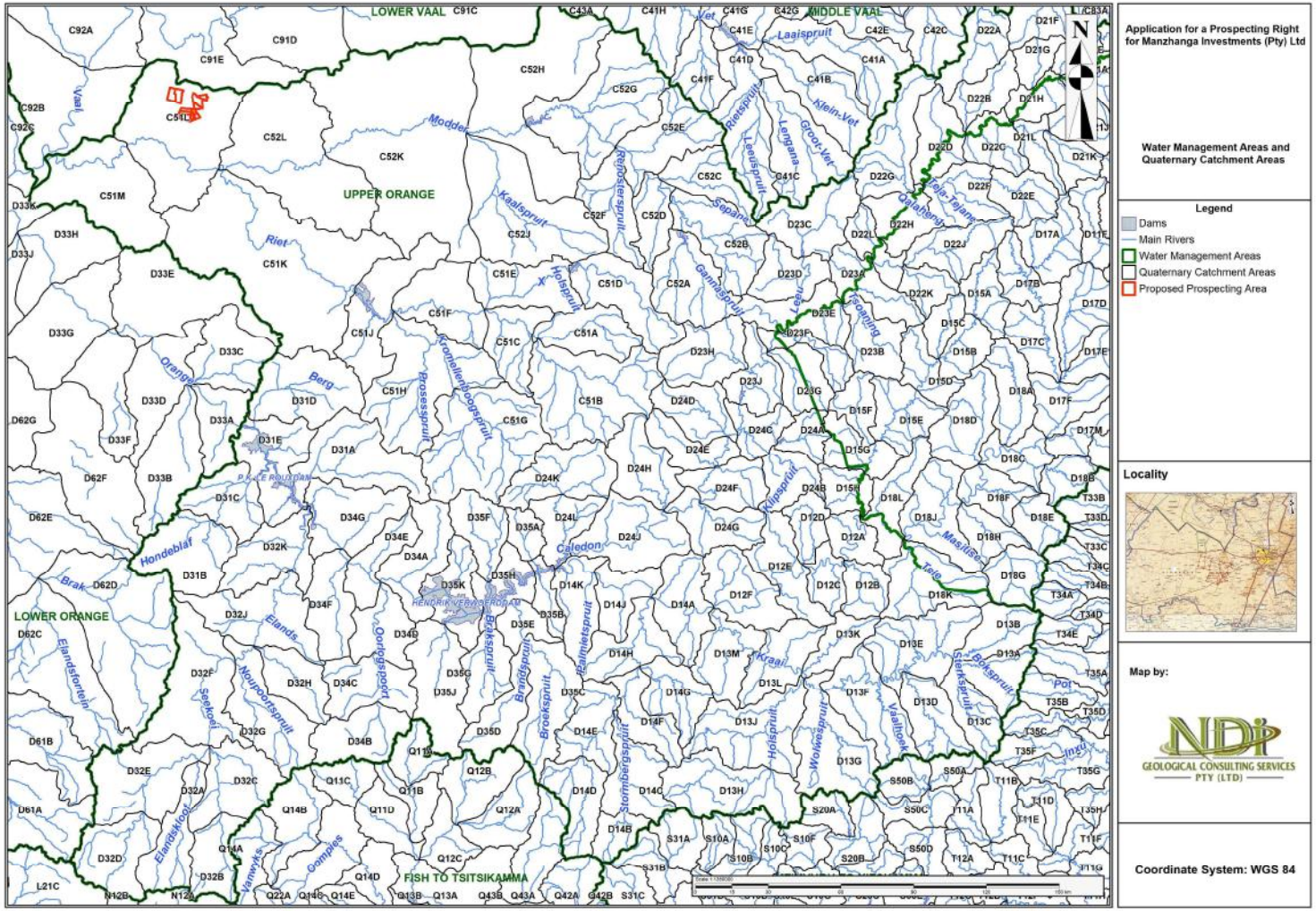
GEOLOGICAL CONSULTING SERVICES PTY (LTD)

WATERCOURSES

Figure 12-5: Rivers, Streams and Drainage Lines

According to the SANBI Wetland Inventory (2006) National Freshwater Ecosystem Priority Areas (NFEPA) (2011), the affected quaternary catchment areas are not regarded as important in terms of fish sanctuaries, rehabilitation or corridors.

In addition, the project area is not considered important in terms of translocation and relocation zones for fish.



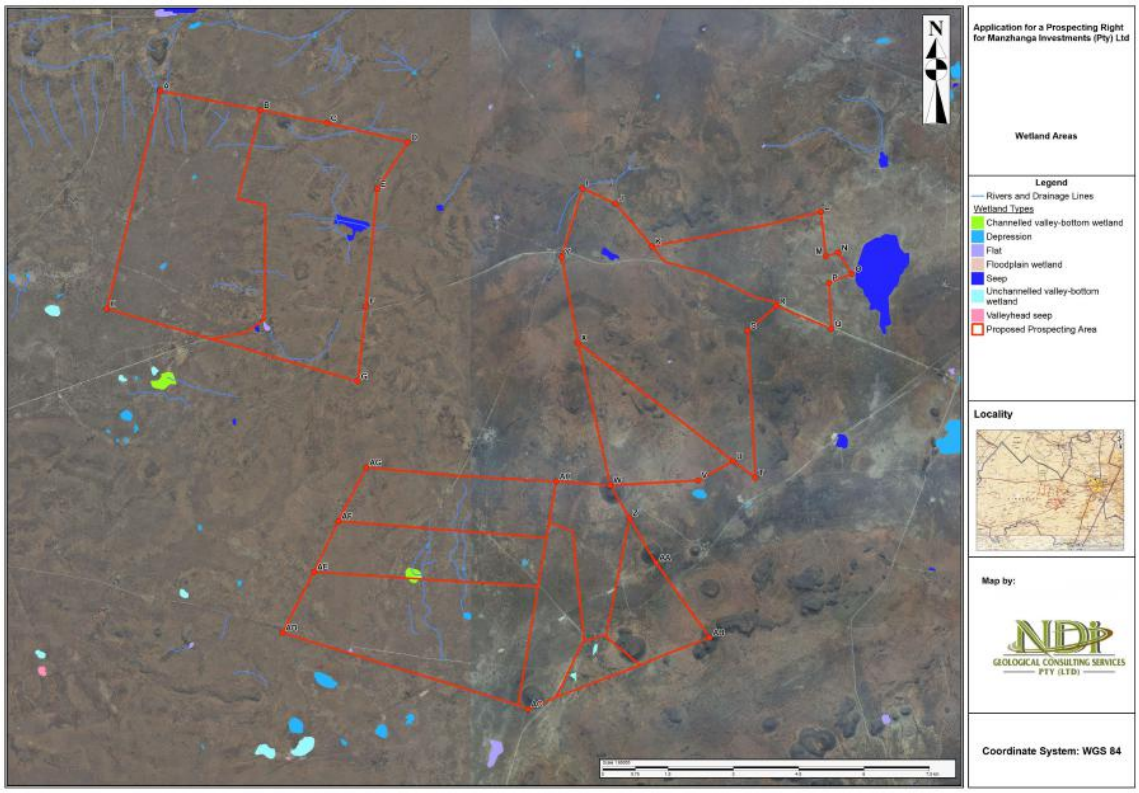
GEOLOGICAL CONSULTING SERVICES PTY (LTD)

WATER MANAGEMENT AREA AND CATCHMENT AREAS

Figure 12-6: Water Management Areas and Quaternary Catchment Areas

12.1.6 Wetlands

The SANBI data in Figure 12-7 shows the type of wetlands occurring on the study area, whereas Figure 12-8 indicates the status of wetland conservation.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	WETLANDS

Figure 12-7: Wetland Types

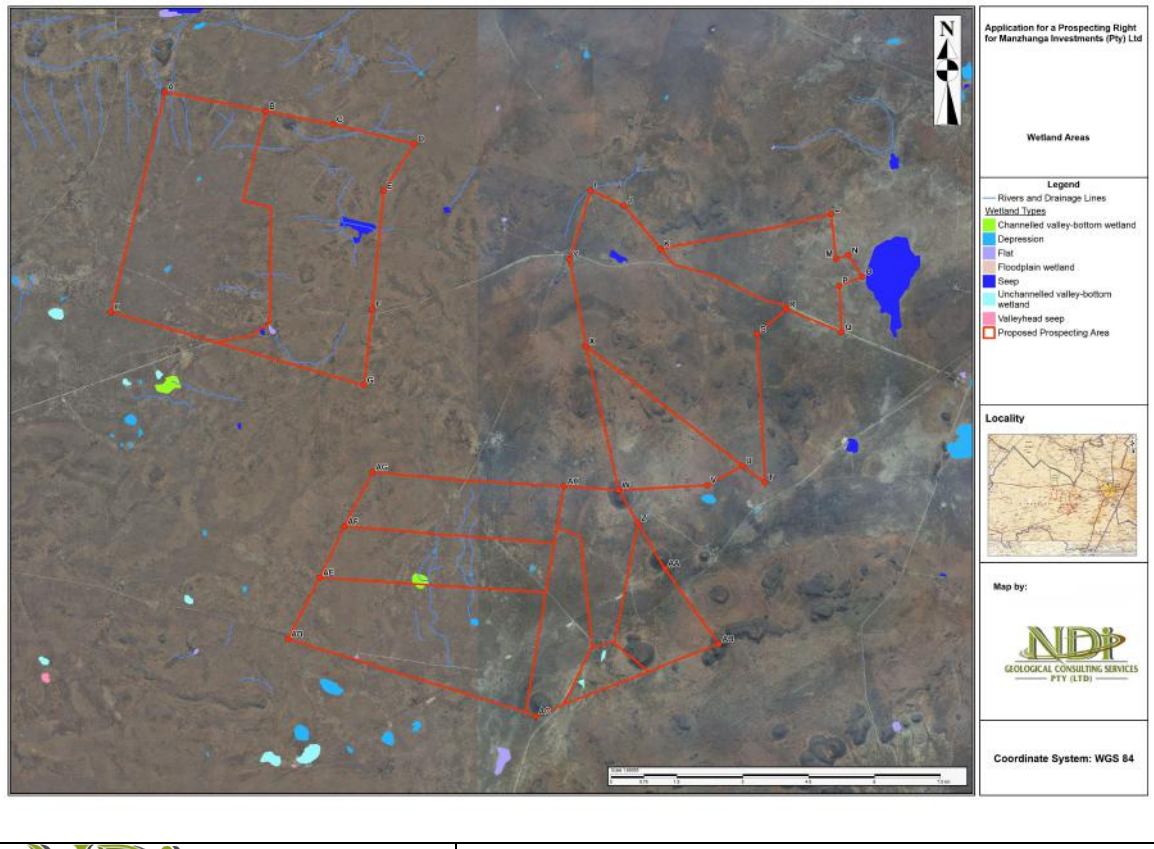


Figure 12-8: Status of Wetland Conservation

12.1.7 Groundwater

Aquifer Characterisation

The DWS launched the Reconstruction and Development Programme (RDP) in South Africa, which highlighted the importance of groundwater resources in the country as well as the role they will play in satisfying the targets of the RDP. According to the DWS aquifer classification the following applies for the prospecting area:

The Groundwater Harvest Potential Map of South Africa published by the Department of Water Affairs (Baron et al, 1998) classifies the area around Kimberley has having a harvest potential of 6 000 to 10 000 m3/km2/annum, defined as the maximum volume of groundwater that may annually be abstracted per square kilometre per annum without depleting the aquifers.

Groundwater Yield

The NGA shows that the prospecting area is located within a fractured aquifer, with low ground yield between 0.1 and 0.5l/s and 0.5 and 2l/s and intergranular and fractured between aquifers with groundwater yield between 0.5 and 0.1l/s (Figure 12-9),

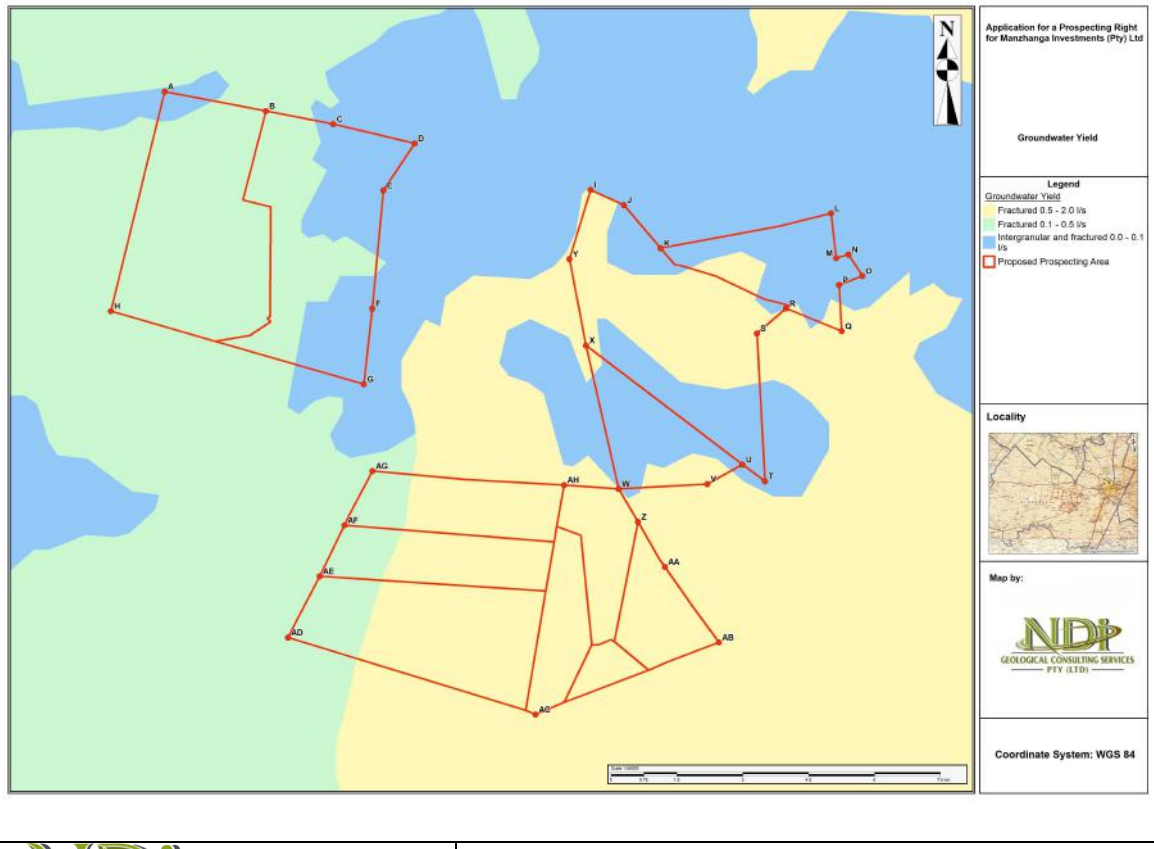
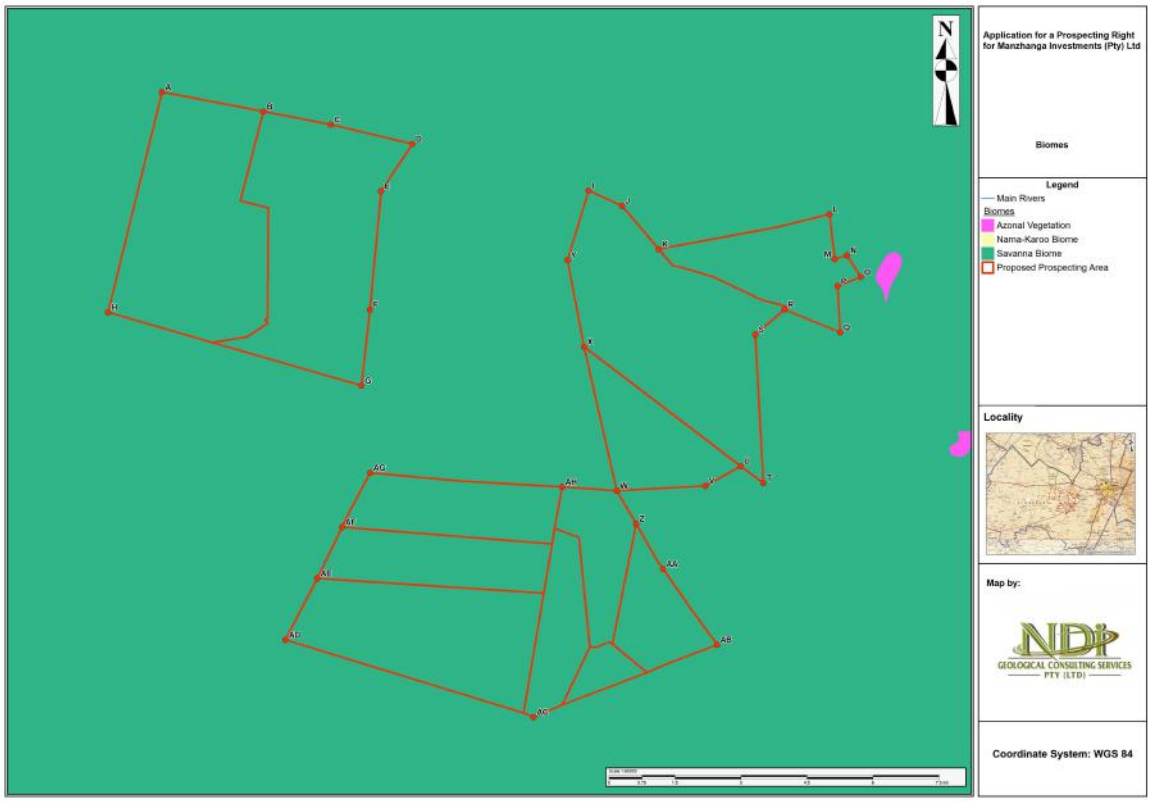


Figure 12-9: Groundwater Yield

12.1.1 Biodiversity

Biomes

The proposed prospecting area as shown in Figure 12-10 is in the Savanna Biome. The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.



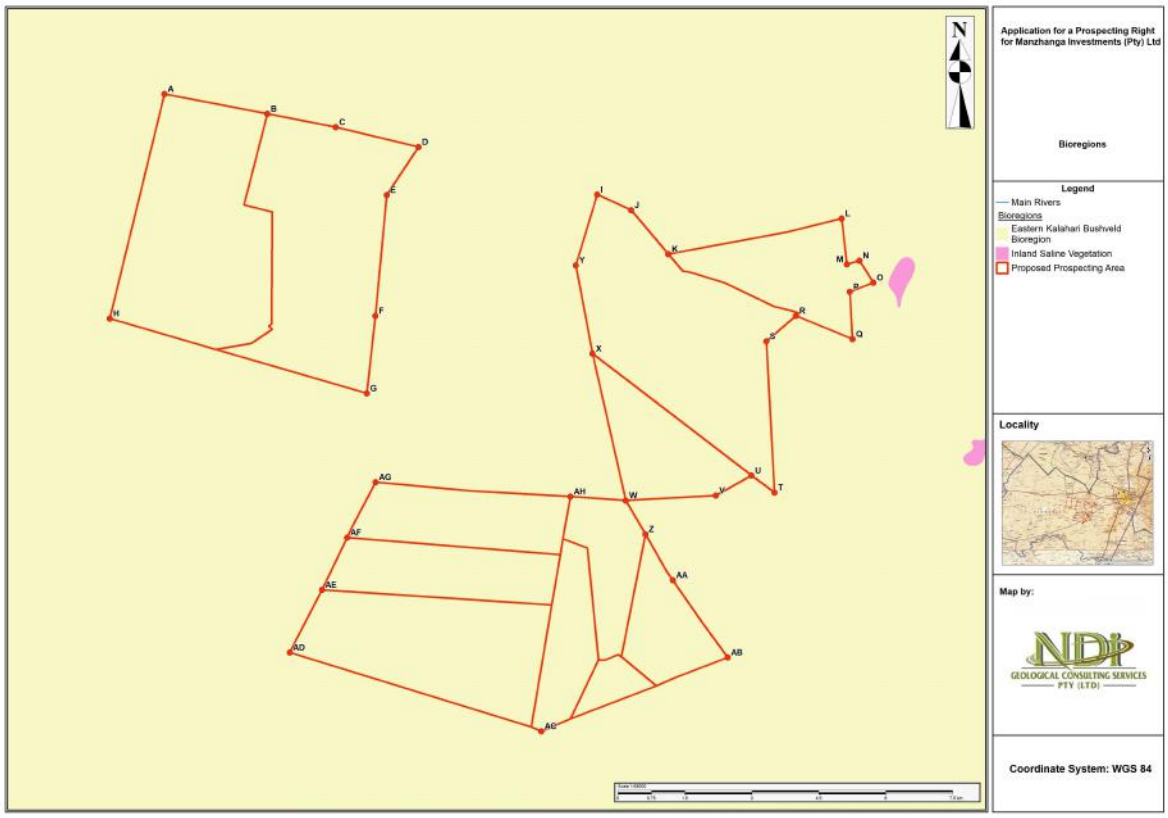
GEOLOGICAL CONSULTING SERVICES PTY (LTD)	BIOMES

Figure 12-10: Biomes

Most of the savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost savanna types, goats are the major stock. In some types crops and subtropical fruit are cultivated. These mainly include the Clay Thorn Bushveld, parts of Mixed Bushveld, and Sweet Lowveld Bushveld.

Bioregions

Figure 12-11 indicates that the proposed prospecting area is in the Eastern Kalahari Bushveld Bioregion. The Eastern Kalahari Bushveld Bioregion is the largest savanna bioregion and is on average at the highest altitude. It is roughly bounded by Mafikeng, Bloemhof, Kimberley, Groblershoop and Van Zylsrus.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	BIOREGIONS

Figure 12-11: Bioregions

Vegetation Types

The proposed site is associated with ecosystems that are threatened (Figure 12-12). The threatened ecosystem associated with the site is the Kimberley Thornveld and Vaal Rocky Shrubland. According to SANBI, the ecosystem is classified at Least Threatened (Figure 12-12). The status of Vegetation with Threatened Ecosystems is indicated in Figure 12-13.

Vaalbos Rocky Shrubland

This vegetation type is found in slopes and elevated hills and ridges within plains of mainly Kimberley Thornveld, also in the vicinity of Northern Upper Karoo. Evergreen shrub communities dominated by Tarchonanthus camphorates, Olea europaea subsp africana, Euclea crispa, Diospyros lycioides, Rhus burchellii and Buddleja saligna arefound. Trees such as Celtis africana, Rhus lancea and Ziziphus mucronata are occur in sheltered, cool sites (Mucina & Rutherford 2006).

Some of the important taxa for this vegetation unit are Cussonia spicata, Digitaria eriantha, Elionurus muticus, Albuca setose, Aloe grandidentata and Stapelia grandiflora (Mucina & Rutherford 2006).

Although this vegetation type is ascribed a Least Threatened conservation status, only a small portion (less than 2%) is statutorily conserved in the Vaalbos National Park (Mucina & Rutherford 2006) (de-proclaimed). The vegetation of the pans is subjected to natural degradation/regeneration cycles controlled by concentration of grazing animals such as antelopes.

Kimberley Thornveld

This vegetation type, as described by Acocks (1988) is similar to Kalahari Thornveld. The summer rainfall is 400 to 500 mm per year. Temperature varies between -8°C and 41°C, with an average of 19°C (Mucina & Rutherford 2006).

This is an open savanna, with Umbrella Thorn Acacia tortilis and Camel Thorn A. erioloba the dominant tree species, and scattered individuals of Shepherd's Tree Boscia albitruncha and Sweet Thorn Acacia karroo. The shrub layer is poorly to moderately developed in places and individuals of Camphor Tree Tarchonanthus camphoratus, Spike-flowered Black Thorn Acacia mellifera, Wild Raisin Grewia flava and Lycium hirsutum occur widely scattered. The grass layer is fairly well developed and grasses such as Redgrass Themeda triandra, Common Nine-awn Grass Enneapogon cenchroides, Lehmann's Lovegrass Eragrostis lehmanniana, Elionurus muticus and Cymbopogon plurinodis are conspicuous (Mucina & Rutherford 2006).

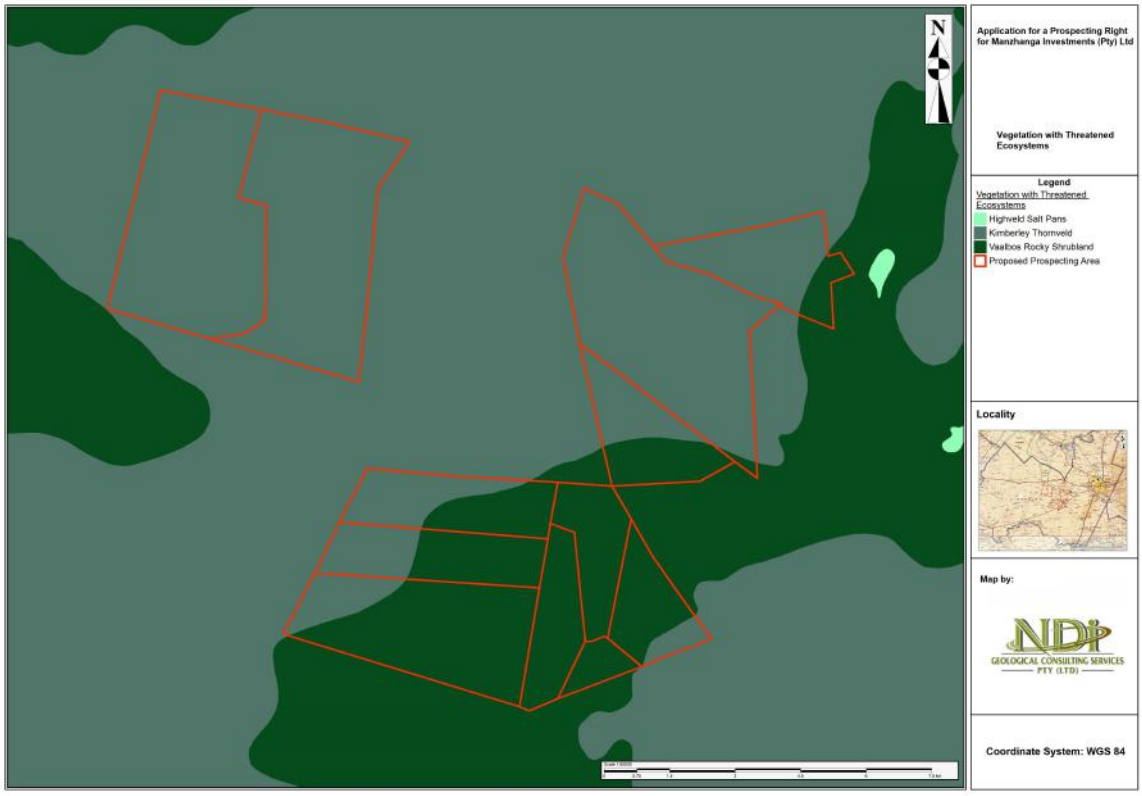


Figure 12-12: Vegetation with Threatened Ecosystems

Protected Ecosystem

Protected Ecosystems, which are ecosystems that are of a high conservation value or contain indigenous species at high risk of extinction in the wild in the near future.

Flora

The following are the protected species that occur in the Sol Plaatje Local Municipality(SPLM):

• Acacia erioloba; (which is a protected species in terms of the National Forest Act 84 of 1998);

• Nerine laticoma;

• Drimia sanguine (listed as Near Threatened, according to IUCN); and

• Aloe grandidendata (which is a protected species in terms of the Nature Conservation Ordinance (Ordinance 19 of 1974).

Fauna

The SPLM has rare and endangered species such as Greater and Lesser Flamingos that occur on Kamfers Dam and these species, because of their conservation status, need to be protected. According to Anderson (2008), available literature and the McGregor Museum mammal database suggest a total composition of approximately 64 mammal, 204 bird, 40 reptile and six amphibian species for the Kimberley Thornveld complex. Anderson (2008) listed the following species as recorded in Sol Plaatje during the ecological survey undertaken in 2007.

Only 3% of the Kimberley thorn bushveld was conserved in the Vaalbos National Park which is now de-proclaimed while Ghaap Plateau Vaalbosveld is not conserved in the FBDM.

Sensitive areas in area include:

- **Vaalbos National Park**

  Vaalbos National Park is now de-proclaimed as a national park and was claimed back by land claimants. Subsequent farming on the land was un-successful and a diamond mine has been granted. The Graspan Breeding Centre was retained by SANPARKS and is used for breeding endangered species such as African buffalo.

- **Kamfers Dam**

  According to de Villiers (2008), Kamfers Dam (28º44'S, 24º46'E, grid cell 2824DB) has no official protection, although it is a Natural Heritage Site and an Important Bird Area. Kamfers Dam is of great conservation and scientific importance, largely because of its wealth of waterbird species but especially because of the vast number of Lesser Flamingos that it supports year-round. The use of the wetland by these birds as a roosting, feeding and moulting site and the wetland's potential as a breeding site by them (only two other breeding sites are used by the species in southern Africa), make Kamfers Dam valuable on a national and a regional level. The wetland is also an important asset for tourism and environmental education. Kamfers Dam also holds 8 species of wetland birds in internationally important numbers, among a total of 67 species of waterfowl.

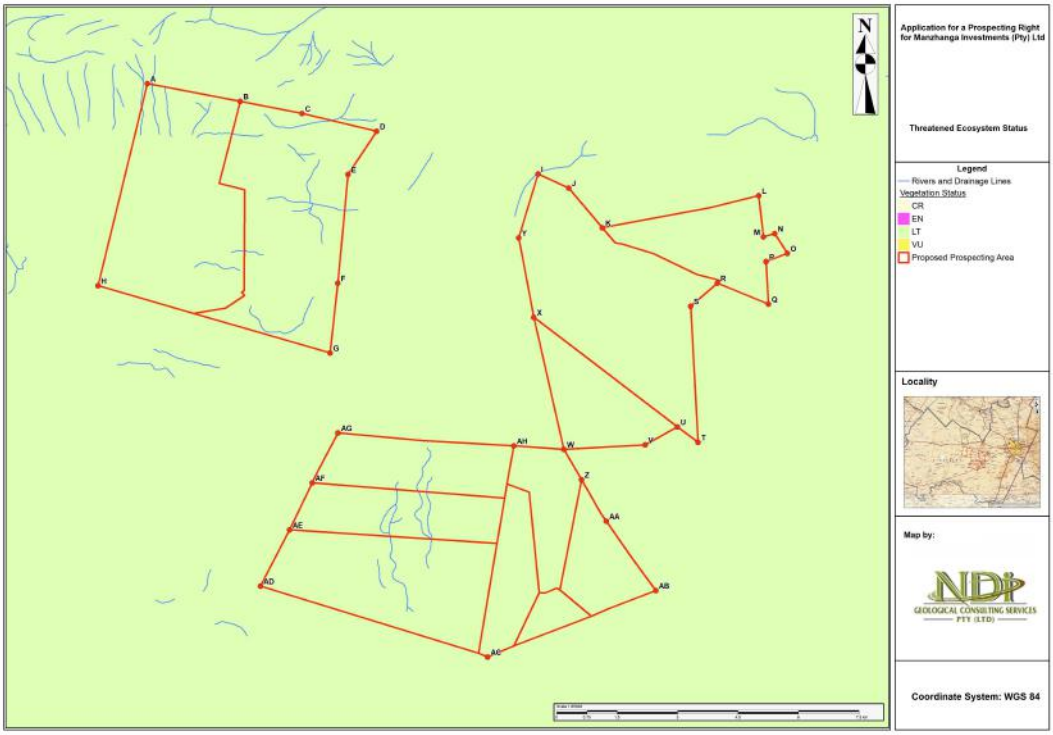
The Spitskop Safari located 25 km outside Kimberley also form part of the sensitive areas around the study area.

Mining is impacting on the resource quality (especially habitat, morphology and water quality) of watercourses in the district. In particular, the sensitive alluvial vegetation is under threat from these activities.

Pollution at the Kamfers Dam which is home to thousands of flamingos. Pollution poses a threat to the ecosystem.

Economic activities such as game farming and hunting may be affected by drilling activities. Loss of biodiversity may lead to ecosystem degradation and subsequent loss of important ecological services. Biodiversity is important for economic, cultural, aesthetic, scientific and educational purposes. For example, biodiversity conservation makes a variety of genes available that can be used for food, materials and medicine (Young; 1999). Mining is a driving force that exerts pressure on the natural

habitat and biological diversity. This pressure arises from both current and past activities since there is often a time lag between human actions and environmental responses.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

THREATENED ECOSYSTEM STATUS

Figure 12-13: Status of Vegetation with Threatened Ecosystems

12.1.2 Conservation Plan

According to the Northern Cape Provincial Biodiversity Conservation Plan (C Plan), some portions of Spitskop 115 fall within the Critical Biodiversity Areas (CBAs).

Figure 12-14 provides a map showing areas of conservation importance that may be affected by the prospecting activities.

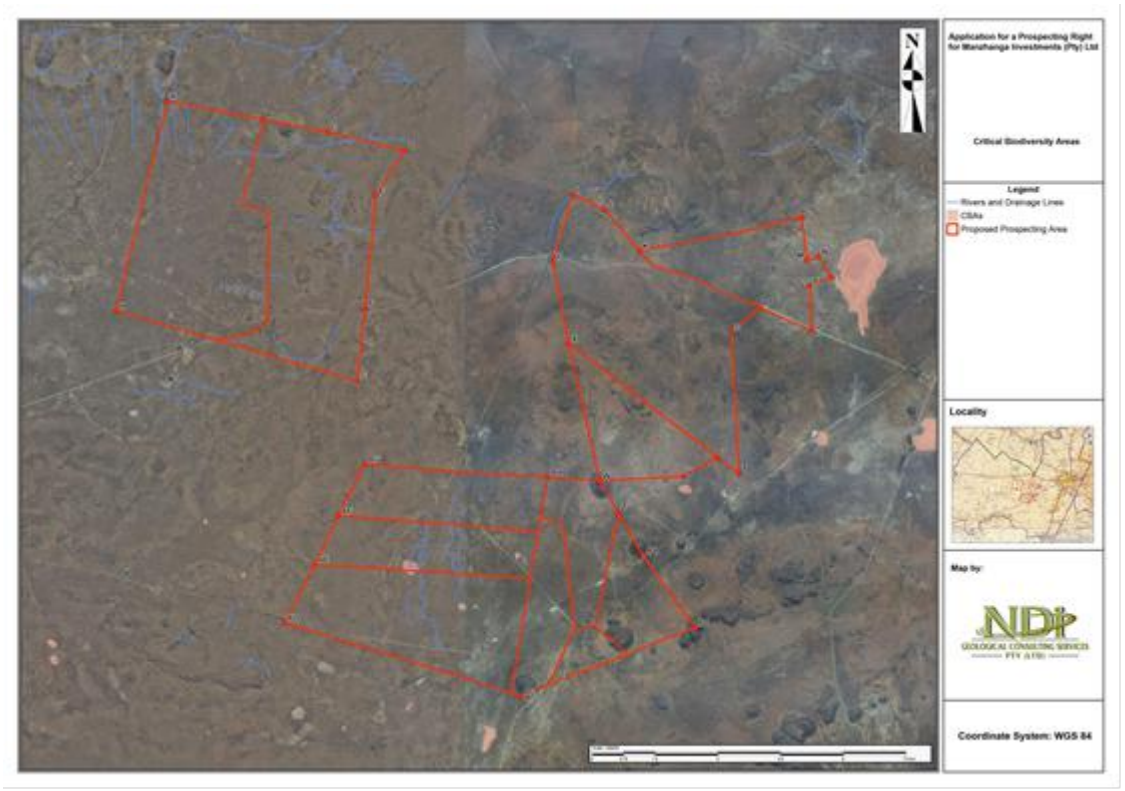


Figure 12-14: Areas of Conservation Importance

12.1.3 Heritage Resources

Heritage resources may be tangible, such as buildings and archaeological artefacts or intangible such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical scientific, social, spiritual, linguistic economic or technological values; their representation of a particular period; their rarity and their sphere of influence. There are several heritage and cultural resources in the Northern Cape Province. However, there are no major heritage resources sites that are associated with the affected properties. It is however expected that there may be graves and burial sites that may be affected by the proposed prospecting activities.

Should there be any heritage sites (graves) within the prospecting area, they will be identified and fenced before any prospecting activities take place.

12.1.4 Socio-Economic

The proposed prospecting project will be located within the Sol Plaatje Local Municipality which is situated in the Frances Baard District Municipality.

Population

The municipality has experienced negative growth (-0.3%) in the population from 1996 to 2001 and an upswing to 2% from 2001 to 2011. With almost 260 000 people, the Sol Plaatje Local Municipality housed 0.5% of South Africa's total population in 2015. Between 2005 and 2015 the population growth

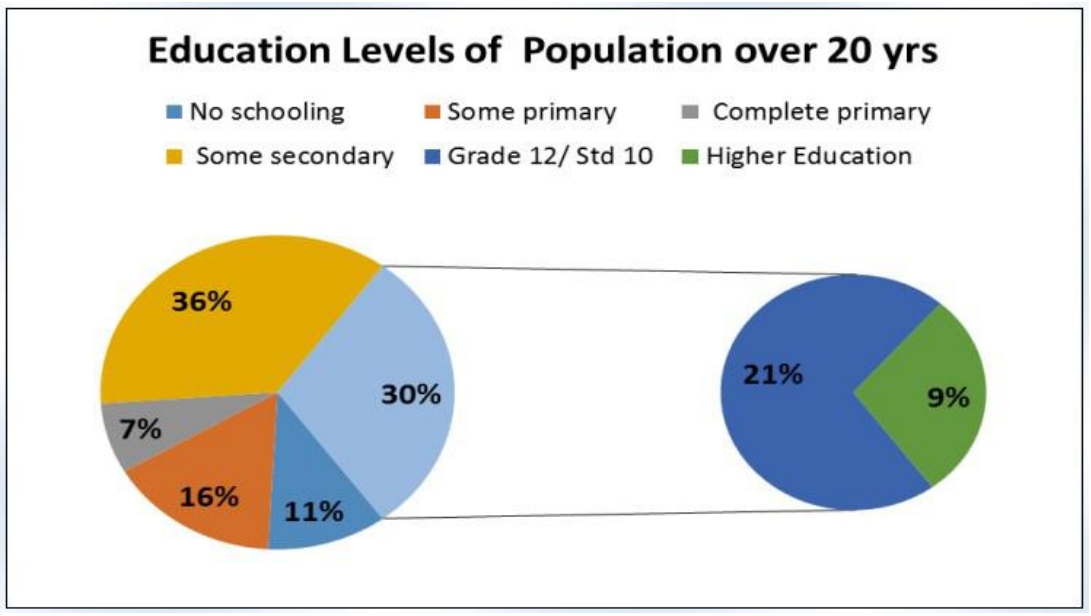
averaged 2.22% per annum which is slightly higher than the growth rate of South Africa as a whole (1.51%). Compared to Frances Baard's average annual growth rate (1.78%), the growth rate in Sol Plaatje's population at 2.22% was slightly higher than that of the district municipality. The population projection of Sol Plaatje Local Municipality shows an estimated average annual growth rate of 1.9% between 2015 and 2020. The average annual growth rate in the population over the projection period for Frances Baard District Municipality, Northern Cape Province and South Africa is 1.7%, 1.5% and 1.4% respectively and is lower than that the average annual growth in Sol Plaatje Local Municipality.

The population pyramid reflects a projected change in the structure of the population from 2015 and 2020. The differences can be explained as follows:

- In 2015, there is a significantly larger share of young working age people between 20 and 34 (27.4%), compared to what is estimated in 2020 (25.4%). This age category of young working age population will decrease over time.
- The fertility rate in 2020 is estimated to be slightly higher compared to that experienced in 2015.
- The share of children between the ages of 0 to 14 years is projected to be slightly smaller (27.4%) in 2020 when compared to 2015 (27.6%).
- In 2015, the female population for the 20 to 34 years age group amounts to 14.3% of the total female population while the male population group for the same age amounts to 13.2% of the total male population. In 2020, the male working age population at 12.1% does not exceed that of the female population working age population at 13.3%, although both are at a lower level compared to 2015.

Level of Education

Of the population over 20 years, 30% have matric and higher education, while 10% indicate no schooling. The remaining 60% have some primary schooling and some secondary schooling. This will pose a serious problem for the future economic trajectory as skills will have to be built to suit the economic path and in the short-term skills will have to be brought in from skilled areas. Within Sol Plaatje Local Municipality, the number of people without any schooling decreased from 2005 to 2015 with an average annual rate of -3.43%, while the number of people within the 'matric only' category, increased from 32 100 to 49 200. The number of people with 'matric and a certificate/diploma' increased with an average annual rate of 3.65%, with the number of people with a 'matric and a Bachelor's' degree increasing with an average annual rate of 7.82%. Overall improvement in the level of education is visible with an increase in the number of people with 'matric' or higher education. Figure 12-15 indicates the levels of education in the Sol Plaatje Municipality.

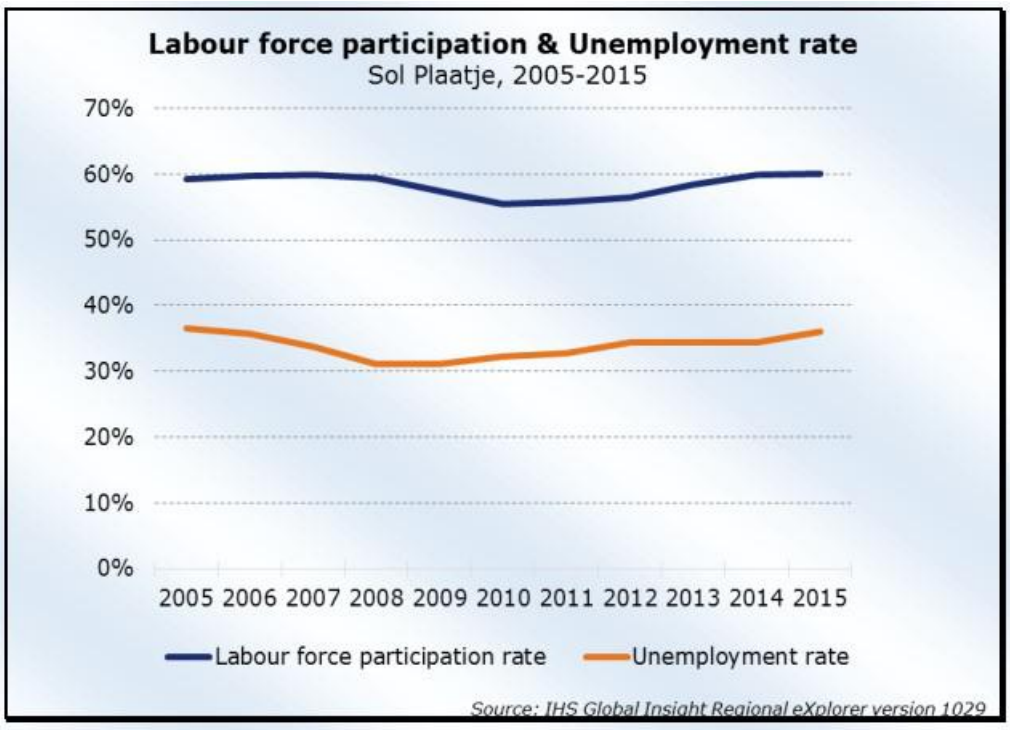


GEOLOGICAL CONSULTING SERVICES PTY (LTD)	EDUCATION LEVELS

Figure 12-15: Highest level of Education 15+ (2005 vs. 2015) (Source: Stats SA & Quantec)

Employment Levels

In 2005, 39.7% of the total population in Sol Plaatje Local Municipality were classified as economically active which decreased to 39.6% in 2015. Compared to the other regions in Frances Baard District Municipality, Sol Plaatje Local Municipality had the highest Economic Active Population (EAP) as a percentage of the total population within its own region relative to the other regions. On the other hand, Magareng Local Municipality had the lowest EAP with 28.0% people classified as economically active population in 2015. Of the economically active people in the municipality, 31.9% are unemployed (narrow definition of unemployment). 41.7% of the economically active youth (15 – 34 years) in the area are unemployed. This figure is compelling enough to direct a special focus on youth employment. In 2015 the labour force participation rate for Sol Plaatje was at 60.0% which is very similar when compared to the 59.2% in 2005 (Figure 12-16). The unemployment rate is an efficient indicator that measures the success rate of the labour force relative to employment. In 2005, the unemployment rate for Sol Plaatje was 36.6% and decreased overtime to 36.0% in 2015. The gap between the labour force participation rate and the unemployment rate decreased which indicates a negative outlook for the employment within Sol Plaatje Local Municipality.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	LABOUR FORCE AND UNEMPLOYMENT

Figure 12-16: Labour force and Unemployment Rates

Economic Statistics

The tertiary sector employs relatively little unskilled labour compared to the primary and secondary sectors. Therefore, growth in the tertiary sector does not normally have a significant impact on unemployment as most unemployed people are not highly skilled. compared to the national economy of South Africa, Sol Plaatje Local municipality has a comparative advantage on community services and almost the same advantage on the transport industry. A slight advantage is also noted on financial services. However, when it comes to specifically manufacturing, Sol Plaatje has a significant comparative disadvantage relative to the country. In terms of trade the quotient of Sol Plaatje is relatively like that of South Africa. Sol Plaatje has a very narrow economy.

12.2 Description of the current land uses.

The dominant land use is grazing and farming with limited crop production. Irrigation is practiced sporadically, and it is usually associated with drainage depressions unless groundwater is available. Wetlands also form part of the study area with a national park situated about 2.5 km northeast of the study area.

12.3 Description of specific environmental features and infrastructure on the site.

Please refer to Section 12.1.

12.4 Environmental and current land use map.

An environmental and current land use map has been attached as Figure 12-17 and is also included in Appendix 6.

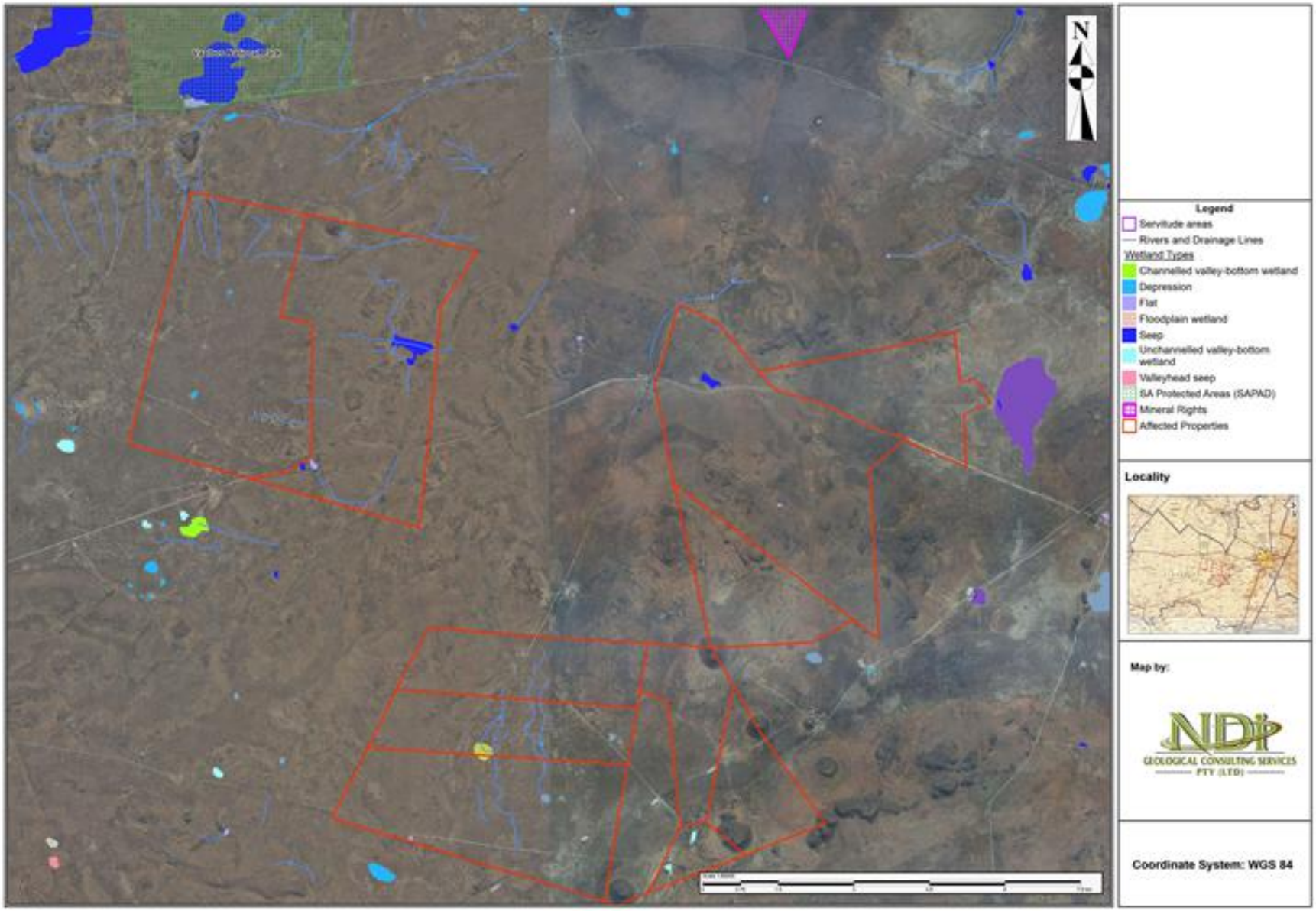


Figure 12-17: Current Environmental Attributes and Land use Map

13 Impacts and Risks Identified

Table 13-1 provide a high-level assessment of the potential impacts and associated mitigation measures which could result from the proposed mine during construction, operation and decommissioning/closure. These impacts will be further refined and assessed according to the impact assessment methodology in Section 14.

Table 13-1: Summary of Potential Environmental Impacts Associated with the Proposed Development

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible job opportunities during the construction and operation.
Hydrogeology	Possible groundwater contamination.
Surface water	Possible surface water contamination.
Air Quality	Possible impact on Air Quality in the area.
Climate Change	Possible contribution to climate change through emission of Green House Gases
Blasting and Vibrations	Possible impacts on private properties and fauna due to blasting and vibrations
Noise	Possible generation of noise during construction and operation.
Soils/Land Use/Land Capability	Loss of soil resource and change in land capability and land use.
Biodiversity	Disturbance and loss of biodiversity, especially SCC.
Aquatic ecology	Possible loss, sedimentation and contamination of aquatic resources
Heritage	Possible impact on heritage and cultural resources (including graves) in the area.
Traffic	Potential safety issues due to the increased traffic.
Cumulative Impacts	Cumulative Impacts

13.1 Construction

The construction phase of the project will entail the site establishment for surveying and pegging sites. Environmental impacts on the biophysical and socio-economic environment which are anticipated to occur throughout the construction were identified as follows:

13.1.1 Socio-Economic

The main positive impacts of the prospecting activities will be the temporary creation of jobs during the construction phase of the project. The project may also result in a temporary boost in small local businesses in the area and will also affect the economic activities at the national park and safari.

Site establishment activities may result in grievance because of possible grave relocation. It is expected that the final site layout will consider all the sensitive environment in the area and will avoid graves and other heritage and cultural resources in the area. Movement of construction vehicles on the roads (357, R64 and other farm roads) may increase the risks accidents on the roads. Other health and safety risks may be as a result on construction workers lighting fires on site, littering and lack of housekeeping. Potential increase in social pathologies and negative health impacts due to potential squatting of job seekers and increase in nuisance dust may also occur.

13.1.2 Groundwater

The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. The removal of vegetation could furthermore lower the evapotranspiration rates, thereby allowing a greater volume of potentially contaminated water to percolate to the underlying aquifer in the event of an accidental spill from the machinery. It must however be noted that the removal of vegetation will be limited to the required footprints for the access roads, the boreholes and sumps as well as the camp sites. The impact on evapotranspiration is therefore expected to be negligible.

Site clearing and grubbing is unlikely to materially affect the groundwater within the project area. However, care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality because of spillages and uncontrolled release.

13.1.3 Surface water

The potential impacts on surface water during the construction phase of the proposed project are as follows:

- Accidental spillages of hazardous substances from construction vehicles used during construction of the crossings, as well as from hazardous storage areas;
- Contamination of runoff by poor materials/waste handling practices;
- Debris from poor handling of materials and/or waste blocking watercourses;
- Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality;
- Increase in turbidity of the local water streams because of runoff of cleared areas; and
- Increase of surface runoff and potentially contaminated water that needs to be controlled in the areas where site clearing occurred.

Some level of sedimentation is expected to occur in the drainage line that traverse the project area as runoff is naturally anticipated to pick up environmental debris as it crosses natural areas. Increased turbidity is reversible and surface water should return to pre-impact turbidity levels once sediment levels entering the watercourse are reduced. Settled sediments should naturally move downstream during periods of high flow flowing storm events.

13.1.4 Aquatic Ecosystems

The removal of vegetation from the construction area is also expected to have an impact on the provision of ecological and sociocultural services by aquatic ecosystems. In addition, construction waste dumping and oil leakages from construction vehicles will alter biodiversity maintenance of the aquatic ecosystems, which endangers the survival of aquatic ecosystem and riparian species inhabiting the area. Impacts on the aquatic ecosystems and will include:

- Loss of habitat and aquatic ecosystem and riparian ecological structure because of site clearance activities and uncontrolled aquatic ecosystem and riparian habitat degradation;
- Impact on the aquatic ecosystem and riparian systems due to changes to the sociocultural service provisions though site clearance, waste management and riparian disturbance;
- Impact on the hydrological functioning of the aquatic ecosystem and riparian systems;
- Soil compaction and levelling because of construction activities and vehicle movement leading to loss of riparian habitat; and

- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian resources.

The proposed project will only involve drilling and not trenching or pitting, there are also no major surface water sources and for that reason, it is not anticipated that there will be significant impact on aquatic life, if any.

13.1.5 Heritage and Archaeological Resources

The following impacts are envisaged on archaeological artefacts and graves resulting from the construction phase of the proposed project:

- The proposed project has the potential to impact on local graves within the area; and
- The proposed project has the potential to impact on sites of archaeological importance.

The final layout plan will be dependent on the location of local heritage and archaeological resources. The siting of the boreholes and infrastructure will be in such a way as to avoid sensitive environments, which include graves and archaeological resources as far as is practicable.

13.1.6 Palaeontology Impacts

Earth moving activities may result in the destruction of fossils (if any).

13.1.7 Flora

The project may result in the following impacts on the floral environment during the construction phase:

- Destruction of potential floral habitats for species of conservational concern as a result of site clearing, alien species, waste management and soil compaction;
- Vegetation clearance may lead to floral habitat loss of potential species of conservational concern;
- Impact on floral diversity as a result of site clearance, anthropogenic activity, and possible uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance;
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase;
- Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation; and
- Habitat fragmentation because of construction activities leading to loss of floral diversity.

13.1.8 Fauna

The project may result in the following impacts on the faunal environment during the construction phase:

- Loss of faunal habitat and ecological structure resulting from site clearing, alien invasive species, erosion, and general construction activities;
- Loss of faunal species due to collisions with construction vehicles and machinery;
- Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping;

- Impact on faunal species of conservational concern due to habitat loss and collision with construction vehicles;
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts on faunal habitat during the operation phase.

The loss of biodiversity is expected be insignificant as it will be limited to the footprints of the required infrastructure. However, mitigation and management of species of conservational concern, if any, needs to be adhered to.

Due to the nature of prospecting activities, construction activities will be localised. The main issue will be due to movement of vehicle which may collide with fauna.

13.1.9 Air Quality

The movement of construction vehicles and earth moving machinery as well as the stripping of vegetation will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust.

13.1.10 Visual

The following impacts on the visual character as a result of the proposed project are envisaged during the construction phase:

- Scaring of the landscape as a result of the clearance of vegetation;
- Visual intrusion because of the movement of machinery and the erection of contractor camps; and
- Indirect visual impact due to dust generation because of the movement of vehicles and materials, to and from the site area.

13.1.11 Ambient Noise

The use of vehicles and machinery may result in an increase in ambient noise has in the immediate vicinity of the project including the Vaalbos National Park. This has the potential to impact humans and flora in the vicinity of the construction area.

13.1.12 Soil Land use and Land Capability

During the construction phase, all infrastructure and activities required for the operational phase will be established. The main envisaged activities include the following:

- Movement of construction vehicles, machinery and workers in unprotected areas (bare) may result in compacting of the soil of the existing roads. Fuel and oil spills from vehicles may result in soil chemical pollution;
- Clearing of vegetation will result in the soils being particularly more vulnerable to soil erosion. The impact can persist long after cessation of prospecting activities depending on mitigation and rehabilitation strategies. Strategic stormwater management should be put in place to minimise soil losses.

- Soil contamination resulting from construction activities can be because of a number of activities (i.e., incorrect hazardous substance storage, incidental hydrocarbon leakages from construction vehicles);
- Loss of soil resource and utilisation resulting from the cleaning and topsoil stripping of the construction footprint. Although soils will be stripped and stockpiled, loss of seed reserve and organic matter depletion through decomposition during stockpiling will severely reduce soil quality and its ecological function if not managed appropriately. Re-vegetation should be imposed as far as is possible to maintain soil fertility through natural nutrient cycling during soil storage prior to rehabilitation phase;
- Other activities in this phase that will impact on soil are the handling and storage of building materials and different kinds of waste. This will have the potential to result in soil pollution when not managed properly; and
- In areas of permanent changes such as the borehole and sump area, access roads (tracks), the erection of infrastructure and stockpiles, the current land capability and land use will be lost permanently. This will however be localised to the footprint of the infrastructure.

13.1.13 Traffic

The movement of construction vehicles in the project area will result in an increase in traffic on the roads.

13.1.14 Climate Change

The movement of vehicles and earth moving machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

The above-mentioned impacts were assessed based on the quantitative impact assessment methodology described in Section 14 of this Report. For each impact assessed, mitigation measures have been proposed to reduce or avoid negative impacts and enhance positive impacts. These mitigations were also incorporated in the EMPr to ensure that they are implemented during the various phases of the proposed project.

The summary of the impact assessment during the construction phase is provided in Table 13-2.

Table 13-2: Impact Assessment Table for the Construction Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Site Establishment: Establishment of the access (tracks) to the prospecting site, Establishment of the campsite, site physical surveying and pegging of drilling sites																
Social	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	2	3	2	2	28	Medium Low	Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public; Security and safety should be emphasised; Recruitment will not be undertaken on site; Recruitment practises will favour locals, but farm labourers will not be employed unless agreed to with the farm owners; Liaise with the SAPD and existing forums to implement effective crime prevention strategies; and No construction workers shall be allowed to access private properties without the owner's knowledge and consent.	1	1	1	1	2	9	Low
	Unauthorised access to private property outside of the demarcated areas will result in conflict with landowners.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low
	Increased traffic in the area will increase the likelihood of accidents on the roads, posing a health and safety issue for the landowners and land occupiers.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low
	The influx of job seekers in the area may result in an increase in petty crimes.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low
	Ineffective communication channels leading to community unrest.	2	2	3	2	2	28	Medium Low		1	1	1	1	2	9	Low
	Negative impact as a result of the dissection of land by clearing and excavations for construction of infrastructure, constraints to access to cultivated land to farmers, impacting on day-to-day farm activity.	3	1	3	2	2	28	Medium Low		1	1	1	1	2	9	Low
	Possible boost in short term local small business opportunities.	3	1	3	2	2	28	Medium Low positive		3	1	3	2	2	28	Medium Low positive
Groundwater	Localised spillages of oils from machinery leaching to groundwater contamination.	3	2	2	2	2	28	Medium Low	No washing of vehicles shall be allowed outside demarcated areas. The bays will be clearly demarcated and will not be allowed to contaminate any surface runoff; Sufficient areas shall be provided for the maintenance and washing of vehicles; Refuelling of vehicles will only be allowed in designated areas; All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is not used for some time; On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material; Bund areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund areas must have a facility such as a valve/sump to drain or remove clean stormwater; Contaminated water shall be pumped into a container for removal by an approved service provider; Regular inspections shall be carried out to ensure the integrity of the bund walls; All preventative servicing of earth moving equipment and construction vehicles shall be undertaken off site; Runoff from this area shall be contained; Spill kits shall be made available, and all personnel shall be trained on how to use the kits and training records shall be	2	1	1	2	2	16	Low
	Existing boreholes within the prospecting area may create conduits of flow to the groundwater unless sealed.	3	2	2	2	2	28	Medium Low		2	1	1	2	2	16	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									made available on request.							
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the drill sites and associated infrastructure.	2	3	2	2	2	28	Medium Low	Ensure that topsoil is properly stored, away from the streams and drainage areas; No construction activities will be undertaken within 100 metres of the nearby steams and 500 meters from riparian areas without consent from the DWS; Vehicle and personnel movement within watercourses and riparian areas shall be strictly prohibited; Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water.	1	1	1	2	2	12	Low
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	3	2	2	2	28	Medium Low		1	1	1	2	2	12	Low
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2	2	2	24	Low		1	1	1	2	2	12	Low
	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality.	2	3	2	2	2	28	Medium Low		1	1	1	2	2	12	Low
	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	3	2	2	2	2	28	Medium Low		1	1	1	2	2	12	Low
Aquatic Ecosystems	Localised changes to the riparian areas as a result of vegetation clearing.	2	2	2	2	3	30	Medium Low	Adequate stormwater management must be incorporated into the design of the project to prevent erosion and the associated sedimentation of the aquatic system; No construction activities shall be allowed within 500 m of riparian zones without consent from the DWS; No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; All disturbed areas shall be re-vegetated with indigenous species; All construction materials shall be kept out of the riparian areas; and All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystems	1	1	1	1	1	6	Low
	Loss of habitat and aquatic ecological structure as a result of site clearance activities and uncontrolled aquatic ecosystem degradation.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low
	Impact on the aquatic ecological systems as a result of changes to the sociocultural service provisions.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian resources.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of riparian habitat.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low
	Impact on the hydrological functioning of the aquatic ecosystems.	3	2	2	2	2	28	Medium Low		1	1	1	1	1	6	Low
Heritage Resources	The proposed project has the potential to impact on local graves within the area (if any).	2	1	2	2	2	20	Low	Prior to the site establishment, a heritage impact assessment must be undertaken and mitigation and /or management measure for the protection of such resources must be implemented; No construction activities may be undertaken within 50 m of the heritage and/or cultural sites; If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	1	1	1	1	1	6	Low
	The proposed project has the potential to impact on sites of archaeological importance.	2	1	2	2	2	20	Low		1	1	1	1	1	6	Low
Palaeontological Resources	Drilling of exploratory boreholes has potential to impact on palaeontological resources	2	1	2	2	1	20	Low	Should fossils be exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.	1	1	1	1	1	6	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of drill sites.	2	1	2	2	2	20	Low	The Contractor shall be on the lookout for SCC and any floral SCC encountered within the development footprint are to be relocated to areas with suitable habitat, outside the disturbance footprint; Floral species of conservation concern, if encountered within the development footprint, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist; The proposed development footprint shall be kept to the minimum; All disturbed areas must be concurrently rehabilitated during construction; Prohibit the collection of any plant material for firewood or medicinal purposes; The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas; Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area; All sensitive open space areas will be demarcated and access into these areas shall be prohibited; Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities; Monitoring of relocation success will be conducted during the operational phase; Construction related activities shall be kept strictly within the development footprint; Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project. Alien Invasive Plant Species Management plan to be implemented; Edge effects of activities including erosion and alien/ weed control will be strictly managed in the riparian area; All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants; Exotic or invasive plants shall be controlled as they emerge; An alien vegetation control program must be developed and implemented within all disturbed areas. After removal of alien vegetation, the affected areas must be re-assessed to determine the success of the program and any follow up measures that may be required; The eradicated plant material must be disposed of at an approved solid waste disposal site; During post-construction, an alien vegetation removal and monitoring plan must be compiled for those areas which were not effectively rehabilitated; The extent of invasion must be established through investigation to identify priority areas; Priority species shall be identified to control and develop protocols for the removal of all alien species e.g., mechanical removal, herbicidal treatment etc. Mechanical,	1	1	1	1	2	9	Low
	Loss of localised floral species diversity including RDL and medicinal protected species due to site clearance and establishment of drill sites.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low
	Potential spreading of alien invasive species as indigenous vegetation is removed and pioneer alien species are provided with a chance to flourish.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									methods must be favoured for the removal of alien invasive species. Chemical removal shall only be undertaken by a suitably qualified and approved person; and As much vegetation growth as possible must be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, rehabilitation planting (where applicable) is to be implemented.							
Fauna	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	2	1	2	2	2	20	Low	The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; No trapping or hunting of fauna shall be permitted; Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed; Should any SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist; No informal fires in the vicinity of construction areas shall be permitted; Fencing of construction and prospecting areas will protect fauna; An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss.	1	1	1	1	2	9	Low
	Habitat fragmentation resulting from construction activities of leading to loss of floral diversity.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping.	2	2	2	2	2	24	Low		1	1	1	1	2	9	Low
	Movement of construction vehicles and machinery may result in collision with fauna, resulting in loss of fauna.	2	2	2	2	2	24	Low		1	1	1	1	1	6	Low
Air Quality	Possible increase in dust generation, PM_{10} and $PM_{2.5}$ as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	2	2	2	2	24	Low	Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; Appropriate dust suppression measures may include spraying with water; Where practical rehabilitation should be undertaken in tandem with the construction activities; A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved road; All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution; Dust control suppression shall be implemented on dry weather days and periods of high wind velocities; Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; Where practical rehabilitation should be undertaken progressively; Materials transported on public roads must be covered; Odours: Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.	1	2	1	1	2	12	Low
	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.	2	2	2	2	2	24	Low		1	2	1	1	2	12	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Visual	Scaring of the landscape as a result of the clearance of vegetation.	2	1	2	2	2	20	Low	The number of construction vehicles and machinery to be used shall be kept to a minimum; Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents; Materials transported on public roads must be covered; and Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum.	1	1	1	1	2	9	Low
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity.	2	2	2	2	2	24	Low	Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.gw. noise) in advance; Surrounding communities must be notified in advance of noisy construction activities; All equipment should be provided with standard mufflers; Muffling units on vehicles and equipment must be kept in good working order. Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment; Where possible, operation of several equipment and machinery simultaneously must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g., no overloading of machines); Regular maintenance of equipment must be undertaken, particularly regarding lubrication; Equipment shall be switched off when not in operation; Appropriate directional and intensity settings must be maintained on all hooters and sirens; The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; and Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00).	1	1	1	2	1	9	Low
Soil, Land use and Land Capability	Localised chemical pollution of soils because of vehicle hydrocarbon spillages and compaction.	2	1	2	2	2	20	Low	Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA, or can be removed by a service provider that is qualified to clean the soil; The time in which soils are exposed during construction activities should remain as short as possible;	1	1	1	2	1	9	Low
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
	Localised loss of resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	2	2	20	Low	Erosion control measures shall be implemented where deemed necessary; In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion; Runoff from stockpiles shall be detained in order to support growth of vegetation; Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels; Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff; A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity; If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation; Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes; Topsoil stockpiles shall be monitored regularly to identify alien vegetation, which shall be removed as soon as possible to prevent further distribution of any alien vegetation.	1	1	1	1	2	9	Low
	Localised loss of soil and land capability due to reduction in nutrient status - de-nitrification and leaching due to stripping and stockpiling footprint areas.	2	1	2	2	2	20	Low		1	1	1	1	2	9	Low
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the Secondary, 357 Main Road and R64 roads as well as the farm roads around the prospecting area.	2	3	2	2	2	28	Medium Low	Local speed limits and traffic laws shall always apply to minimise the occurrences of accidents on public roads; The number of construction vehicles and trips shall be kept to a minimum; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	2	2	2	1	2	18	Low
Climate	Emissions of Green House Gases because of the use of plant, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low	All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	2	1	1	1	8	Low
Waste Management	Potential water and soil pollution because of inappropriate waste management practices.	2	3	2	2	2	28	Medium Low	Separation of waste: All waste shall be separated into general waste and hazardous waste; Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; General waste can further be separated into waste that can be recycled and or reused; No littering shall be allowed in and around the site, enough bins shall be provided for the disposal of waste; Where necessary dedicate a storage area on site for collection of construction waste. Storage of waste: No stockpiling of debris shall be permitted within 100 m of any water courses and drainage lines, or within 500 m of	2	2	2	1	2	18	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									riparian areas; General waste will be collected in an adequate number of litter bins located throughout the construction site; Bins must have lids to keep rainwater out; Bins shall be emptied regularly to prevent them from overflowing; All work areas shall be always kept clean and tidy; All waste management facilities will be maintained in good working order; Waste shall be stored in demarcated areas according to type of waste; Runoff from any area demarcated for waste will be contained, treated and reused; Flammable substances must be kept away from sources of ignition and from oxidizing agents; No construction rubble shall be disposed of to the riparian area; If construction rubble is not removed immediately, it shall be stockpiled outside the 1:100-year flood line and outside the sensitive riparian areas; Demolition waste and surplus concrete shall be disposed of responsibly; Waste shall not be buried or burned on site; and The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. Disposal of hazardous waste: No dumping shall be allowed in or near the construction site; Hazardous containers shall be disposed of at an appropriate licensed site; Hazardous waste will be removed and managed by an approved service provider; A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and The safe disposal certificate shall be stored and provided on request. Disposal of general waste: No dumping shall take place in or near the construction site; All general waste shall be disposed of to the nearest licensed landfill site; Demolition waste and builder's rubble shall be disposed of to an appropriate licensed landfill site; and The necessary permissions must be obtained to dispose of builders' rubble to the landfill site.							

13.2 Operational Phase

The operation phase of the project will include drilling of 20 RC and 10 diamond core holes. The project has potential to affect economic activities at the national park and safari due to noise, dust and visual impacts. The visitors in the safari may not frequent the business because of noise that is produced by drilling.

13.2.1 Social-Economic

It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit because of the continued boost in small local businesses. The socio-impacts expected during the operation phase include:

- Impact on the day-to-day operation by landowners in the area, which may have an impact on their livelihoods;
- Negative impacts on health and safety of the local communities resulting from additional vehicles on the roads;
- Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation; and
- Potential damage to adjacent landowners'/occupiers' infrastructure resulting from drilling activities.

13.2.2 Groundwater

The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater.

Depending on how far the drawdown spreads, this may affect the national park and safari depending on whether they use groundwater.

The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users.

Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.

13.2.3 Surface water

Drilling operations may result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The runoff containing sediments will have negative impacts on the water quality due to increase turbidity and sedimentation of water courses. This will also have an impact on aquatic habitats. The activities could potentially affect the water used by fauna from the national park and safari.

13.2.4 Aquatic Ecology

In addition to the impacts on aquatic habitats as explained above, the operation phase of the project is expected to have the following impacts on aquatic ecosystems:

- Loss of habitat and aquatic ecological structure resulting from continual disturbance and uncontrolled degradation;
- Impact on the aquatic ecological systems resulting from changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and disturbance; and
- Impact on the hydrological functioning of the aquatic ecological and riparian systems because of reduced aquatic ecosystem and riparian footprints and uncontrolled disturbance.

13.2.5 Flora

The project may result in the following impacts on the floral environment during the operation phase:

- Destruction of potential floral habitats resulting from continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation;
- Impact on floral diversity as a result of possible uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.

13.2.6 Fauna

The project may result in the following impacts on the faunal environment during the operation phase:

- Migration of fauna from the prospecting area and its vicinity such as the national park and safari due to noise as a resulting of drilling activities;
- Loss of faunal species due to collisions with vehicles and machinery;
- Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping;
- Failure to initiate a rehabilitation plan and alien control plan during the operation phase may lead to further impacts during the operation phase.

13.2.7 Soils, Land Use and Land Capability

The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.

13.2.8 Air Quality

The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery. It is expected that the implementation of dust suppressing mitigation measures will result in the reduction in nuisance dust. The movement of fauna out of the area may impact economic activities at the national park and safari since their presence generate the income that keep the businesses running.

13.2.9 Visual

The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities near the prospecting area.

13.2.10 Heritage, Archaeological Resources

The drilling operations may result in the destruction of graves and other heritage resources that may be on site.

13.2.11 Palaeontology Impacts

Earth moving activities may result in the destruction of fossils (if any).

13.2.12 Ambient Noise

The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project such as the Vaalbos National Park and the Spitskop Day Spa and Safari. The noise will affect the farm dwellers, workers, guests, hunters and the fauna in the park and safari.

13.2.13 Traffic

The movement of vehicles in the project area will result in an increase in traffic on the roads.

13.2.14 Climate

The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.

13.2.15 Vibrations

Drilling ground vibrations may result in possible damage to infrastructure and private property.

The summary of the impact assessment during the operation phase is provided in Table 13-3.

Table 13-3: Impact Assessment Table for the Operation Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency:	Significance	Significance Rating	Management and Mitigation Measures	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Socio-Economic	Operation may affect the day-to-day operation of the landowners hence result in direct impact on their livelihood.	2	1	2	2	3	25	Low	Random and regular alcohol and drug testing shall be conducted on all personnel responsible for operating machinery and driving construction vehicles to ensure the safety of the public; Drill sites shall be kept to a minimum; Landowners shall be informed of the exact location of the drill sites and shall be privy to the drilling programme, indicating the days on which each site will be drilled; and The time spent at each drill site shall be kept to a minimum.	1	1	2	1	1	8	Low
	Uncontrolled access of private property during operation may result in conflict with affected landowners and occupiers.	2	1	1	2	2	16	Low	Security and safety should be emphasized; No construction workers shall be allowed to access private properties without the owner's knowledge and consent; Access to private property and areas outside the designated operation areas shall be strictly prohibited.	1	1	1	1	1	6	Low
	Negative impact as a result of additional trucks on the roads, impacting on local communities' health and safety.	3	3	2	1	2	24	Low	Local speed limits and traffic laws shall always apply to minimise the occurrences of accidents on public roads; Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents; The number of vehicles on the roads shall be kept to a minimum; Materials transported on public roads must be covered.	1	2	1	1	1	8	Low
	Negative impact on, local community health and safety due to potential influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation.	3	3	2	1	2	24	Low	Liaise with the SAPD and existing forums to implement effective crime prevention strategies; and The applicant will ensure that as far as possible locals will be used during the operation of the prospecting project. Recruitment will not be undertaken on site.	1	2	1	1	1	8	Low
Groundwater	The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils. The material removed from the drilling exercises will contain carbonaceous material, which has a potential for pollution should it be allowed stay for a prolonged period at the drilling site.	3	2	2	2	2	28	Medium Low	Ensure that the drilling of the exploration boreholes is conducted in such a manner that the environment is protected from probable spillages and contamination. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed to a registered disposal facility e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.	2	1	2	1	2	15	Low
	Storage of hydrocarbons and chemicals, which may impact on groundwater because of spillages and uncontrolled release.	3	2	2	2	2	28	Medium Low		2	1	2	1	2	15	Low
	The prospecting operations will require the drilling of boreholes. The boreholes may result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling may leach pollutants that will result in the pollution of the surrounding groundwater regime. This may even spread beyond the backfilling site via plume migration.	2	2	2	2	2	24	Low	Ensure that the landowners' borehole yields are monitored during the drilling operation. Should it be proven that the operation is indeed affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated.	2	1	2	1	2	15	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Surface Water	The drilling operations may result in the generation of surface water runoff contaminated with drilling muds and cuttings should spillages occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the surrounding clean water environment. These will cause an increase in the turbidity and will decrease acidity of the water in the streams, which will affect the aquatic habitat, hence important habitats may be lost.	2	2	2	2	2	24	Low	No prospecting operations will be undertaken within 100 metres from the nearby steams and 500 meters from riparian areas without consent from the DWS; Sumps will be excavated for the collection mud and excess water from the drilling sites; The sumps will be sized such that they will be able to contain the water and mud that will be generated during the prospecting operation; Storm water generated around the drilling site will be diverted away to the clean water environment; No concrete mixing and vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams.	2	1	2	1	2	15	Low
Biodiversity	Continued destruction of potential floral habitats for species of conservational concern as a result continual disturbance of soils leading to altered floral habitats, erosion and sedimentation.	2	1	3	2	2	24	Low	All disturbed areas must be rehabilitated in tandem with construction activities. The collection of any plant material for firewood or medicinal purposes shall be strictly prohibited.	2	1	1	1	1	8	Low
	Impact on floral species of conservational concern as a result of an increased in alien species proliferation and ineffective rehabilitation of exposed areas	2	1	3	2	2	24	Low	The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the demarcated drill sites.	2	1	1	1	1	8	Low
	Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	2	1	3	2	2	24	Low	The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas. The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas. No trapping or hunting of fauna shall be permitted. Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat shall be strictly managed. No informal fires in the vicinity of drill sites shall be permitted. An alien vegetation control plan must be implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss. Poaching of wild animals and livestock will be prohibited.	1	1	1	1	1	6	Low
Soils Land use and Land Capability	Topsoil removal, storage and replacement during the excavation of the sumps will result. This will result in the disruption of the soils profile.	2	1	2	2	2	20	Low	Ensure that topsoil is properly stored, away from the streams and drainage areas. The soils must be used for the backfilling and rehabilitation of the sumps. The rehabilitated sump must be seeded with recommended seed mix consisting of indigenous species. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. Soil disturbance within the drill sites shall be kept to a minimum.	1	1	1	1	1	6	Low
	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e., hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	3	1	2	2	2	24	Low		2	1	1	1	1	8	Low
Air Quality	The prospecting operation will require vehicular movement which may result in Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	2	3	2	2	2	28	Medium Low	Dust suppression must be conducted during the operational phase of the project. Correct speed will be maintained at the proposed project site. Vehicle maintenance must be conducted regularly to avoid	1	1	1	1	1	6	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	2	3	2	2	2	28	Medium Low	excessive diesel fumes. Where practical possibly rehabilitation should be undertaken progressively. A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads. All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution. Dust control suppression shall be implemented on dry weather days and periods of high wind velocities; Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; Materials transported on public roads must be covered; and Where practical rehabilitation should be undertaken progressively. *Odours* Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.	1	1	1	1	1	6	Low
Visual	The drill rigs and towers used during the drilling operations will be visible from the nearby residents and properties.	2	2	3	2	3	35	Medium Low	Ensure that the time period used for the drill rigs is optimised to ensure that the drill rigs are moved from one site to another over short periods Materials transported on public roads must be covered.	1	1	1	1	1	6	Low
Heritage Resources	The drilling operation may result in the destruction of graves and any other heritage that may exist on site during operational phase of the project.	3	2	2	1	2	21	Low	Locate exploration borehole more than 50 m from the identified heritage sites.	1	1	1	1	1	6	Low
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	2	2	2	2	2	24	Low	Ensure that proper management measures as well as technical changes are undertaken to reduce the impacts on surrounding residents and employees. This include ensuring that less noisy equipment is used, that equipment is kept in good working order and that the equipment must be fitted with correct and appropriate noise abatement measures and where possible use white-noise generators instead of tonal reverse alarms on heavy vehicles operating on roads. Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.gw. noise) in advance. Surrounding communities must be notified in advance of noisy construction activities. All equipment should be provided with standard mufflers. Muffling units on vehicles and equipment must be kept in good working order. Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment. Where possible, operation of several equipment and machinery must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g., no overloading of machines); Regular maintenance of equipment must be undertaken,	1	1	1	1	1	6	Low
	Increase in ambient noise levels as a result of the drilling activities.	2	2	2	2	2	24	Low		1	1	1	1	1	6	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequency	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									particularly with regard to lubrication; Equipment shall be switched off when not in operation; Appropriate directional and intensity settings must be maintained on all hooters and sirens; The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; Adjacent landowners shall be notified in writing if work needs to be carried out after hours or if any blasting will be required; and Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 - 14H00).							
Traffic	Increase in traffic volumes as a result of pre-construction activities which may lead to an increase in traffic congestion along the Secondary, 357 and R64 roads as well as the farm roads around the prospecting area.	2	3	1	2	2	24	Low	Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; and Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents.	1	2	1	1	1	8	Low
Climate	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	2	2	2	24	Low	The number of construction vehicles and trips shall be kept to a minimum All the vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	1	1	1	1	1	6	Low
Drilling and Vibrations	Impact of drilling ground vibration on houses, boreholes and roads, resulting in possible damage to infrastructure	2	1	1	2	2	16	Low	Drill sites shall be located as far from private property as is possible. Affected property owners shall be notified of any drilling activities before commencement of the activities. Should there be damage to private property as a result of drilling activities, property owners shall be appropriately compensated.	1	1	1	1	1	6	Low
	Fly rock impact on houses, boreholes and roads, resulting in possible damage to infrastructure;	2	1	1	2	2	16	Low		1	1	1	1	1	6	Low
Waste Management		2	1	1	2	2	16	Low	*Storage of waste* General waste will be collected in an adequate number of litter bins located throughout the construction site; Bins must have lids in order to keep rainwater out; Bins shall be emptied regularly to prevent the bins from overflowing; All work areas shall be kept clean and tidy at all times; All waste management facilities will be maintained in good working order; Waste shall be stored in demarcated areas according to type of waste; Runoff from drill sites will be contained, treated and reused; Flammable substances must be kept away from sources of ignition and from oxidizing agents; No storage of waste shall be permitted within 100 m of the water courses or within 500 m of riparian areas; Demolition waste and surplus concrete shall be disposed of responsibly; Waste shall not be buried or burned on site; and The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour. *Disposal of hazardous waste* No dumping shall be allowed in or near the construction site; Hazardous containers shall be disposed of at an appropriate licensed site; Hazardous waste will be removed and managed by an approved	1	1	1	1	1	6	Low

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Probability					Consequence			Probability			
		Severity	Spatial	Duration	Frequency: Activity	Frequenc	Significa	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									service provider; A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and The safe disposal certificate shall be stored and provided on request. *Disposal of general waste* No dumping shall take place in or near the drill sites; and All general waste shall be disposed of to the nearest licensed landfill site.							

13.3 Decommissioning and Closure

It is expected that the impacts for the decommissioning and closure phases will be similar to the impacts during the construction phase and have not been assessed in detail (please refer to the construction phase assessment). The most significant impacts will be:

13.3.1 Soils and Land Capability

The rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed. However, should the rehabilitation of affected sites not be conducted properly, it may result in loss of usable soils and agricultural land, resulting in reduced land capability.

13.3.2 Land Use

Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the drilling sites.

13.3.3 Soils and Vegetation

The use of vehicles/machinery during the rehabilitation of the exploration sites may result in the compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover, soils and groundwater.

13.3.4 Surface Water and Aquatic Ecosystems

During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water courses.

13.3.5 Air Quality

Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.

13.3.6 Noise

Noise will be generated during the removal of equipment and rehabilitation of the sites. The noise is not expected to exceed occupational noise limits and will be short lived.

The summary of the impact assessment during the decommissioning and closure phase is provided in Table 13-4.

Table 13-4: Impact Assessment Table for the Decommissioning and Closure Phase

Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation						
		Consequence			Likelihood (Probability)	Frequency: Impact	Significance	Significance Rating		Consequence			Likelihood (Probability)	Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity				Management and Mitigation Measures	Severity	Spatial	Duration	Frequency Activity			
Soils, Land Capability and Land Use	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	N/A	N/A	N/A	N/A	N/A	0	N/A	Ensure that contamination of the rehabilitate area by hydrocarbon liquids is prevented. Ensure that the rehabilitation work is done in such a manner that the environment is protected from probable spillages. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the rehabilitation sites will be collected in proper receptacles and removed to registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Land Use	Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	N/A	N/A	N/A	N/A	N/A	0	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Soils and Vegetation	The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	2	1	2	2	2	20	Low		1	1	2	1	2	12	Low
Surface Water	During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation, surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	2	3	2	2	2	28	Medium Low	Ensure that water leaving the site does not have elevated silt load. Adequate stormwater management shall be conducted on site to ensure that dirty water is kept separate from clean water. Ensure that the rehabilitated areas are free draining and that water from these areas is clean.	2	1	2	2	2	20	Low
Air Quality	Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also be generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	1	3	2	2	2	24	Low	Dust suppression must be conducted during the decommissioning phase of the project whenever excessive dust is generated. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes.	1	1	1	1	2	9	Low
Noise	Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	2	1	2	2	2	20	Low	Where necessary, provide employees with ear plugs and employees must be instructed to use the ear plugs. Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.	1	1	1	1	2	9	Low

14 Impact Assessment Methodology

All the identified potential impacts were assessed according to the following Impact Assessment Methodology as described below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

The first stage of any impact assessment is the identification of potential environmental activities1, aspects2 and impacts which may occur during the commencement and implementation of a project. This is supported by the identification of receptors3 and resources4, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts5 (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 14-1. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity6, spatial scope7 and duration8 of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity9 and the frequency of the impact10 together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in

[1]An ***activity*** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.

[2]An ***environmental aspect*** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact.

[3]***Receptors*** comprise but are not limited to people or man-made structures.

[4]***Resources*** include components of the biophysical environment.

[5]***Environmental impacts*** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as residents, communities, and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.

[6]***Severity*** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.

[7]***Spatial scope*** refers to the geographical scale of the impact.

[8]***Duration*** refers to the length of time over which the stressor will cause a change in the resource or receptor.

[9]***Frequency of activity*** refers to how often the proposed activity will take place.

[10]***Frequency of impact*** refers to the frequency with which a stressor (aspect) will impact on the receptor.

Table 14-1. This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Natural and existing mitigation measures, including built-in engineering designs, are included in the pre-mitigation assessment of significance. Measures such as demolishing of infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

Table 14-1: Criteria for Assessing Significance of Impacts

SEVERITY OF IMPACT	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

SPATIAL SCOPE OF IMPACT	RATING
Activity specific	1
Project area specific (within the prospecting area boundary)	2
Local area (within 5 km of the mine boundary)	3
Regional (Municipal area)	4
National	5

DURATION OF IMPACT	RATING
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

CONSEQUENCE

FREQUENCY OF ACTIVITY / DURATION OF ASPECT	RATING
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

FREQUENCY OF IMPACT	RATING
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

LIKELIHOOD

Consequence

Likelihood														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	20	30	40	50	60	70	80	90	100	110	120	1	140	150

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

15 Positive and Negative Impacts

The impacts of the proposed site layout will be the same as those of the alternative sites that may be identified during the prospecting exercise. The alternative sites will be identified based on the location of sensitive environments such as heritage sites (graves etc.), aquatic ecosystems, riparian zones, and areas with Red Data Species. Changes in the layout plan will be discussed and agreed on with the affected landowners.

The positive impacts of the activities are the creation of employment, which is required in the region. Should adequate diamonds be found in the project area, Manzhanga will be able to mine the available reserves. This will result in job creation and support to local businesses is continued. Manzhanga expects that substantial benefits from the project (should adequate reserves be found and confirmed) will accrue to the immediate project area, the sub-region and the province of the Northern Cape.

Diamond mining in South Africa is of important economic value. This prospecting activity has a potential to decrease level of unemployment rate in proposed areas and surroundings. This prospecting activity will bring revenue into the city and the province which will in turn boost the economy of the country.

The proposed activities have medium to low significance impacts, which will be short term activities in nature. The probability of occurrence of an impact was determined and most of the activities can be controlled and impacts can be reduced or avoided. The probability was also determined based on other prospecting activities of similar nature. It was found that generally prospecting activities have low impact on the environment.

Please refer to Section 13 for a comprehensive impact assessment.

16 The possible mitigation measures that could be applied and the level of risk.

Please refer to Section 13 for the management and mitigation measures.

17 Motivation where no alternative sites were considered.

As discussed previously, the site is in an area where there is potential for diamond mineralisation due to the geology of the area. The site is therefore regarded as the preferred site and alternatives sites are not considered. The alternative drill sites will be identified based on the location of sensitive environments such as heritage sites (graves etc.), aquatic ecosystems, riparian zones, and areas with Red Data Species. Changes in the layout plan will be discussed and agreed on with the affected landowners.

18 Statement motivating the alternative development location within the overall site. (Provide a statement motivating the final site layout that is proposed)

The location and extent of the prospecting activities will be based on the information derived from the desktop surveys as well as stakeholder consultation process. Where practicable, the drilling sites and location of infrastructure will be selected to avoid sensitive environments such as aquatic ecosystems, riparian areas, watercourses, biodiversity of conservation importance and heritage features.

18.1 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

To identify the potential impacts associated with the proposed prospecting activities, the following steps were undertaken:

- The stakeholder consultation process is currently being undertaken in a manner to be interactive, providing the landowners and identified stakeholders with an opportunity to provide input into the project. This is considered a key focus as the residents have capabilities of providing site-specific information, which may not be available in desktop research material. Stakeholders were requested, as part of the notification letter, to provide their views on the project, and to state any potential concerns they may have. All comments and responses provide will be collated into the Comments and Responses Register, which will be attached to the final BAR, and will also be incorporated into the final impact assessment.
- A detailed desktop study was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations, various resources were used to

determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:

- The South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS System;
- The Municipal Integrated Development Plan for the Sol Plaatje Local Municipality; and
- The Spatial Development Framework for the Frances Baard District Municipality.

The rating of the identified impacts was undertaken in a quantitative manner as provided in Section 11 (impact rating). The ratings were undertaken in a manner to calculate the significance of each of the impacts. The identification of management and mitigation measures was done based on the significance of the impacts and measures included are considered sufficient, appropriate and practical to protect the environment.

19 Assessment of each identified potentially significant impact and risk

Table 19-1: Assessment of each identified potentially significant impact and risk

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Data Collection and Assessment	Desktop Study	None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Geological Mapping		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Planning for Drilling Surveys		None	N/A	Planning	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	N/A
Access Roads	Physical surveying of the site, access roads and pegging of drilling boreholes	None	N/A	N/A	N/A	Rehabilitation of areas cleared of vegetation and dust control	Low
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Medium Low	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	N/A	Monitoring through rehabilitation and management of spoil sites	Low
Fence		None	N/A	Construction	N/A	Control of access to aquatic ecosystems and riparian habitat areas and within the regulated 500 m buffer.	Low
Hydrocarbon storage area		None	N/A	Construction	N/A	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Low
Mobile office		None	N/A	Construction	N/A	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low
Mobile ablution facility		Loss of natural vegetation in the affected areas	Flora	Construction	Medium Low	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Low
Ablution Facility		Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Low	Relocation of affected species of conservation importance	Low
Vehicle parking area		Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Low	Dust control measures	Low
		Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		Visual impacts as a result of vegetation clearance	Visual	Construction	Low	Rehabilitation of areas cleared of vegetation	Low
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socio-economic	Construction	Medium Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Low	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Low
RC and Diamond Core Drilling	Drilling and Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Socio-Economic	Operation	Low	Control of times during which operation activities will take place	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Groundwater	Operation	Medium Low	Rehabilitation of affected areas and control using bunds	Low
		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation will have negative impacts on the water quality due to increase turbidity in the watercourses. This will have an impact on aquatic habitats.	Surface Water	Operation	Low	Control through management and monitoring of surface runoff	Low
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Soils Land use and Land Capability	Operation	Low	Rehabilitation of affected areas	Low
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Air Quality	Operation	Medium Low	Dust control measures	Low
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Medium Low	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Low
		The drilling operations may result in the destruction of graves and other heritage resources that may exist on site.	Heritage Resources	Operation	Low	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
						heritage sites	
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Low	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Low
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Low
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Low	Speed control and limitation of the times when construction vehicles may be on the roads	Low
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Low	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Low
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Low	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Low
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A	N/A
Borehole capping Removal of equipment and infrastructure	Closure and Rehabilitation of borehole and infrastructure sites	The rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	N/A	N/A
		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the drilling sites.	Land Use	Decommissioning and Closure	N/A	N/A	N/A
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Low	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Low
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Medium Low	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Low

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also generate diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Air Quality	Decommissioning and Closure	Low	Dust control measures and rehabilitation of areas stripped of vegetation	Low
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Noise	Decommissioning and Closure	Low	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Low

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked Appendix

Please refer to Appendix 5.

20 Summary of specialist reports.

No specialist studies were conducted as part of this application. Desktop information was used to compile the report and to conduct the impact assessment.

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
No specialist studies have been undertaken	N/A. Specialist studies will be undertaken during the mining right application process.	N/A	N/A

Attach copies of Specialist Reports as appendices (N/A)

21 Environmental impact statement

21.1 Summary of the key findings of the environmental impact assessment;

During the proposed prospecting operation impacts may occur on soils, natural vegetation, surface water, groundwater, sensitive landscapes, air quality, noise, visual aspects, and sites of archaeological and cultural importance should the EMPr not be adhered to.

Manzhanga will undertake measures to ensure that the identified impacts are minimised. Assessment of the impacts with the proposed mitigation measures has shown the significance of the impacts on all affected environmental aspects to be reduced from medium and low to low and negligible significance.

Land use will not change. Landowners and land occupiers within the proposed project area may be affected although on a temporary basis due to the need to access the sites. Measures such as safety along the roads and dust suppression will be undertaken to ensure that the impacts on the landowners and land occupiers are minimised.

The national park and safari may be impacted by noise caused by drilling activities, and this may lead to faunal movement from these areas. Guests in the safari may be unsettled due to the noise coming from the drilling lsite.

Storm water runoff from the dirty water areas of the drilling sites, may have a detrimental impact on the surrounding water environment should this water be released to the environment. To prevent the occurrence of the above-mentioned impacts, dirty water collection sump will be used to collect all dirty water from the drilling site. The water collected from the sump will be re-used, evaporated and the sump will be rehabilitated once the drilling is finished. Sediments will be created from the site during the construction, operational and decommissioning phase, which may impact negatively on the surrounding water environment. The sediments will be treated should they contain hydrocarbon waste.

The employees will undergo training and will be given strict instruction not to undertake activities that will affect the environment and that may have an impact on the landowners. Waste generated from the site will be collected in proper receptacles and disposed of in registered waste disposal sites.

Key findings of the environmental impact assessment include:

- All the identified impacts will be localised, short term and will have a medium and low significance. The significance of potential environmental impacts can be reduced to low and very low significance with implementation of mitigation measures and monitoring.
- Cumulative noise, visual and air quality (dust) impacts are deemed to not be significant (low) when proper mitigation measures are implemented.
- Vegetation loss is unavoidable during the construction phase of the project. This will however be limited to the footprint of the infrastructure (boreholes). Care must be taken to manage any species of special concern as well as the proliferation of alien invasive plant species.

21.2 Final Site Map

Please refer to Appendix 6 for the preliminary site map which includes the environmental sensitive areas.

The final map showing the layout of the proposed project will be submitted to the DMR on granting of the prospecting right. The map will be developed to superimpose the proposed prospecting project and associated infrastructure together with the environmentally sensitive areas such as heritage sites,

wetland and riparian areas, water courses and Red Data Listed floral species within the proposed project site.

21.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

The proposed activities have medium and low significance and will be short term activities. The probability of occurrence of an impact was determined and most of these activities can be controlled and impacts can be reduced or avoided. Generally prospecting activities have low impact on the environment. The planned activities negative impacts can be controlled and avoided or minimised. Mitigation measures will be used to manage and control any potential impact. The main impacts will include:

- Increased ambient noise levels resulting from drilling activities and increased traffic movement;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on the water resources utilised by the communities and landowners;
- Potential water and soil pollution resulting from hydrocarbon spills and soil erosion which may impact on ecosystem functioning;
- Increased vehicle activity within the area resulting in potential destruction and disturbance of flora and fauna;
- Poor access control to farms may impact on cattle movement, breeding and grazing practices;
- Influx of job seekers to site may result in increased opportunistic crimes;
- Potential visual impacts by drilling activities as well as vegetation clearance;
- Prospecting will be undertaken by special sub-contractors, and it is not anticipated that employment opportunities for local and/or regional communities will result from prospecting activities; and
- Short term boost for local businesses.

22 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

The objectives of the EMPr will be to:

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts;
- Provide sufficient information and guidance to plan the prospecting activities in a manner that will reduce impacts (social, physical, and biological) as far as is practically possible;
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance; and
- Provide a management plan that is effective and practical for implementation.

Through the implementation of the identified proposed mitigation measures, it is anticipated that the identified impacts can be managed and mitigated effectively. All the impacts were assessed to have significance ranging between medium and low without the implementation of mitigation measures. All the identified impacts will have a reduced significance of low when the mitigation measures have been implemented.

23 Aspects for inclusion as conditions of Authorisation.

The following conditions should be included in the Environmental Authorisation:

- A minimum distance of 100 m from any dwellings or infrastructure must be kept;
- Landowners as well as land occupiers must be re-consulted at least 30 days prior to any prospecting activities undertaken on their properties;
- A map detailing the drilling locations should be submitted to the relevant landowners, the DWS and DMR prior to the commencement of the prospecting activities;
- No activities may be undertaken within 500 m of riparian areas/wetland areas and/or within 100 m of watercourses without approval from the DWS;
- No relocation or destruction of heritage resources may be undertaken without the approval of SAHRA; and
- Heritage Impact Assessment must be undertaken where infrastructure and drilling sites will be located, prior to commencement of the prospecting activities.

24 Description of any assumptions, uncertainties and gaps in knowledge.

The following assumptions, uncertainties and gaps are applicable to this project:

- The Stakeholder Consultation is not yet complete. The Draft BAR will be updated once the 30-day public review and comment period has lapsed. Comments from the stakeholders will be incorporated into the Final BAR to be submitted to the DMR;
- Details on the Water Use Licence requirements are not available;
- No Heritage Impact Assessment was undertaken therefore details on the SAHRA permit requirement are not available;
- No wetland/riparian area delineation was undertaken;
- No detailed site layout is currently available due to the nature of the prospecting activities. The impact assessment was undertaken as a holistic assessment for the overall site.

25 Reasoned opinion as to whether the proposed activity should or should not be authorised

25.1 Reasons why the activity should be authorized or not.

It is the considered opinion of the EAP that the activity may be authorised. The proposed prospecting area that Manzhanga identified is in an area underlain by Archaean age rocks which also include a variety of Cenozoic sediments and intrusive rocks. The dolerite occurs widely spread as dykes, sills and funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies which occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. Other rock types in the study area are calcrete and sand. The site is therefore regarded as the preferred site and alternatives are not considered.

The option of not approving the activities will result in a significant loss of valuable information regarding the mineral status (in terms of diamond), present on the identified properties. In addition, should economical reserved be present and the applicant does not have the opportunity to prospect the opportunity to utilize these reserves for future phases will be lost.

According to the impact assessment undertaken for the proposed project, the impacts of the project considered medium and low significance. The significance of the impacts can be reduced to low and very low when the mitigation measures are implemented.

The project will also have positive impacts due to the employment to be created although for a short term, as well as a short boost to local businesses.

The stakeholders will also be requested for their comments. All comments to be received during Public Participation Process will be included in this BAR and EMPr. These comments will be addressed the as far as possible to the satisfaction of the interested and affected parties.

The management of the impacts identified in the impact assessment for all phases of the proposed project will be undertaken through a range of programmes and plans contained in the EMPr. In consideration of the layout plan and the management and mitigation measures contained within the EMPr compiled for the project, which are expected to be effectively implemented, there will be significant reduction in the significance of potential impacts.

25.2 Conditions that must be included in the authorisation

See Section 23 of the BAR.

26 Period for which the Environmental Authorisation is required.

The prospecting right has been applied for a period of two (2) years. The Environmental Authorisation should therefore allow for 2 years of prospecting.

27 Undertaking

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme report.

An undertaking by the EAP and the client is provided in Section 41 of the EMPr.

28 Financial Provision

Work will be carried out by the contractors and consultant. The closure costs were calculated to be R160 533.00 as shown in Table 28-1.

Table 28-1: Cost Estimate Expenditure

0		CALCULATION OF THE QUANTUM				
Applicant:	**Manzhanga Investments (Pty) Ltd**	**DMR Ref No:**		**NC30/5/1/1/2/12871PR**		
Evaluators:	**Ndi Geological Consulting Service (Pty) Ltd**	**Date:**		**2021/08/23**		

No.	Description	Unit	A Quantity	B Master Rate	C Multiplicatio factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and pow erlines)	m3	0	**17.32**	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	**241.33**	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	**355.65**	1	1	0
3	Rehabilitation of access roads	m2	1000	**43.19**	1	1	43190
4 (A)	Demolition and rehabilitation of electrified railw ay lines	m	0	**419.16**	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railw ay lines	m	0	**228.63**	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	**482.67**	1	1	0
6	**Opencast rehabilitation including final voids and ramps**	**ha**	**0**	**245652**	**0.52**	**1**	**0**
7	Sealing of shafts adits and inclines	m3	0	**129.56**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0	**168679.35**	1	1	0
8 (B)	Rehabilitation of processing w aste deposits and evaporation ponds (non-polluting potential)	ha	0	**210087.08**	1	1	0
8 (C)	Rehabilitation of processing w aste deposits and evaporation ponds (polluting potential)	ha	0	**610192.47**	1	1	0
9	Rehabilitation of subsided areas	ha	0	**141243.55**	1	1	0
10	General surface rehabilitation	ha	0.4	**133622.5**	1	1	53449
11	River diversions	ha	0	**133622.5**	1	1	0
12	Fencing	m	0	**152.42**	1	1	0
13	Water management	ha	0	**50807.03**	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	1	**17782.46**	1	1	17782.46
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		114421.46

1	Preliminary and General (12.0% of Subtotal 2)	13730.5752	**weighting factor 2** 1	13730.5752
2	Contingencies (10.0% of Subtotal 2)	11442.146		11442.146
			Subtotal 2	139594.18
			VAT (15%)	20939.13
			Grand Total	**160533**

28.1 Explain how the aforesaid amount was derived.

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The “Guideline Document for the Evaluation of Financial Provision made by the Mining Industry” was developed by the DMR in January 2005 to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure of mining sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

28.2 Confirm that this amount can be provided for from operating expenditure.

The amount required to cover the rehabilitation is estimated to **be R160 533.00** at this stage. Manzhanga will fund the operation.

The applicant hereby confirms that the amount is anticipated to be an operating cost and is provided for as such in the Prospecting Work Programme.

29 Specific Information required by the competent Authority

29.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the: -

29.1.1 Impact on the socio-economic conditions of any directly affected person.

No specific report was generated for the purposes of the socio-economic conditions. Current land uses inside the prospecting area, such as grazing and farming, may be temporarily impacted through the presence of the fenced areas that drill rigs will operate within. These will, however, be small areas. These areas will be rehabilitated post drilling activities and the areas will once again become available for grazing. Other potential socio-economic impacts will include:

- Nuisance noise due to on site activities and drilling;
- Poor access control resulting in impacts on cattle movement, breeding and grazing practises;
- Influx of job seekers to site, which may result in an increase in opportunistic crime;
- Uncontrolled access to private property outside of the demarcated boundaries; and
- Visual impact as a result of the vegetation clearance.

Prospecting will be undertaken by specialist sub-contractors, and it is not anticipated that employment opportunities for local and/or regional communities will result from the prospecting activities during the drilling phases.

Management and mitigation measures must be implemented to prevent environmental pollution which may impact on environmental resources utilised by communities, landowners and other stakeholders. Measures to manage the potential impacts on communities, individuals or competing land uses in close proximity include;

Noise due to construction activities and drilling:

- Directly affected and adjacent landowners and land occupiers must be informed of the planned dates of the drilling activities and a grievance lodging mechanism must be made available to the stakeholders.
- Site activities shall be concluded during daytime hours (07:00 to 17:30), to avoid night-time noise disturbances and night-time collisions with fauna.

Poor access control resulting in impacts on cattle movement, breeding and grazing practices:

- Access control procedures must be agreed on with the farm owners and all on site personnel shall be trained on these procedures.

Influx of job seekers to the site which may result in increased opportunistic crime:

- Casual labour shall not be recruited at the site. This will eliminate the incentive for people to travel to site seeking employment. Where necessary, a recruitment centre may be established in the major town areas;
- The landowners shall be notified on unauthorised persons encountered on site; and
- Where necessary, the South African Police Service (SAPS) will be notified of unauthorised persons encountered on site.

Visual Impact:

- Wet dust suppression will be undertaken to manage nuisance dust from construction vehicle movements and other construction activities as and when necessary;
- The portable ablution facilities and any other infrastructure will be acquired with a consideration for colour. Natural earth, green and mat black options which blend with the surrounding must be favoured;
- A waste management system will be implemented, and sufficient waste bins will be provided for on site. A fine system must be implements to further prohibit littering and poor housekeeping practices; and
- Vegetation cover shall be used where drill rigs will be located to minimise visual impacts.

29.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

As outlined in Section 7 of this report, prospecting will be undertaken in phases. The first phase will be a desktop study, which will be followed by geological mapping.

Based on the outcome of the desktop studies activities and geological mapping, drill sites will be determined. Potential heritage impacts will only occur once the drilling sites have been identified. It is therefore recommended that the HIA be undertaken prior to the commencement of the drilling activities, and that the HIA be conducted over the identified localised drill sites and access routes, as opposed to the entire exploration area.

This recommendation will be submitted to the SAHRA for approval.

29.3 Other matters required in terms of sections 24(4)(a) and (b) of the Act.

The proposed prospecting area is underlain by Archaean age rocks which also include a variety of Cenozoic sediments and intrusive rocks. The dolerite occurs widely spread as dykes, sills and

funnel shaped bodies. Early Jurassic age igneous intrusions are abundant in the area. The intrusions are generally referred to loosely as dolerite, but the actual rock type varies which occur in the form of dykes and sills and are composed primarily of plagioclase feldspar ad pyroxene. Other rock types in the study area are calcrete and sand. The site is therefore regarded as the preferred site and alternatives are not considered.

The location of the infrastructure will be determined based on the location of the prospecting activities, which will only be determined during Phase 1 of the Prospecting Works Programme, as well as the presence of sensitive environmental attributes such as wetlands, watercourses, protected flora and graves. All infrastructure will be temporary and/or mobile (Refer to Section 7.6) of this report).

In addition, the proposed technologies have been chosen based on long term proven success in prospecting.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

30 Draft environmental management programme.

30.1 Details of the EAP

Details of the EAP are included in Part A Section 3

30.2 Description of the Aspects of the Activity

The EAP hereby confirms that the requirement to describe the aspects of the activity that are covered by the draft Environmental Management Programme is already included in Part A, Section 11 of this report as required.

30.3 Composite Map

Please refer to Appendix 7 for the composite map. No specific heritage sites have been identified and therefore have not been included in the preliminary composite map. The composite map will be updated once all the sensitive environmental sites have been identified. The current composite map includes red flag areas which include the following:

- Water Course and 100m regulated buffer area;
- Wetlands and regulated 500m areas;
- CBAs and ESAs; and
- Protected Areas.

31 Description of Impact management objectives including management statements

31.1 Determination of closure objectives.

As previously mentioned, each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the findings from Phase 1, Phase 2 will be initiated. The location and extent of the drill sites can therefore not be determined at this stage of the process.

The rehabilitation plan was developed on the basis that the rehabilitated areas will be made safe, stable, non-polluting and will be able to support self-sustaining ecosystems, like surrounding natural ecosystems.

To ensure that the rehabilitation plan is aligned with the closure objective, high-level risk assessment of the prospecting components was undertaken to establish the potential risks associated with therewith.

The closure objectives are to:

- Eliminate any safety risks associated with drill holes and sump through adequate drill hole capping and backfilling;
- Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To establish rehabilitated areas to a state which with no susceptible to soil erosion which may result in loss of soil, pollution of water resources;
- Restore disturbed areas and re-vegetate these areas with plant species naturally occurring in the area to restore the ecological function of the affected areas as far as practicable; and
- Eliminate all alien invasive plant species from the disturbed areas.

32 Volumes and rate of water use required for the operation.

The rates and volumes of water to be used are not available at this stage.

33 Has a water use licence has been applied for?

It is anticipated that discussions will be held with the DWS to determine whether abstraction of water will be required. Based on the outcomes of the discussions with the DWS, any potential abstraction of water due to drilling activities will be clarified. At this stage it is not anticipated that abstraction will be required.

Water will be used for dust suppression purposes, consumption by field staff as well as for 10 diamond core drilling holes. Furthermore, depending on the DWS opinion, Section 21 (c) and (i) WUL may not be required. This will also be clarified with the DWS. Should it be deemed necessary, on instruction by the DWS, the applicant will submit a water use licence application.

34 Impacts to be mitigated in their respective phases

Table 34-1: Environmental Management Programme for the proposed Manzhanga Prospecting project

NAME OF ACTIVITY		PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Data Collection and Assessment	Desktop Study	Planning	N/A	N/A	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Throughout the planning phase
Geological Mapping			N/A	N/A		
Planning for Drilling Surveys			N/A	N/A		
Access Roads	Physical surveying of the site and pegging of drilling boreholes	Construction	1000m^2	<u>Loss of soils, erosion of the soils and impacts on landowner's livelihood:</u> No soil stripping will be allowed during site establishment; Should it be necessary to conduct geophysical surveys and geological mapping, ensure minimal disturbance of soil; Any activity that may result into the disturbance of the soils must be rehabilitated immediately on discovery; Machinery to be used for the operation will be of good working conditions; Any hydrocarbon spill from the site establishment will be remediated as soon as possible; Use sites that are unused and that are in the degraded state for the proposed development. This must be done in agreement with the landowner. The siting of the boreholes must be conducted such that rocky ridges, sensitive grass lands, indigenous trees and shrubs, sites of geological importance and farmlands actively used for crop farming are avoided; Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEMWA, or can be removed by a service provider that is qualified to clean the soil; The time in which soils are exposed during construction activities should remain as short as possible; Erosion control measures shall be implemented where deemed necessary; In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised; Institute adequate sedimentation control measures where necessary when excavation or disturbance of the riverbanks takes place; The time in which soils are exposed during construction activities; If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion and resulting in the increase in turbidity; Runoff from stockpiles shall be detained in order to support growth of vegetation; Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels; Vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff; A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity; If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation; Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes; <u>Loss of natural vegetation in the affected areas</u>: Use sites with most disturbed vegetation cover for the development; No strip of topsoil and vegetation will be allowed during site establishment; Ensure minimal disturbance of vegetation when conducting geophysical surveys and geological mapping; Use existing track and roads in all instances as far as is practicable; As part of the drilling programme, no tracks will be cleared for once-off access to	Implementation of mitigation measures will ensure that the activities in the development of the prospecting sites and associated infrastructure do not have detrimental impacts on the soils, land use and land capability. The implementation of mitigation measures will ensure that the establishment of the prospecting site and associated infrastructure/equipment do not have detrimental impact on the	During the construction phase
Drill Sites			Total 20 RC and 10 Diamond core drilling sites with a total footprint of 0.2ha			
Temporary Soil Storage Area			0.01ha			
Fence			N/A			
Hydrocarbon storage area			N/A			
Mobile office			N/A			
Vehicle parking			0.002ha			
Ablution Facility			0.01ha			

				sampling sites; Avoid significant vegetation such as trees and large shrubs in the event that driving through the veld is required to access an identified sampling site; Any area that may result into the disturbance of the vegetation cover must be rehabilitated immediately on discovery; The Contractor shall be on the lookout for SCC and any floral SCC encountered within the development footprint, are to be relocated to areas with suitable habitat outside the disturbance footprint; Floral species of conservation concern, if encountered within the development footprint, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist; The proposed development footprint shall be kept to the minimum; All disturbed areas must be concurrently rehabilitated during construction; Prohibit the collection of any plant material for firewood or medicinal purposes; The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas; Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area; All sensitive open space areas will be demarcated and access into these areas shall be prohibited; Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities; Construction vehicles shall only be allowed on designated roadways to limit the ecological footprint of the project; Implementation of an Alien Invasive Plant Species Management plan; Edge effects of activities including erosion and alien/ weed control will be strictly managed in the affected areas; All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants; Exotic or invasive plants shall be controlled as they emerge; An alien vegetation control program must be developed and implemented within all disturbed areas;	area's flora, in particular indigenous species and species that are of conservation importance.	
				<u>Migration of animal life due to disturbance caused proposed project:</u> The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; Site activities will be conducted during daytime hours 07h00 – 17h30 to avoid night-time noise disturbances and night-time collisions with fauna; Vehicle speed will be reduced, particularly in highly vegetated areas to avoid deaths by vehicle impacts; No trapping or hunting of fauna shall be permitted; Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed; Should any faunal SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist; No informal fires in the vicinity of construction areas shall be permitted; An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss; Poaching will be prohibited at the prospecting site;	Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	
				<u>Deterioration of water quality in in the nearby streams and within the groundwater regime</u>: No site establishment shall be permitted within sensitive landscapes; No construction activities shall be permitted within 100 meters of water courses and/or drainage lines and within 500 m of riparian zones without consent from the DWS; Avoid stripping of areas within the construction sites; Rehabilitate areas that may have been mistakenly stripped; Storm water upslope of the campsite and drill sites should be diverted around these sites; Proper waste management facilities will be put in place at the campsite and drilling site.	Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in	

				Any hydrocarbon spill from the site establishment will be remediated as soon as possible; No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, will be clearly demarcated and will not be allowed to contaminate any surface runoff; Sufficient areas shall be provided for the maintenance and washing of vehicles; Refuelling of vehicles will only be allowed in designated areas; All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is used for some time; On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material; Bunded areas shall contain 110% of the stored volume; Bund areas must be impermeable; Bund area must have a facility such as a valve/sump to drain or remove clean stormwater, Contaminated water shall be pumped into a container for removal by an approved service provider; Regular inspections shall be carried out to ensure the integrity of the bund walls; All preventative servicing of earth moving equipment and construction vehicles shall conducted off site; Runoff from this area shall be contained; Spill kits shall be made available, and all personnel shall be trained, and training records shall be made available on request; Ensure that topsoil is properly stored, away from the streams and drainage areas; Vehicle and personnel movement within watercourses and riparian areas shall be strictly prohibited; Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses from dirty water;	Compliance with the regulations under the GN704.	
				<u>Water abstraction:</u> Any abstraction of water for construction purposes must be approved by DWS’	Water abstraction will not be permitted unless authorisation is granted by DWS. Obtain all necessary authorisations in terms of Section 21 of the National Water Act (No.36 of 1998).	
				<u>Riparian and Aquatic Ecosystem Ecology destruction and loss of habitat:</u> Construction activities will be limited to be more than 500 m from the edge of the riparian areas without consent from the DWS; Adequate stormwater management must be incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system; No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; All disturbed areas shall be re-vegetated with indigenous species; All construction materials shall be kept out of the riparian areas; All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystem;	Implementation of mitigation measures will assist with maintaining the current state of the sensitive landscapes within the project area and will enable the project to comply with the requirements of the NWA	
				<u>Air pollution through air pollutants’ emissions, from the construction site</u>: Wet suppression using will be conducted at areas with excessive dust emissions; Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; Rehabilitation of disturbed areas shall be undertaken in tandem with construction activities; A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads; All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air	With the implementation of the mitigation measures, the construction will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.	

				pollution; Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; Odours: Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer; All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency; Traffic will be restricted to demarcated areas and traffic volumes and speeds within the construction site will be controlled; <u>Increased nuisance noise levels:</u> The maximum speed limit shall be limited to 40 km/hr subject to risk assessment; Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures; Ensure that the employees are issued with earplugs and that they are instructed to use them; Educate employees on the dangers of hearing loss due to mine machinery noise; Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.g., noise) in advance; Surrounding communities must be notified in advance of noisy construction activities; All equipment should be provided with standard mufflers; Muffling units on vehicles and equipment must be kept in good working order; Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment; Where possible, operation of several equipment and machinery must be avoided; All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; Equipment must be operated within specifications and capacity (e.g., no overloading of machines); Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; Equipment must be operated in such a way that the equipment is operated throughout the working periods instead of operating several items simultaneously; Equipment shall be switched off when not in operation; Appropriate directional and intensity settings must be maintained on all hooters and sirens; The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; Adjacent landowners shall be notified in writing if work needs to be carried out after hours; Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 18H00 and Saturday 07H00 -14H00); <u>Visual impacts on the surrounding communities and road users from the construction:</u> The landowners will be informed on the type of machinery and equipment to be used at the prospecting sites; Lighting will be conducted in a manner that will reduce the impacts on visual aspects at night times; The number of construction vehicles and machinery to be used shall be kept to a minimum; Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents; Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum; <u>Damage or destruction of sites with archaeological and cultural significance</u>: Prior to the site establishment, a heritage impact assessment must be undertaken and mitigation and /or management measures for the protection of such resources must be	The mitigation measures ensure that the noise levels from the construction sites will be managed, and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the prospecting staff and surrounding communities/landowners. Measures will be undertaken to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives and ensure that all operations during the construction phase do not result in detrimental visual impacts on surrounding properties, communities and road users. The construction will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and	

				implemented If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made; The establishment of the sites will be away from any identified grave site or heritage sites. A buffer of 50 m will be created between the sites and the proposed camp and drilling sites; <u>Impact from the influx of job seekers and employment of farm labourers:</u> Recruitment will not be undertaken on site; Recruitment process shall favour locals, but farm labourers will not be employed unless agreed to with the farm owners; Where required, liaise with the SAPD to ensure safety of landowners in the areas; <u>Waste Management:</u> *Separation of waste* All waste shall be separated into general waste and hazardous waste; Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; General waste can further be separated in waste that can be recycled and or reused; No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste; Where necessary dedicate a storage area on site for collection of construction waste. *Storage of waste:* No stockpiling of material shall be permitted within 100 m of water courses and/or drainage lines, or within 500 m of riparian areas; General waste will be collected in an adequate number of litter bins located throughout the construction site Bins shall be located no more than 50 m from construction sites; Bins must have lids in order to keep rainwater out; Bins shall be emptied regularly to prevent the bins from overflowing; All work areas shall be kept clean and tidy at all times; All waste management facilities will be maintained in good working order; Waste shall be stored in demarcated areas according to type of waste; Runoff from any area demarcated for waste will be contained, treated and reused; Flammable substances must be kept away from sources of ignition and from oxidizing agents; Waste shall not be buried or burned on site; and The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour; *Disposal of hazardous waste:* No dumping shall be allowed in or near the construction site; Hazardous containers shall be disposed of at an appropriate licensed site; Hazardous waste will be removed and managed by an approved service provider; A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and The safe disposal certificate shall be stored and provided on request; Disposal of general waste: No dumping shall take place in or near the construction site; All general waste shall be disposed of to the nearest licensed landfill site; Demolition waste and builder's rubble shall be disposed of to an appropriate licensed landfill site; and The necessary permissions must be obtained to dispose of waste to a registered landfill site; <u>Traffic:</u> Where existing public roads are used to access the construction areas, adequate construction signage is in place to inform the public of increased construction activities in the affected areas by placing adequate signage; Traffic signs should warn community road users of the presence of construction vehicles;	recommendations from the specialist. The mitigation measures will ensure that the construction activities do not have detrimental impacts on the heritage sites The identified mitigation measures will result in minimal influx of job seekers to the site The mitigation measures will result in reduced the amounts of waste produced, will encourage re-use of material where possible and recycling of the material where possible. Disposal will be utilised as the last resort. The mitigation measures will also ensure that the management of waste will be in accordance with the National Environmental Management: Waste Act, 2008 (Act 51 of 2008) Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow-moving vehicles.	

				Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents; The number of construction vehicles and trips shall be kept to a minimum Materials transported on public roads must be covered.		
RC and Diamond Core Drilling	Drilling and Sampling	Operation	30 Boreholes	<u>Soil profile disruption, contamination of soils, destruction of natural vegetation and loss of land use:</u> The drilling of the exploration boreholes will be undertaken in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material. All boreholes and sumps will be rehabilitated to pre-drilling conditions. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the drilling sites and the campsite will be collected in proper receptacles and removed top registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. No topsoil shall be stored within 100 m of water courses and drainage lines or within 500 m of d riparian areas. The soils must be used for the backfilling and rehabilitation of the sumps. The rehabilitated sump must be seeded with recommended seed mix. <u>Migration of animal life due to disturbance caused proposed project:</u> Where possible drill sites shall be located within degraded environments. Poaching will be prohibited at the prospecting sites. <u>The drilling operation and use of campsite may result in the generation of surface water runoff contaminated with silt (sedimentation) and possibly hydrocarbon fluids should</u>	The implementation of the mitigation measures will ensure that the land use and capability of the sites where the operations will be undertaken will continue after the proposed project. Maintenance of the current status on animal life within the project area.	Upon cessation of the individual activity Throughout the operation phase

				spillages occur: No prospecting operations will be undertaken within 100 metres from the nearby steams and 500 meters from the riparian areas. Sumps will be excavated for the collection mud and excess water from the drilling sites. The sump will be sized such that it will be able to contain the water and mud that will be generated during the prospecting operation. Storm water generated around the drilling site will be diverted away to the clean water environment. No vehicle maintenance will be allowed on site. All hydrocarbons will be stored on protected storage areas away from the streams. The drilling of the exploration boreholes will be undertaken done in such a manner that the environment is protected from probable spillages and contamination by carbonaceous material. Tarpaulins will be placed on the ground to prevent oil, grease, hydraulic fluid and diesel spills during emergency repairs. All oil spills will be remedied using approved methodologies. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. The landowners' borehole water quality and yield will be closely monitored during the drilling operation. Should it be proven that the operation is affecting the quantity and quality of groundwater available to users and surrounding water resources, the affected parties must be compensated. All boreholes and sumps will be rehabilitated to pre-drilling conditions. All waste generated from the drilling sires and the campsite will be collected in proper receptacles and removed to a registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. The contaminated soils will be removed and disposed of at a licensed waste disposal facility. All waste generated from the drilling sires and the campsite will be collected in proper receptacles and removed top registered disposal facilities e.g., sewage treatment plant, sold waste disposal site or hydrocarbon recycling or treatment facilities. Generation of dust and fuel fumes by vehicular movement:	The mitigation measures will ensure that the drilling operation does not have detrimental impacts on the surface and ground water environment, and that the activities will comply with the provisions of the NWA.	
				Dust suppression must be conducted during the operational phase of the project. Vehicle maintenance must be conducted regularly to avoid excessive diesel fumes. Maintain a speed limit of 20km/hr during the dry season and or when the wind velocity is likely to result in an increased nuisance dust. Materials transported on public roads must be covered.	The air quality in the vicinity of the drilling sites and sites' access routes will be maintained to stay within the national air quality standards.	
				Increased noise levels: Limit the maximum speed to 40 km/h or less, subject to risk assessment. Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures. Ensure that the employees are issued with earplugs and that they are instructed to use them. Educate employees on the dangers of hearing loss due to mine machinery noise. Drill sites shall be located as far from private property as is possible to minimise noise impacts	The mitigation measures will ensure that the noise levels from the sites will be managed, and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 guidelines.	
				Visual impacts on the surrounding communities and road users from the construction: The landowners will be informed on the type of machinery and equipment to be used at the prospecting sites. Lighting will be conducted in manner that will reduce the impacts on visual aspects at night times. Materials transported on public roads must be covered. The number of construction vehicles and machinery to be used shall be kept to a minimum. Movement of vehicles shall be kept to outside busy hours to minimise the visual impacts on the residents.	Measures will be undertaken by the mine to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives.	

				All lighting shall be kept to a minimum within the requirements of safety and efficiency. Where such lighting is deemed necessary, low-level lighting, which is shielded to reduce light spillage and pollution, shall be used. No naked light sources shall be directly visible from a distance. Only reflected light shall be visible from outside the site. External lighting shall use down-lighters shielded in such a way as to minimise light spillage and pollution beyond the extent of the area that needs to be lit. Security and perimeter lighting shall be shielded so that no light falls outside the area needing to be lit Drill rigs shall be in areas with adequate tree and bush cover to minimise the visual impact on residents. Where no adequate vegetation cover is available for the drill rigs, shade cloths can be used to screen off the drill rigs. Where possible, rehabilitation of the work areas shall be undertaken in tandem with construction to ensure that areas stripped of vegetation are kept to a minimum <u>Damage or destruction of sites with archaeological and cultural significance:</u> The drilling sites will be situated away from any identified grave site or heritage sites. A 50 m buffer will be created between the sites and the proposed camp and drilling sites.	With the implementation of the mitigation measures, the drilling operations will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the specialist.	
				<u>Safety, intrusion livelihood impacts on the landowners and occupiers:</u> Residents shall be informed of any road closures and other disruptions and maintain roads used for the operation in good order. Clear signage shall be installed around the project area indicating the type of disruption and the time during which the disruptions will occur. Communication with landowners and land occupiers shall be kept open during the operational phase of the project. A record of such communication shall be kept on site. Ensure that negotiations on compensation are undertaken before the drilling programme can commence. This will include any other conditions that the landowners may deem necessary for the prospecting operation. The outcomes of the negotiations shall be recorded and kept in a file on site. Ensure that safety measures are implemented to prevent impacts on landowners and occupiers. Access to private property, outside of the demarcated drill sites, without landowner consent shall be strictly prohibited.	The mine will ensure that all safety standards are met and that access to landowners and occupiers are not detrimentally affected	
				<u>Traffic:</u> Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; Where possible the transportation of materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents; The number of construction vehicles and trips shall be kept to a minimum All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency.	The objective is to warn the general public of construction traffic, and to manage traffic on site and implementing the mitigation measures will ensure road safety along the public roads and onsite and to increase awareness of slow-moving vehicles	
				<u>Flora:</u> All disturbed areas must be concurrently rehabilitated. Prohibit the collection of any plant material for firewood or medicinal purposes. The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area. All sensitive open space areas will be demarcated and access into these areas shall be	The implementation of mitigation measures will ensure that the drilling and sampling activities do not have detrimental impact on the area's flora.	

				prohibited. Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the drilling activities. Monitoring of relocation success will be conducted during the operational phase. Monitoring of relocation success shall continue during and beyond the decommissioning and closure phase. All disturbed areas shall be re-vegetated with indigenous riparian species. As much vegetation growth as possible must be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro seeding, rehabilitation planting (where applicable) is to be implemented. <u>Fauna:</u> The rehabilitation of the disturbed areas must be conducted such that the rehabilitated areas will encourage the migration of animals back into the rehabilitated areas. The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas. No trapping or hunting of fauna shall be permitted. Edge effects of all operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed. No informal fires in the vicinity of construction areas shall be permitted. An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss. Poaching of wild animals and livestock will be prohibited.	Maintenance of the current status on animal life within the project area.	
Data Analysis	Feasibility Studies		N/A	N/A	N/A	N/A
Feasibility Studies Report			N/A	N/A	N/A	N/A
Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	Decommissioning and Closure	All the affected sites	<u>Compaction and contamination of soils within the rehabilitation site:</u> All vehicles and machinery used at the rehabilitation site will be kept in good working order. No repairs of vehicles or machinery will be conducted at the rehabilitation site unless it is emergency repairs, which will be conducted on protected ground. Movement of mine vehicles and machinery will be limited to demarcated routes, which will be rehabilitated when no longer in use.	Rehabilitated areas will be maintained to comply with the closure objectives.	Upon cessation of the aggregate stone-dolerite, Clay and sand prospecting
Removal of equipment and infrastructure				<u>Re-instatement of soil productivity, land capability and land use:</u> All infrastructure will be removed from the site in accordance with the rehabilitation plan. Contaminated soils shall be cleaned or disposed of at a registered landfill site in terms of the requirements of the NEM: WA. <u>Pollution of surface water environment:</u> The site area will be rehabilitated to be free draining. Erosion protection measures such as the use of contour berms and repair of gullies will be undertaken until such time that the rehabilitated surfaces can be shown to be sustainable. Existing roads should be used where possible and new disturbed areas should be minimised. <u>Air pollution from rehabilitation site:</u> Where necessary, wet suppression will be conducted at areas with excessive dust emissions. Vehicles and machinery will be well maintained. The traffic volumes and speed within the rehabilitation site will be controlled. <u>Nuisance Noise:</u> Smaller or less noisy equipment should where possible be used when working near receptors. Equipment will be well maintained and fitted with the correct and appropriate noise abatement measures. <u>Damage or destruction of sites with Archaeological and cultural significance</u>:	Rehabilitated areas will be maintained to comply with the closure objectives. The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters. Decommissioning and rehabilitation of the site will be conducted in such a manner that the ambient air quality does not exceed the air quality standards Ensure that the noise from the rehabilitation activities do not exceed the SANS 10103 Rating Level.	

				A 50m buffer will be maintained between any site and the archaeological site.	Should heritage sites be identified, rehabilitation in close proximity to the sites will not be damaged or destroyed by the rehabilitation activities	

35 Impact Management Outcomes

Table 35-1: Impact Management

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
Data Collection and Assessment	Desktop Study	None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Geological Mapping		None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Planning for Drilling Surveys		None	N/A	Planning	Control potential deviations from the approved EMPr through the effective implementation of the data acquisition and desktop study.	Remain within the ambits of the EMPr and Environmental Authorisation.
Access Roads	Physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction	Rehabilitation of areas cleared of vegetation and dust control	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Groundwater	Construction	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Comply with the EMPr. Retain topsoil integrity for the reuse in rehabilitation. Where required, disposal of contaminated soils shall be undertaken in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA)
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Surface water	Construction	Monitoring through rehabilitation and management of spoil sites	Retain topsoil integrity for the reuse in rehabilitation Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of riparian zones without consent from the DWS.
Fence		None	N/A	Construction	Control of access to riparian areas and within the regulated 500 m buffer.	National Water Act, 1998 (Act 36 of 1998) No construction activities may be conducted within 500 m of riparian zines without approval from the DWS.
Hydrocarbon storage area		None	N/A	Construction	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources
Mobile office		None	N/A	Construction	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	No destruction/loss of fossils
Vehicle parking		Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Soils, Land capability and Land use	Construction	Rehabilitation of areas cleared of vegetation and dust control	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Ablution Facility		Loss of natural vegetation in the affected areas	Flora	Construction	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
		Migration of fauna due to disturbance caused by the proposed project	Fauna	Construction	Relocation of affected species of conservation importance	Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation
		Air pollution through nuisance dust, PM 10 and PM2.5 as well as emissions from construction vehicles and machinery.	Air Quality	Construction	Dust control measures	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards
		Increase in ambient noise due to movement of construction vehicles and machinery	Noise	Construction	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Remain within the Noise Regulation Standards for Rural Areas.
		Visual impacts as a result of vegetation clearance	Visual	Construction	Rehabilitation of areas cleared of vegetation	Vegetation clearance must be limited to demarcated areas only
		Increased traffic on the roads due to additional construction vehicles	Traffic, Socio-economic	Construction	Speed control and limitation of the times when construction vehicles may be on the roads	Minimise the number of vehicles used during construction Movement of construction vehicles shall be limited to outside of busy hours
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Climate Change	Construction	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Comply with the EMPr Minimise the number of vehicles used during construction Regular maintenance of vehicles and machinery to improve fuel efficiency Comply with requirements of the National Environmental Management: Air Quality Act, 2004
RC and Diamond core drilling and Sampling	Drilling and Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Socio-Economic	Operation	Control of times during which operation activities will take place	Maintain a 100% crime free area within the control of the prospecting No complaints from landowners due to prospecting activities. Should there be conflicts, these must be resolved
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Groundwater	Operation	Rehabilitation of affected areas and control using bunds	No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA
		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the water quality due to increase turbidity and an increase in acidity of the water in the streams. This	Surface Water	Operation	Control through management and monitoring of surface runoff	Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/stormwater entering water courses. The NWA: No activities within 100 m of watercourses and drainage without

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
		will have an impact on aquatic habitats.				consent from the DWS. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA
		Uncontrolled movement within riparian zones may have an impact on the aquatic ecological habitat, ecological functioning and structure.	Aquatic Ecosystems	Operation	Avoidance of riparian areas	NWA: No activities shall be permitted within 500 m of riparian areas without prior approval from the DWS Comply with requirements of the NWA
		The project may result in the following impacts on the floral environment during the operation phase: Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation; Impact on floral diversity as a result of possible uncontrolled fires; Potential spreading of alien invasive species as a result of floral disturbance; and Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Flora	Operation	Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success.	No invasive plant species in rehabilitated areas No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation and/or removal of contaminated soils
		The project may result in the following impacts on the faunal environment during the operation phase: Migration of fauna from the prospecting area due to noise as a resulting of drilling activities; Loss of faunal due to collisions with vehicles and machinery; Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Fauna	Operation	Rehabilitation of affected areas Drill holes must be temporarily plugged immediately after drilling is completed and remain plugged until they are permanently plugged below ground to eliminate the risk posed to fauna by open drill holes. Drill holes must be permanently capped as soon as is practicable	No removal of vegetation outside of demarcated areas. Successful plugging of drill holes, with no faunal casualties as a result of holes being left open
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The materials removed from the drilling sites will contain carbonaceous material, which has potential for contamination should it not be managed properly. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Soils Land use and Land Capability	Operation	Rehabilitation of affected areas	Retain topsoil integrity for the reuse in rehabilitation.
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Air Quality	Operation	Dust control measures	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Visual	Operation	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	No removal of vegetation outside de of demarcated area to ensure as much vegetation cover for the rigs, as possible Make use of rigs that have earthy cover to minimise the visual impact

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
		The drilling operations may result in the destruction of graves and other heritage resources.	Heritage Resources	Operation	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	No destruction/loss of heritage resources Comply with requirements of the SAHRA
		Earth moving activities may result in the destruction of fossils (if any).	Palaeontological Resources	Operation	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	No destruction/loss of fossils Comply with requirements of the SAHRA
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Noise	Operation	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operation	Speed control and limitation of the times when construction vehicles may be on the roads	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Climate	Operation	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
		Drilling ground vibrations may result in possible damage to infrastructure.	Drilling and Vibrations	Operation	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	No private infrastructure shall be damaged/lost due to drilling vibrations
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A	N/A
Feasibility Studies Report		None	N/A	Operation	N/A	N/A
Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	Soils, Land Capability and Land Use	Decommissioning and Closure	N/A	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
Removal of equipment and infrastructure		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	Land Use	Decommissioning and Closure	N/A	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Soils and Vegetation	Decommissioning and Closure	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Vehicle movement shall be limited to areas demarcated as access tracks Comply with the requirements of the EMPr

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	Standard to be achieved
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Surface Water	Decommissioning and Closure	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Maintain the water quality of water course in the project area Ensure that dirty stormwater and runoff is diverted from the water courses and riparian areas Comply with the requirements of GN704
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also be generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Air Quality	Decommissioning and Closure	Dust control measures and rehabilitation of areas stripped of vegetation	Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Noise	Decommissioning and Closure	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Comply with the Noise Regulation Standards for Rural Areas.

36 Impact Management Actions

Table 36-1: Impact management actions

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
Data Collection and Assessment	Desktop Study	None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Geological Mapping		None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Planning for Drilling Surveys		None	Control potential deviations from the approved Prospecting Works Programme through the effective implementation of the data acquisition and desktop study.	Planning	Remain within the ambits of the EMPr and Environmental Authorisation.
Access Roads	Physical surveying of the site and pegging of drilling boreholes	Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Rehabilitation of areas cleared of vegetation and dust control	Construction	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Drill Sites		Contamination of groundwater from hydrocarbon spillages	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Construction	Comply with the EMPr. Retain topsoil integrity for the reuse in rehabilitation. Where required, disposal of contaminated soils shall be undertaken in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA)
Temporary Soil Storage Area		Contamination of surface water due to erosion of soils which will lead to increased turbidity as well as contamination from hydrocarbon spillages	Monitoring through rehabilitation and management of spoil sites	Construction	Retain topsoil integrity for the reuse in rehabilitation Comply with the requirements of the NWA: no construction activities within 100 m of water courses and 500m of riparian zones without consent from the DWS.
Fence		None	N/A	Construction	National Water Act, 1998 (Act 36 of 1998) No construction activities may be conducted within 500 m of riparian zines without approval from the DWS.
Hydrocarbon storage area		None	N/A	Construction	No destruction/loss of heritage resources
Mobile office		None	N/A	Construction	No destruction/loss of fossils
Vehicle parking		Loss of soils, erosion of the soils and impacts on landowners' livelihood.	Rehabilitation of areas cleared of vegetation and dust control	Construction	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Ablution Facility		Loss of natural vegetation in the affected areas	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Construction	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
		Migration of fauna due to disturbance caused by the proposed project	Relocation of affected species of conservation importance	Construction	Remain within the designated area demarcated for prospecting activities. Ensure minimal clearance of vegetation

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
		Air pollution through nuisance dust, PM 10 and PM 2.5 as well as emissions from construction vehicles and machinery.	Dust control measures	Construction	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards
		Increase in ambient noise due to movement of construction vehicles and machinery	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Construction	Remain within the Noise Regulation Standards for Rural Areas.
		Visual impacts as a result of vegetation clearance	Rehabilitation of areas cleared of vegetation	Construction	Vegetation clearance must be limited to demarcated areas only
		Increased traffic on the roads due to additional construction vehicles	Speed control and limitation of the times when construction vehicles may be on the roads	Construction	Minimise the number of vehicles used during construction Movement of construction vehicles shall be limited to outside of busy hours
		Impact of carbon dioxide (GHG) produced by construction vehicles on the local climate	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Construction	Comply with the EMPr Minimise the number of vehicles used during construction Regular maintenance of vehicles and machinery to improve fuel efficiency Comply with requirements of the National Environmental Management: Air Quality Act, 2004
RC and Diamond Core Drilling and Sampling	Drilling and Sampling	It is expected that during the operation phase the project will not result in the creation of employment as prospecting requires highly specialised personnel. The applicant will make use of qualified contractors for the drilling and sampling of the sites. The community will however continue to benefit as a result of the continued boost in small local businesses. Drilling has potential to affect the day-to-day operations by affected landowners	Control of times during which operation activities will take place	Operation	Maintain a 100% crime free area within the control of the prospecting No complaints from landowners due to prospecting activities. Should there be conflicts, these must be resolved
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from vehicles and machinery. This will result in the contamination of soils and groundwater. The prospecting operations will require the drilling of boreholes, which my result in the drawdown, which may affect the yield to the surrounding groundwater users. Material used for backfilling boreholes may leach pollutants, which will result in the contamination of surrounding groundwater regime. This may spread beyond the backfilling site via plume migration.	Rehabilitation of affected areas and control using bunds	Operation	No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA
		Drilling operations my result in the generation of surface water runoff contaminated with drill muds and cuttings, should spillage occur. The sedimentation and possible contamination with carbonaceous material will have negative impacts on the water quality due to increase turbidity and an increase in acidity of the water in the streams. This will have an impact on aquatic habitats.	Control through management and monitoring of surface runoff	Operation	Retain topsoil integrity for the reuse in rehabilitation. No dirty runoff/stormwater entering water courses. The NWA: No activities within 100 m of watercourses and drainage without consent from the DWS. No soil contamination as a result of hydrocarbon spillages Rehabilitation and disposal of contaminated soils conducted in terms of the NEM: WA

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
		The project may result in the following impacts on the floral environment during the operation phase: Destruction of potential floral habitats resulting from continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation; Impact on floral diversity resulting from possible uncontrolled fires; Potential spreading of alien invasive species because of floral disturbance; and Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase	Avoidance of riparian areas	Operation	NWA: No activities shall be permitted within 500 m of riparian areas without prior approval from the DWS Comply with requirements of the NWA
		The project may result in the following impacts on the faunal environment during the operation phase: Migration of fauna from the prospecting area due to noise as a resulting of drilling activities; Loss of faunal due to collisions with vehicles and machinery; Loss of faunal diversity and ecological integrity resulting from poaching and faunal species trapping; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Rehabilitation of affected areas Monitoring of rehabilitated areas to ensure success.	Operation	No invasive plant species in rehabilitated areas No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation and/or removal of contaminated soils
		The project may result in the following impacts on the faunal environment during the operation phase: Migration of fauna from the prospecting area due to noise as a resulting of drilling activities; Loss of faunal due to collisions with vehicles and machinery; Loss of faunal diversity and ecological integrity as a result of poaching and faunal species trapping; Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Rehabilitation of affected areas Drill holes must be temporarily plugged immediately after drilling is completed and remain plugged until they are permanently plugged below ground to eliminate the risk posed to fauna by open drill holes. Drill holes must be permanently capped as soon as is practicable	Operation	No removal of vegetation outside of demarcated areas. Successful plugging of drill holes, with no faunal casualties as a result of holes being left open
		The use of vehicles during the drilling of the exploration boreholes may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of soils. The materials removed from the drilling sites will contain carbonaceous material, which has potential for contamination should it not be managed properly. The material from the drilling site may result in the contamination of soils, which may render the land not usable after backfilling operation.	Rehabilitation of affected areas	Operation	Retain topsoil integrity for the reuse in rehabilitation.
		The movement of vehicles and drilling machinery will likely result in an increase in nuisance dust, PM10 and PM2.5. There is also potential for increase in carbon emissions and ambient air pollution due to the movement of vehicles and construction machinery.	Dust control measures	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards
		The drill rigs and towers used during the drilling operation phase will be visible from nearby locations and will have visual impact on the local communities in close proximity to the prospecting area.	Strategic location of rigs and towers to areas where there may be some tree cover, as far as practicable	Operation	No removal of vegetation outside de of demarcated area to ensure as much vegetation cover for the rigs, as possible Make use of rigs that have earthy cover to minimise the visual impact
		The drilling operations may result in the destruction of graves and other heritage resources.	Control through clear demarcation of prospecting areas to ensure avoidance of graves and other heritage sites	Operation	No destruction/loss of heritage resources Comply with requirements of the SAHRA

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
		Earth moving activities may result in the destruction of fossils (if any).	Management of drill sites. Should any fossils be discovered, operations must cease and SAHRA must be notified	Operation	No destruction/loss of fossils Comply with requirements of the SAHRA
		The use of vehicles and machinery may result in an increase in noise in the immediate vicinity of the project. The drilling activities will also result in an increase in noise in the vicinity of the project.	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Operation	Remain within the Noise Regulation Standards for Rural Areas. National Noise Control Regulations, SANS10103:2008 guidelines.
		The movement of vehicles in the project area will result in an increase in traffic on the roads.	Speed control and limitation of the times when construction vehicles may be on the roads	Operation	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times
		The movement of vehicles and machinery may result in the production of carbon dioxide (Green House Gas), which may have an impact on the climate in the area.	Control and keep to a minimal the number of vehicles used for operations. Vehicles must be maintained to ensure efficient use of fuel.	Operation	Remain within the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural as well as Minimum Air Emissions Standards Minimise the number of vehicles
		Drilling ground vibrations may result in possible damage to infrastructure.	Drill sites must be located as far from infrastructure as is possible to avoid damage to infrastructure	Operation	No private infrastructure shall be damaged/lost due to drilling vibrations
Data Analysis	Feasibility Studies	None	N/A	Operation	N/A
Feasibility Studies Report		None	N/A	Operation	N/A
Borehole capping	Closure and Rehabilitation of borehole and infrastructure sites	The removal of the campsite equipment and the rehabilitation of the drilling sites and associated access infrastructure will result in the affected soil and land use being restored. This will also result in the resumption of the use of the land since the infrastructure would have been removed.	N/A	Decommissioning and Closure	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
Removal of equipment and infrastructure		Positive impacts will result due to the reduction in areas of disturbance and the return of land use of the affected areas and making available an area that was covered by the campsite and drilling sites.	N/A	Decommissioning and Closure	No removal of vegetation outside of demarcated areas. Ensure successful rehabilitation of contaminated soils Rehabilitation of land to a state it was before prospecting activities
		The use of vehicles/machinery during the rehabilitation of the exploration sites may result compaction of soils and in the spillages of hydrocarbon liquids from the vehicles and machinery. This will result in the contamination and destruction of the vegetation cover and soils.	Control and prohibit access of vehicles and machinery to areas outside of established access tracks Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of a soil management programme in terms of the correct tops oil removal, stockpiling and rehabilitation practices as discussed in the EMPr.	Decommissioning and Closure	Vehicle movement shall be limited to areas demarcated as access tracks Comply with the requirements of the EMPr
		During the decommissioning and closure phases equipment will be removed, stockpiled soils will be used for rehabilitation, remaining sumps will be backfilled, levelled, top soiled and the area re-seeded. During the process of rehabilitation surface water runoff from the rehabilitation site may have elevated silt load, which may cause pollution of the nearby water environment.	Control through the clear delineation of the prospecting area. Control through the implementation of environmental induction and toolbox talks, as well as the implementation of a fine system. Control through the implementation of the NWA GN 704 water management principles.	Decommissioning and Closure	Maintain the water quality of water course in the project area Ensure that dirty stormwater and runoff is diverted from the water courses riparian areas Comply with the requirements of GN704

NAME OF ACTIVITY		POTENTIAL IMPACT (Including the potential impacts for cumulative impacts)	MITIGATION TYPE	Time Period for Implementation	Compliance with standards
		Rehabilitation and removal of the prospecting sites and equipment will require vehicular movement. This will result in the generation of dust by movement of vehicles and due to blowing winds. Vehicles and machinery will also be generated diesel or petrol fumes. Generated dust will migrate towards the predominant wind direction and may settle on surrounding properties including nearby vegetation.	Dust control measures and rehabilitation of areas stripped of vegetation	Decommissioning and Closure	Comply with the requirements of the National Environmental Management Air Quality Act, 2004 Dust Regulation guidelines for rural communities.
		Noise will be generated during the removal of equipment and rehabilitation of the sites. This noise is not expected to exceed occupational noise limits and will be short lived.	Management and maintenance of construction vehicles. Management through the use of noise dissipating technologies e.g., noise mufflers	Decommissioning and Closure	Comply with the Noise Regulation Standards for Rural Areas.

37 Financial Provision

37.1 Determination of the amount of Financial Provision.

37.1.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

Each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the outcome of the Desktop and geological mapping phase, the prospecting drilling will be initiated. The location and extent of the drill and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

The rehabilitation plan was developed on the basis that the rehabilitated areas will be left safe, stable, non-polluting and able to support a self-sustaining ecosystem similar to the surrounding natural environment. To ensure that the rehabilitation plan is aligned with the closure objective, a high-level risk assessment of the prospecting components was undertaken to establish the potential risks associated therewith.

The closure objectives are to:

- Eliminate any safety risks associated with drill hole and sumps through adequate drill hole capping and backfilling;
- Remove and/or rehabilitate all pollution and pollution sources such as waste materials and spills;
- To establish a rehabilitated area that is not susceptible to soil erosion which may result in the loss of soil, degradation of water resources and aquatic environments;
- Restore disturbed areas and re-vegetate these areas with plant species naturally occurring the area to restore the ecological function of such areas, as far as is practicable; and
- To eradicate all alien invasive plant species that may colonise the areas that have been cleared of vegetation.

37.1.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The draft BAR and EMPr will be made available to all registered I&APs for a 30-day review and comment period. All comments received and responses provided to the stakeholders will be incorporated into the final BAR and EMPr and will be collated into a Comments and Responses Register.

37.1.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

As mentioned previously, each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the outcome of the desktop and geological mapping phase, the prospecting drilling will be initiated. The location and extent of the drill and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

Due to the nature of the activities, the potential impacts will be limited in spatial extent and will be of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for drilling purposes will be the main area experiencing impacts. The

impacts will be temporary in nature, and a detailed management plan has been provided to address the potential impacts associated with these activities.

The only rehabilitation that will specifically be required is borehole capping and revegetation:

- Borehole Capping: Drill holes will be permanently capped as soon as is practicable.
- Re-vegetation: A suitably qualified ecologist will be appointed to determine the appropriate species that may be used for re-vegetating the area.
- Re-vegetation efforts will be monitored every second month for a period of 6 months after the initial seeding. An effective vegetation cover of 45% must be achieved. Re-seeding will be undertaken if the vegetation cover has not been achieved after 6 months.

37.1.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

Due to the nature of the activities, the impacts will be very limited and of short duration. The management plan is in such a manner as to ensure concurrent rehabilitation. The areas for drilling purposes will be the main areas that will require rehabilitation at the end of the prospecting activities. The impacts of the drilling activities will be temporary in nature and a detailed management plan has been provided to address potential impacts.

37.1.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 in order to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure for mining sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines. The closure costs were calculated to be R160 533.00 as shown in Table 37-1.

Table 37-1: Cost Estimate Expenditure

0		CALCULATION OF THE QUANTUM				
Applicant:	**Manzhanga Investments (Pty) Ltd**	**DMR Ref No:**		**NC30/5/1/1/2/12871PR**		
Evaluators:	**Ndi Geological Consulting Service (Pty) Ltd**	**Date:**		**2021/08/23**		

No.	Description	Unit	A Quantity	B Master Rate	C Multiplicatio factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and pow erlines)	m3	0	**17.32**	1	1	0
2 (A)	Demolition of steel buildings and structures	m2	0	**241.33**	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	**355.65**	1	1	0
3	Rehabilitation of access roads	m2	1000	**43.19**	1	1	43190
4 (A)	Demolition and rehabilitation of electrified railw ay lines	m	0	**419.16**	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railw ay lines	m	0	**228.63**	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	**482.67**	1	1	0
6	**Opencast rehabilitation including final voids and ramps**	**ha**	**0**	**245652**	**0.52**	**1**	**0**
7	Sealing of shafts adits and inclines	m3	0	**129.56**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0	**168679.35**	1	1	0
8 (B)	Rehabilitation of processing w aste deposits and evaporation ponds (non-polluting potential)	ha	0	**210087.08**	1	1	0
8 (C)	Rehabilitation of processing w aste deposits and evaporation ponds (polluting potential)	ha	0	**610192.47**	1	1	0
9	Rehabilitation of subsided areas	ha	0	**141243.55**	1	1	0
10	General surface rehabilitation	ha	0.4	**133622.5**	1	1	53449
11	River diversions	ha	0	**133622.5**	1	1	0
12	Fencing	m	0	**152.42**	1	1	0
13	Water management	ha	0	**50807.03**	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	1	**17782.46**	1	1	17782.46
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		114421.46

1	Preliminary and General (12.0% of Subtotal 2)	13730.5752	**weighting factor 2** 1	13730.5752
2	Contingencies (10.0% of Subtotal 2)	11442.146		11442.146
			Subtotal 2	139594.18
			VAT (15%)	20939.13
			Grand Total	**160533**

37.1.6 Confirm that the financial provision will be provided as determined.

Manzhanga will fund the operation and hereby undertakes to fund the operations and to manage the operations. The applicant (Manzhanga) hereby confirms that the financial provision will be provided as determined in

38 Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

38.1 Monitoring of Impact Management Actions

Please refer to Table 38-1.

38.2 Monitoring and Reporting Frequency

Please refer to Table 38-1.

38.3 Responsible Persons (Roles and Responsibilities)

Generic roles that require to be defines for the project include:

- Project Developer;
- Environmental Control Officer;
- Environmental Health and Safety (EHS) Manager; and
- Site Manager.

The typical requirements of each of the roles are provided in the following sections.

38.3.1 Project Developer

The Project Developer (Manzhanga) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the Environmental Authorisation issued in terms of NEMA (should the project receive such authorisation) are fully complied with, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that Manzhanga will appoint the Environmental Control Officer, EHS Manager and Site Manager.

38.3.2 Environmental Control Officer

An independent Environmental Control Officer (ECO) must be appointed to monitor the compliance of the proposed project with the conditions of Environmental Authorisation (should such authorisation be granted by DMR) during the construction phase (and possibly the operational phase, depending on the requirements of DMR). The ECO must also monitor compliance of the proposed project with environmental legislation and conditions of the EMPr. The roles and responsibilities of the ECO should include the following:

- The ECO must undertake periodic environmental audits during the relevant phases of the proposed project to monitor and record environmental impacts and non-conformances. It is recommended that weekly or bi-weekly environmental audits be undertaken by the ECO during the construction phase.
- Environmental compliance reports must be submitted by the ECO to the DMR on an annual basis or as stipulated by the DMR.
- The ECO must maintain a diary of site visits and audits, a copy of the Environmental Authorisation (should such authorisation be granted by DMR) and relevant permits for

reference purposes, a non-conformance register, a public complaint register, and a copy of previous environmental audits undertaken.

- Prior to the commencement of construction, the ECO must meet on site with the Site Manager to confirm the construction procedure and designated construction areas.

38.3.3 Environmental Health and Safety (EHS) Manager

The EHS Manager will be appointed to fulfil the roles of the Environmental Officer during the construction phase and the Environmental Manager during the operational phase. The responsibility of the EHS Manager include overseeing the implementation of the EMPr during the construction and operational phases, monitoring environmental impacts, record-keeping and updating of the EMPr as and when necessary. The EHS Manager is also responsible for monitoring compliance with the conditions of the Environmental Authorisation that may be issued to Manzhanga.

The lead contractor and sub-contractors may have their own Environmental Officers or designate Environmental Officer functions to certain personnel.

During construction, the EHS Manager will be responsible for the following:

- Meeting on site with the Site Manager prior to the commencement of construction activities to confirm the construction procedure and sites allocated for the drill sites and infrastructure required for the project.
- Daily or weekly monitoring of site activities during construction to ensure adherence to the specifications contained in the EMPr and Environmental Authorisation (should such authorisation be granted by DMR), using a monitoring checklist that is to be prepared at the start of the construction phase.

38.3.4 Site Manager

The site manager will be responsible for the following:

- Overall construction programme, project delivery and quality control for the construction of the facility.
- Overseeing compliance with the Health, Safety and Environmental Responsibilities specific to the project construction.
- Promoting total job safety and environmental awareness by employees, contractors and sub-contractors and ensuring that all employees and contractors and sub-contractors are aware of the importance that the project proponent attaches to safety and the environment.
- Ensuring that each subcontractor employ an Environmental Officer (or have a designated Environmental Officer function) to monitor and report on the daily activities on-site during the construction period.
- Ensuring that safe, environmentally acceptable working methods and practices are implemented, and that sufficient plant and equipment is made available, is properly operated and maintained in order to facilitate proper access and enable any operation to be carried out safely.
- Meeting on site with the EHS Manager prior to the commencement of construction activities to confirm the construction procedure and designated activity zones.
- Ensuring that all appointed contractors and sub-contractors are aware of this EMPr and their responsibilities in relation to the programme.

- Ensuring that all appointed contractors and sub-contractors repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in the EMPr, to the satisfaction of the EHS Manager.

38.4 Time Period for Implementing Impact Management Actions

Please refer to Table 38-1.

38.5 Mechanism for Monitoring Compliance

Please refer to Table 38-1.

Table 38-1: Mechanisms for Monitoring

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Site Clearance and removal of vegetation Drilling of prospecting boreholes (RC) Stockpiling material from site clearance Discarding material from drill sites Construction of temp/mobile site infrastructure and access routes Stormwater management Waste generation and management. Demolition and/or removal of temporary infrastructure/equipment Rehabilitation and restoration of disturbed areas	Soil Erosion	Management and monitoring of soil stockpiles. Soils must be stored properly and revegetated to prevent erosion and to enable re-use during rehabilitation. Stockpiles must be visually inspected daily to ensure that no erosion is taking place	ECO, Site Manager	Daily Monitoring and Monthly Reporting
	Loss of Indigenous plant Species	A suitably ecologist or horticulturist will be required to make recommendations regarding the collection, propagation/storage and transplantation of plants is advised.	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed, and sustainability of vegetation cover is achieved.
	Faunal Habitat Loss	Adhere to law and best practice guidelines regarding the displacement and relocation of CI fauna Where required fauna shall be relocated to an area with a similar habitat as the project area Time construction activities to minimise faunal mortality Poaching of fauna shall be prohibited Uncontrolled fires shall not be permitted on site and persecution or hunting of fauna	ECO, Site Manager	Monthly monitoring and reporting. Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed, and sustainability of vegetation cover is achieved.
	Proliferation of alien invasive species	Declared weeds and alien invasive species must be eradicated. Management of alien invasive plant shall be undertaken though throughout the	ECO, Site Manager	Monthly monitoring and reporting Monitoring will be required at all the construction and operational activities until such time that rehabilitation is completed and sustainable.
	Nuisance dust and air emissions generation	During dry seasons, ensure that cleared (excavated) areas and unpaved surfaces are sprayed with water obtained from an approved source to minimise dust generation. Set up PM 2.5 and PM10 Monitoring sites in the area to monitor dust fall.	ECO, Site Manager	Monthly monitoring and reporting
	Loss of arable land/land for grazing	Ensure proper rehabilitation measures are adhered to in order to return the soil quality to its natural state.	ECO, Site Manager	Monitor monthly and report on an annual basis. Monitoring will be required until such time that rehabilitation is completed.
	Soil and groundwater contamination	Manage through the EMPr and develop a groundwater management programme. Collection of baseline hydrochemistry samples for analysis.	ECO, Site Manager	Monthly monitoring and reporting
	Groundwater extractions	Ensure that no groundwater extraction is undertaken without approval from the DWS Monitoring water levels of the boreholes found in close proximity to the proposed mining site, through a flow meter and water level data logger.	ECO, Site Manager	Monthly monitoring and reporting
	Visual Intrusion and loss of sense of place	Ensure that infrastructure is kept to its most “natural” state and keep a tidy visually ordered site. Rubble/litter/waste removal and disposal to be monitored throughout construction. Complaints about night lights should be investigated and documented in a register	ECO, Site Manager	Monthly monitoring and reporting
	Increased pressure on the road network	Speed control and limitation of the times when construction vehicles may be on the roads	ECO, Site Manager	Monthly monitoring and reporting
	Soil disturbance resulting in the spread of alien	Alien invasive vegetation monitoring and control through Alien Invasive Management Plan	ECO, Site Manager	Monthly monitoring and reporting

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
	Surface water contamination	Monitor surface water quality upstream and downstream of the prospecting area to ensure that the prospecting activities are not contamination water resources	ECO, Site Manager	Monthly monitoring and reporting
	Riparian Area and Aquatic Ecosystem Loss	Ensure that there are construction activities that will be located within any riparian and aquatic ecosystem areas.	ECO, Site Manager	Monthly monitoring and reporting
	Destruction of graves and cultural resources	No drilling sites shall impact graves and sites of heritage or cultural importance	ECO, Site Manager	Monthly monitoring and reporting
	Water Use	No water may be sources from rivers and streams without approval from the DWS. No clean water shall be used for dust suppression		
	Nuisance Noise	Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	ECO, Site Manager	Monthly monitoring and reporting
	Health and safety of personnel	Routine safety checks, safety training and Inspections to be carried out during the construction and operation phase to enforce the use of Personnel Protective Equipment (PPE). This must also be included in the safety requirements of the Contract.	ECO, Site Manager	Routine inspection and Quarterly reporting
	Waste Management	Maintain a waste manifest book to record volumes of waste leaving the site, including recyclables. Keep safe disposal certificates on file on site for Hazardous waste. Way Bridge slips must be obtained for all other waste streams and kept on file on site	ECO, Site Manager	Monthly daily and report on a monthly basis
	Stormwater Management	Visual monitoring based on sediment Clean water must be kept separate from contaminated water emanating from the project sites	ECO, Site Manager	Monthly daily and report on a monthly basis
	Rehabilitation	Monitoring of the following: • Basal Cover • Arial Cover • Species diversity	ECO, Site Manager	Rehabilitation will be undertaken throughout all the project phases. The final rehabilitation will be undertaken when the prospecting activities have been finalised. The ECO shall inspect the affected areas 6 months after finalisation of rehabilitation to assess the success of the rehabilitation.

39 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

Annual environmental audits must be undertaken to ensure compliance with the EMPr and EA. The environmental audit reports must also include the financial provision. The reports must be submitted to the DMR.

40 Environmental Awareness Plan

40.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

An Environmental Awareness and Risk Assessment Schedule has been developed and is outlined in Table 40-1. The purpose of this schedule is to ensure that onsite employees are not only trained, but that the principles are continuously re-enforced.

Table 40-1: Environmental Training and Awareness Schedule

Frequency	Time allocation	Objective
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects. Establish a basic knowledge of the environmental legal framework and consequences of non - compliance. Clarify the content and required actions for the implementation of the Environmental Management Plan. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.
Monthly Awareness Talks (all staff and workers)	30 minutes awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (supervisor and workers involved in task)	Daily task-based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures on a daily basis as part of daily toolbox talks.

40.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

As prescribed in Table 40-1, Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks in order to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

Environmental Awareness Training Content- Induction Training: The following environmental awareness training will be provided to all staff and workers who will be involved in prospecting activities:

- Description of the approved prospecting activities and content of the prospecting right;
- An overview of the applicable legislation and regulations as they relate to environmental, health, safety and community;

Content and implementation of the approved EMPr specifically:

- Allocated roles and responsibilities;

- Management and mitigation measures; and
- Identification of risks and requirements adaptation.

Sensitive environments and features:

- Description of environmentally sensitive areas and features; and
- Prohibitions as it relates to activities in or in proximity to such areas.

Emergency Situations and Remediation:

- Methodology for the identification of areas where accidents and emergencies may occur, communities and individuals that may be affected;
- An overview of the response procedure;
- Equipment and resources;
- Designate of responsibilities;
- Communication, including communication with the potentially affected communities and responsible authorities; and
- Training schedule to ensure effective response.

Development of procedures and checklists: The following procedures will be developed, and all staff and workers will be adequately trained on the content and implementation thereof:

Emergency Preparedness and Response: The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals etc.) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation will potentially affected landowners.

In the even that risks are identified, which may affect adjacent landowners (or other persons), the procedure will include appropriate communication strategy to inform such persons and provide response measures to minimize the impact.

Incident Reporting Procedure: Incident reporting will be undertaken in accordance with an established incident reporting procedure to:

- Provide details of the responsible person, including any person who
- Is responsible for the incident;
- Owns any hazardous substance involved in the incident;
- Was in control when the incident occurred.
- Provide details of the incident (time, date, location);
- The details of the cause of incident;
- Identify aspects of the environment affected;
- The details of corrective action taken; and
- The identification of any potential residual or secondary risks that must be monitored and corrected or managed.

Environmental and Social Audit Checklist: An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and

approved as part of the EMPr. Non-conformances will be identified, and corrective action taken where required.

40.3 Specific information required by the Competent Authority

No specific information was required by the Competent Authority.

41 UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports; ☒

b) the inclusion of comments and inputs from stakeholders and I&APs; ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒ and

d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein. ☒

Signature of the environmental assessment practitioner:

Ndi Geological Consulting Services (Pty) Ltd

Name of company:

23 August 2021

Date:

-END-

Appendices

Appendix 1: The Qualifications of the Environmental Assessment Practitioner

Appendix 2: Curriculum Vitae of the EAP

Appendix 3: Locality and Layout Maps

Appendix 4: Stakeholder Engagement Documents

Appendix 5: Supporting Impact Assessment

Appendix 6: Preliminary Layout Plan, including Environmental Attributes

Appendix 7: Composite Map