

# Application for a Mining Permit and Associated Environmental Authorisation for the Proposed Mining of Aggregate on Farm Arcadia Drie Drie Een No. 1449 located in the Mafube Municipality, Free State Province

## Draft Basic Assessment Report

**DMR Reference Number: FS10349MP**

Report Prepared for

**Maximus Earthworks (Pty) Ltd**



Report Prepared by



April 2022

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*Report By* *Ndi Geological Consulting Services (Pty) Ltd*



*38 Ophelia Street  
Kimberley, 8301  
Cell: 082 760 8420  
Tel: 053 842 0687  
Fax: 086 538 1069  
atshidzaho@gmail.com  
ndi@ndigeoservices.co.za*

*Environmental Assessment Practitioner* *Ndivhudzannyi Mofokeng*

*Applicant* *Maximus Earthworks (Pty) Ltd (Maximus  
511 Long Road,  
Welkom,  
Free State  
9459*



## mineral resources

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

### DRAFT BASIC ASSESSMENT REPORT

And

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

**DMR Ref: FS10349MP**

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:** Maximus Earthworks (Pty) Ltd  
**TEL NO:** 083 444 5075  
**FAX NO:**  
**POSTAL ADDRESS:** 511 Long Road, Welkom, Free State, 9459  
**PHYSICAL ADDRESS:** 511 Long Road, Welkom, Free State, 9459  
**FILE REFERENCE NUMBER SAMRAD:** FS10349MP

# 1 IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a mining permit 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 taken into account 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 uninterpreted 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 these 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

Maximus Earthworks (Pty) Ltd (Maximus) appointed Ndi Geological Consulting Services (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to facilitate the Environmental Authorisation (EA) process for the proposed mining of aggregate on Farm Arcadia Drie Drie Een No. 1449 located in Mafube Local Municipality, Free State Province.

The proposed mining project will cover an area of 3.27612 hectares and is located +/- 6 km northeast of Tweeling and +/- 24 km south of Frankfort in the Free State Province. Maximus requires a mining permit in terms of the Mineral and Petroleum Resources Development Act (Act No. 22 of 2002) (MPRDA). Before the mining permit will be granted, Maximus must undertake an EA process in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The competent authority for the EA process is the Free State Department of Mineral Resources (DMR).

The Department of Forestry, Fisheries, and the Environment, (DFFE) 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 mining project triggers activities listed in Listing Notices 1 and 3 of the NEMA, a Basic EIA authorisation process in terms of NEMA Government Notice Regulation (GNR) 326 of 7 April 2017 will be required.

The total duration of the mining activities is planned for five (5) years. However, under mining permit applications the applicant can only apply for a period of two (2) years, with potential to renew the MP. The MP will be renewed three (3) times to make up for the 5 years required. Where possible, rehabilitation will be conducted in tandem with the mining activities, with the final rehabilitation being undertaken once the mining activities have been completed and before the mining team leaves the site.

The Interested and Affected Parties (I&AP) engagement process is conducted as part of the EA process in terms of NEMA (as amended), which provides clear guidelines for I&AP 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 I&AP engagement process is primarily aimed at affording 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 I&APs is to provide the competent authority with the necessary information in order 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.

I&APs are therefore invited to participate in the public review period of the Draft Basic Assessment Report (Draft BAR) from 19 April 2022 to 23 May 2022 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 I&APs on the Draft BAR. The updated Final BAR will be submitted to the competent authority (DMR). The DMR will consider the findings in consultation

with various authorities and make a decision whether environmental authorisation should be granted for the proposed mining project.

This BAR and EMPr has been compiled in terms of the provisions of Appendix 1 and Appendix 4 GNR 325 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 326 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 6-2
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 7.6 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 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;	Section 8
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

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
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 manner in which 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
		A concluding statement indicating the preferred alternatives, including preferred location of the activity.
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



Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
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
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

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for Basic Assessment Reports	Section
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 I&APs 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 326 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 12-20
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

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EMPr	Section where addressed in the EMPr
Appendix 4 (f)	<p>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:</p> <ul style="list-style-type: none"> <li>i. avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</li> <li>ii. comply with any prescribed environmental management standards or practices;</li> <li>iii. comply with any applicable provisions of the Act regarding closure, where applicable; and</li> <li>iv. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.</li> </ul>	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
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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)	<p>an environmental awareness plan describing the manner in which-</p> <ul style="list-style-type: none"> <li>i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</li> <li>ii. risks must be dealt with to avoid pollution or the degradation of the Environment.</li> </ul>	Section 40
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 19 April 2022 to 23 May 2022. Copies of the Draft BAR been made available at the following public places for review:

Public Place	Locality	Telephone
Ndi Geological website	<a href="http://www.ndigeoservices.co.za/">http://www.ndigeoservices.co.za/</a>	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 MAY 2022**

**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  
Fax: 086 538 1069  
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
DFFE:	Department of Forestry, Fisheries, and the Environment
DESTEA:	Department of Small Business Development, Tourism and Environmental Affairs (Free State)
DM:	District Municipality
DMR:	Department of Mineral Resources
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
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
GNR:	Government Notice Regulation
GSSA:	Geological Society of South Africa
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plans
LM:	Local Municipality
MLM:	Mafube Local Municipality
LUDS:	Land Use Development System
MPA:	Mining Permit Area
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)

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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
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
WMA:	Water Management Area
WUA:	Water Use Authorisation

### 3 Project background

Maximus Earthworks (Pty) Ltd (Maximus) appointed Ndi Geological Consulting Services (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to facilitate the Environmental Authorisation (EA) process for its proposed mining of aggregate on Farm Arcadia Drie Drie Een No. 1449, which is located in Mafube Local Municipality, Free State Province. The proposed mining project will cover an area of 3.27612 hectares and is located +/- 6 km northeast of Tweeling and +/- 24 km south of Frankfort in the Free State Province.

Before the mining activities can commence, Maximus requires a Mining Permit (MP) in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA). Before the MP will be granted, Maximus must undertake an EA application process in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The competent authority for the EA process is the Free State Department of Mineral Resources (DMR).

The Department of Forestry, Fisheries, and the Environment, (DFFE) has identified the need for the alignment of EAs 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 mining project triggers activities listed in Listing Notices 1 and 3 of the NEMA, a Basic EIA authorisation process in terms of NEMA Government Notice Regulation (GNR) 326 of 7 April 2017 will be required. The total duration of the mining activities is planned for five (5) years. However, under mining permit applications the applicant can only apply for a period of two (2) years, with potential to renew the MP. The MP will be renewed three (3) times to make up for the 5 years required. Where possible, rehabilitation will be conducted in tandem with the mining activities, with the final rehabilitation being undertaken once the mining activities have been completed at a site and before the mining team leaves the site.

The Interested and Affected Parties (I&APs) engagement process, is conducted as part of the EA process in terms of NEMA (as amended), which provides clear guidelines for I&AP 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 I&AP engagement process is primarily aimed at affording 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 I&APs is to provide the competent authority with the necessary information in order 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. I&APs are therefore invited to participate in the public review period of the Draft Basic Assessment Report (Draft BAR) from 19 April 2022 to 23 May 2022 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 I&APs on the Draft BAR.

The updated Final BAR will be submitted to the competent authority (DMR) for review once the comments from the I&APs have been incorporated into the Draft BAR. The DMR will consider the findings in consultation with various authorities and make a decision whether an EA should be granted for the proposed mining project.

## 4 Purpose and context of this document

The project triggers activities listed in terms of Listing Notices 1 and 3 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended) and will require an EA from the DMR.

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

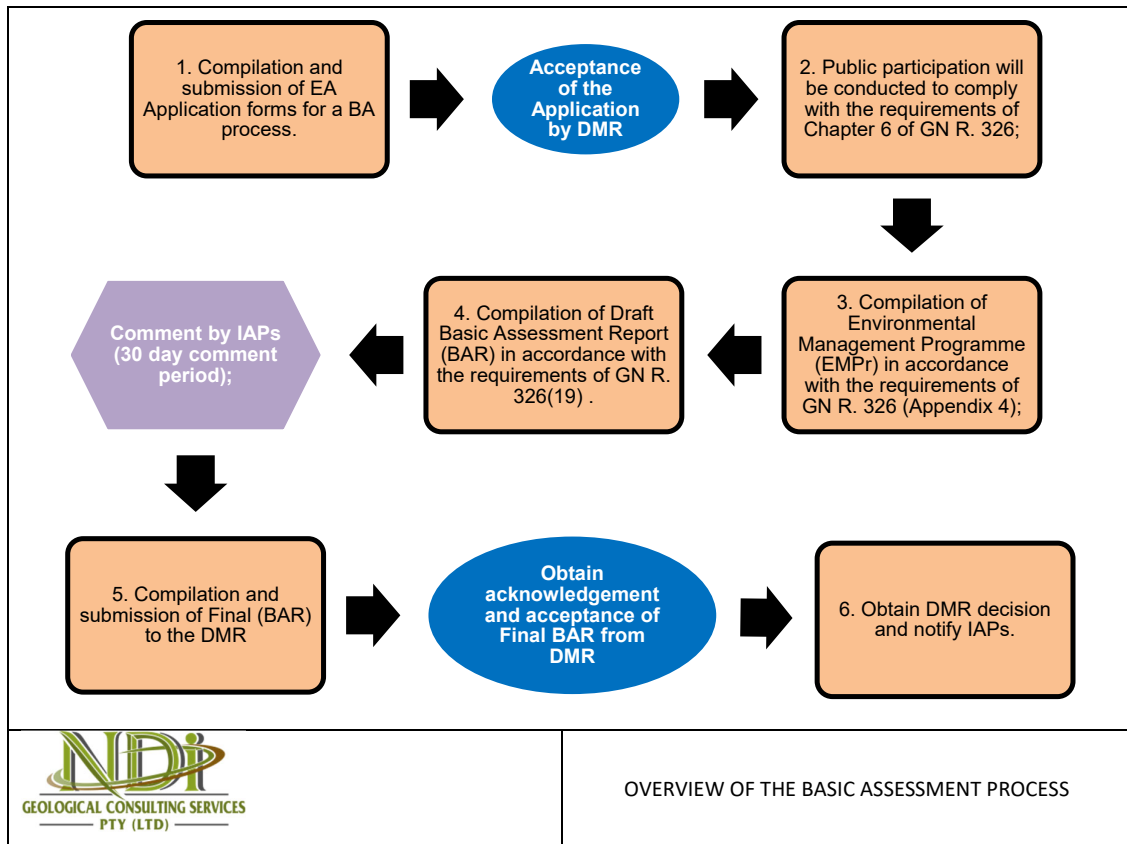
- To comply with the requirements of NEMA and associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of activities associated with the proposed mining of aggregate on Farm Arcadia Drie Drie Een No. 1449 Arcadia Drie Drie Een No. 1449. The cumulative 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 in order 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 327 and 324 (Listing Notice 1 and 3) require that a Basic Assessment (BA) process be followed. The BA process will entail:

- Submission of the EA Application to the DMR. The application was submitted to the DMR and formally accepted.
- Compilation of a Draft Basic Assessment Report (BAR) and draft Environmental Management Programme (EMPr) for the public to comment on during the official public participation comment period of 30 days.
- Incorporation of I&AP 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

Ndi Geological Consulting Services (Pty) Ltd has been appointed by Maximus as the independent Environmental Assessment Practitioner (EAP) to undertake the necessary EA process and associated I&AP engagement process to meet the requirements of NEMA.

### 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	<a href="mailto:atshidzaho@gmail.com">atshidzaho@gmail.com</a>

### 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	EAPASA Reg Number 2020/1554 GSSA Prof Reg	11

#### 5.2.2 Summary of EAPs past experience

The EAP, Mrs Ndivhudzannyi is a registered EAP (EAPASA Reg Number 2020/1554) with a BSc (Hons) Earth Sciences, majoring in Mining and Environmental Geology. She is a self-motivated and hardworking Geologist with 13 years of experience in environmental, mining exploration, open cast work and consulting in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation and Percussion Drilling). Proven field experience in exploration, i.e. mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, supervisory duties in the field. Her responsibilities involve but are not limited to managing all Environmental matters: Environmental Impact Assessment and Environmental Management Programme, Environmental Authorizations, Environmental Auditing & Risk Assessment, Mine Closure & Rehabilitation, and conducting & reviewing Environmental specialists' studies. Ndivhudza also has experience in writing geological reports, including Prospecting Work Programmes and Mining Work Programmes Environmental Management Plans, handling Department of Mineral Resources and Energy documents in general like the submission of Mining & Prospecting Right Applications and Renewals.

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 property is provided in Figure 6-1.

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

<b>Farm Name:</b>	Arcadia Drie Drie Een No. 1449
<b>Coordinates (centre point):</b>	27°29'54.17"S, 28°32'4.90"E
<b>Application area (Ha)</b>	3.27612 ha
<b>Magisterial district:</b>	Frankfort
<b>Distance and direction from nearest town</b>	+/_ 6 km northeast of Tweeling and +/_ 24 km south of Frankfort
<b>21-digit Surveyor General Code for each farm portion</b>	F0140000000144900000

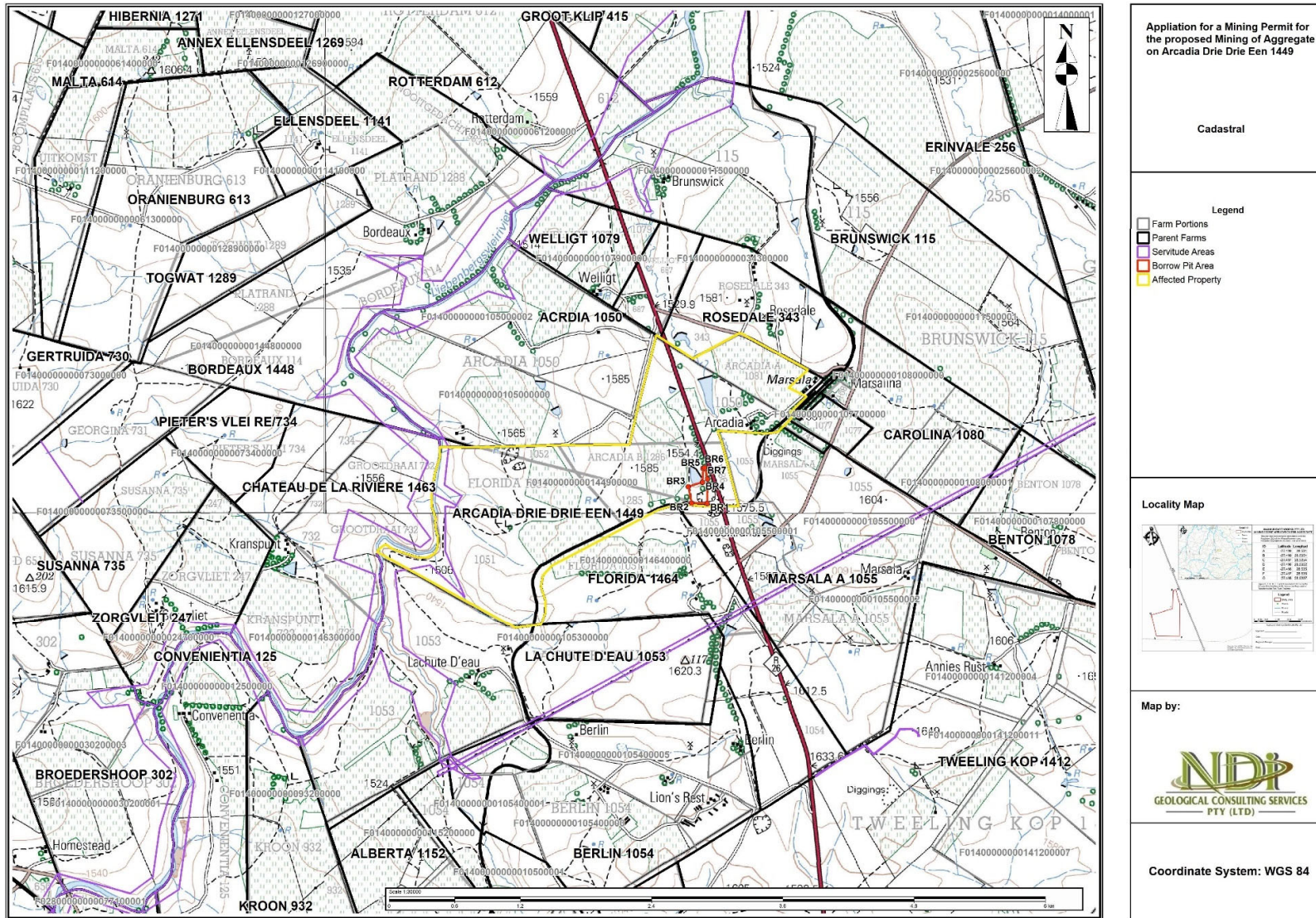


Figure 6-1: Cadastral Map

## 6.2 Locality map

The proposed aggregate mining project is located in the Free State Province of South Africa, approximately 5+/- 6 km northeast of Tweeling and +/- 24 km south of Frankfort in the Free State Province.

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

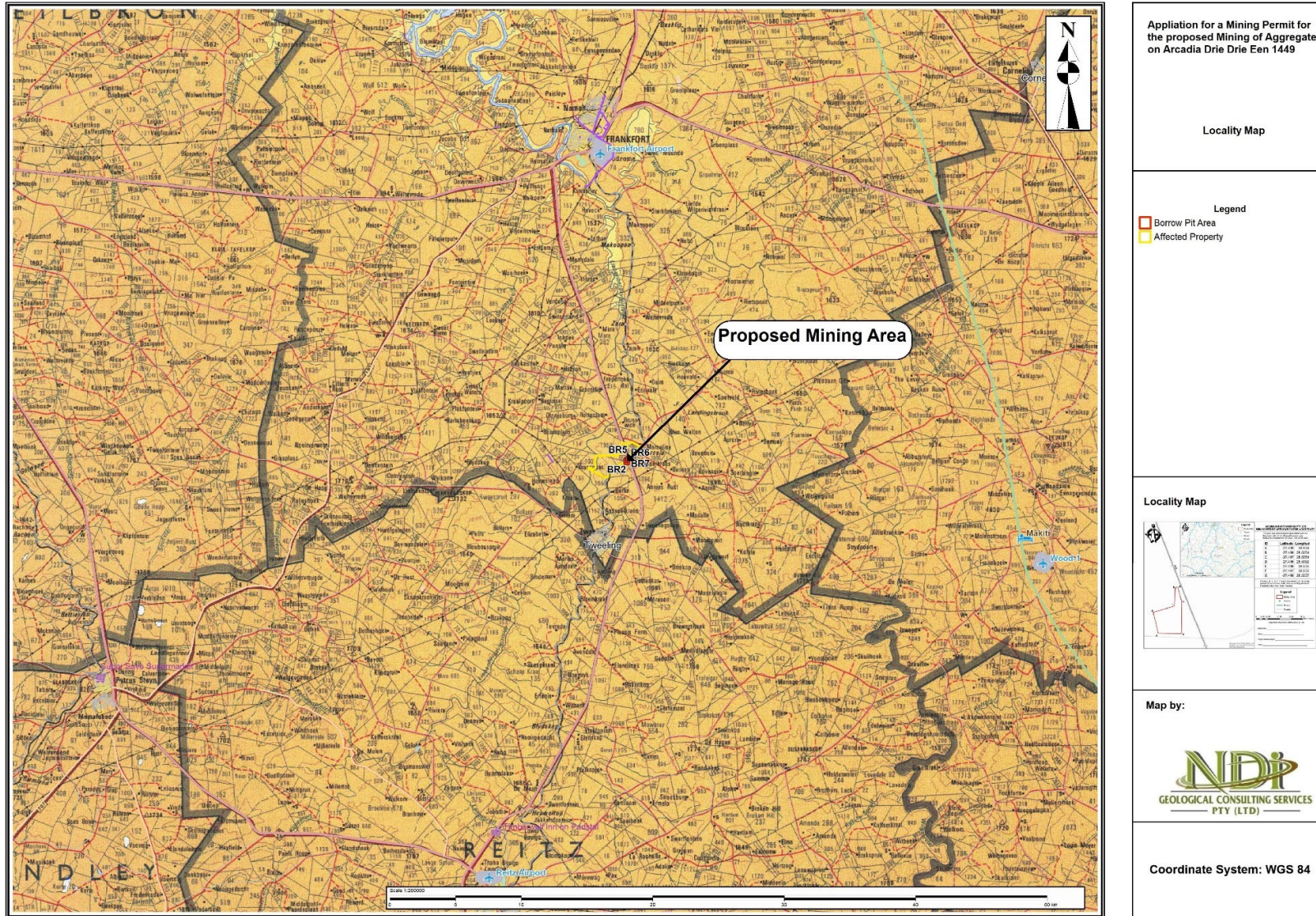


Figure 6-2: Locality Map

# 7 Description of the Scope of the Proposed Overall Activity

## 7.1 Overview of the Mining Activities

Maximum proposes the improvement of the road between Frankfort and Tweeling, in the Mafube Local Municipality, Free State Province. The proposed borrow pit is required as a source of material to be used for the upgrading of the road. The material will be used to build the sub-base layers (G5 and G6 quality material) for the project.

### 7.1.1 Pre-Construction Phase

The primary activities associated with the pre-construction (pre-mining) of the borrow pit will include the following:

- Detailed geotechnical investigations to be completed.
- Contractor to confirm the mining process and to develop a method statement for the excavation and operation of the borrow pit.
- Development of the mine plan including the layout of mining activities and infrastructure locations.
- Determine pre-existing drainage patterns and concentration of flow on the borrow pit site.
- Site preparation, including clearing, grubbing, and fencing of the borrow pit area.
- Removal and safe storage (temporary stockpiles) of topsoil and overburden material for rehabilitation.

### 7.1.2 Construction And Operation Phases

The mining process of a crusher operation will consist of loading, hauling, and crushing. To get to the fresh aggregate, weathered materials need to be stripped. Gravels are used for back filling the borrow pit. On intersecting the fresh aggregate, the process of drill and blast will then follow. This material is then transported to a jaw crusher, from the jaw crusher it will go to a cone crusher, then into a 4-deck screen, to produce crusher dust (-5mm), ballast, -70mm + 32mm. The -32mm goes into a VSI, and from there to the screens to produce -26mm, -21mm, -15mm, and -5mm. Equipment to be used are 2 excavators between 26 and 36 ton each, 2 Front end loaders, with 5 cube bucket, 2 ADT's, between 30 and 40 tons each and screens.

### 7.1.3 Closure Phase

The following activities will occur during the Closure Phase of the borrow pit:

- All fences, infrastructure (site office/store), mining equipment, and waste/rubble on site will be removed;
- Overburden stockpiles from the construction and operation phase will be used for the filling of the borrow pit excavated; and
- Site stabilisation where the borrow pit will be graded, re-vegetated and grassed with indigenous grasses in order to blend with surrounding environment.
- Closure of borrow area where a Closure Plan will also be required for the proposed borrow pit area, which will ensure that the borrow area is rehabilitated, and that after closure of the area, vegetation establishes effectively. Measures for rehabilitation of the borrow area during closure will be provided in the EMPr.

## 7.1.4 Rehabilitation

Rehabilitation measures to be implemented will include:

- The Contractor shall take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.
- The contractor must re-establish any grass and vegetation within the borrow pit area that was disturbed during construction. All alien vegetation must be removed from the borrow pit area.
- Upon completion of all construction activities, all structures, equipment, materials, waste, rubble at the borrow pit area must be removed from site.
- The decommissioning of the site camp must be done in such a manner to cause the least environmental impact.
- All waste generated by the decommissioning of the site must be disposed of at an appropriate waste disposal site.
- All rehabilitation and reinstatement efforts shall be implemented immediately after completion of construction activities.
- Re-vegetation shall take place at the start of the rainy season to maximise water availability and minimise the need for watering.
- All topsoil including mulched vegetation material removed during vegetation clearing, but excluding invasive species), removed and stockpiled must be spread evenly all scared areas.
- Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion.
- Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.
- Re-vegetation of disturbed areas must be undertaken with site indigenous species.
- All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state, or better where possible, in agreement with the ECO.

## 7.2 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 project triggers activities listed in NEMA Listing Notices 1 and 3 as provided in Table 7-1.

**Table 7-1: Applicable Activities**

Name of the activity (All activities including activities not listed)	Aerial extent of the activity in Ha or m <sup>2</sup>	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 mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required to exercise the mining permit.	3.27612 ha	x	GNR 983 (as amended by GNR 327) Activity 21
The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	3.27612 ha	x	GNR 983 (as amended by GNR 327) Activity 27
Fence	50 000 m <sup>2</sup>	x	GNR 983 (as amended by GNR 327) Activity 27 GNR 985 Activity 12
Mobile Office	0.0025 ha	x	GNR 983 (as amended by GNR 327) Activity 21 GNR 983 (as amended by GNR 327) Activity 27
Stockpiles	<3.27612 ha	x	GN R 983 (as amended by GNR 327) Activity 27 GNR 985 (as amended by GNR 327) Activity 12 GNR 983 (as amended by GNR 327) Activity 21
Ablution Facility	0.0025 ha	x	GNR 983 (as amended by GNR 327) Activity 27 GNR 983 (as amended by GNR 327) Activity 21
Loading Hauling & Transport	1000m <sup>2</sup>	x	GNR 983 (as amended by GNR 327) Activity 27 GNR 983 (as amended by GNR 327) Activity 21

## 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**

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>	<b>REFERENCE WHERE APPLIED</b>	<b>HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT</b>
Constitution of the Republic of South Africa, (No. 108 of 1996)	The BA process	The proposed activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental rights of South Africans.
Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA)	The BA process and I&AP engagement	The BA process will be undertaken in terms of the NEMA and where required, the NWA, where the associated I&AP consultation process will be aligned with the PAIA in the sense that all I&APs will be given an opportunity to register as an I&AP prior to the initiation of the project and all registered I&APs will in turn be provided a fair opportunity to review and comment on any reports submitted to the competent authorities for decision making.
Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) (As amended)	Application for Mining in terms of Section 16	The application was submitted to and formally accepted by the DMR.
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 permits from the South African Heritage Resources Agency (SAHRA) for the destruction or relocation of graves or any other heritage resources 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 or not any permits will be required.
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA)	This Basic Assessment Report (BAR) and Environmental Management Programme (EMPr)	The application was submitted to and formally accepted by 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: Waste Act, 2008 (Act 59 of 2008)	The project does not trigger activities listed in GNR92 1of the NEM: WA and will not	The waste management hierarchy will be incorporated in the EMPr to govern

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
	require a Waste Management Licence (WML) from the DMR.	waste management during the implementation of the project.
National Environmental Management: Air Quality Act, 2008 (Act 59 of 2008) (NEM AQA)	This Basic Assessment Report (BAR) and Environmental Management Programme (EMPr)	The principles of the NEM: AQA, focusing on minimisation of pollutant emissions will also be taken cognisance of in the development of the EMPr.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)	This Basic Assessment Report (BAR) and Environmental Management Programme (EMPr)	The EMPr will include measures to control and manage alien invasive plant species.
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 Water Act, 1998 (Act 36 of 1998) (NWA)	Construction and operation of infrastructure within 100 m of a watercourse or 500m of a wetland	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 Authorisation (WUA). Should the impacts of the activities be of low significance, the activities may also be Generally Authorised (GA). According to the SANBI wetlands database, the proposed aggregate mining area is located within 500m of a wetland and will therefore require a Section 21 (c) and (i) WUA.
Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended in 2014.	Land Claims	There are no land claims associated with the affected properties.
Fezile Dabi District Municipality (DM) Spatial Development Framework (SDF)	Alternatives	The Fezile Dabi DM Spatial Development Framework shows that the area is not earmarked for any development by the DM.

## **9 Need and Desirability**

### **9.1 Need**

The existing conditions of the road between Frankfort and Tweeling poses risks to road users in terms of accidents and traffic congestion. Due to safety concerns along this section of the road, it was deemed necessary that this portion of the road be upgraded to improve the current operating conditions.

The proposed borrow pit will be used to provide the aggregate material required for the road improvement project.

### **9.2 Environmental responsibility**

It is expected that the mining project will have some negative environmental impacts, including, but not limited to the impacts that have been included in Section 13 of this report. Where possible, measures to mitigate the impacts of the project have been identified and included in the EMPr. The mitigation measures include designs and management practices that will be embarked on, to prevent and/or minimise the identified impacts on the social, cultural, and environmental aspects. The EMPr also includes environmental monitoring programme that will allow Maximus to keep track of the impacts of the project on the environment and where required, to take remedial action.

### **9.3 Socio-economic benefits**

The proposed mine is expected to have a positive socio-economic benefit through employment of locals. Recruitment of labour will be guided by Maximus's recruitment policies which are expected to promote the employment of local labour by the mine as well as by any appointed contractors. Maximus will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise.

### **9.4 No-go option**

The no-go alternative would entail not mining the aggregate. Should the borrow pit not be implemented, the applicant will have to import the material which result in increased costs to the project and loss of job opportunities to the local community.

It must be noted that with the no-go option, the additional potential negative impacts on the environment associated with aggregate mining would not exist. The environmental, social, and economic impacts have been assessed in detail in Section 13 of this report.

## **10 Motivation**

### **10.1 Preferred Site**

The application for the borrow pit has been proposed in order to source material that can be used for the construction of the refurbished road. The applicant has chosen this site due to its proximity to the road requiring upgrading, making it more cost effective and efficient compared to importing the material from elsewhere.

### **10.2 Technologies**

The technology proposed for the borrow pit will comply with national standards and best practices.

### **10.3 Design/Layout**

The borrow pit was designed to optimally mine the desired amount of material needed, taking cognisance of the possible environmental impacts associated with the proposed activities.

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

The identification and investigation of alternatives is a key aspect during the EIA process. All reasonable and feasible alternatives must be identified and assessed to determine and assess the most suitable alternatives. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of this scope. Such constraints include social, financial and environmental issues, which will be discussed in the evaluation of the alternatives. The preferred option is to be highlighted and presented to the authorities.

Alternatives can typically be identified according to:

- Location alternatives;
- Process alternatives;
- Technological alternatives; and
- Activity alternatives (including the No-go option).

For any alternative to be considered feasible, such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. The alternatives are described, and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical as well as environmental perspective.

Incremental alternatives typically arise during the impact assessment process and are usually included as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives. This section provides information on the development footprint alternatives, the properties considered, as well as the type of activity, activity layout, technological and operational aspects of the activity.

## 11.1 The property on which or location where it is proposed to undertake the activity

The location of the proposed borrow pit was selected due to its proximity to the road between Frankfort and Tweeling requiring upgrading.

## 11.2 Type of Activity

No activity alternatives were investigated.

## 11.3 Design or Layout of the Activity

The borrow pit was designed to optimally mine the desired amount of material needed, taking cognisance of the possible environmental impacts associated with the proposed activities.

## 11.4 The Technology to be used in the Activity

The technology proposed for the borrow pit will comply with national standards and best practices. As such, no technology alternatives were assessed.

## 11.5 The Operation Aspects of the Activity

The activities will be undertaken in such a way that they will comply with national standards and best practices. Therefore, no operational alternatives were assessed.

## 11.6 The Option of Not Implementing the activity

The no-go alternative would entail not mining the aggregate and leaving the landuse in the area as open veld. Should the borrow pit not be implemented, the applicant will have to import the material which result in increased costs to the project and loss of job opportunities to the local community.

## 11.7 Details of the Public Participation Process Followed

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

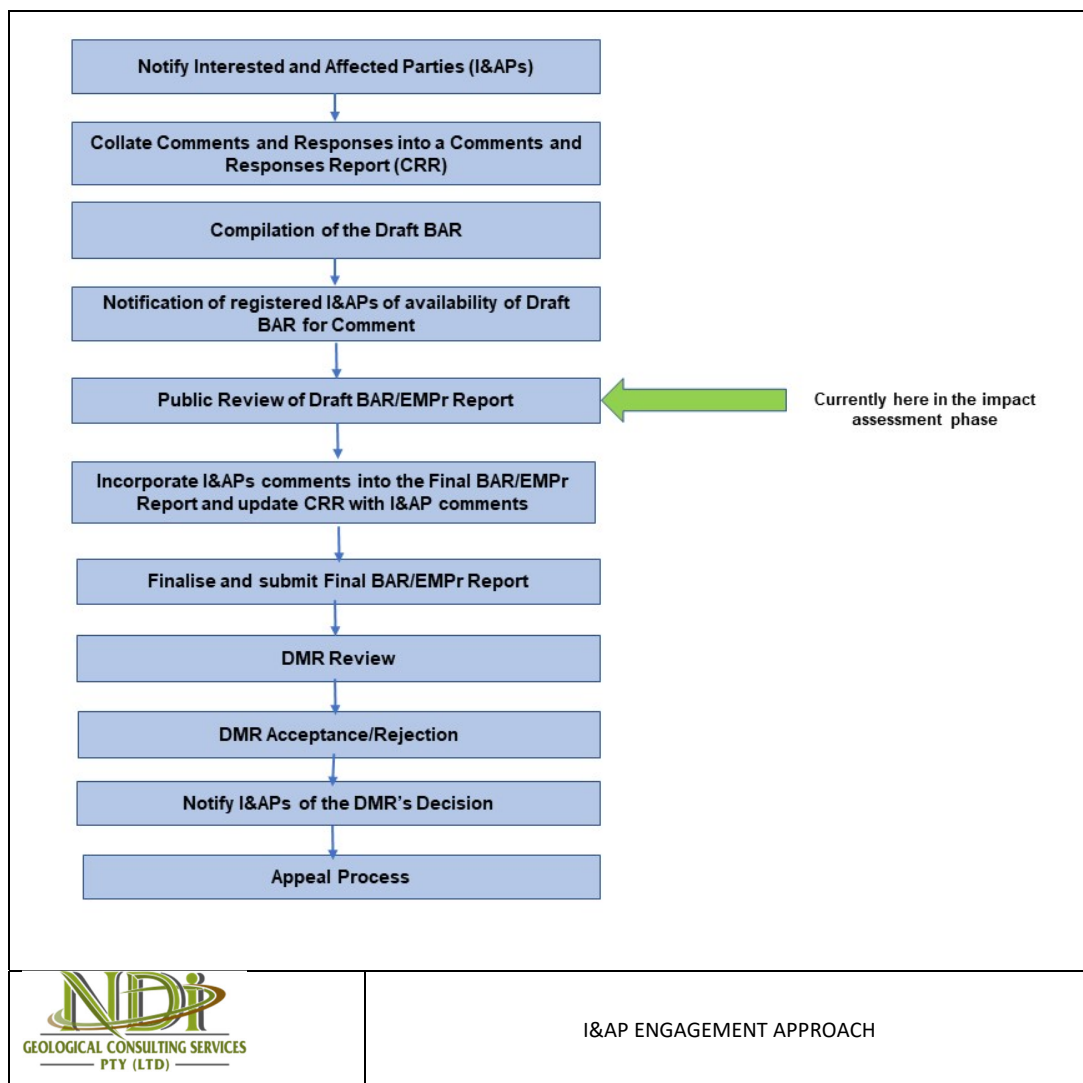
The I&AP engagement process forms an important part of the impact assessment process. The I&AP engagement process is primarily aimed at affording I&AP's the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key I&APs, and I&AP's 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 I&AP engagement process will be conducted in terms of NEMA, which provides clear guidelines for I&AP engagement during an EIA as summarised in Table 11-1.

**Table 11-1: NEMA I&AP Guidelines**

<b>NEMA Section</b>	<b>Applicability to I&amp;AP Engagement</b>
<b>Chapter 1</b>	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).
<b>Chapter 6,</b>	Regulations 39 – 44 of the amended EIA Regulations (GNR) 326, promulgated on 8 December 2014, specify the minimum requirements for I&AP engagement in an EIA process conducted under the NEMA.
<b>Section 24J of the NEMA</b>	In 2017, the Minister of Environmental Affairs published, Section 24J of the NEMA in terms of, Public Participation Guidelines which guide the Public Participation Process in order to give effect to Section (2)(4)(f), (o) and 24 (1A)(C) of the NEMA.

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



**Figure 11-1: Summary of the I&AP Engagement Process followed**

All the above guidelines have been incorporated into this I&AP 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;
- Mafube Local Municipality;
- Fezile Dabi District Municipality; and
- Free State Department of Small Business Development, Tourism and Environmental Affairs (DESTE).

All I&AP engagement documents have been included in Appendix 4.

**11.7.1 I&AP Identification Interested and Affected Parties**

An I&APs register was developed using information from the surveyor general’s office and from I&APs 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 I&APs 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 11-2.

**Table 11-2: List of Affected Farm and Farm Portions**

Farm	21 Digit Survey General Code
Farm Arcadia Drie Drie Een No. 1449	F01400000000144900000

The adjacent properties are provided in Table 11-5.

**Table 11-3: List of Adjacent Farm and Farm Portions**

Farm	21 Digit Survey General Code
Marsala A 1055 (Remaining Extent)	F01400000000105500000
Marsala A 1055 (Portion 1)	F01400000000105500001
Florida 1464	F01400000000146400000
Klein Je 1049	F01400000000104900000
Acrdia 1050 (Portion 2)	F01400000000105000002
Acrdia 1050 (Remining Extent)	F01400000000105000000
Chateau De La Riverie 1463	F01400000000146300000
Welligt A 687	F01400000000068700000
Marsala Siding 692	F01400000000069200000
Silver's Rest 744	F01400000000074400000
Arcadia "A" 1081	F01400000000108100000
La Chute D'Eau 1053	F01400000000105300000
Rosedale 343	F01400000000034300000
Marsala Siding 692	F01400000000069200000
Marsalina 1077	F01400000000107700000

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

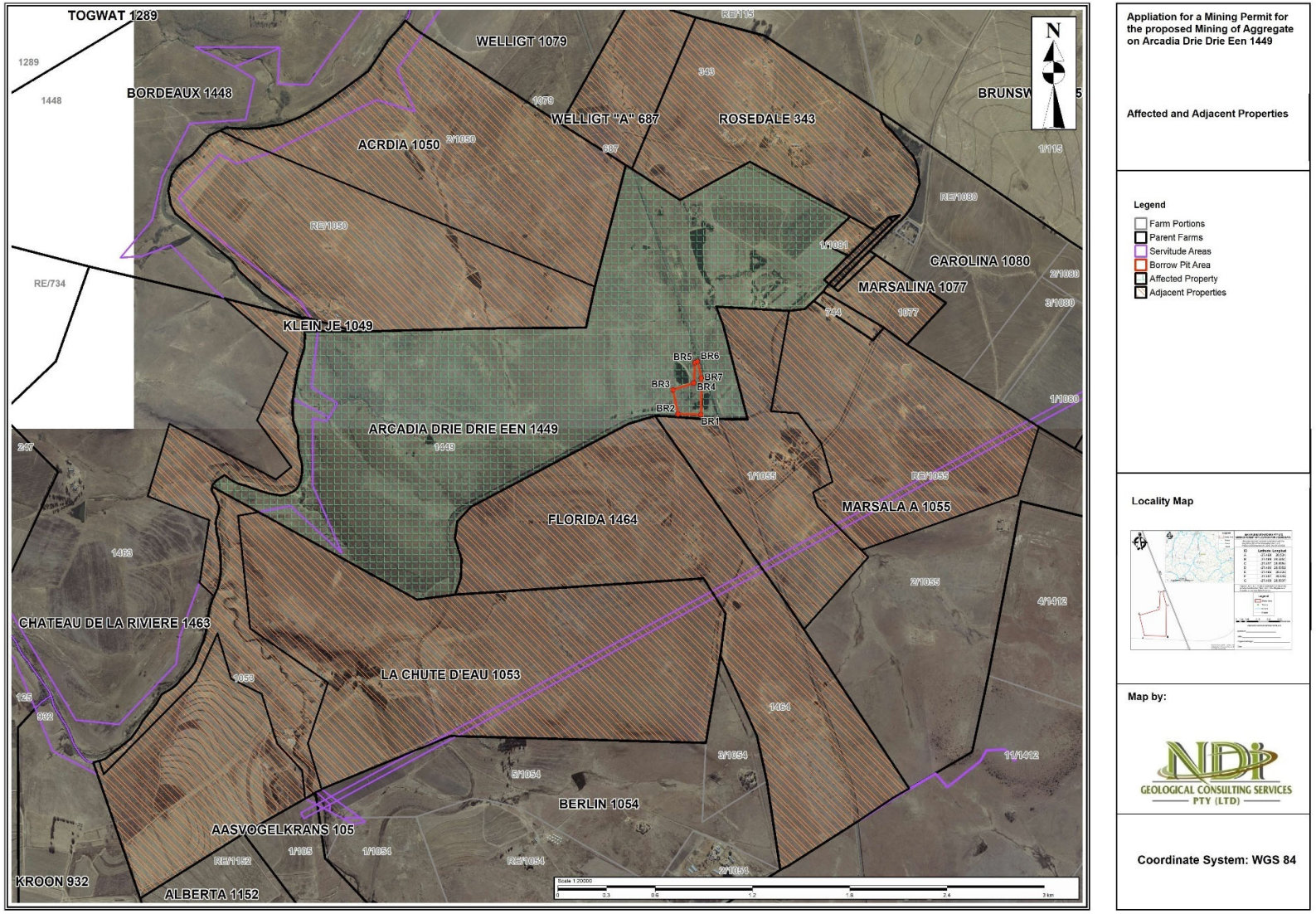


Figure 11-2: Affected and Adjacent Properties

### 11.7.2 Project Announcement

I&APs were informed of the proposed mining project as well as Maximus's intention to undertake the required environmental processes and EA application through various methods. I&APs 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 informing them of the proposed project.
- Site Notice Placements: Sites notice boards (Size A2: 600 mm X 420 mm) notifying I&APs and I&APs of the proposed mining were placed at conspicuous places in the project area.
- Newspaper Advertisements: Newspaper advertisements notifying I&APs about the proposed project and the opportunity to participate in the EIA process were placed in the newspapers.

## 11.8 Public Review of the Draft Basic Assessment Report

The Draft BAR was compiled in terms of the requirements of GNR 326 and will be made available to I&APs for 30 days between 19 April and 23 May 2022. All comments received during the announcement phase of the I&AP engagement process will be incorporated into Draft BAR and collated into a Comments and Responses table that will be incorporated into the Final BAR.

The availability of the Draft BAR was announced by means of SMSes, letters and emails to registered I&APs. Copies of the draft BAR will be made available at the venues listed in Table 11-4.

**Table 11-4: List of places the Draft BAR will be places for public review**

Public Place	Locality	Telephone
Ndi Geological Services Website	<a href="http://www.ndigeoservices.co.za/">http://www.ndigeoservices.co.za/</a>	053 842 0687

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

## 11.9 I&AP Consultation Meeting

Where required, a I&AP consultation meeting will be held ensuring that the COVID-19 Regulation requirements are met. This would preferably be undertaken through, where possible, online meetings. In cases where I&APs do not have internet access, the meetings will be held with no more than 50 I&APs in attendance. I&APs will be informed of the COVID-19 Regulation requirements that will be enforced during the meeting. The purpose of the meeting will be to discuss the proposed mining project as well as the findings from the impact assessment process. I&APs will be provided with an opportunity to raise queries and/or objections to the proposed project.

## 11.10 Summary of Issues Raised by I&APs

No comments have been received to date following the announcement phase of the project. Any comments received will be included in Table 11-5 which provides a summary of the comments received from I&APs.

**Table 11-5: 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.
<b>AFFECTED PARTIES</b>				
<b>Landowner/s</b>				
Municipal councillor	X			
<b>Municipality</b>				
No comments received to date.				
<b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS</b>				
<b>Communities</b>				
<b>Dept. Land Affairs</b>				
<b>Traditional Leaders</b>				
<b>Dept. Environmental Affairs</b>				
<b>Other Competent Authorities affected</b>				
<b>OTHER AFFECTED PARTIES</b>				

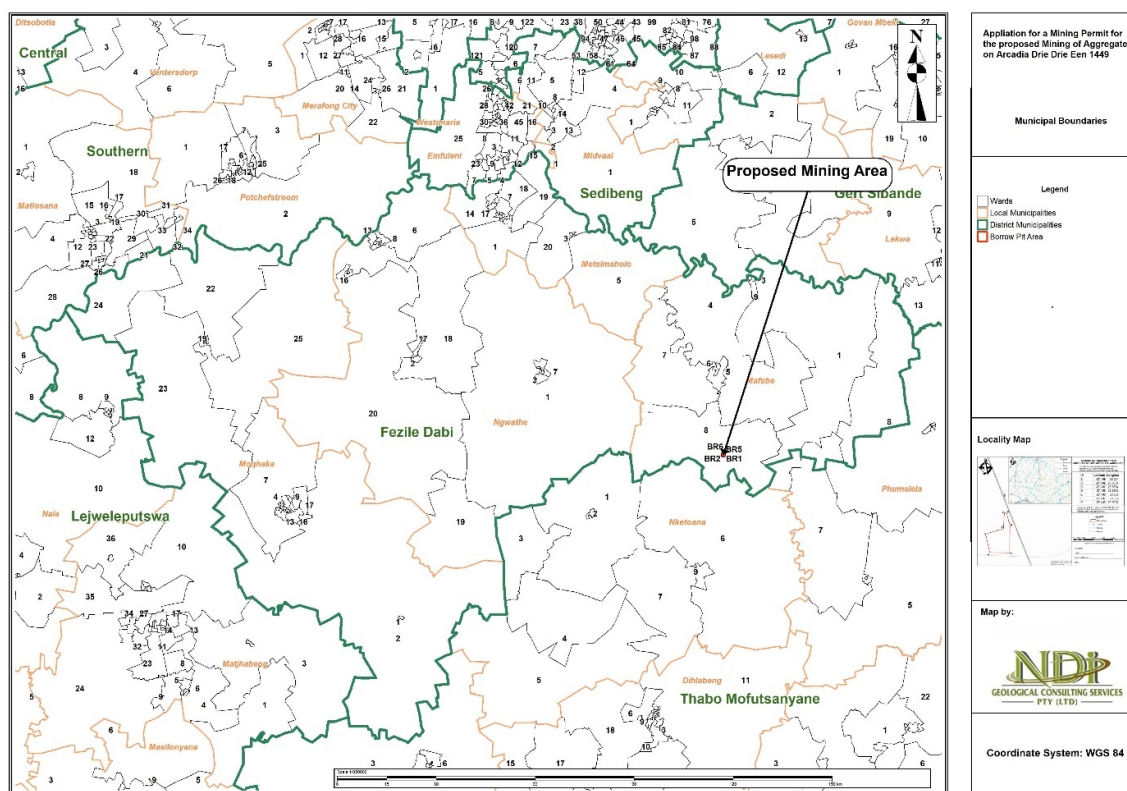
NO COMMENTS RECEIVED TO DATE

# 12 Environmental Attributes Associated with the Alternatives

## 12.1 Baseline Environment

### 12.1.1 Geographical

The proposed project area is situated in the Mafube Local Municipality (MLM)'s area of jurisdiction, within the Fezile Dabi District Municipality, in the Free State Province (Figure 12-1). The Fezile Dabi District Municipality is a Category C municipality, formerly known as the Northern Free State District Municipality, situated in the north of the Free State. It is bordered by the Northwest, Gauteng and Mpumalanga Provinces to the north, Thabo Mofutsanyane District to the south, and Lejweleputswa District to the west.



**Figure 12-1: Municipal Areas**

The Mafube Local Municipality is a Category B municipality in the Fezile Dabi District of the Free State Province. It is one of the four municipalities in the district, making up almost a quarter of its geographical area.

### 12.1.2 Topography

The site is located in an area with flat terrain, with elevation ranging between 1 560 and 1 580 MAMSL (Figure 12-2).

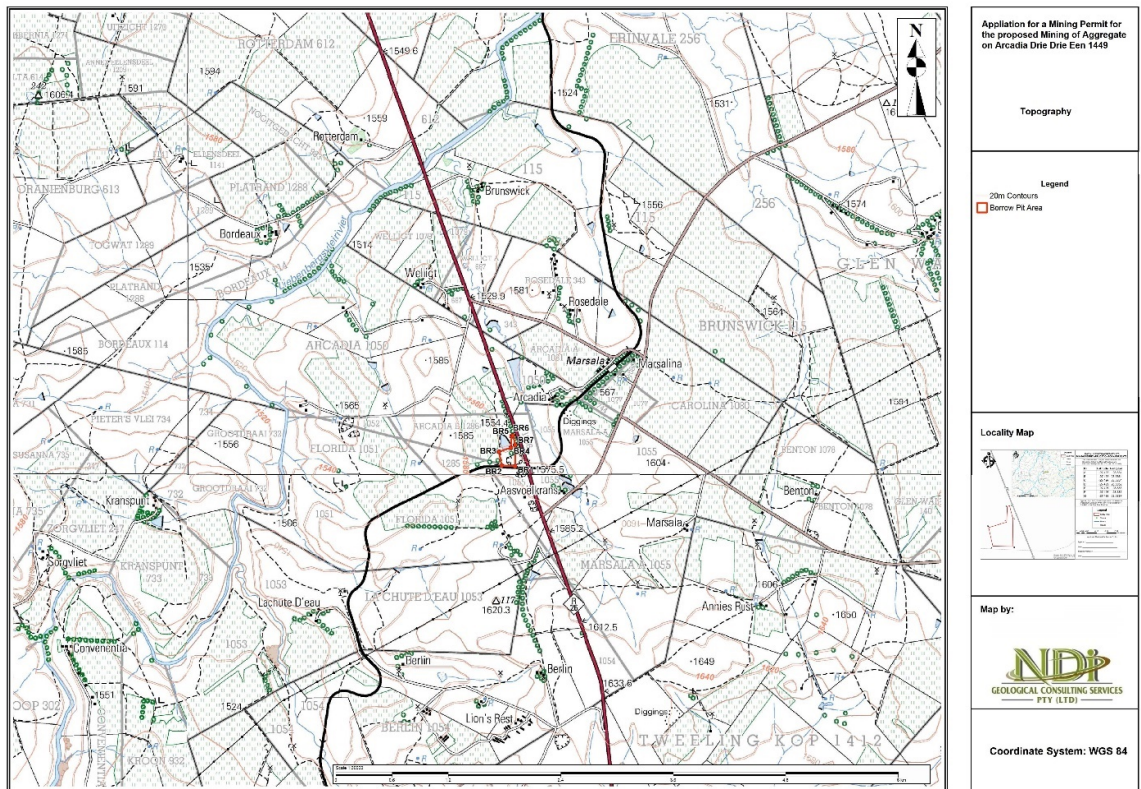
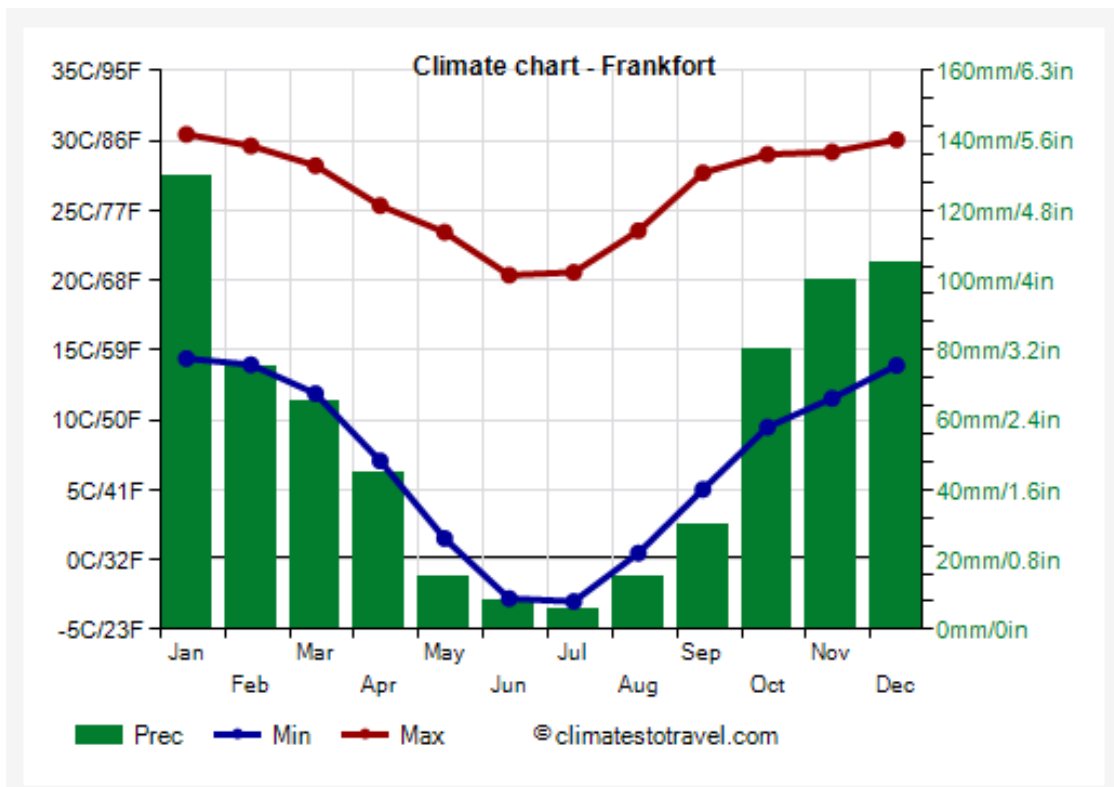


Figure 12-2: Topography

### 12.1.3 Climate

Frankfort's climate is temperate, influenced by altitude, with mild, dry winters (during which it gets cold at night) and hot, sunny summers (during which thunderstorms often break out). The area experiences summer-rainfall, with Mean Annual Precipitation (MAP) of around 680mm (much of which falls in the form of thunderstorms) as shown in Figure 12-3.



**Figure 12-3: Climatic data**

The Mean Annual Temperature of the area is around 15-17 °C, indicating a cool to warm-temperature climate, characterised by great temperature differences between summer and winter (thermic continentality due to the deep inland situation and high altitude of the unit) as provided in Table 12-1.

**Table 12-1: Mean Annual Temperature**

Month	Min (°C)	Max (°C)	Mean (°C)
January	14	30	22.4
February	14	30	21.8
March	12	28	20
April	7	25	16.2
May	2	23	12.5
June	-3	20	8.8
July	-3	21	8.8
August	0	24	12
September	5	28	16.4
October	9	29	19.2

Month	Min (°C)	Max (°C)	Mean (°C)
November	12	29	20.4
December	14	30	22
Annual	6.9	26.4	16.65

In Frankfort, precipitation amounts to 675 millimetres per year: so, it is at an intermediate level. It ranges from 6 mm in the driest month (July) to 130 mm in the wettest one (January). The precipitation data is provided in Table 12-2.

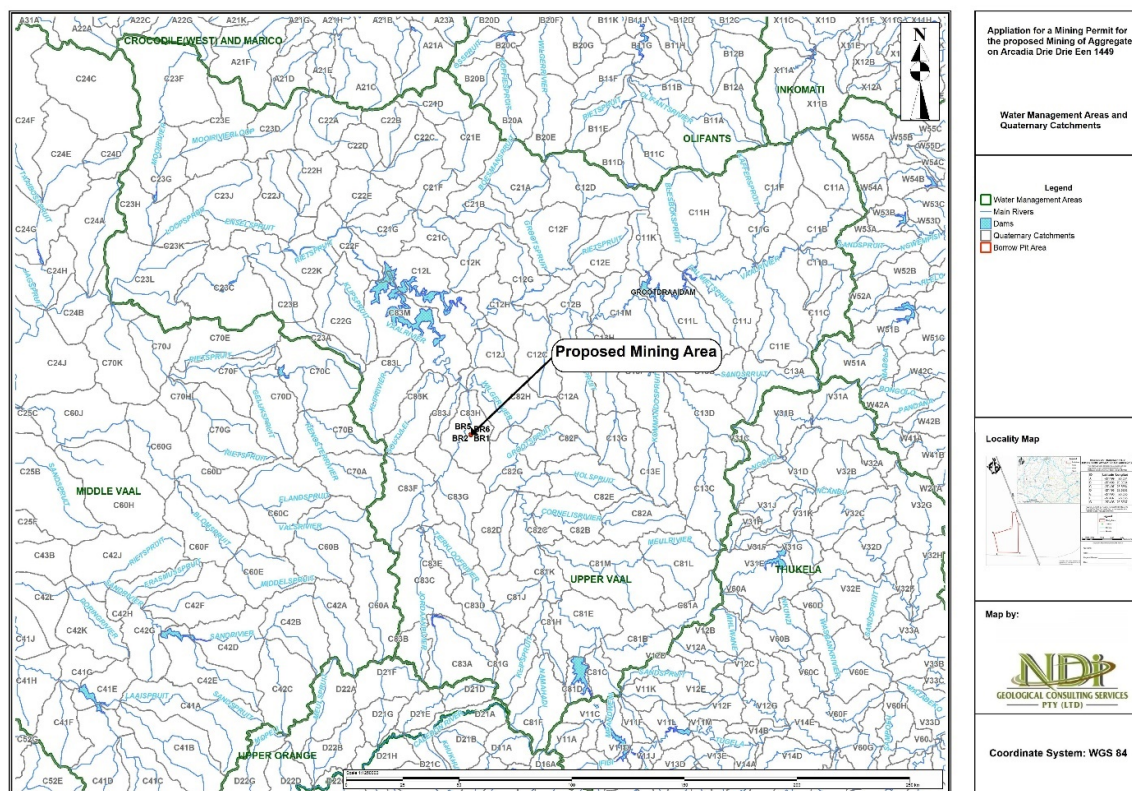
**Table 12-2: Average Precipitation**

Month	Average Precipitation (mm)
January	130
February	75
March	65
April	45
May	15
June	8
July	6
August	15
September	30
October	80
November	100
December	105
Annual	675

### 12.1.4 Water Resources

The project is located within quaternary catchment area C83H, located within the Upper Vaal Water Management Area (WMA) (Figure 12-4). The Upper Vaal WMA is part of a larger water supply system, which includes adjacent WMAs and Lesotho.





**Figure 12-4: Water Management Areas and Quaternary Catchment Areas**

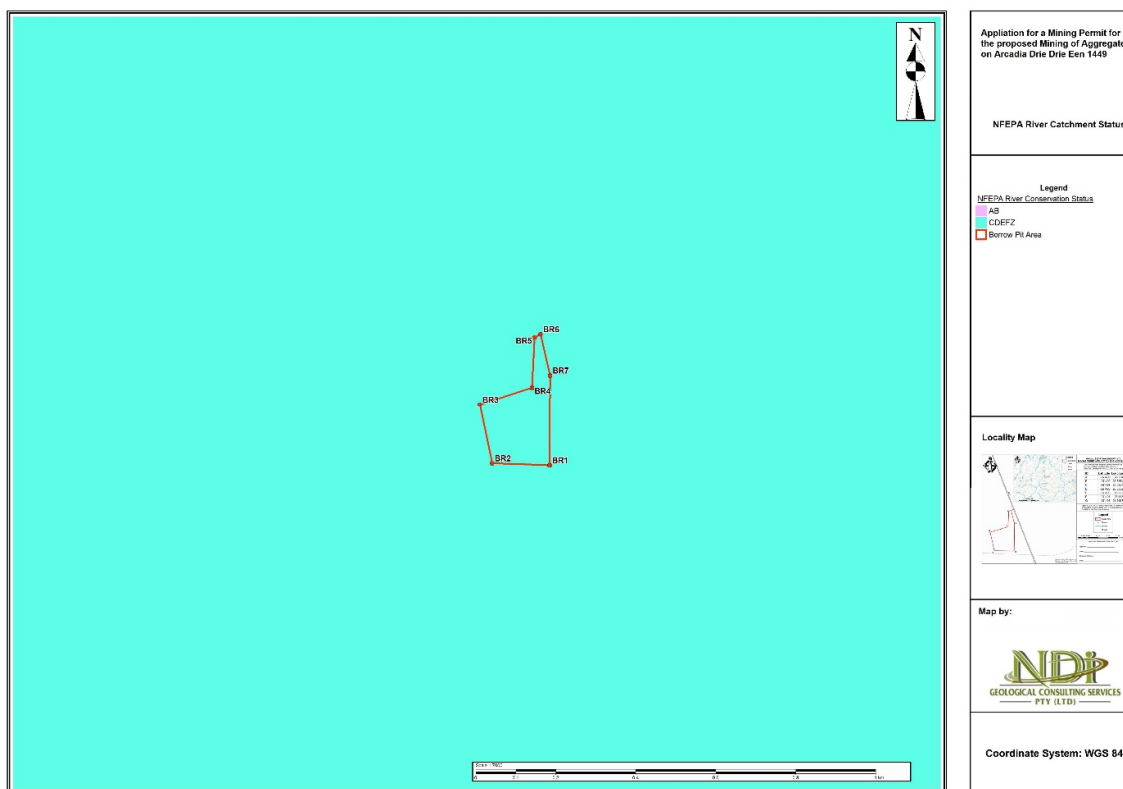
The Upper Vaal Water Management Area (Upper Vaal WMA) includes the Vaal, Klip, Wilge, Liebenbergsvlei and Mooi Rivers and extends to the confluence of the Mooi and Vaal Rivers. It covers a catchment area of 55 565 km<sup>2</sup>. This WMA includes the very important dams Vaal Dam, Grootdraai Dam and Sterkfontein Dam. The southern half of the WMA extends over the Free State, the north-east mainly falls within Mpumalanga and the northern and western parts in Gauteng and North West Provinces respectively.

There are no streams and/or drainage lines that traverse the project area or located within 100m of the project area (Figure 12-5).



**Figure 12-5: Rivers, Streams and Drainage Lines**

According to the SANBI National Freshwater Ecosystem Priority Areas (NFEPA) (2011), the affected quaternary catchment area has river conditions considered to be modified (CDEFZ) (Figure 12-6). The area is however not regarded as important in terms of fish sanctuaries, rehabilitation, or corridors.



**Figure 12-6: NFEPA River Catchment Status**

### 12.1.5 Regional Geology

The geology of the Free State Province is underlain by sedimentary rocks belonging to the Beaufort and Ecca Groups of the Karoo Supergroup. These constitute sandstone, shale and mudstone, which have been intruded by dolerite sills and dykes. They are part of the vast Karoo basin that covers almost two-thirds of South Africa and were deposited between 200 and 300 million years ago.

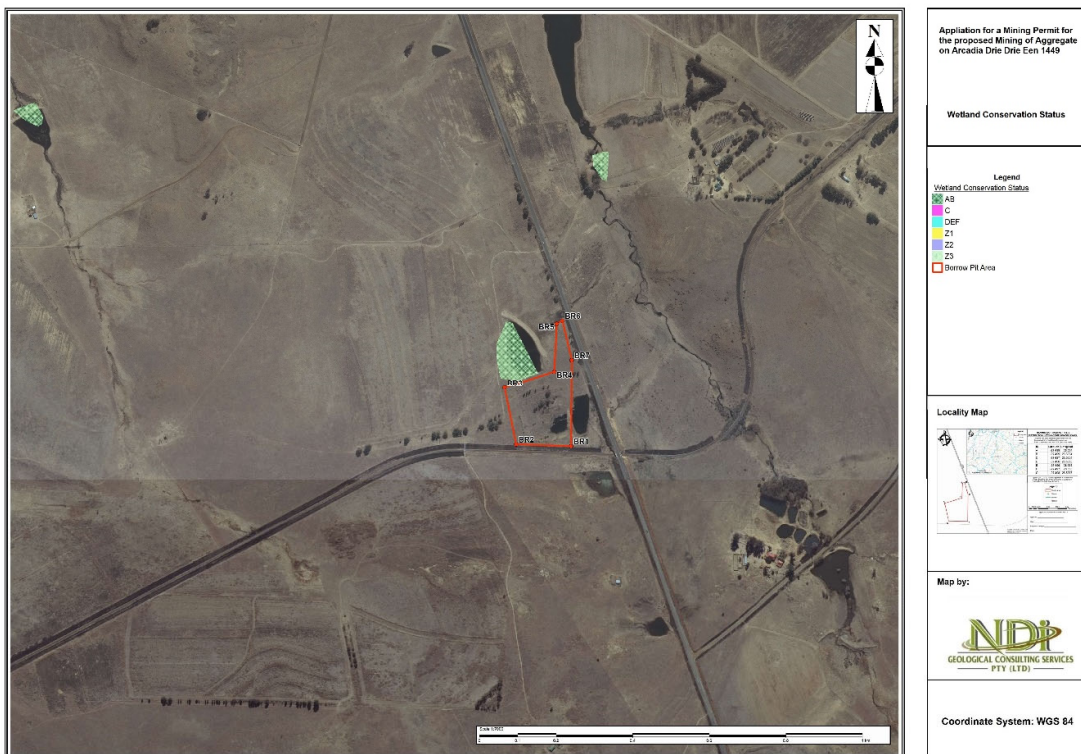
### 12.1.6 Wetlands

The SANBI data shows that there is an unchanneled valley bottom wetland occurring proximate to the proposed borrow area (Figure 12-7).



**Figure 12-7: Wetland Types**

According to the NFEPA, the wetland is classified as Z (heavily to critically modified) - (percentage natural land cover < 25%) (Figure 12-8).



**Figure 12-8: Wetland Status**

The NFEPA also classifies the wetlands as follows:

- The wetland does not intersect with a Ramsar Site; and
- The wetland is not located within 500 m of an IUCN threatened frog point locality.

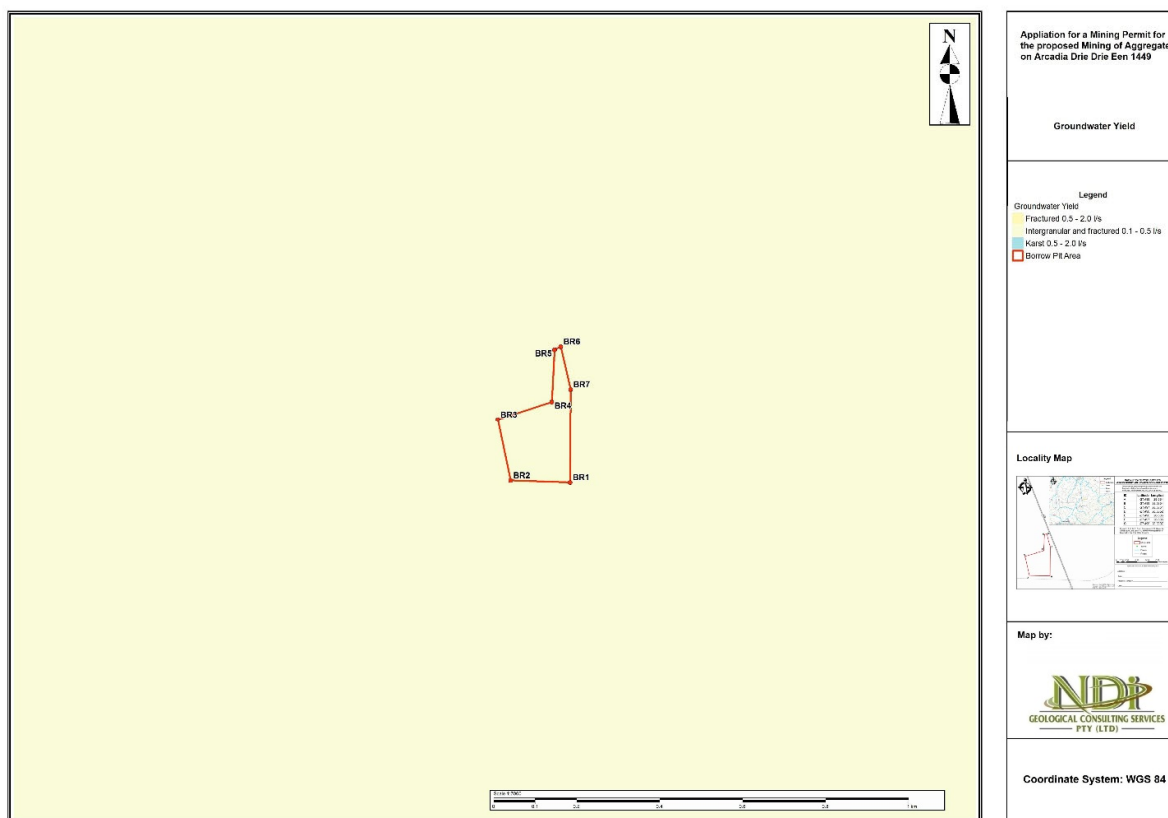
### 12.1.7 Protected Areas

There are no protected areas or Important Bird Areas (IBA) associated with the area.

### 12.1.8 Groundwater

#### Groundwater Yield

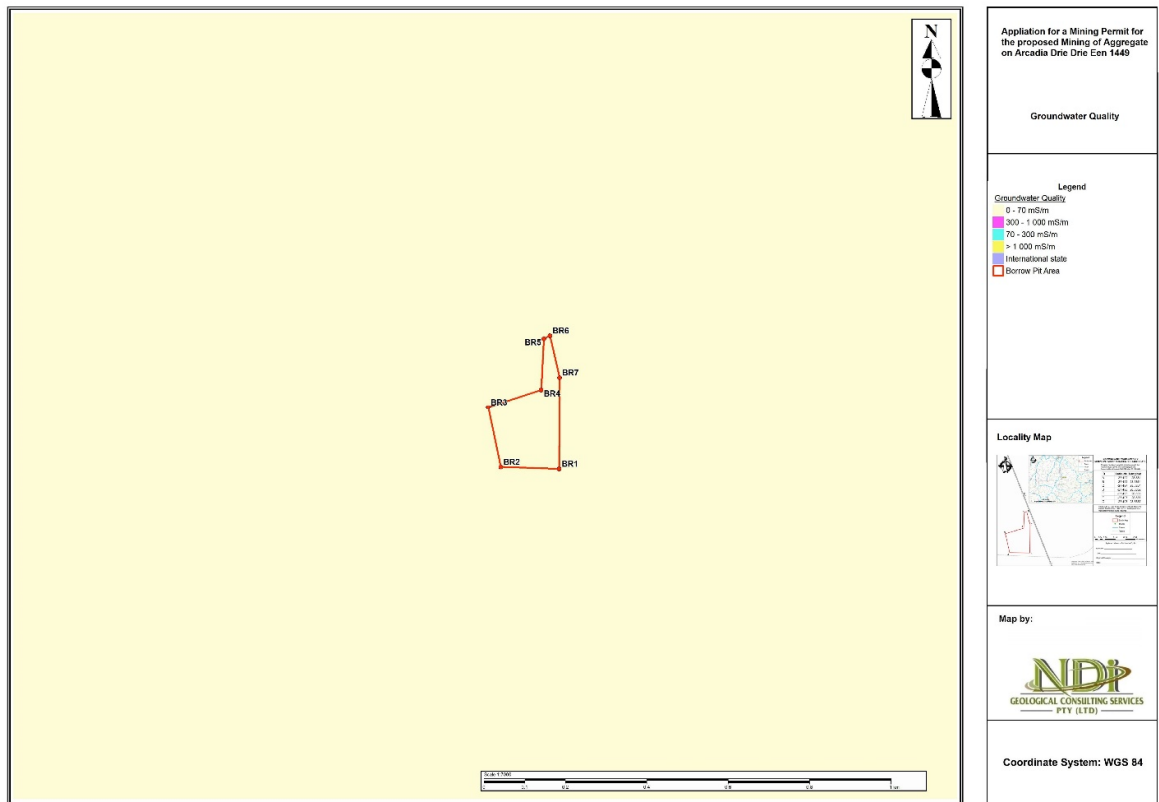
The DWS National Groundwater Archive (NGA) shows that a section of the area is located in an area with a fractured aquifer with groundwater yield between 0.5 and 2.0l/s (Figure 12-9).



**Figure 12-9: Groundwater Yield**

#### Groundwater Quality

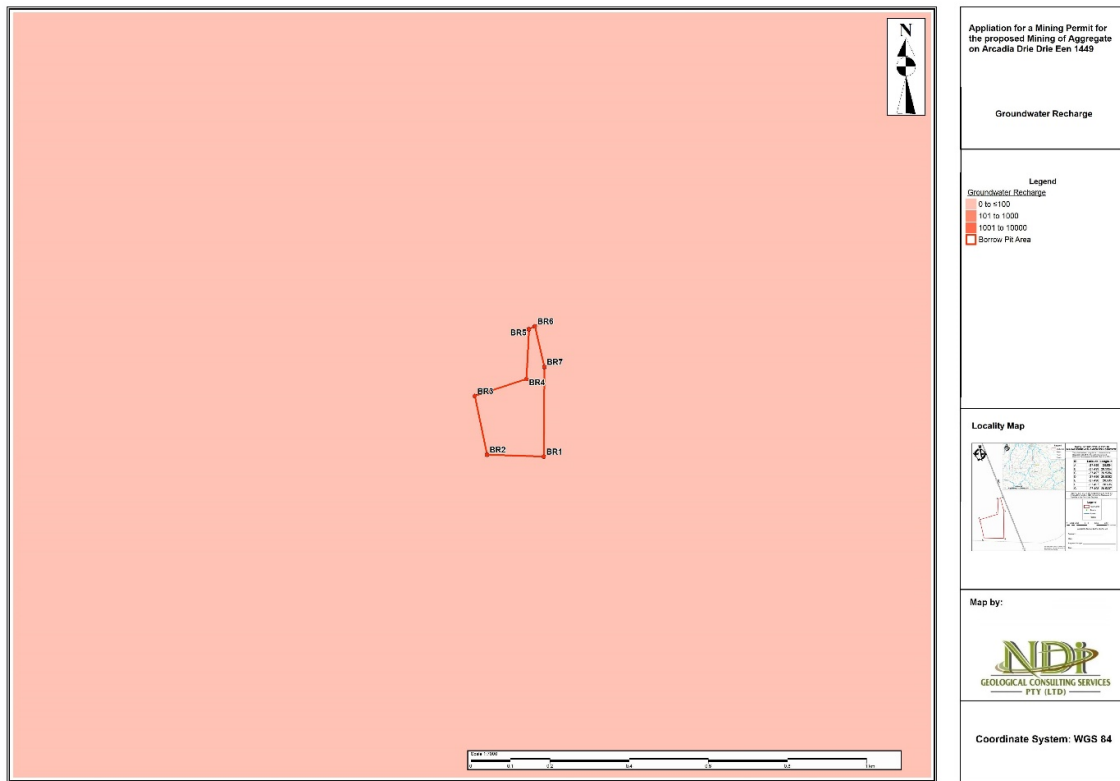
The DWS NGA data shows that the area has groundwater considered to be of good quality, with Electrical Conductivity (EC) levels between 70 and 300 mSm (Figure 12-10).



**Figure 12-10: Groundwater Quality**

Groundwater Recharge

Groundwater recharge in the area is also fairly low, between 0 and 1000 mm/yr (Figure 12-11).

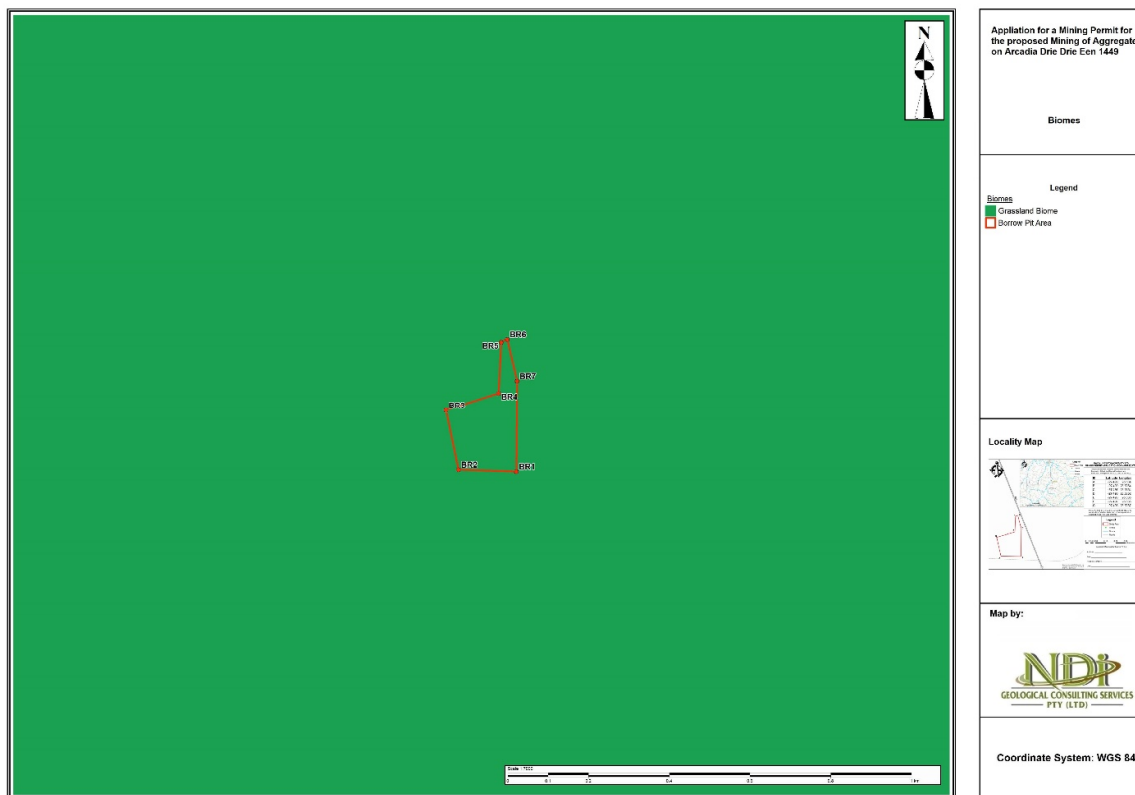


**Figure 12-11: Groundwater Recharge**

### 12.1.9 Biodiversity

#### Biomes

The proposed mining area is located in the Grassland Biome as shown in Figure 12-12.



**Figure 12-12: Biomes**

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. Trees are absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

There are two categories of grass plants: sweet grasses have a lower fibre content, maintain their nutrients in the leaves in winter and are therefore palatable to stock. Sour grasses have a higher fibre content and tend to withdraw their nutrients from the leaves during winter so that they are unpalatable to stock. At higher rainfall and on more acidic soils, sour grasses prevail, with 625 mm per year taken as the level at which unpalatable grasses predominate. C4 grasses dominate throughout the biome, except at the highest altitudes where C3 grasses become prominent.

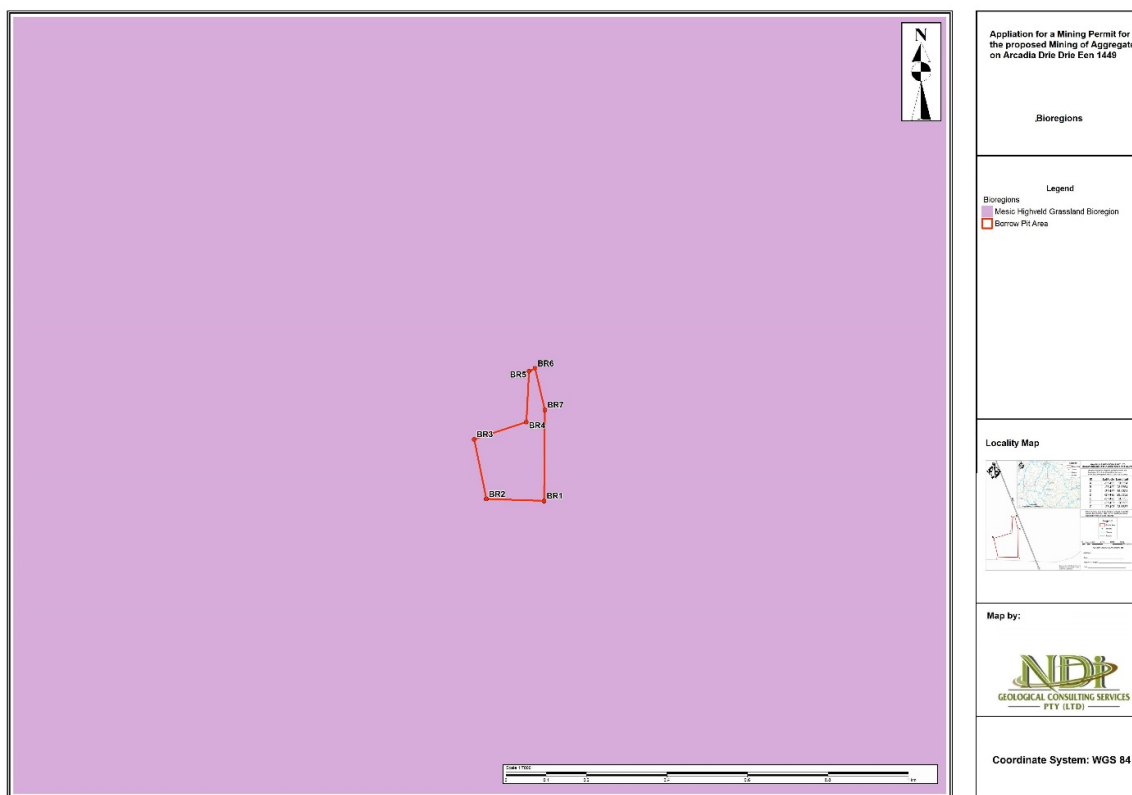
Grass plants tolerate grazing, fire, and even mowing, well: most produce new stems readily, using a wide variety of strategies. Overgrazing tends to increase the proportion of pioneer, creeping and annual grasses, and it is in the transition zones between sweet and sour grass dominance that careful management is required to maintain the abundance of sweet grasses. The Grassland Biome is the mainstay of dairy, beef and wool production in South Africa. Pastures may be augmented in wetter areas by the addition of legumes and sweet grasses. The Grassland Biome is the cornerstone of the maize crop, and many grassland types have been converted to this crop. Sorghum, wheat and sunflowers are also farmed on a smaller scale.

Urbanization is a major additional influence on the loss of natural areas. The Grassland Biome is considered to have an extremely high biodiversity, second only to the Fynbos Biome. Rare plants are often found in the grasslands, especially in the escarpment area. These rare species are often endangered, comprising mainly endemic geophytes or dicotyledonous herbaceous plants. Very few grasses are rare or endangered. The scenic splendour of the escarpment region attracts many tourists.



### **Bioregions**

The proposed mining area is located in the Mesic Highveld Vegetation Bioregion (Figure 12-13).



**Figure 12-13: Bioregions**

The Mesic Highveld Grassland is found mainly in the eastern, high rainfall regions of the Highveld, extending all the way to the northern escarpment. These are considered to be “sour” grasslands and are dominated by primarily andropogonoid grasses. The different grassland types are distinguished on the basis of geology, elevation, topography and rainfall. Shrublands are found on the outcrops of rock within the bioregion, where the surface topography creates habitat in which woody vegetation is favoured above grasses.

### **Vegetation Types**

According to the SANBI remaining vegetation types database, there is no remaining natural vegetation on the affected area. The threatened ecosystem associated with the site is the Frankfort Highveld Grasslands (Figure 12-14). According to SANBI, all the affected ecosystems are classified as Least Threatened (Figure 12-15).

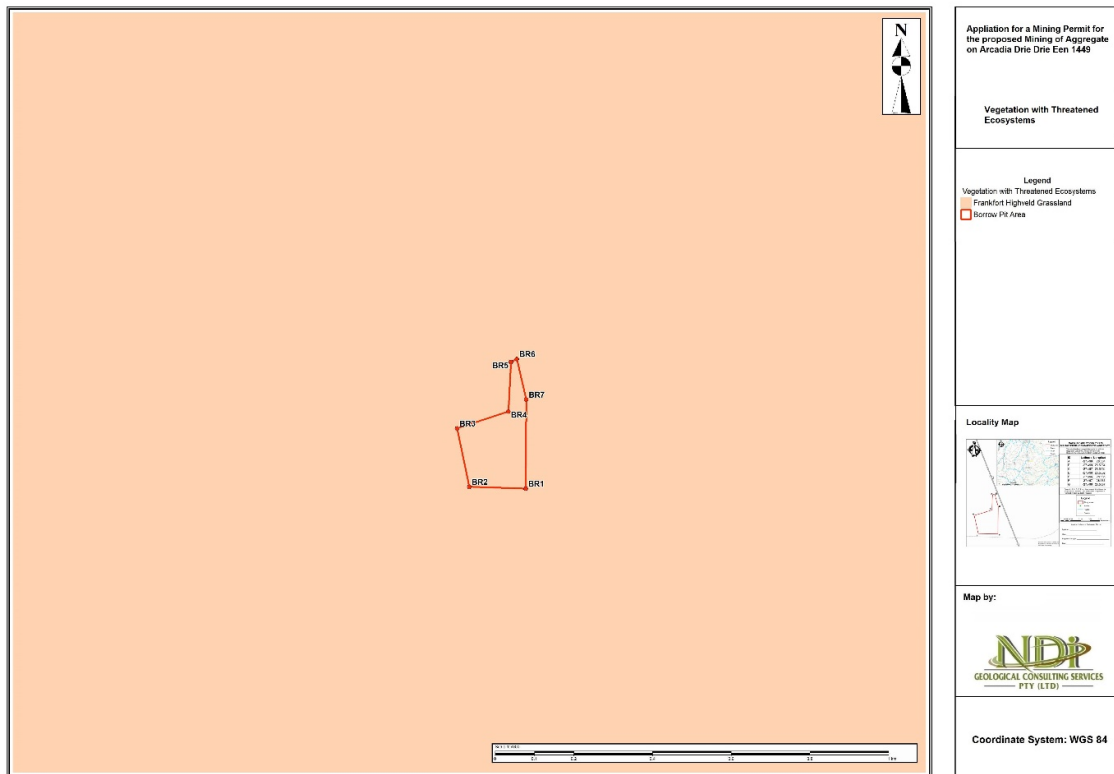


Figure 12-14: Vegetation with Threatened Ecosystems

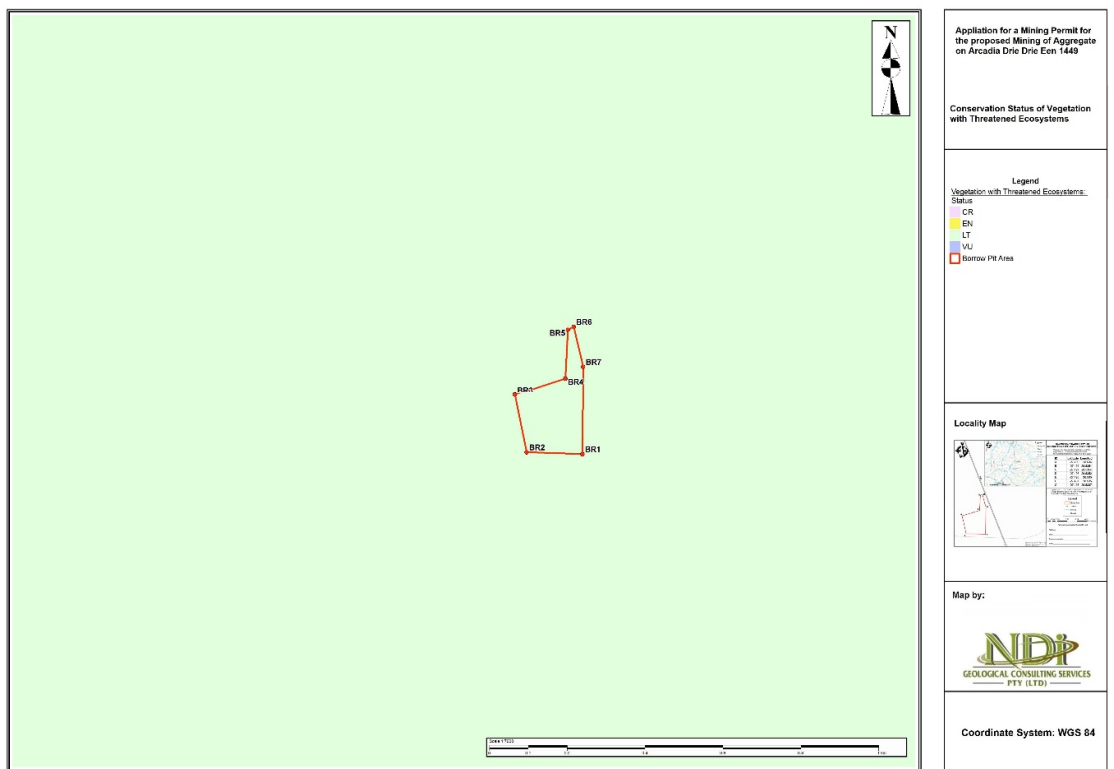
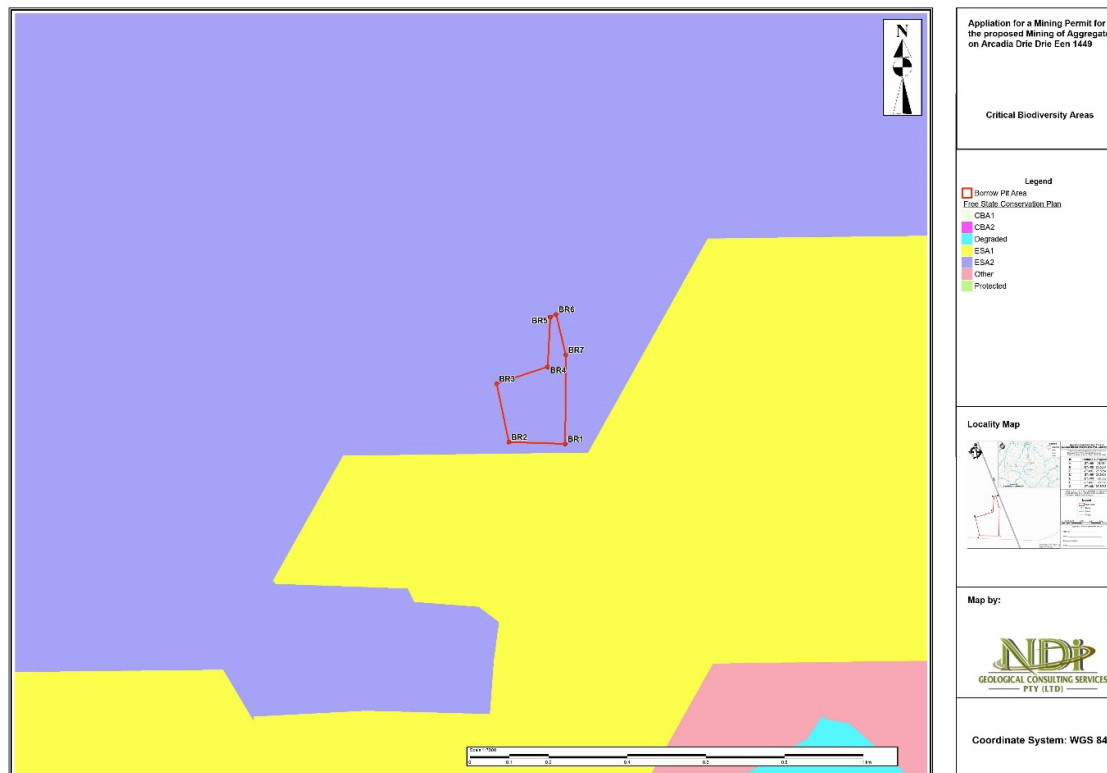


Figure 12-15: Status of Vegetation with Threatened Ecosystems

### 12.1.10 Conservation Plan

According to the Free State Provincial Biodiversity Conservation Plan (C Plan), there are Ecological Support Areas (ESAs) (areas not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services) associated with the proposed project area as shown in Figure 12-16.



**Figure 12-16: Areas of Conservation Importance**

### 12.1.11 Noise

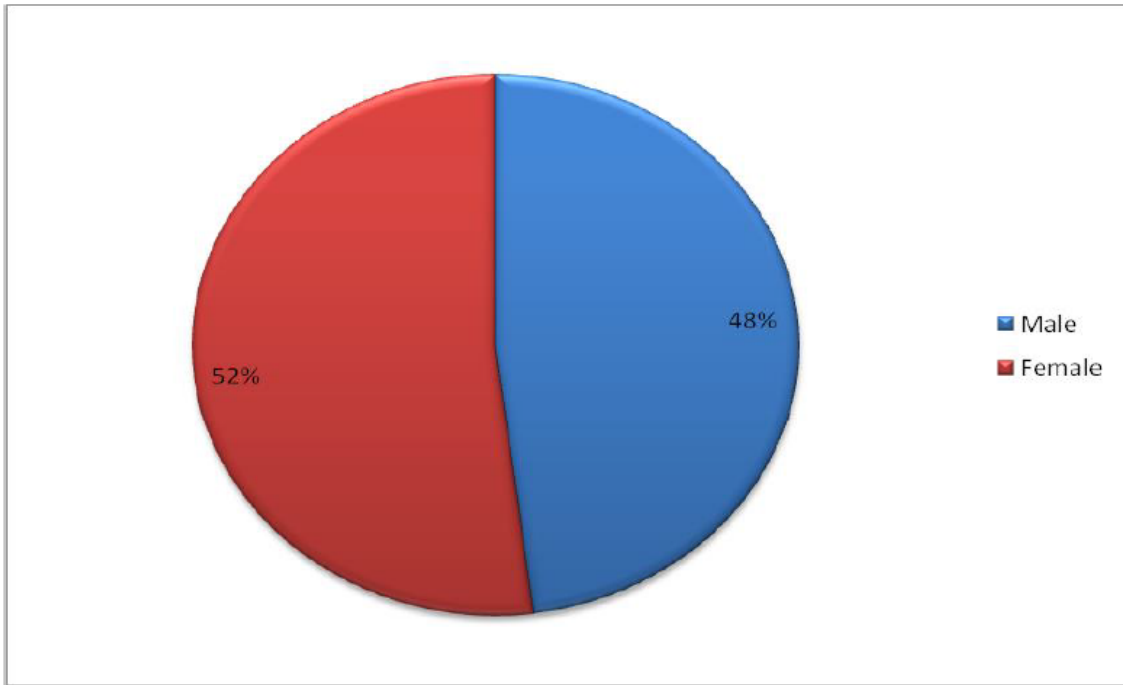
The typical noise rating in the area is expected to be that for rural districts with little road traffic. According to SANS 10103:2008, the continuous noise rating level is thus likely between 35 dB(A) at night to 45 /50 dB(A) during the day.

### 12.1.12 Socio-Economic

The proposed mining area is located within the Mafube Local Municipality (MLM), in the Fezile Dabi District Municipality of the Free State Province. Mafube Local Municipality consists of four (4) towns (Frankfort//Namahadi, Villiers/Qalabotjha, Cornelia/Ntswanatsatsi and Tweeling/Mafahlaneng) as well as a rural area consisting mainly of commercial agriculture.

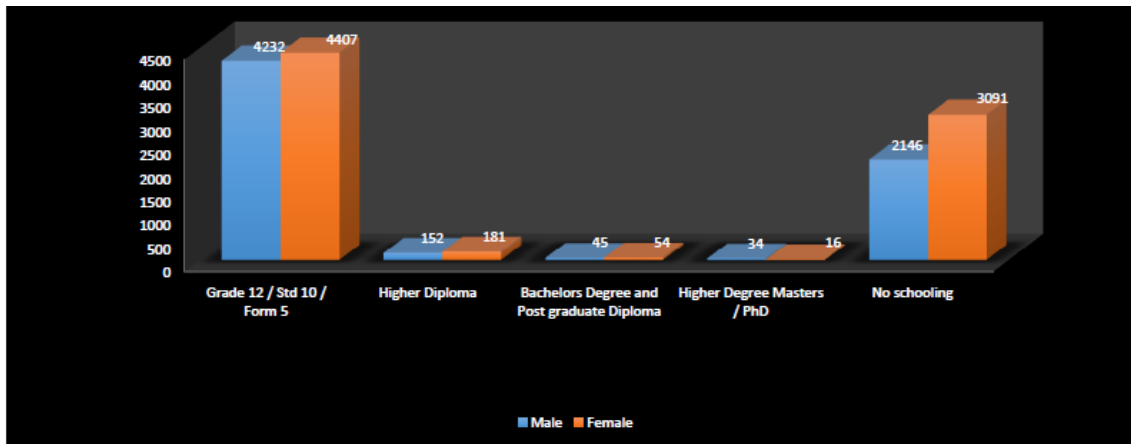
#### Demographics

The total estimated residents in the Mafube Region, is 57 876, with approximately 52% of the population being female (Figure 12-17).



**Figure 12-17: Population distribution of Mafube L.M (Census 2011)**

Population of Mafube L.M, on educational level; majority of Mafube L.M population has up to grade 12/ form 5, followed by the no schooling, with the majority being females and less numbers of the population, has higher/diploma, bachelor’s Degree and post graduate diploma, and higher degree masters/PhD as shown in Figure 12-18.



**Figure 12-18: Gender by Highest Education Level**

Employment

Most of the employed in Mafube are male’s with 63.52 % of the population, with 36.46% employed females. Unemployment rates stand at 57.84% for females and 42.16% for males, discouraged work-seekers stand at 65.93% females and 34.07% males (Figure 12-19). The population that is not economically active stands at, 59.12% females and 40.88 males; this information is as the census 2011, and it is evident that most of the unemployed and the discouraged work-seekers, are females.

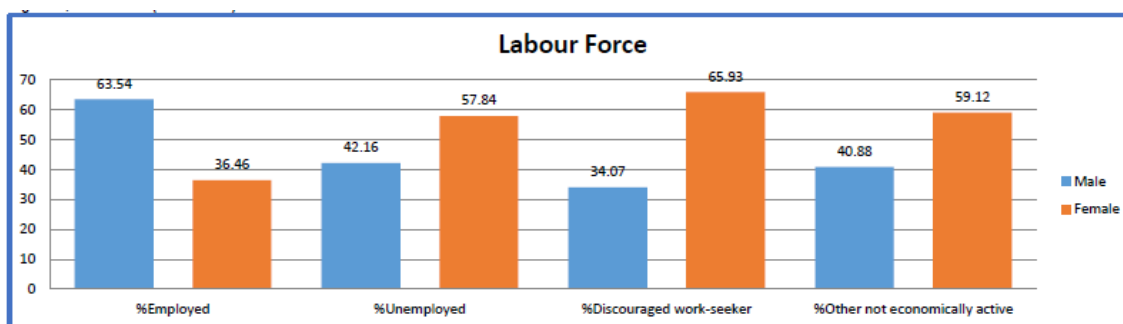


Figure 12-19: Labour force (Census 2011)

## 12.2 Description of the current land uses

The land use associated with the open veld.

## 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 12-20.

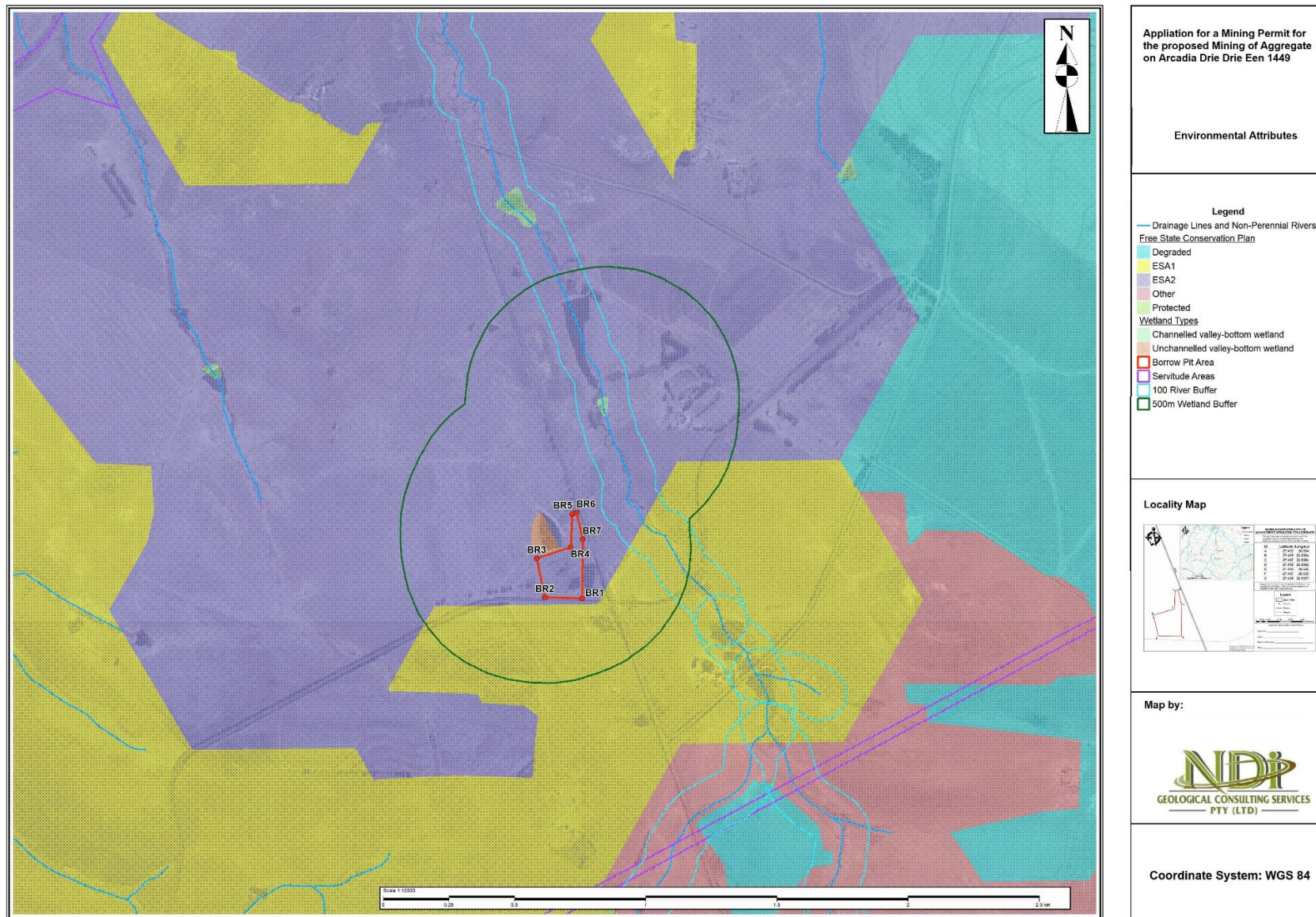


Figure 12-20: Current Environmental Attributes and Landuse Map

## 13 Impacts and Risks Identified

This section contains the assessment of potentially positive and negative environmental impacts that can be caused by the proposed project. The impacts are linked to the activities conducted for the proposed development, broadly relating to pre-construction, construction, operations and decommissioning phases. Specific emphasis was placed on any relevant environmental, social and economic impacts identified by the specialist studies, comments received during the I&AP engagement process, issues highlighted by relevant authorities; as well as a professional judgement of the EAP team through appraisals on the project description, listed activities and the receiving environment.

The objectives for each of the potential environmental impacts identified was to determine their significance and to promote mitigation measures to reduce the impacts to an acceptable level where required. Key potential positive and negative environmental issues relating to the proposed project were assessed according to the adopted methodology for assessing impacts as described in Section 14.

Table 13-1 provide a high-level assessment of the potential impacts and associated mitigation measures which could result from the proposed mining project 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.
Aquatic ecosystems, riparian and wetland areas	Possible impacts on aquatic ecosystems, riparian and wetland areas
Air Quality	Possible impact on Air Quality in the area.
Climate Change	Possible contribution to climate change through emission of Green House Gases
Vibrations	Possible impacts on private properties and fauna due to 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.
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 Pre-Construction and Construction

The detailed description of activities to be undertaken during the pre-construction and construction phases is included in Section 7. The following impacts are envisaged during the pre-construction and construction phases.

### 13.1.1 Socio-Economic

The following socio – economic impacts are envisaged as a result of the construction phase of the proposed project:

- Positive impact on local economy due to economic opportunities for local and regional business (informal as well) from supplying services and materials to contractors during the construction phase;
- Negative impact associated with construction activities, including the clearing of land and excavations for the project dissecting the landscape which will impact on the sense of place;
- Negative impact due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site, health and safety impacts on local communities may include construction workers lighting fires on site, littering and driving irresponsibly;
- Potential increase in social pathologies and negative health impacts due to contractor camp and potential squatting of job seekers; and
- As a result of construction activities, potential local employment opportunities will become available, increasing access to financial capital for workers.

### 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. Care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality as a result of spillages and uncontrolled release. 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 infrastructure. The impact on evapotranspiration is therefore expected to be negligible.

### 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 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 as a result 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.

### 13.1.4 Wetlands and Aquatic Ecosystems

It is expected that the removal of vegetation from the construction area will 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 wetland riparian species inhabiting the area. Impacts on the aquatic ecosystems and will include:



- Loss of habitat and aquatic ecosystem and wetlands and riparian ecological structure as a result of site clearance activities and uncontrolled aquatic ecosystem and riparian habitat degradation;
- Impact on the aquatic ecosystem and wetland systems as a result of changes to the sociocultural service provisions through site clearance, waste management and riparian disturbance;
- Potential poor planning, resulting in the placement of the infrastructure into aquatic ecosystem and wetland habitats, leading to altered habitat;
- Impact on the hydrological functioning of the aquatic ecosystem and wetland systems;
- Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetlands habitat; and
- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetlands/riparian resources.

### 13.1.5 Heritage and Archaeological Resources

The following potential impacts are envisaged should any archaeological artefacts and graves be located on the site:

- 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 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 Conservation Concern (SCC) as a result of site clearing, alien species, waste management and soil compaction;
- Vegetation clearance may lead to floral habitat loss of potential SCC;
- 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 as a result 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 as a result of 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 species trapping; and
- Impact on faunal SCC due to habitat loss and collision with construction vehicles.

### **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, PM<sub>10</sub> and PM<sub>2.5</sub>. 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 as a result of the movement of machinery and the erection of contractor camps; and
- Indirect visual impact due to dust generation as a result 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 in the immediate vicinity of the project.

### **13.1.12 Soil Landuse 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 mining activities depending on mitigation and rehabilitation strategies. Strategic stormwater management should be put in place to minimise soil losses.
- Soil contamination as a result of construction activities can be as a result of a number of activities (i.e. incorrect hazardous substance storage, incidental hydrocarbon leakages from construction vehicles);
- Loss of soil resource and utilisation as a result of 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 waste. This will have the potential to result in soil pollution when not managed properly; and
- In areas of permanent changes such as the access borrow pit area, the erection of infrastructure and stockpiles, the current land capability and land use will be lost permanently.

### **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 Pre-Construction and Construction Phases**

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		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
Socio-economic	Influx of job seekers will have a negative social impact on the landowners and land occupiers.	2	1	2	2	2	20	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; Liaise with the SAPD and existing forums in order 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	1	2	2	2	20	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	1	2	2	2	20	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	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)		
	Ineffective communication channels leading to community unrest.	2	1	2	2	2	20	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.	2	1	2	2	2	20	Low (-)		1	1	1	1	2	9	Low (-)		
	Possible boost in short term local small business opportunities.	2	1	2	2	2	20	Low (+)		2	1	2	2	2	20	Low (+)		
	Possible creation of short-term employment for locals	2	1	2	2	2	20	Low (+)		2	1	2	2	2	20	Low (+)		
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 bundwalls; 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 made available on request.	2	1	1	2	2	16	Low (-)		
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 infrastructure.	2	2	2	2	2	24	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 streams and 500 meters from wetland and riparian areas without approval from the DWS; Vehicle and personnel movement within watercourses, wetland and riparian areas shall be strictly prohibited;	1	1	1	2	2	12	Low (-)		
	Potential deterioration in water quality due to the potential accidental spillages of hazardous substances.	2	2	2	2	2	24	Low (-)		1	1	1	2	2	12	Low (-)		

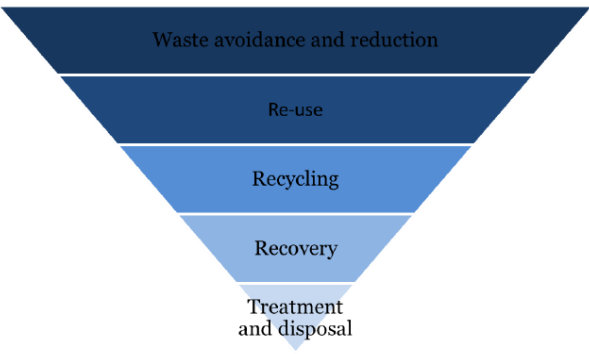
Environmental Aspect	Nature of potential impact/risk	Environmental Impact Significance Before Mitigation							Impact Management Actions (Proposed Mitigation Measures)	Environmental Impact Significance After Mitigation								
		Consequence			Probability		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
	Debris from poor handling of materials and/or waste blocking watercourses, resulting in flow impediment and pollution.	2	2	2	2	2	24	Low (-)	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 (-)		
	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, Wetlands and Riparian Areas	Localised changes to the riparian and wetland 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 in order to prevent erosion and the associated sedimentation of the aquatic system; No construction activities shall be allowed within 500 m of riparian and wetland areas without consent from the DWS; No vehicles may be allowed to indiscriminately drive through the riparian and wetland 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 and wetland 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	2	9	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	2	9	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	2	9	Low (-)		
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of riparian and wetland resources.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)		
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of riparian and wetland habitat.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)		
	Impact on the hydrological functioning of the aquatic ecosystems.	3	2	2	2	2	28	Medium Low (-)		1	1	1	1	2	9	Low (-)		
Heritage Resources	The proposed project has the potential to impact on local graves within the area.	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	Clearance of the area 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 (-)		
Flora	Loss of localised biodiversity habitats within sensitive areas due to site clearance and establishment of infrastructure and mining area.	3	3	2	2	2	32	Medium 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;	1	1	1	1	2	9	Low (-)		
	Loss of localised floral species diversity including SCC and medicinal protected species due to site clearance and site establishment.	3	3	2	2	2	32	Medium 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.	3	3	2	2	2	32	Medium 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		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
									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 and wetland 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. 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, 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;	1	1	1	1	2	9	Low (-)		
	Habitat fragmentation as a result of construction activities leading to loss of floral diversity.	2	1	2	2	2	20	Low (-)	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;	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 (-)	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;	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 (-)	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.	1	1	1	1	1	6	Low (-)		
Air Quality	Possible increase in dust generation, PM <sub>10</sub> and PM <sub>2.5</sub> as a result of bulk earthworks, operation of heavy machinery, and material movement.	3	2	2	2	2	28	Medium Low (-)	Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities;	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		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
	Increase in carbon emissions and ambient air pollutants (NO <sub>2</sub> and SO <sub>2</sub> ) as a result of movement of vehicles and operation of machinery/equipment.	3	2	2	2	2	28	Medium Low (-)	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 in tandem with the construction activities; A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from any unpaved roads used; 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; 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 (-)		
Visual	Scaring of the landscape as a result of the clearance of vegetation.	3	2	2	2	2	28	Medium 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;	1	1	1	1	2	9	Low (-)		
	Visual intrusion as a result of the movement of machinery and the establishment of the required infrastructure.	3	2	2	2	2	28	Medium Low (-)	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 (-)		
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	3	2	2	2	2	28	Medium 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.	3	2	2	2	2	28	Medium Low (-)	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 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 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; 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 as a result of vehicle hydrocarbon spillages and compaction.	2	1	2	2	2	20	Low (-)	During site preparation, special care must be taken during the clearing of the works area where organic material will be stored	1	1	1	2	1	9	Low (-)		

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		Consequence			Probability		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity	Severity	Spatial			
	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 (-)	separately from the topsoil and spoil material to ensure for the protection thereof. This topsoil must be re-used during the rehabilitation phase. 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. This will include, but not limited to: <ul style="list-style-type: none"> <li>Suitable erosion protective measures to be implemented.</li> <li>Stabilisation of cleared areas to prevent and control erosion.</li> <li>Monitoring to be conducted to detect erosion.</li> <li>Rehabilitate all areas disturbed during construction.</li> <li>Manage stormwater from construction site to avoid environmental contamination and erosion.</li> </ul> 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 resource and its utilisation potential due to compaction over unprotected ground/soil.	2	1	2	2	2	20	Low (-)		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 on public roads as well as the farm roads around the mining area.	2	3	2	2	2	28	Medium Low (-)		Local speed limits and traffic laws shall apply at all times 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 as a result 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 as a result of inappropriate waste management practices.	2	3	2	2	2	28	Medium Low (-)	The management of waste on site will take into account the principles of the NEM: WA and implement the waste management hierarchy of waste management as provided in Figure 13-1.	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					
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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance		Significance Rating	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact
								 <p><b>Figure 13-1: Waste Management Hierarchy to be followed</b></p> <p><i>Separation of waste:</i>                      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, 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.</p> <p><i>Storage of waste:</i>                      No stockpiling of debris shall be permitted within 100 m of any water courses and drainage lines, or within 500 m of riparian and wetland areas;                      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 them 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;                      No construction rubble shall be disposed of to the wetland and riparian area;                      If construction rubble is not removed immediately, it shall be stockpiled outside the sensitive environments including 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.</p> <p><i>Disposal of hazardous waste:</i>                      No dumping shall be allowed in or near the construction site;</p>						

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		Frequency: Impact	Significance		Significance Rating	Consequence			Probability		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity					
									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. <i>Disposal of general waste:</i> 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 detailed description of activities to be undertaken during the operational phase is included in Section 7. The quantitative impact assessment for the operational phase can be found in Table 13-3. The following impacts are envisaged during the operational phase.

### 13.2.1 Social-Economic

The following socio – economic impacts are envisaged as a result of the operational phase of the proposed project:

- Negative impact as a result of the project as there will be additional trucks on the roads, impacting on local communities' health and safety;
- 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;
- Positive impacts due to the implementation of the provisions of the EMPr; and
- Positive impact as a result of operation and associated activities, providing a potential for local employment opportunities; increasing access to financial capital for workers.

### 13.2.2 Groundwater

Potential operational phase impacts on groundwater are expected to be as follows:

- Handling of waste and transport of materials cause various types of spills (domestic waste, sewage water, hydrocarbons) which can infiltrate and cause contamination of the groundwater system.
- The use of machinery and vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater.

### 13.2.3 Surface water

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

- The potential for contamination of surface water due to releases of dirty water due to transportation of aggregate. It is recommended that regular dust suppression be conducted as far as possible. Spillages and accidental discharges could result in the contamination of surface water resources.
- Improper site management may result in runoff from latrines and domestic waste which could pollute surface water resources.
- Impacts on surface water resources quality as a result of incorrect waste management practises and pollution.

### 13.2.4 Wetlands and Aquatic Ecology

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

- Loss of wetland and riparian habitat and aquatic ecological structure as a result of continual disturbance and uncontrolled degradation;

- Impact on the aquatic ecological systems as a result of 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, riparian and wetland systems as a result of reduced aquatic ecosystem, riparian and wetland 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 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.

### 13.2.6 Fauna

The proposed may result in the following impacts on the faunal environment during the operational phase:

- Continued loss of faunal diversity as a result of poaching and faunal species trapping;
- Impact of faunal species of conservational concern due to habitat loss and collision with vehicles transporting material; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts on faunal habitats during the operation phase.

### 13.2.7 Wetland and Aquatic Environmental Impacts

In addition to the impacts on aquatic habitats as explained in Section 13.1.5, the operational phase of the project is expected to have the following impacts on wetlands and aquatic ecosystems:

- Loss of habitat and wetland ecological structure as a result of continual wetland disturbance and uncontrolled wetland degradation;
- Impact on water quality and availability as a result in ineffective dirty water separation, and dirty water entering into the wetland;
- Impact on the wetlands systems as a result of changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and wetland disturbance; and
- Impact on the hydrological functioning of the wetland systems as a result of reduced wetland footprints and uncontrolled disturbance.

### 13.2.8 Soils, Land Use and Land Capability

The operation of the mine will inevitably scar the landscape. 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). The use of vehicles during the operation of the project may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination and compaction of soils. The materials removed from the mining activities has

potential for contamination should it not be managed properly, which may render the land not usable after backfilling operation.

### **13.2.9 Topography Impacts**

As a result of operational phase activities, the following impacts are envisaged as a result of the operational phase:

- The continuous placement of mined aggregate onto the demarcated stockpile area will modify the local topography of the site-specific area; and
- Mining of the aggregate will ultimately alter the topography.

### **13.2.10 Geology Impacts**

Extraction of the aggregate will result in the removal of local geology.

### **13.2.11 Air Quality**

During the operational phase there is potential for dust generation potentially resulting in nuisance and health effects on nearby receptors during operational activities. Dust generating activities associated with the operational phase activities include materials handling, vehicle entrainment of dust on the haul roads, windblown dust from the stockpiles and exposed areas. The impact the postposed project is envisaged to have on the air quality of the area during the operational phase are as follows:

- Possible increase in dust generation, PM<sub>10</sub> and PM<sub>2.5</sub> as a result of stockpiling material, use of heavy machinery, and material movement;
- Increase in carbon emissions and ambient air pollutants (NO<sub>2</sub> and SO<sub>2</sub>) as a result of movement of vehicles and operation of machinery/equipment.

### **13.2.12 Visual**

The operational phase of the project will potentially result in visual impacts due to loss of sense of place due to:

- Mining activities and the aggregate stockpiles;
- Additional vehicular activities impacting on the rural character of the region;
- Generation of dust leading to visual intrusion, visual exposure of receptors and impacts on the overall landscape character; and
- Night-time lighting should 24-hour operations taking place may impacting on receptors accustomed to a low district brightness during night-time.

### **13.2.13 Heritage, Archaeological Resources**

The mining operations may result in the destruction of graves and other heritage resources.

### **13.2.14 Palaeontology Impacts**

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

### **13.2.15 Ambient Noise**

The following noise impact is envisaged as a result of the operational phase of the proposed project:

- The use of vehicles and machinery during the operational phase may generate noise in the immediate vicinity; and

- Increase in ambient noise levels as a result of the mining activities. The assembling of mine related equipment and/or structures during the operational phase will inherently generate a degree of noise emissions.

### **13.2.16 Traffic**

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

### **13.2.17 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.

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: Impact	Significance	Significance Rating		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
Socio-Economic	Positive impact as a result of operation and associated activities, providing a potential for local employment opportunities; increasing access to financial capital for workers	2	1	2	1	2	15	Low (+)	Where it is possible, hire/use local people; Identify opportunities for the employment/procurement and training of people and contractors from the local area; Opportunities for local employment may include activities related to office cleaning, ground maintenance and mining; Based on these opportunities, develop a recruitment and training strategy that operations recruiters will have to adhere to; Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; Employment and training of the youth and females where possible; Implementation of employment and procurement policy; Communication with locals regarding job opportunities and skills requirements to manage expectations.	2	1	2	1	2	15	Low (+)
	Additional trucks on the roads may impact local communities' health and safety	2	1	2	1	2	15	Low (-)	Operation vehicles to be road worthy and drivers to adhere to speed limits; Develop and implement mine standards and requirements, Mine Safety Health and Environmental policies, as well as relevant South African regulations such as the Mine Health and Safety Act (Act No. 29 of 1996) as amended; Inform employees and neighbouring landowners and inhabitants about operation activities; Ensure a grievances procedure is in place.	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 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	2	1	1	2	2	16	Low (-)	Ensure a grievances procedure is in place for local people to log grievances; Implement local recruitment and training strategies and policies, and clearly communicate these locally through relevant authorities and media; Do not recruit informally at the gate but follow a formal recruitment process; Make use of local accommodation for contract workers, as opposed to a contractor's camp; Inform employees and neighbouring landowners and inhabitants about local recruitment strategies and policies, and give regular updates; Monitor the surrounding area for informal settlement and develop a strategy to deal with informal settling; Ensure that all contractors and their employees attend inception training, addressing mine standards and requirements, Mine Safety Health and Environmental policies, relevant South African regulations, the environmental management plan, and recruitment strategies.	1	1	1	1	1	6	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 in order 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 mining project. Recruitment will not be undertaken on site.	1	2	1	1	1	8	Low (-)
Groundwater	The use of vehicles may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	3	2	2	2	2	28	Medium Low (-)	All spillages will need to be cleaned up as soon as practically possible; Proper management of stormwater drainage infrastructure should be ensured;	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
	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	3	2	2	2	2	28	Medium Low (-)	Maintain construction vehicles and encourage contractors to report, react and manage all spills and leaks so that action can be taken to immediately minimise contamination to the groundwater; A groundwater monitoring programme must be developed by a groundwater specialist; Spill kits will be made available in areas of likely spillage; All hydrocarbon storage containers will be stored within a bunded areas which are watertight and able to contain 110% of the stored volume; All equipment utilising hydrocarbons will be stored on a hard-standing surface.	2	1	2	1	2	15	Low (-)
Surface Water	The potential for contamination of surface water due to releases of dirty water due to transportation of aggregate. It is recommended that regular dust suppression be conducted as far as possible. Spillages and accidental discharges could result in the contamination of surface water resources.	2	3	3	2	2	32	Medium Low (-)	Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste. The clean stormwater will be diverted which further mitigates the impact. All spillages will need to be cleaned up as soon as practically possible; Proper management of stormwater drainage infrastructure should be ensured;	1	2	2	2	2	20	Low (-)
	Improper site management may result in runoff from latrines and domestic waste which could pollute surface water resources	2	3	3	2	2	32	Medium Low (-)	Maintain construction vehicles and encourage contractors to report, react and manage all spills and leaks so that action can be taken to immediately minimise contamination to the groundwater; A groundwater monitoring programme must be developed by a groundwater specialist; Spill kits will be made available in areas of likely spillage;	1	2	2	2	2	20	Low (-)
	Impacts on surface water resources quality as a result of incorrect waste management practises and pollution.	2	3	3	2	2	32	Medium Low (-)	All hydrocarbon storage containers will be stored within a bunded areas which are watertight and able to contain 110% of the stored volume; All equipment utilising hydrocarbons will be stored on a hard-standing surface. A waste management plan will be compiled and approved for implementation of site. This management plant should focus on the waste hierarchy of the NEM:WA; No waste may be disposed of to land without the necessary legal permits; Waste will be removed from site by an accredited waste removal company and legally disposed of. Disposal certificates will be kept on site for audit purposes; Sufficient waste receptacles will be placed around the site allowing the separation of waste as source.	1	2	2	2	2	20	Low (-)
Aquatic Ecology	Loss of habitat and aquatic ecological structure as a result of continual disturbance and uncontrolled degradation.	2	2	2	2	2	24	Low (-)	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 activities shall be allowed within 500 m of riparian zones and wetland areas without consent from the DWS; No vehicles may be allowed to indiscriminately drive through the riparian and wetland areas or within the active stream channels;	2	1	2	1	2	15	Low (-)
	Impact on the aquatic ecological systems as a result of changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and disturbance.	2	2	2	2	2	24	Low (-)	All disturbed areas shall be re-vegetated with indigenous species; All construction materials shall be kept out of the riparian and wetland 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 ecosystems	2	1	2	1	2	15	Low (-)
	Impact on the hydrological functioning of the aquatic ecological and riparian and wetland systems as a result of reduced aquatic ecosystem, riparian and wetland footprints and uncontrolled disturbance.	2	2	2	2	2	24	Low (-)	No dumping of waste should take place within wetland and riparian areas or their buffer zones. If any spills occur, they should be immediately cleaned up; Implement an alien vegetation control program within the wetland features and ensure establishment of indigenous species within areas previously dominated by alien vegetation;	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
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 mining area.	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 mining area 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	3	2	2	2	28	Medium Low (-)	Existing established roads should be used wherever possible; The side drains of the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used;	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).	2	3	2	2	2	28	Medium Low (-)	Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; Processing areas should be contained, and systems designed to effectively manage and dispose of contained stormwater, effluent and solids.	2	1	1	1	1	8	Low (-)
Air Quality	The mining operation will require vehicular movement which may result in Possible increase in dust generation, PM <sub>10</sub> and PM <sub>2.5</sub> 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 excessive diesel fumes.	1	1	1	1	1	6	Low (-)
	Increase in carbon emissions and ambient air pollutants (NO <sub>2</sub> and SO <sub>2</sub> ) as a result of movement of vehicles and operation of machinery/equipment.	2	3	2	2	2	28	Medium Low (-)	Where practical possibly rehabilitation should be undertaken progressively. A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from any unpaved roads used. 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. <b>Odours</b> Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; and	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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer.							
Visual	Scaring of the landscape as a result of the clearance of vegetation and preparation of the mine.	2	2	3	2	3	35	Medium Low (-)	It is recommended that stockpiles be vegetated with indigenous vegetation in order to blend more easily into the existing landscape and for screening purposes;	1	1	1	1	1	6	Low (-)
	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	1	2	2	3	3	30	Medium Low (-)	The design and height increase of stockpiles and dumps must be monitored to ensure that these components relate to acceptable environmental standards in terms of slope and elevation; Stockpiles are ideally to be shaped at an adequate slope from the commencement of the project to ensure that it integrates more successfully into the natural topography of the visual landscape; It must be ensured, wherever possible, that existing natural vegetation is retained in the vicinity of the infrastructure areas; The access gravel roads should be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff; Soil stockpiles must be kept damp during the dry season, and preferably be vegetated in order to minimise the potential for dust generation; Vehicle speed on gravel roads must be reduced to limit dust generation; As far as possible, operational activities should take place during the daylight hours, in order to limit the use of bright floodlighting and to avoid the use of additional night-time lighting which may lead to skyglow; Outdoor lighting must be strictly controlled; The use of high light masts and high pole top security lighting should be avoided along the periphery of the operations. Any high lighting masts should be covered to reduce sky glow; Up-lighting of structures must be avoided, with lighting installed at downward angles that provide precisely directed illumination beyond the immediate surrounding of the mining infrastructure, thereby minimising the light spill and trespass; Censored and motion lighting may be installed at office areas, workshops and other buildings to prevent use of lights when not needed; Vehicle-mounted lights or portable light towers are preferred over permanently mounted lighting for night- time maintenance activities. If possible, such lighting should be equipped with hoods or louvers and be aimed toward the ground to avoid causing glare and skyglow; The use of permanent signs and project signs should be in accordance with the requirements of the project and mining regulations, be minimised and visually unobstructive.	1	1	1	2	2	12	Low (-)
Heritage Resources	The mining operation may result in the destruction of graves and any other heritage sites during operational phase of the project.	3	2	2	1	2	21	Low (-)	Should heritage resources, including graves be found during mining, 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 (-)
Palaeontological Resources	Mining has potential to impact on palaeontological resources	2	1	2	2	1	20	Low (-)	Should fossils be exposed during mining, 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 (-)
Noise	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	2	2	3	2	3	35	Medium 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.	1	1	1	1	1	6	Low (-)
	Increase in ambient noise levels as a result of the mining activities.	2	2	3	2	3	35	Medium Low (-)	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 activities. All equipment should be provided with standard mufflers.	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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
									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 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 on public roads.	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 (-)
Topography	Progressive mining of the borrow pit will ultimately alter the topography.	3	3	2	2	2	32	Medium Low (-)	The mining area will be kept to a minimum	2	2	2	2	2	24	Low (-)
Geology	Removal of local geology as a result of the mining activities the mine	2	2	3	2	2	28	Medium Low (-)	Mining will be conducted strictly according to the mine plan to be submitted to the DMR; Optimally exploit this resource.	1	2	2	2	2	20	Low (-)
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices.	2	1	1	2	2	16	Low (-)	The management of waste on site will take into account the principles of the NEM: WA and implement the waste management hierarchy of waste management as provided in Figure 13-1. <b>Storage of waste</b> 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 mining area 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 and wetland areas; Demolition waste and surplus concrete shall be disposed of responsibly; Waste shall not be buried or burned on site; and	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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact	Significance	Significance Rating
								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. <i>Disposal of hazardous waste</i> 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. <i>Disposal of general waste</i> No dumping shall take place in or near the mining area; and All general waste shall be disposed of to the nearest licensed landfill site.								

### **13.3 Decommissioning and Closure**

The main activity that will take place during this phase of the project is the demolition and removal of mining related infrastructure. The potential impacts associated with demolition activities are similar to the anticipated impacts to occur during the construction phase. The impacts and mitigation measures have been dealt with during the discussions of the construction activities and will not be recaptured in this section, only references will be made where applicable.

#### **13.3.1 Demolition of Project Related Infrastructure**

The decommissioning and closure of the mine will entail the demolition and removal of the majority of the project related Infrastructure:

#### **13.3.2 Potential Impacts and Mitigation Measures**

It is anticipated that the potential impacts of this activity in the rehabilitation phase will be the same as the anticipated impacts listed in the construction phase. It is therefore recommended that the mitigation/management measures applicable to the construction phase are implemented. 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	Severity					Spatial	Duration	Frequency: Activity					
Surface water, wetlands, riparian areas and aquatic ecosystem	Accidental spillages of hazardous substances from construction vehicles used during demolition.	1	3	2	2	2	24	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. Demolish during dry season, limit the disturbed footprint. Operate using best practices and clean spillages immediately they occur and remediate as necessary using spill kits.	1	1	1	1	2	9	Low (-)		
	Increased turbidity due to demolition.	1	3	2	2	2	24	Low (-)		1	1	1	1	2	9	Low (-)		
Air Quality	Rehabilitation and removal of the 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.	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 site. 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 (-)		
Visual	Removal of infrastructure and general decommissioning and closure activities leading to visual intrusion on sensitive receptors.	1	3	2	2	2	24	Low (-)	Decommissioning footprints and disturbed areas should be kept as small as possible and no further indigenous vegetation should be cleared or soils exposed for this purpose; All areas where infrastructure is removed must be resloped to resemble the pre-development landscape and revegetated as soon as possible; Concurrent/ progressive rehabilitation must be implemented, and disturbed areas must be rehabilitated as soon as possible and as soon as areas become available by replacing topsoil and revegetating disturbed areas; Indigenous and locally occurring plant species selected for use in re-vegetation should be selected taken quick growth rates into consideration in order to cover bare areas and prevent soil erosion; and Upon final rehabilitation, it must be aimed to remove all much surface infrastructure and to reshape the landscape	2	1	2	2	2	20	Low (-)		
Soils, Land use and Land Capability	Soil Compaction	3	1	3	3	2	35	Medium-Low (-)	Heavy machinery/mining equipment should stick to demarcated routes to avoid soil compacting; If possible, vegetation clearance, can be scheduled to coincide with low rainfall conditions when soil moisture is anticipated to be relatively low to avoid surface crusting and sealing of exposed soils Direct surface disturbance of soils should be limited within demarcated areas where possible to minimise the intensity of compaction; and Compacted soils adjacent to the mining pit and associated infrastructure footprint can be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation.	2	1	2	1	2	15	Low (-)		
	Dust and Soil Erosion	3	1	3	3	2	35	Medium-Low (-)	Temporary erosion control measures may be used to protect the disturbed soils during the decommissioning and closure phase until adequate vegetation has established. Restrict vegetation clearance to priority areas of development. The footprint of the proposed mining and infrastructure areas should be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint as far as practically possible; Bare soils can be regularly dampened with water to suppress dust during the decommissioning and closure phase, especially when strong wind conditions are predicted according to the local weather forecast;	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			Likelihood (Probability)		Frequency: Impact	Significance		Significance Rating	Consequence			Likelihood (Probability)		Frequency: Impact	Significance	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Severity					Spatial	Duration	Frequency: Activity					
	Soil Degradation	3	1	3	3	2	35	Medium-Low (-)	Excavation and long-term stockpiling of soil should be limited within the demarcated areas as far as practically possible; Ensure all stockpiles are clearly and permanently demarcated and located in defined no-go areas; Separate stripping, stockpiling and replacing of soil horizons in the original natural sequence to combat hard setting and compaction, and maintain soil fertility; Stockpiles height should be restricted to that which can deposited without additional traversing by machinery. Maximum height of 2-3 m is proposed, and the stockpile should be treated with temporary soil stabilization; Stockpiled soils should be stored for a maximum of 3-5 years.	2	1	2	1	2	15	Low (-)		
Waste Management	Potential water and soil pollution as a result of inappropriate waste management practices	2	3	2	2	2	28	Medium-Low (-)	Implement the mitigation measures contained in the construction phase assessment.	2	2	2	1	2	18	Low (-)		

## 13.4 Cumulative Impacts

Incomparable activities can result in several complex effects on the natural biophysical and social environment. These impacts are mainly identified as direct and immediate effects on the environment by a single entity affecting a variable of the environment. These direct impacts have the potential to combine and interact with other activities, depending on the surrounding environmental state and land use. These impacts may aggregate or interact with other impacts to cause additional effects, not easily quantified when assessing an individual entity.

The NEMA, 2014, specifically requires that cumulative impacts be assessed. This section provides a description and analysis of the potential cumulative effects of the proposed mining project, and past and present projects hereby considering the effects of any changes on the:

- Biophysical; and
- Socio – Economic conditions.

For the analysis of cumulative effects to be utilised as a useful tool for decision makers and I&APs, it must be limited to the effects that can be meaningfully evaluated, rather than expanding on resources or receptors that are no longer affected by the development or are not of interest to the I&APs. Two important aspects require consideration prior to the evaluation of cumulative effects:

- The determination of an appropriate spatial and temporal boundaries for evaluation of cumulative effects of the project; and
- The evaluation of relevant projects for consideration in the cumulative effects' analysis.

Spatial and temporal boundaries for analysis of cumulative effects are dependent on several factors, including:

- The size and nature of the project and its potential effects;
- The size, nature and location of past and (known) future projects and activities in the area,
- The aspect of the environment impacted by the cumulative effect; and
- The period of occurrence of effects.

The spatial extent of the cumulative impact analysis is generally aligned with the zone of influence of the project and other projects in the vicinity. Most impact will be localised; however, others may be experienced on a regional scale. This is taken into consideration during the assessment of cumulative impacts. It is reasonably straightforward to identify significant past and present projects and activities that may interact with the proposed mining project to produce cumulative impacts, and in many respects, these are taken into account in the descriptions of the biophysical and socio- economic baseline.

### 13.4.1 Hydrological and Surface Water Impacts

The potential groundwater and surface water quality impacts associated with the construction and operation of the proposed mining project relate to the potential contamination as a result of leakages from vehicles and machinery. Mitigation measures have been proposed for the impacts on ground water and surface water contamination. It is expected that with the implementation of the mitigation measures, together with the fact that mining activities will be localised and of short duration, these impacts will be reduced to an acceptable level. The hydrological and surface water cumulative impacts resulting from the construction and operation phases of the mining project will be negligible.



### **13.4.2 Air Quality Impacts**

The potential air quality impacts associated with the construction and operation of project relate to the potential generation of PM<sub>2.5</sub>, PM<sub>10</sub> and fugitive dust emissions as a result of vehicular movements and mining activities.

Mitigation measures have been proposed to mitigate the potential air quality impacts. It is expected that the implementation of these mitigation measures will reduce the impacts to an acceptable standard. It is expected that the cumulative air quality impacts from the construction and operation of the proposed mining project will be negligible.

### **13.4.3 Biodiversity**

The proposed development will result in the clearance of vegetated areas and the potential displacement of faunal species within the local area. Furthermore, ineffective control and monitoring of edge effects can result in the spread of AIP species to the surrounding natural areas, which will further alter faunal habitat and subsequently faunal diversity within this area. However, due to the nature of mining activities, the areas to be cleared of vegetation will be limited in footprint and the impacts will be of short duration.

Due to the limited size of the development footprint, it is highly unlikely that the proposed development will impact conservation targets for sensitive floral and faunal species.

### **13.4.4 Noise Impacts**

The potential noise nuisance associated with the construction and operation of the project relates to the movement of vehicles and operation of machinery on site. Mitigation measures have been proposed to avoid and/or reduce the nuisance noise impacts. It is expected that with the implementation of the mitigation measures the impacts will be reduced to an acceptable level. It is therefore anticipated that the cumulative noise impacts from the construction and operation of the project will be negligible.

## 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 activities<sup>1</sup>, aspects<sup>2</sup> and impacts which may occur during the commencement and implementation of a project. This is supported by the identification of receptors<sup>3</sup> and resources<sup>4</sup>, which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts<sup>5</sup> (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 severity<sup>6</sup>, spatial scope<sup>7</sup> and duration<sup>8</sup> of the impact together comprise the consequence of the impact and when summed can obtain a maximum value of 15. The frequency of the activity<sup>9</sup> and the frequency of the impact<sup>10</sup> 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 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.

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<sup>1</sup>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.

<sup>2</sup>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.

<sup>3</sup>**Receptors** comprise but are not limited to people or man-made structures.

<sup>4</sup>**Resources** include components of the biophysical environment.

<sup>5</sup>**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 local 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.

<sup>6</sup>**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.

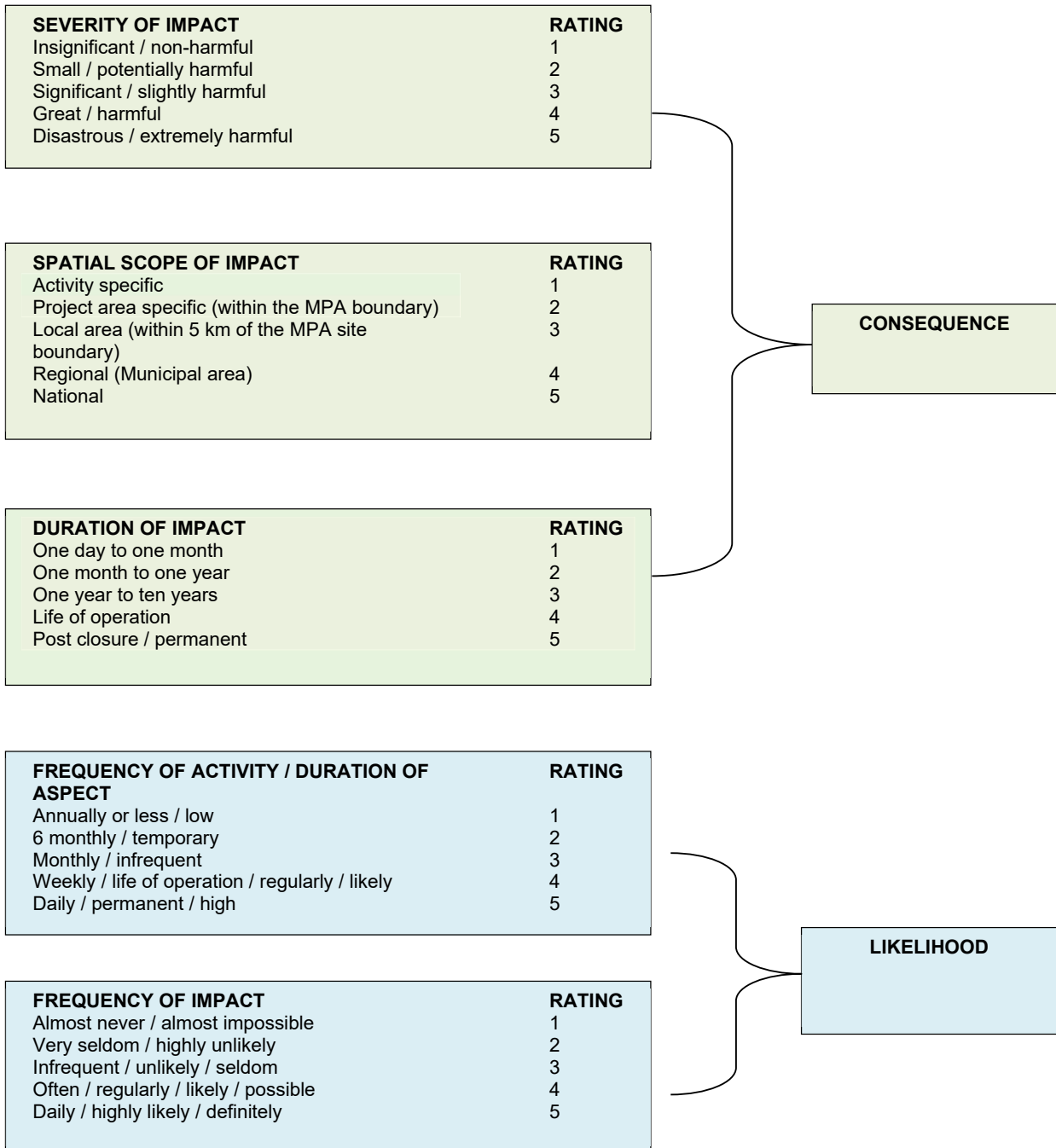
<sup>7</sup>**Spatial scope** refers to the geographical scale of the impact.

<sup>8</sup>**Duration** refers to the length of time over which the stressor will cause a change in the resource or receptor.

<sup>9</sup>**Frequency of activity** refers to how often the proposed activity will take place.

<sup>10</sup>**Frequency of impact** refers to the frequency with which a stressor (aspect) will impact on the receptor.

**Table 14-1: Criteria for Assessing Significance of Impacts**



Consequence		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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	130	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

Please refer to Section 13 for positive and negative impacts.

## **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**

The location of the proposed project components is constrained to the location of the resource (aggregate). The location of the proposed borrow pit was also selected due to its proximity to the road between Frankfort and Tweeling requiring upgrading. As such, no property alternatives were considered for the location of the mining area. In addition, no red flags were identified for the preferred site during the baseline characterisation and impact assessment.

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

The application for the borrow pit has been proposed in order to source material that can be used for the construction of the refurbished road. The applicant has chosen this site due to its proximity to the road requiring upgrading, making it more cost effective and efficient compared to importing the material from elsewhere.

The technology proposed for the borrow pit will comply with national standards and best practices and the borrow pit was designed to optimally mine the desired amount of material needed, taking cognisance of the possible environmental impacts associated with the proposed activities.

The layout plan will be designed to avoid sensitive environments such as aquatic ecosystems, wetlands, 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**

In order to identify the potential impacts associated with the proposed mining activities, the following steps were undertaken:

- The I&AP consultation process is currently being undertaken in a manner to be interactive, providing the landowners and identified I&APs with an opportunity to provide input into the project. This is considered a key focus as the local residents have capabilities of providing site-specific information, which may not be available in desktop research material. I&APs 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;
  - Department of Water and Sanitation information documents such as the Internal Strategic Perspective (ISP) for the Upper Vaal WMA and Groundwater Vulnerability Reports;
  - The Municipal Integrated Development Plan for Mafube Local Municipality; and
  - The Spatial Development Framework for Fezile Dabi District Municipality.

The rating of the identified impacts was undertaken in a quantitative manner as provided in Section 13 (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

All the impacts identified and assessed in Section 13 are of medium to low significance and can be mitigated to be of low significance.

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

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Site Establishment and site clearance for the construction of infrastructure: <ul style="list-style-type: none"> <li>Fence</li> <li>Mobile Office</li> <li>Stockpiles</li> <li>Ablution Facility</li> </ul>	Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation.	Flora	Construction and decommissioning	Medium-Low (-)	Implementation of proper waste management strategies	Low (-)
	Impact of faunal species of conservational concern due to habitat loss and collision with construction vehicles	Fauna	Construction and decommissioning	Medium-Low (-)	Relocation of affected faunal species of conservation importance Rehabilitation of areas cleared of vegetation Control of alien invasive plant species Minimisation of project footprint areas	Low (-)
	Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Flora and Fauna	Construction and decommissioning	Medium-Low (-)	Rehabilitation of areas cleared of vegetation Control of alien invasive plant species Relocation of floral affected species of conservation importance	Low (-)
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping	Fauna	Construction, operation and decommissioning	Medium-Low (-)	Relocation of affected faunal species of conservation importance Minimisation of project footprint areas	Low (-)
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources	Flora	Construction, operation and decommissioning	Medium-Low (-)	Development and implementation of a stormwater management plan Separation of clean and dirty water around the site Minimisation of project footprint areas Control access to wetland and riparian areas and the regulated 500m buffer around wetlands	Low (-)
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat	Wetlands and Aquatic Ecosystems	Construction, operation and decommissioning	Medium-Low (-)	Confirm with the DWS if the unchannelled valley bottom wetland located in close proximity to the proposed borrow area is a wetland. Control access of vehicles in sensitive areas and in areas where soils are exposed Control access to wetland and riparian areas and the regulated 500m buffer around wetlands	Low (-)
	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	Social	Construction and decommissioning	Medium-Low (-)	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel 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 (-)
	Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Soil, Land Use and Land Capability Impacts	Construction and decommissioning	Low (-)	Rehabilitation of areas cleared of vegetation Minimisation of project footprint areas	Low (-)
	Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint.		Construction and decommissioning	Medium-Low (-)		
Potential to impact on sites of archaeological importance.	Heritage Resources	Construction and decommissioning	Low (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)	

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Potential sealing-in or destruction of the fossils during earth moving activity	Fossils	Construction and decommissioning	Low (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)
	Removal of local geology as a result of the mine	Geology	Construction and operation	Medium-Low (-)	Minimisation of project footprint areas	Low (-)
	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	Climate	Construction, Operation and decommissioning	Low (-)	Air quality monitoring Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Low (-)
Mining and operation of associated infrastructure	The use of vehicles may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination of the vegetation cover and soils.	Human health and Social	Operation	Low (-)	Management of influx of employees Implementation of the EMPr Open and honest communication with surrounding communities	Low (-)
	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	Groundwater	Operation	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 (-)
	The potential for contamination of surface water due to releases of dirty water (runoff and return water). It is recommended that regular dust suppression be conducted as far as possible. Spillages and accidental discharges could result in the contamination of surface water resources.	Surface Water	Operation	Medium-Low (-)	Development and implementation of a stormwater management plan	Low (-)
	Improper site management may result in runoff from latrines and domestic waste which could pollute surface water resources	Surface Water	Operation	Medium-Low (-)	Proper management of waste	Low (-)
	Impacts on surface water resources quality as a result of incorrect waste management practices and pollution.	Surface Water	Operation	Medium-Low (-)	Proper management of waste	Low (-)
	Loss of habitat and wetland ecological structure as a result of continual wetland disturbance and uncontrolled wetland degradation.	Wetlands and aquatic ecology	Operation	Low (-)	Control of access to wetland areas and within the 500 m regulated area. Minimisation of project footprint areas Where possible, avoid placement of infrastructure in wetland areas and within the 500 m regulated area	Low (-)
	Impact on the wetlands systems as a result of changes to the sociocultural service provisions through uncontrolled vegetation clearance, waste management and wetland disturbance	Wetlands and aquatic ecology	Operation	Low (-)		Low (-)
	Impact on the hydrological functioning of the wetland systems as a result of reduce wetland footprints and	Wetlands and aquatic ecology	Operation	Low (-)		Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	uncontrolled disturbance during maintenance activities					
	Impacts on the hydrological functioning of the wetland as a result of the mining activities	Wetlands and aquatic ecology	Operation	Low (-)		Low (-)
	Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	Air Quality, Social and Human Health	Operation	Medium-Low (-)	Air quality monitoring Management through use of dust suppression techniques	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).	Soil, landuse and land capability	Operation	Medium-Low (-)	Implementation of proper waste management strategies Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low (-)
	The proposed project has the potential to impact on sites of archaeological importance. Historic power line pylons are present within the proposed footprint.	Heritage Resources	Operation	Low (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)
	Sealing-in or destruction of the fossils during earth moving activity	Fossils	Operation	Low (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)
	Mining of aggregate will ultimately alter the topography.	Topography	Operation	Medium-Low (-)	Minimisation of project footprint areas	Low (-)
Transportation of aggregate	The use of vehicles for transportation of aggregate material may generate noise in the immediate vicinity	Social	Operation	Medium-Low (-)	Management and maintenance of 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 (-)
<i>Closure and rehabilitation of mine and infrastructure sites.</i> <i>Removal of equipment and infrastructure</i>	Accidental spillages of hazardous substances from construction vehicles used during demolition. Increased turbidity due to demolition.	Surface Water	Decommissioning and closure	Low (-)	Rehabilitation of areas cleared of vegetation Monitoring of water courses Control of access	Low (-)
<ul style="list-style-type: none"> <li>Fence</li> <li>Mobile Office</li> <li>Stockpiles</li> <li>Ablution Facility</li> </ul>	Removal of infrastructure and general decommissioning and closure activities leading to visual intrusion on sensitive receptors.	Visual and Social	Decommissioning and closure	Low (-)	Removal of infrastructure must be done in a way that will minimise visual impacts Minimise the amount of time waste is left on site	Low (-)
	Soil Compaction	Soils, Land use and Land Capability	Decommissioning and closure	Medium-Low (-)	Management and maintenance of 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 (-)
	Dust and Soil Erosion	Soils, Land use and Land Capability	Decommissioning and closure	Medium-Low (-)	Implementation of dust control measures Air quality monitoring Monitoring and management of soil erosion	Low (-)
	Ineffective rehabilitation and monitoring of disturbed areas could lead to loss of floral species diversity	Biodiversity	Decommissioning and closure	Medium-Low (-)	Monitoring of rehabilitated areas to ensure successful rehabilitation	Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Loss of floral habitat	Biodiversity	Decommissioning and closure	Medium-Low (-)		Low (-)
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered vegetation communities within the project area	Biodiversity	Decommissioning and closure	Medium-Low (-)	Control and management of alien invasive vegetation Monitoring of rehabilitated areas to ensure successful rehabilitation	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 site-specific specialist studies have been undertaken		N/A	N/A

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

## 21 Environmental impact statement

### 21.1 Summary of key findings

The impacts evident from the detailed impact assessment (Section 13) of the proposed project are both positive and negative in nature. The key positive and negative findings outlined below.

#### 21.1.1 Key Positive Impacts After Mitigation

The main positive impacts identified for the project relate to socio-economic impacts that the construction and operation of the project will have. The socio-economic impacts were determined to have a positive impact, either directly or through the spinoffs generated by the development and operation of the proposed project and associated infrastructure.

#### 21.1.2 Key Negative Impacts After Mitigation

The assessment found that there are a number of negative impacts that are expected as a result of the proposed mine. The most significant impacts identified were on the biodiversity, groundwater and surface water resources.

- **Biodiversity:** There is potential for vegetation loss due to vegetation clearing leading to habitat loss, degradation and fragmentation as well as proliferation of alien invasive plant species. The impact significance of the proposed mining activities prior to mitigation affecting floral habitat, diversity and SCC are considered to be medium significance impacts.
- **Socio – Economic:** Transportation of material to and from the study area will result in additional trucks and construction vehicles on the study area roads, which can cause damage to the road surface and increase the potential for accidents in the area. The influx of additional people looking for employment will result in impacts on the social dynamics in the area.
- **Groundwater Impacts:** Local spillages of hydrocarbons and chemicals used during the pre-construction and construction phase which may leach to groundwater.
- **Surface Water:** Movement and use of vehicles and machinery as well as improper storage of hazardous substance may have Impacts on surface water and groundwater quality due to accidental spillages of hazardous substances. Contaminated dirty water runoff from the mining area to surrounding areas resulting in the impact on local surface water quality.
- **Wetland Impacts:** The NFEPA database shows that is an unchannelled valley bottom wetland located on the site of the proposed mine area , therefore, there is potential for impacts on these wetlands located on the property. Indiscriminate movement into and access to wetlands areas will result in:
  - Loss of habitat and wetland ecological structure as a result of site clearance activities and uncontrolled wetland degradation;
  - Impact on the wetlands systems as a result of changes to the sociocultural service provisions
  - Impact on the hydrological functioning of the wetland systems;
  - Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources; and
  - Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of wetland and riparian habitat.

- Air Quality Impacts: The movement of vehicles in the area will have an impact on ambient air quality as follows:
  - Possible increase in dust generation, PM<sub>10</sub> and PM<sub>2.5</sub> as a result of bulk earthworks, operation of heavy machinery, and material movement.
  - Increase in carbon emissions and ambient air pollutants (NO<sub>2</sub> and SO<sub>2</sub>) as a result of movement of vehicles and operation of machinery/equipment.
- Visual Impacts due to:
  - Visual intrusion as a result of the movement of machinery and the erection of contractor camps;
  - Scaring of the landscape as a result of the clearance of vegetation and preparation of the mine areas; and
  - Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.
- Noise Impacts: The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity. The environment of the proposed mine is rural and mining activities will therefore result in an increase in ambient noise levels as a result of the mining activities
- Soil, Land Use and Land Capability: There is potential for chemical potential pollution of soils due to use of vehicles and machinery and storage of hazardous material at the mine. Other impacts include:
  - Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion;
  - Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint;
  - As a result of construction activities, the land use will have altered from grazing and agriculture to that of construction for mining activities;
  - Handling and storage of building materials and different kinds of waste leading to soil sterilisation.
- Heritage Impacts: There is a possibility that heritage resources may be impacted by the proposed project. These heritage resources may not be relocated or destroyed without written approval from the SAHRA. Implementation of mitigation measures included in Section 13 will result in the reduction of the significance of the impact, if any, on heritage resources.
- Palaeontology Impacts: Sealing-in or destruction of the fossils during earth moving activity. Implementation of the mitigation measures in Section 13 of this report will reduce the potential for loss of fossils.

## Closure and Decommissioning

The main impacts that will result from the closure phase will relate to the ineffectiveness of the construction and operational phases to eradicate alien vegetation, which will ultimately result in the loss of indigenous fauna and flora. In addition, the decommissioning activities may further impact on the established vegetation in the area, resulting in the loss of biodiversity species, habitats and ecological structure. All the impacts that may result from the decommissioning activities of the proposed project have been effectively addressed in the impact assessment in Section 13.3, as well as the EMPr.

The positive and negative implications were assessed according to the construction, operational and decommissioning phases of the proposed Project. Please refer to Section 13 for a comprehensive impact assessment.

## **21.2 Final Site Map**

Please refer to Figure 21-1 and 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 mining permit. The map will be developed to superimpose the proposed mining project and associated infrastructure together with the environmentally sensitive areas within the proposed project site.



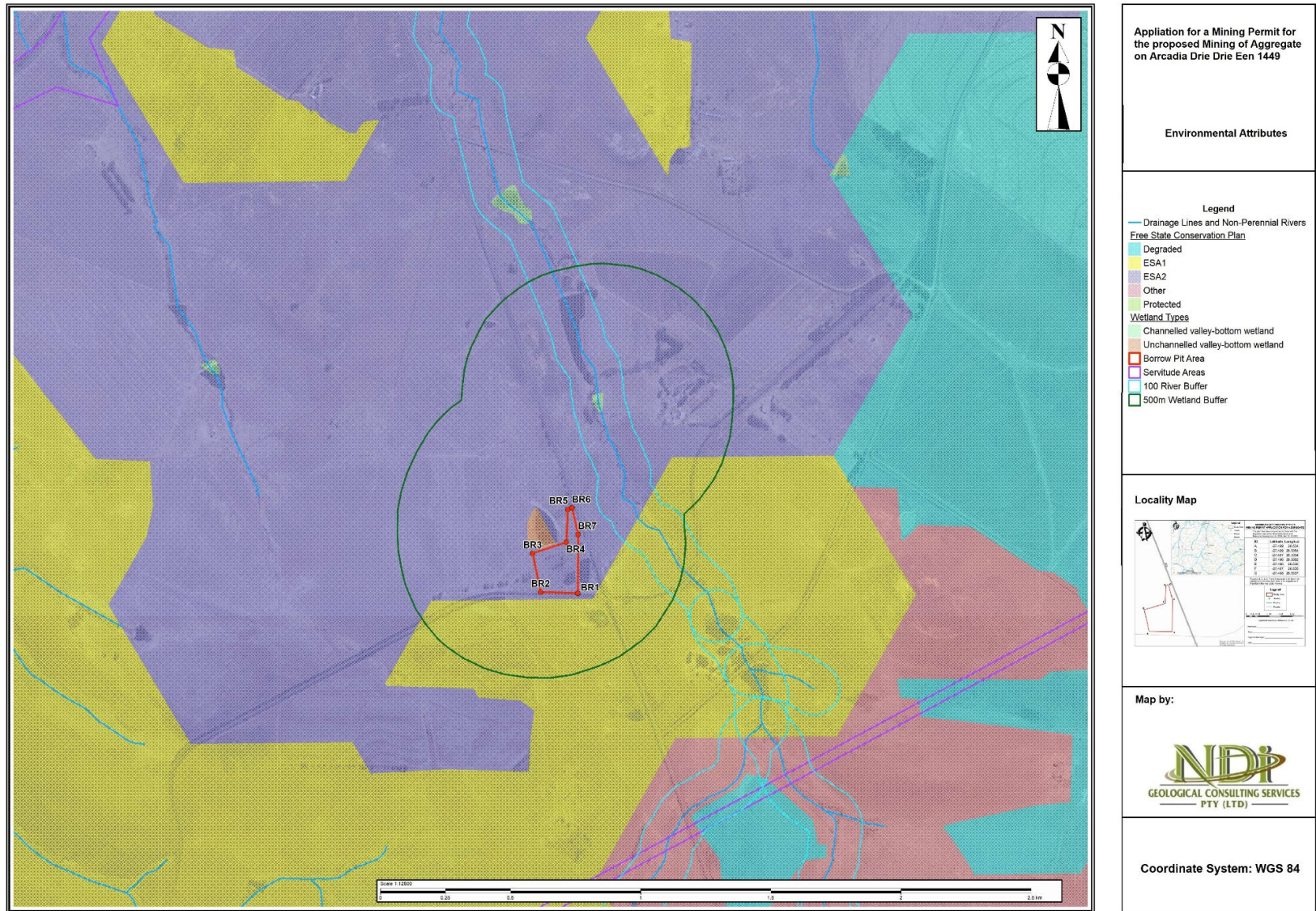


Figure 21-1: Preliminary Site Map

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

The positive and negative implications were assessed according to the construction, operational and decommissioning phases of the proposed project. A detailed description of the main impacts is provided in Section 13 and the main impacts are provided in Section 18.1. A short summary is provided below for each phase of the project.

### **21.3.1 Construction Phase**

During the construction phase of the proposed project the majority of the negative impacts are associated with site clearance and vegetation removal activities. Topsoil loss should be limited by storing and protecting the topsoil to be used for rehabilitation purposes. The establishment of the proposed project may result in loss of wetland habitat.

Vegetation clearance during construction will also result in loss of natural vegetation and disturbance to fauna on site. Site clearance and vegetation removal will also result in a loss in land capability. Natural vegetation removal is expected to have moderate significance impacts. Where possible, the implementation of mitigation measures such as commencing rehabilitation activities in tandem with or immediately following construction will reduce the duration and significance of the impacts. The main negative implications associated with other general construction activities are nuisance noise, traffic, dust and visual impacts.

From a socio-economic perspective the development of the mine will have a positive impact on employment creation, economic and social upliftment and community development. An increase in employment opportunities, household income and skills development will contribute to a positive growth in the local and regional economy.

### **21.3.2 Operational Phase**

The majority of the impacts identified for the operational phase are associated with the mining activities. The operation of surface infrastructure may lead to deterioration of water quality. Stormwater management measures will be in place to ensure clean and dirty water separate. Topsoil loss has been identified as a potential impact during the operational phase as a result of rainwater runoff and wind erosion from soil stockpiles. In addition, alien vegetation may establish on the topsoil. This can be prevented by planting indigenous grass mixture, which will also assist in erosion reduction. Seepage of hydrocarbons into groundwater may result in groundwater contamination and can impact on surface water quality.

Ineffective rehabilitation of construction areas will lead to proliferation of alien invasive plant species.

Similar to the construction phase, nuisance noise, dust and visual impacts of moderate negative significance are expected from general operation activities such as loading, hauling and stockpiling. All of these impacts can be mitigated.

### **21.3.3 Decommissioning Phase**

During the decommissioning phase positive impacts will occur from rehabilitation activities including the restoration of land capability to its pre-mining state or agreed upon alternative, the restoration of vegetation and habitat types as well as the rehabilitation of infrastructure footprint areas.

The main expected negative impacts are associated with the movement of machinery to dismantle and remove equipment and infrastructure and rehabilitate the disturbed areas. Negative impacts resulting from soil loss, erosion and dust emissions were also identified.

Post closure monitoring is essential to determine if rehabilitation was successful and sustainable.

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

The EMPr seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment and surrounding communities will be mitigated, controlled and monitored.

The EMPr will address the environmental impacts and possible unplanned events during each phase of the project (construction, operational, decommissioning and post-closure). Due regard must be given to environmental protection during the entire project; a number of environmental recommendations are made to achieve environmental protection.

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts, assess their significance and implement appropriate mitigation and management measures to avoid, minimise and/or remediate the associated impacts where they cannot completely be avoided.
- Implement an adequate monitoring programme to:
  - o Ensure that mitigation and management measure are effective.
  - o Allow quick detection of potential impacts, which in turn will allow for quick responses to issues/impacts.
  - o Reduce duration of any potential negative impacts.

The objectives of the EMPr will be to:

- Provide sufficient information to strategically plan the mining activities as to avoid unnecessary social and environmental impacts;
- Provide sufficient information and guidance to plan the mining 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.

**Table 22-1: Impact Management Objectives and Management Outcomes**

Objectives	Outcomes
<b>Soil</b>	
Ensure suitable removal, storage, transportation of topsoil for reuse during rehabilitation. To manage soil erosion.	No visual evidence of erosion. No visual evidence of erosion from topsoil stockpiles and from areas where topsoil has been reinstated.
<b>Flora</b>	

Objectives	Outcomes
Minimise unnecessary clearance of indigenous vegetation. Preserve protected flora species. Control alien plants and noxious weeds.	Clearance of vegetation to be limited to borrow pit area. No disturbance to SCC without permits. Ongoing eradication of alien invasive plants and noxious weeds.
<b>Fauna</b>	
Ensure the protection of animals.	No direct / indirect harm to animals from construction activities.
<b>Surface Water</b>	
Minimise impact to wetland areas. Minimise environmental impacts associated with stormwater. Minimise stormwater runoff from the site.	Reduced impact to wetland areas. Rehabilitation of wetland areas. No visual evidence of erosion caused by wastewater or stormwater practices. No environmental contamination associated with wastewater or stormwater practices.
<b>Noise</b>	
Minimise noise nuisance.	No complaints regarding noise pollution. Comply with SANS 10103:2008. Comply with blasting-related legislation and standards.
<b>Air Quality</b>	
Minimise dust generation	No complaints regarding air pollution
<b>Visual</b>	
Objectives	Outcomes
Minimise impacts to the aesthetics / visual quality. Ensure that the visual appearance of the site is not an eyesore the adjacent areas.	No complaints regarding impacts to visual quality.
<b>Safety and Security</b>	
Provide a safe and healthy working environment to construction workers and the public.	No complaints regarding impacts to safety and security. No reportable health and safety incidents. Compliance with the OHS Act, Construction Regulations (2014) and other relevant regulations.
<b>Traffic</b>	
Ensure the safety of all road users by implementing proper signage and traffic control measures. Minimise traffic disruptions.	No reports of construction vehicles using other unauthorised routes. No transporting of unsafe loads. Permits are to be obtained for abnormal loads. No speeding. No accidents.
<b>Heritage</b>	
To avoid damage to or destruction of previously unknown or excavated heritage resources and archaeological artefacts during construction. The preservation and appropriate management of new findings should these be discovered during construction.	No archaeological and cultural resources or graves to be damaged during construction.
<b>Waste</b>	

<b>Objectives</b>	<b>Outcomes</b>
Minimise environmental impacts associated with waste.	No littering on construction site. Maintain a clean and tidy site. 100% record of all waste generated and disposed at waste disposal facilities. Valid disposal certificates for all waste disposed. Provision of adequate waste containers that are easily accessible and maintained.

## 23 Aspects for inclusion as conditions of Authorisation

The impact assessment has been based on the proposed mine location and other available information from the applicant. The management of the impacts identified for the construction, operation and closure phase is through a comprehensive range of programmes and plans contained in the EMPr. Implementation of these plans and programmes together with mitigation measures stipulate in the EMPr will be institutionalized through regular monitoring and auditing.

In order to achieve relative environmental management standards and ensure that the findings of the environmental assessment are implemented through practical measures, the recommendations and management measures from this EIA study are included within an EMPr.

The EMPr must be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for the life cycle phases of the project is considered to be vital in achieving the appropriate environmental management standards as detailed for this project.

In addition, the following key conditions should be included as part of the authorisation:

- No activities may be undertaken within 500 m of wetlands and/or within 100 m of watercourses without approval from the DWS.
- No removal and/or relocation of protected species may be undertaken without relevant permits.
- No graves and/or cultural and palaeontological resources may be relocated and/or destroyed without relevant permits from SAHRA.
- The proponent is not exempted from complying with any other statutory requirements that is applicable to the undertaking of the activity. Relevant key legislation that must be complied with by the proponent includes *inter alia*:
  - Provisions of the National Environmental Management Waste Act (No. 59 of 2008);
  - Provisions of the National Water Act, 1998 (Act No 36 of 1998);
  - Provisions of the National Forests Act (Act No 84 of 1998); and
  - Provisions of the National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- The proponent must appoint a suitably experienced (independent) ECO for the construction phase of the development that will have the responsibility to ensure that the mitigation and rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr;
- A Stormwater Management Plan must be developed and adhered to;
- The EMPr must be enforced throughout the life of the project; and
- Environmental audits reports must be submitted to the DMR on a monthly basis once construction has begun and on an annual basis during the operational phase. This is to ensure that mitigation measures are being implemented and to prevent environmental degradation (e.g. erosion) during the construction and operational phases.

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

### 24.1 Assumptions

The information used by the EAP team was from existing information from other processes, environmental databases and municipal IDPs and SDFs. All the data and information are assumed to be accurate and applicable. It is also assumed that the applicant will comply with all legislation pertaining to the activities of this proposed project and that all permits and licenses that may be required will be identified and applied for prior to commencement of construction activities.

The public involvement process has been sufficiently effective in identifying the critical issues needing to be addressed in the EIA / EMPr by the EAP. The I&AP 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 I&APs will be incorporated into the Final BAR to be submitted to the DMR;

Ndi Geological assumes that Maximus will implement the measures contained in the EMPr and will adhere to any monitoring procedures. A monitoring and evaluation system, including auditing, will be established, and operationalised to track the implementation of the EMPr ensuring that management measures are effective to avoid, minimise and mitigate impacts and that corrective action is being undertaken to address shortcomings and/or non-conformances.

### 24.2 Limitations

No specialist studies were conducted as part of the EIA and the identification and assessment of the significance of potential impacts was based on available information, knowledge of the project area and experience of the EAP team. All identified impacts on the environment were assessed using the professional judgement of Ndi Geological's project team. It must be noted that the following also applies:

- Details on the Water Use Licence requirements are not available, it is assumed that no water abstraction from ground or surface will be required.
- In addition, no wetland/riparian area delineation was undertaken. the SANBI database shows that there is a wetland located in close proximity to the project site. A Section 21 ( c) and (i) WUA will therefore be required. It is assumed that Maximus will liaise with the DWS in that regard before commencement of the project;
- No Heritage Impact Assessment was undertaken therefore details on the SAHRA permit requirement are not available;
- No terrestrial ecology assessment was conducted, SANBI databases and literature review were used for the assessment of potential flora and fauna that may occur in the area;
- No detailed site layout indicating the location of the infrastructure is currently available. 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.**

An assessment of proposed project was undertaken with the objective of identifying and weighing anticipated impacts and risks associated with the mining activities as well as in accordance with all relevant legislative requirements and no fatal flaws were identified by the EAP. It is therefore the considered opinion of the EAP that the activity may be authorised.

The application for the borrow pit has been proposed in order to source material that can be used for the refurbishment of the road. The applicant has chosen this site due to its proximity to the road requiring upgrading, making it more cost effective and efficient compared to importing the material from elsewhere.

The no-go alternative would entail not mining the aggregate. Should the borrow pit not be implemented, the applicant will have to import the material which result in increased costs to the project and loss of job opportunities to the local community.

The I&APs will also be requested to review the draft Bar and submit their comments. All comments to be received during the Public Participation Process will be included in the final 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 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.

With the correct and effective mitigation and management measures, including the protection of wetlands located outside the footprints of the mining areas and infrastructure, the mining operations are feasible. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DFFE should monitor activities during the construction, operational and closure phases of the proposed mine operation.

### **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 total duration of the mining activities is planned for five (5) years. However, under mining permit applications the applicant can only apply for a period of two (2) years, with potential to renew the MP. The MP will be renewed three (3) times to make up for the 5 years required.

## **27 Undertaking**

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

## 28 Financial Provision

The estimated environmental cost expenditure related to the project is anticipated to be R 129 931.00 as shown in Table 28-1.

**Table 28-1: Environmental Cost Estimate Expenditure**

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	200	17.32	1	1	3464
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	500	43.19	1	1	21595
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	419.16	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	228.63	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	482.67	1	1	0
<b>6</b>	<b>Opencast rehabilitation including final voids and ramps</b>	<b>ha</b>	<b>0.5</b>	<b>245652</b>	<b>0.52</b>	<b>0.5</b>	<b>31934.76</b>
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 waste deposits and evaporation ponds (non-polluting potential)	ha	0	210087.08	1	1	0
8 (C)	Rehabilitation of processing waste 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	0.2	133622.5	1	1	26724.5
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	0.5	17782.46	1	1	8891.23
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
<b>Sub Total 1</b>							<b>92609.49</b>

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Preliminary and General (12.0% of Subtotal 2)		11113.1388		<b>weighting factor 2</b>		11113.1388
					1		
2	Contingencies (10.0% of Subtotal 2)				9260.949		9260.949
					<b>Subtotal 2</b>		<b>112983.58</b>
					<b>VAT (15%)</b>		<b>16947.54</b>
					<b>Grand Total</b>		<b>129931</b>

## **28.1 Explain how the aforesaid amount was derived.**

The financial provision for the environmental rehabilitation and closure of any mine/mining 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 of mining site.

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 estimated environmental cost expenditure related to the project is anticipated to be R 129 931.00. Maximus will fund the operation.

The applicant hereby confirms that the amount can be provided for from the operating expenditure.

## 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. Potential socio-economic impacts will include:

- Nuisance noise due to onsite activities and movement of machinery and vehicles;
- Poor access control resulting in impacts on activities outside the demarked boundaries;
- Influx of jobseekers 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.

It is anticipated that employment opportunities for local and/or regional communities will result from the mining activities, throughout the LOM.

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

#### Noise due to construction activities and mining:

- Directly affected and adjacent landowners and land occupiers must be informed of the planned dates of the mining activities and a grievance lodging mechanism must be made available to the I&APs.
- Site activities shall be concluded during daytime hours (0700 to 1730), to avoid night-time noise disturbances and night-time collisions with fauna.

#### 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; and
- Where necessary, the South African Police Service (SAPS) will be notified of unauthorised persons encountered on site.

#### Visual Impact:

- Dust suppression will be undertaken to manage nuisance dust from 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 implemented to further prohibit littering and poor housekeeping practices; and
- Vegetation cover shall be used to minimise visual impacts.

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

Potential heritage impacts have been identified and assessed and mitigation measures have been included in Section 13 of this BAR. Please refer to Section 13 of this report and the accompanying EMPr.

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

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.

No alternatives were considered for the project as the project location was chosen due to its proximity to the road requiring upgrading, making it more cost effective and efficient compared to importing the material from elsewhere. It was also deemed not necessary to revise the site layout plan as there were no fatal flaws that were identified during the baseline characterisation and impact assessment processes.



**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 7 of this report as required.

### **30.3 Composite Map**

Please refer to Figure 30-1 and Appendix 7 for the composite map. No specific heritage sites have been identified and therefore have not been included in the preliminary composite map. Should it be required, 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 Courses and 100m regulated buffer area;
- Wetlands, riparian areas and regulated 500m areas;
- CBAs; and
- Protected Areas.



**Figure 30-1: Composite Map**

## 31 Description of Impact management objectives including management statements

### 31.1 Determination of closure objectives.

The main aim in developing Maximus's rehabilitation plan is to mitigate the impacts caused by the mining activities and to restore land back to a satisfactory end land use. The rehabilitation plan must be developed as early as possible and maintained throughout the LoM. It is important that the project's closure plan is clearly defined and understood by all involved before starting the process and is complementary to the rehabilitation objectives. The closure vision for the Maximus aggregate mining project is intended to inform the closure objectives and as such is currently stated as:

***To implement a post mining landscape that is safe, stable, and non-polluting over the long term, through collaboration with affected I&APs***

The overall closure objectives for the proposed project are as follows:

- Adequate reinstatement and rehabilitation of construction and borrow pit area;
- Conduct concurrent or progressive rehabilitation of areas affected by construction and operation activities associated with the borrow pit.
- Minimise the area to be disturbed and to ensure that the areas disturbed during the activities are rehabilitated, as per the measures provided in the EMPr and the conditions of the Environmental Authorisation.
- Remove mine infrastructure that cannot be used by a subsequent landowner or a third party.
- Where infrastructure can be used by a third party, arrangements will be made to ensure their long-term sustainable use;
- Clean up all stockpiles and loading areas and rehabilitate these as far as possible to a land capability similar to that which existed prior to mining;
- Rehabilitate the disturbed land to a state that facilitates compliance with applicable environmental quality objectives,
- Landscape the rehabilitated areas in alignment with the surrounding topography to prevent the unnecessary pooling of water which will reduce the runoff in the catchment;
- Implement progressive rehabilitation measures, beginning during the construction phase wherever possible, reducing the overall visual impact;
- Physically and chemically stabilise any remaining structures to minimise residual risks;
- Leave a safe and stable environment for both humans and animals;
- To limit soil and surface/groundwater contamination by managing all water on site;
- Comply with local and national regulatory requirements;
- Form active partnerships with local communities to take care of management of the land after mining, where possible; and
- To maintain and monitor all rehabilitated areas following re-vegetation and, if monitoring shows that the objectives have been met, making an application for closure.

Successful rehabilitation must be monitored to ensure sustainability. This requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

## **32 Volumes and rate of water use required for the operation**

The water required for the project will be approximately 5 000L/day. It is anticipated that the required water will be obtained from either a borehole or municipality.

### **33 Has a water use licence has been applied for?**

Should the water required be from a borehole, it is anticipated that a Section 21 (a) Water Use Authorisation (WUA) will be required. This will be discussed with the DWS once the source of water has been identified and finalised.

In addition, according to the SANBI database, the proposed project is located within 500m of an unchanneled valley bottom wetland, which will require a Section 21 (c) and (i) WUA. This will also be clarified with the DWS. Should it be deemed necessary, on instruction by the DWS, the applicant will submit a WUA application.

## **34 Impacts to be mitigated in their respective phases**

The full impact assessment with associated mitigation and management measures are presented in Section 13.



Table 34-1: Impacts to be mitigated in their respective phases

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
<p><b>Mining</b> – sourcing construction material by creating the borrow pit:</p> <ul style="list-style-type: none"> <li>Excavations; and</li> <li>Blasting.</li> </ul> <p>The excavation of the borrow pit is for material required for the upgrading of the road between Tweeling and Frankfort.</p>	<p>Geology and Soil</p>	<p>Pre-Construction, Construction and Operation</p>	<p>3.27612 ha in total</p>	<ul style="list-style-type: none"> <li>The Contractor to take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>During site preparation, special care must be taken during the clearing of the works area where organic material will be stored separately from the topsoil and spoil material to ensure for the protection thereof. This topsoil must be re- used during the rehabilitation phase.</li> <li>The Contractor to take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>Remove, stockpile and preserve topsoil for re-use during rehabilitation.</li> <li>The Contractor shall take measures to the approval of the Engineer to ensure that there is no undue stormwater damage and soil erosion resulting from the construction and operation activities outside the construction camp and borrow pit area.</li> <li>Erosion Control:                             <ul style="list-style-type: none"> <li>Suitable erosion protective measures to be implemented.</li> <li>Stabilisation of cleared areas to prevent and control erosion.</li> <li>Monitoring to be conducted to detect erosion.</li> <li>Rehabilitate all areas disturbed during construction.</li> <li>Manage stormwater from construction site to avoid environmental contamination and erosion.</li> </ul> </li> <li>Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste, or any other foreign matter, which may inhibit the later growth of vegetation and microorganisms in the soil.</li> <li>Topsoil stockpiles must be always kept free of weeds and alien invasive vegetation.</li> <li>Soil must not be stockpiled on drainage lines or near watercourses or within 100m of watercourses without approval from the DWS.</li> <li>All topsoil including mulched vegetation material removed during vegetation clearing, but excluding invasive species), removed and stockpiled must be spread evenly all scared areas.</li> <li>Topsoil stockpiles must not be contaminated with oil, diesel, petrol, waste, or any other foreign matter, which may inhibit the later growth of vegetation and microorganisms in the soil.</li> <li>All equipment must be inspected regularly for oil or fuel leaks before it is operated. Leakages must be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.</li> <li>Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations.</li> <li>No washing of plant may occur on the construction site. Plant to be washed in dedicated areas.</li> <li>Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion.</li> <li>Monitoring to be conducted to detect erosion (e.g., steep sections along management areas, stockpiles, and the borrow pit area).</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Compliance with mitigation measures included in the BAR, recommendations of the Specialist Studies, and the EMPr, as well as conditions stipulated in the Environmental Authorisation approved will ensure that environmental management standards and practices are met.</p> <p>Comply with the requirements of NEM:BA, NFA, and the National Veld and Forest Fire Act (No. 101 of 1998).</p> <p>Compliance with Hazardous Substances Act (Act No. 15 of 1973)</p> <p>Compliance with emergency response procedure for spills</p> <p>Control of alien invasive species and noxious weeds for disturbed areas, in accordance with the requirements of the Conservation of Agricultural Resources Act (No. 43 of 1983) and GN No. R. 598 (Alien and Invasive Species Regulations, 2014) in terms of NEM:BA.</p>
	<p>Flora</p>	<p>Pre-Construction, Construction, Operation and Rehabilitation</p>		<ul style="list-style-type: none"> <li>Clearly demarcate the construction area.</li> <li>The Contractor to take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>The most significant way to mitigate the loss of habitat is to limit the footprint within the natural habitat areas remaining.</li> <li>No structures should be built outside the area demarcated for the development.</li> <li>All stockpiles, construction vehicles, equipment and machinery should be situated away from the natural vegetation.</li> <li>Indigenous plants naturally growing on the proposed development area, but that would be otherwise destroyed during clearing for development purposes should be incorporated into landscaped areas.</li> <li>Vegetation clearing should be kept to a minimum, and this should only occur where it is necessary.</li> <li>Rehabilitate all disturbed areas as soon as the construction is completed within the proposed development area.</li> <li>Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm, and this can be achieved through provision of appropriate awareness to all personnel.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Comply with the requirements of NEM:BA, NFA, and the National Veld and Forest Fire Act (No. 101 of 1998).</p> <p>Compliance with Hazardous Substances Act (Act No. 15 of 1973)</p> <p>Compliance with emergency response procedure for spills</p> <p>Control of alien invasive species and noxious weeds for disturbed areas, in accordance with the requirements of the Conservation of Agricultural Resources Act (No. 43 of 1983) and GN No. R. 598 (Alien and Invasive Species Regulations, 2014) in terms of NEM:BA.</p>

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
				<ul style="list-style-type: none"> <li>• Where possible, natural vegetation must not be cleared and encouraged to grow.</li> <li>• Disturbance of vegetation must be limited only to areas of construction.</li> <li>• Prevent contamination of natural areas by any pollution.</li> <li>• Proliferation of alien and invasive species is expected within the disturbed areas, and they should be eradicated and controlled to prevent further spread.</li> <li>• No storage of building materials or rubbles are allowed in the sensitive areas, such as the riparian habitats.</li> <li>• Avoid translocating stockpiles of topsoil from one place to sensitive areas to avoid translocating soil seed banks of alien species.</li> <li>• Appropriate measures should be implemented to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person.</li> <li>• Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks.</li> <li>• Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.</li> <li>• Implement suitable erosion control measures</li> <li>• During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation.</li> <li>• Promote awareness of all personnel.</li> <li>• The establishment of pioneer species should be considered with the natural cycle of rehabilitation of disturbed areas, which assists with erosion control, dust and establishment of more permanent species. This can be controlled during construction phase and thereafter more stringent measures should be implemented during the rehabilitation and post rehabilitation.</li> <li>• Manual / mechanical removal of AIPs is preferred to chemical control.</li> <li>• Topsoil should be stored in such a way that it does not compromise its plant-support capacity.</li> <li>• Topsoil from the construction activities should be stored for post-construction rehabilitation work and should not be disturbed more than is necessary.</li> <li>• Protect topsoil to avoid erosion loss on steep slopes.</li> <li>• Protect topsoil from contamination by aggregate, cement, concrete, fuels, litter, oils, domestic and wastes.</li> <li>• An ecologically sound storm water management plan must be implemented during construction and appropriate water diversion systems put in place.</li> <li>• Proliferation of alien and invasive species is expected within the disturbed areas, and they should be eradicated and controlled to prevent their spread.</li> <li>• No unauthorised vehicles should be allowed to drive through the site during the construction activities.</li> <li>• No dumping of any form is permitted.</li> <li>• No damage and/or removal/trapping/snaring of indigenous plant or animal material for cooking and other purposes will be allowed.</li> <li>• All areas to be affected by the proposed development will be rehabilitated by indigenous vegetation.</li> <li>• All areas to be affected by the proposed project will be rehabilitated after construction and all waste generated by the construction activities will be stored in a temporary demarcated storage area, prior to disposal thereof at a licensed registered landfill site.</li> <li>• As much vegetation growth as possible should be promoted within the proposed development site to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping. The plant material to be used for rehabilitation should be like what is found in the surrounding area.</li> <li>• Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by Environmental Control Officer (ECO).</li> </ul>	
	Fauna	Pre-Construction, Construction and Operation		<ul style="list-style-type: none"> <li>• The most significant way to mitigate the loss of habitat is to limit the footprint within the natural habitat areas remaining.</li> <li>• No structures should be built outside the area demarcated for the development.</li> <li>• All stockpiles, construction vehicles, equipment and machinery should be situated away</li> </ul>	Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
				<p>from the natural vegetation.</p> <ul style="list-style-type: none"> <li>Any fauna that becomes trapped in the trenches or in any construction or operational related activity may not be harmed and must be rescued and relocated by an experienced person.</li> <li>Training of construction workers to recognise threatened animal species will reduce the probability of fauna being harmed unnecessarily.</li> <li>The contractor must ensure that no faunal species are disturbed, trapped, hunted, or killed during the construction phase.</li> <li>All construction and maintenance vehicles must stick to properly demarcated and prepared roads. Off-road driving should be strictly prohibited.</li> <li>No fires should be allowed at the site</li> <li>No trapping or any other method of catching of any fauna may be performed on site</li> <li>No dogs or other domestic pets should be allowed at the site.</li> <li>Animals residing within the designated area shall not be unnecessarily disturbed.</li> <li>During construction, refresher training must be conducted to construction workers with regards to littering and poaching.</li> <li>The Contractor and employees shall not bring any domestic animals onto site.</li> <li>Toolbox talks should be provided to contractors regarding disturbance to animals.</li> <li>Any fauna that becomes trapped in the trenches or in any construction or operational related activity may not be harmed and must be rescued and relocated by an experienced person.</li> <li>No unauthorised vehicles should be allowed to drive through the site during the construction activities.</li> <li>No trapping or any other method of catching of any animal may be performed on site.</li> <li>Illegal hunting is prohibited.</li> <li>No dumping of any form is permitted.</li> <li>No damage and/or removal/trapping/snaring of indigenous plant or animal material for cooking and other purposes will be allowed.</li> <li>Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by Environmental Control Officer (ECO).</li> <li>The disturbance of fauna should be minimized.</li> <li>Animals residing within the designated area shall not be unnecessarily disturbed.</li> </ul>	<p>Comply with the requirements of NEM:BA and Animal Protection Act (No. 71 of 1962).</p> <p>Toolbox talks on management of animals on site</p>
	Surface Water	Construction, Operation and Rehabilitation		<ul style="list-style-type: none"> <li>All construction activities to comply with the National Water Act (Act No. 36 of 1998).</li> <li>The Contractor to take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>Ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage.</li> <li>Regularly inspect all vehicles for leaks.</li> <li>Re-fueling of vehicles must take place off-site.</li> <li>Littering must be prohibited by providing adequate number of rubbish bins during the construction and operational phases to ensure proper disposal of rubbish.</li> <li>During construction, contractors used for the project must have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly</li> <li>Staff must be trained to deal with fuel/chemical spills and spill kits must be easily available at all times.</li> <li>Manage stormwater from construction site to avoid environmental contamination and erosion.</li> <li>Implement suitable stormwater measures during construction to manage ingress of runoff into watercourses.</li> <li>Stormwater runoff from workshops, vehicle maintenance area, wash-bays and other potential pollution sources shall be collected and treated in hydrocarbon separation pits/tanks before discharged into the environment.</li> <li>Clean water and dirty water separation shall be implemented as part of stormwater management.</li> <li>Stormwater channels and preferential flow paths should be delineated, filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion.</li> <li>Measures must be taken to divert unpolluted water and runoff away from the site.</li> <li>Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>The environmental parameters to be included as part of the environmental monitoring programme, which is to be undertaken by the Contractor, includes water quality.</p> <p>All water discharges to comply with legal requirements associated with the NWA. Analysis is to be undertaken at a SANS 17025 certified laboratory.</p> <p>Stormwater management in compliance with GNR704</p>

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
				<ul style="list-style-type: none"> <li>• Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching.</li> <li>• All bare areas must be revegetated to decrease the possibility of erosion and sedimentation of the watercourses.</li> <li>• Prevent uncontrolled access of vehicles through the water resources system that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas.</li> <li>• Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil.</li> <li>• All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.</li> <li>• No storage of building materials, equipment or topsoil should be allowed within 500m of wetland areas without authorisation from the DWS.</li> <li>• The construction footprint is to be limited to as small an area as practical and indiscriminate destruction of habitat must be avoided.</li> <li>• Silt traps and silt fencing should be utilised in areas with steep slopes during the pre-construction and construction phases of the proposed development activities to abate any potential impacts from smothering of the wetland habitat emanating from runoff from the site.</li> <li>• Adequate toilet facilities should be provided for construction crews and informal ablutions within the area should be prohibited to conserve the ecological integrity of the wetland habitats and avoid further contamination of the watercourses.</li> <li>• Suitable protection of wetland areas during blasting.</li> <li>• The unchanneled valley bottom wetland must be demarcated as a no-go area.</li> <li>• Conduct water quality monitoring (baseline and during construction and operation of the borrow pit).</li> <li>• All removed soil and material must not be stockpiled within wetland areas. Stockpiling should take place outside of the water resources. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.</li> <li>• It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces.</li> <li>• A formal rehabilitation plan for wetlands affected by the project activities must be developed.</li> <li>• All wetland areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state, or better where possible, in agreement with the ECO.</li> <li>• Re-vegetation of disturbed areas must be undertaken with site indigenous species.</li> </ul>	
	Air Quality	Construction and Operation		<ul style="list-style-type: none"> <li>• Speed limits must be implemented in all areas to limit the levels of dust pollution</li> <li>• Waste must be disposed of, as soon as possible at a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand on site to decay, resulting in malodours</li> <li>• No fires are allowed if smoke from such fires will cause a nuisance.</li> <li>• Vehicles and construction machinery must be well maintained to reduce excessive exhaust emissions.</li> <li>• Appropriate dust suppression measures or temporary stabilising mechanisms must be used when dust generation is unavoidable (e.g., dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area, the borrow pit, etc.</li> <li>• The Contractor will take preventative measures to minimise complaints regarding dust nuisances (e.g., screening, dust control, timing, and pre-notification of affected parties).</li> <li>• Air quality to be monitored (baseline and during construction) for dust fallout and particulate matter. Sampling locations to consider major sources of dust and sensitive receptors.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>The environmental parameters to be included as part of the environmental monitoring programme, which is to be undertaken by the Contractor, includes: Air Quality –</p> <ul style="list-style-type: none"> <li>• Dust fallout; and</li> <li>• Particulate matter (PM10).</li> </ul> <p>Comply with the National Ambient Air Quality Standards.</p> <p>Compliance with monitoring standards</p> <p>Dust fallout – Comply with ASTM D1739; SANS 1929, SANS 69.</p>

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
	Noise	Construction and Operation		<ul style="list-style-type: none"> <li>The provisions of SANS 10103:2008 will apply to all areas at the perimeter of the site.</li> <li>Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.</li> <li>Prior to commencing with blasting activities, the blasting Contractor should submit a Method Statement which should comply with the Explosives Regulations (2014) and all relevant SANS standards and health and safety standards for mitigating blasting.</li> <li>The Contractor shall employ industry standard methods to control the impact of blasting and limit the risk of damage to buildings and structures by reducing blast vibrations induced in the rock mass, eliminating fly rock, and limiting air-blast and noise to acceptable levels.</li> <li>Working hours to be agreed upon with Project Manager, to minimise disturbance to adjacent landowners and community members.</li> <li>The Contractor must inform local communities and landowners of any activity that could cause a nuisance to them.</li> <li>Noise rules must be established for construction areas.</li> <li>The Contractor will take preventative measures (e.g., screening, muffling, timing, pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools.</li> <li>All construction vehicles must be serviced on a frequent basis as a means of limiting excessive noise levels.</li> <li>The contractor must ensure the silencers of all construction vehicles and machinery is working.</li> <li>Noise to be monitored (baseline and during construction). Sampling locations to consider major noise sources and sensitive receptors.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>The environmental parameters to be included as part of the environmental monitoring programme, which is to be undertaken by the Contractor, includes noise.</p> <p>Noise levels - Comply with SANS 10103:2008. Compliance with blasting-related legislation and standards.</p> <p>Compliance with set working hours</p>
	Visual	Construction and Operation		<ul style="list-style-type: none"> <li>On-going housekeeping to maintain a tidy construction area.</li> <li>Damage to the natural environment should be minimised.</li> <li>Particular aspects of concern to landowners and local residents should be addressed.</li> <li>Trees and all woody shrubs should be protected from damage to provide a natural visual shield. Excavated material should not be placed on trees and woody shrubs and movement across them should not be allowed as far as practical.</li> <li>The clearing of all sites should be kept to a minimum and surrounding vegetation should as far as possible be left intact as a natural shield.</li> <li>The Contractor to take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>Rehabilitation of the borrow pit area.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Compliance with rehabilitation standards and objectives.</p>
	Safety and Security	Construction and Operation		<ul style="list-style-type: none"> <li>Compliance with Occupational Health and Safety Act (Act No. 85 of 1993). Contractor to provide an Occupational Health and Safety Management Plan to the Construction Manager for approval prior to the commencement of works in terms of the Construction Regulations (2014).</li> <li>Proper supervision of employees at all times. Employees to be clearly identifiable.</li> <li>Employees must wear the necessary Personal Protective Equipment (PPE).</li> <li>Employees to remain within the site boundary and no loitering to be allowed.</li> <li>Access into and out of the borrow pit area must only be via existing access roads from local public roads.</li> <li>Contractor to prepare and submit, for approval, a rescue procedure for employees in the case of an injury.</li> <li>Any employees of the Contractor or his sub-contractors found to be in breach of any of the Environmental Protection specifications may be ordered to leave the site forthwith.</li> <li>When working in the area of encroachment is prevalent, all open excavated trenches and foundations should be clearly marked and secured to keep people and fauna from falling in.</li> <li>Closure of the borrow pit after construction is completed.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2014) and other relevant regulations.</p> <p>Comply with Health and Safety Plan</p>

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
	Heritage	Construction		<ul style="list-style-type: none"> <li>• If any archaeological material, such as sites, objects, or features, as well as graves and burials are uncovered during construction activities on site, work will cease immediately, and an archaeologist should be contacted as a matter of urgency in order to assess such occurrences.</li> <li>• Permits to be obtained from the relevant heritage authority if heritage resources are to be impacted upon.</li> <li>• No person may, without a permit issued by SAHRA or a provincial heritage resources authority:                             <ul style="list-style-type: none"> <li>○ Destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;</li> <li>○ Destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority or; Bring onto or use at a burial ground or grave referred to in above any excavation equipment, or any equipment which assists in the detection or recovery of metals.</li> </ul> </li> </ul>	Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.
	Socio- Economic	Pre-Construction, Construction and Operation		<ul style="list-style-type: none"> <li>• Establish lines of communications with affected parties, adjacent landowners, and businesses.</li> <li>• Establish processes and procedures to effectively verify and address complaints and claims received.</li> <li>• Provide the relevant contact details to affected parties, adjacent landowners, and businesses for queries / raising of issues or complaints.</li> <li>• Maintain lines of communications with affected parties, adjacent landowners, and businesses.</li> <li>• The requirements of the Occupational Health and Safety Act (Act 85 of 1993) and related regulations shall be adhered to.</li> <li>• Maintain access control to prevent access of the public to the construction areas.</li> <li>• The Contractor must submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work. These requirements are aligned with the Construction Regulations (2014).</li> <li>• Construction related material should be kept in access- controlled area.</li> <li>• Where feasible introduce a programme to transfer skills particularly during the construction phase of the project.</li> <li>• Employment opportunities to be created for women.</li> <li>• The selection process should be transparent and must include both men and women.</li> <li>• The project proponent should designate a person to ensure that employment is handled correctly, transparently and is not disruptive to the project. All evidence of the labour process must be stored by the project proponent.</li> <li>• Construction activities to remain within the designated construction areas.</li> <li>• The provisions of SANS 10103:2008 will apply to all areas at the perimeter of the site, within audible distance of residents.</li> <li>• Working hours to be agreed upon with Project Manager, so as to minimise disturbance to adjacent landowners and businesses.</li> <li>• Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas.</li> <li>• Before any work can start, the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control.</li> <li>• Ensure appropriate traffic safety measures are implemented.</li> <li>• Traffic safety measures (e.g., traffic warning signs, flagmen) to be implemented.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Compliance with agreements made with adjacent landowners and affected parties.</p>

ACTIVITIES	ASPECTS AFFECTED	PHASE / TIME PERIOD FOR IMPLEMENTATION	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
	Waste	Construction and Operation		<ul style="list-style-type: none"> <li>• Suitable litter receptacles to be positioned strategically across the site at all working areas.</li> <li>• Waste must be separated at source (e.g., containers for glass, paper, metals, plastics, organic waste and hazardous wastes).</li> <li>• Waste material that may harm man or animals should be removed immediately.</li> <li>• No hazardous materials e.g., oil, diesel and fuel should be disposed of in the surrounding environment. Any diesel, oil or petrol spillages are to be collected and stored in specially marked containers and disposed of at a permitted waste disposal site and must be treated as hazardous waste.</li> <li>• No refuse or litter is allowed to be burnt on site.</li> <li>• The recycling of all waste is to be encouraged of both the contractor and staff.</li> <li>• All vehicle parking areas and vehicle servicing areas are to be inspected carefully for diesel, oil and other spillages weekly.</li> <li>• Excess spoil material should be disposed of at a location identified by the Contractor and approved by the Engineer and ECO. Where possible, spoil should be used to fill, shape, and rehabilitate the borrow pit.</li> <li>• All waste generated by the decommissioning of the site camp and from construction material must be disposed of at an appropriate waste disposal site.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Compliance with rehabilitation standards and objectives.</p>
	Traffic	Construction and Operation		<ul style="list-style-type: none"> <li>• Ensure appropriate traffic safety measures are implemented.</li> <li>• All reasonable precautions must be taken during construction to avoid severely interrupting the traffic flow on existing roads, especially during peak periods.</li> <li>• All properties adjacent to the site must be able to access the main roads.</li> <li>• Before any work can start, the Local Traffic Department must be consulted about measures to be taken regarding pedestrian and vehicular traffic control.</li> <li>• Traffic safety measures to be implemented.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Obtain the necessary approvals from the necessary Roads Authority, as required.</p> <p>Comply with speed limits.</p> <p>Maintain adequate road conditions</p>
	Rehabilitation of the borrow pit area			<ul style="list-style-type: none"> <li>• All rehabilitation and reinstatement efforts shall be implemented immediately after completion of construction activities.</li> <li>• The Contractor shall take all reasonable measures to minimise disturbance to the natural environment at the site thereby reducing the degree of rehabilitation required.</li> <li>• The contractor must re-establish any grass and vegetation within the road reserve and borrow pit area that was disturbed during construction. All alien vegetation must be removed from the road reserve and borrow pit area.</li> <li>• Upon completion of all construction activities, all structures, equipment, materials, waste, rubble, notice boards along the entire length of the road and at the borrow pit area must be removed from site.</li> <li>• The decommissioning of the site camp must be done in such a manner to cause the least environmental impact.</li> <li>• All waste generated by the decommissioning of the site must be disposed of at an appropriate waste disposal site.</li> <li>• All rehabilitation and reinstatement efforts shall be implemented immediately after completion of construction activities.</li> <li>• Re-vegetation shall take place at the start of the rainy season to maximise water availability and minimise the need for watering.</li> <li>• All topsoil including mulched vegetation material removed during vegetation clearing, but excluding invasive species), removed and stockpiled must be spread evenly all scared areas.</li> <li>• Acceptable reinstatement and rehabilitation of disturbed areas to prevent erosion. Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasives.</li> <li>• Re-vegetation of disturbed areas must be undertaken with site indigenous species.</li> <li>• All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state, or better where possible, in agreement with the ECO.</li> <li>• A formal rehabilitation plan for wetlands affected by the Project activities must be developed.</li> <li>• All wetland areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state, or better where possible, in agreement with the ECO.</li> </ul>	<p>Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.</p> <p>Compliance with rehabilitation standards and objectives.</p>

### 35 Impact Management Outcomes

Table 35-1: Impact Management Outcomes

ACTIVITY (Whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	STANDARD TO BE ACHIEVED
<p><b>Mining</b> – sourcing construction material by creating the borrow pit:</p> <ul style="list-style-type: none"> <li>Excavations; and</li> <li>Blasting.</li> </ul> <p>The excavation of the borrow pit is for material required for the upgrading of the road between Tweeling and Frankfort.</p>	<ul style="list-style-type: none"> <li>Loss of topsoil</li> </ul>	<ul style="list-style-type: none"> <li>Soil</li> </ul>	Pre-Construction Phase	<ul style="list-style-type: none"> <li>Control through appropriate stripping and stockpiling measures</li> </ul>	<ul style="list-style-type: none"> <li>Impact to be controlled</li> </ul>
	<ul style="list-style-type: none"> <li>Unsuitable geological conditions</li> </ul>	<ul style="list-style-type: none"> <li>Geology</li> </ul>		<ul style="list-style-type: none"> <li>Control through compliance with the Geotechnical Investigation</li> </ul>	<ul style="list-style-type: none"> <li>Impact to be controlled</li> </ul>
	<ul style="list-style-type: none"> <li>Clearance of indigenous vegetation</li> <li>Loss of vegetation and habitat</li> <li>Loss of plant species of conservation concern on site</li> </ul>	<ul style="list-style-type: none"> <li>Flora</li> </ul>		<ul style="list-style-type: none"> <li>Control through clearing to be kept to a minimum</li> <li>Remedy through rehabilitation of borrow pit area</li> <li>Stop through obtaining permits</li> </ul>	<ul style="list-style-type: none"> <li>Impact to be controlled</li> <li>Borrow pit area to be rehabilitated</li> </ul>
	<ul style="list-style-type: none"> <li>Loss and displacement of animals on site</li> </ul>	<ul style="list-style-type: none"> <li>Fauna</li> </ul>		<ul style="list-style-type: none"> <li>Control through no faunal species being disturbed, trapped, hunted, or killed</li> <li>Control through training of construction workers to recognise threatened animal species</li> </ul>	<ul style="list-style-type: none"> <li>Impact to be controlled</li> <li>Borrow pit site to be rehabilitated</li> </ul>
	<ul style="list-style-type: none"> <li>Noise pollution</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding landowners and businesses</li> <li>Fauna</li> </ul>	Construction and Operation Phase	<ul style="list-style-type: none"> <li>Control through the compliance with SANS 10103:2008.</li> </ul>	<ul style="list-style-type: none"> <li>Noise levels to be controlled</li> </ul>
	<ul style="list-style-type: none"> <li>Air pollution through excessive dust</li> </ul>	<ul style="list-style-type: none"> <li>Air quality</li> </ul>		<ul style="list-style-type: none"> <li>Control through appropriate dust suppression measures.</li> <li>Control through limiting the speed of vehicle movement.</li> <li>Prevention through the covering of material during transportation.</li> </ul>	<ul style="list-style-type: none"> <li>Dust levels to be controlled</li> </ul>
	<ul style="list-style-type: none"> <li>Soil erosion and contamination</li> </ul>	<ul style="list-style-type: none"> <li>Soil</li> </ul>		<ul style="list-style-type: none"> <li>Control through erosion control measures.</li> <li>Control through stormwater management.</li> <li>Remedy through the re-use of topsoil for rehabilitation.</li> </ul>	<ul style="list-style-type: none"> <li>Erosion to be controlled</li> <li>Borrow pit area to be rehabilitated</li> </ul>
	<ul style="list-style-type: none"> <li>Surface water pollution</li> <li>Inadequate stormwater management</li> <li>Loss/disturbance of wetland areas</li> </ul>	<ul style="list-style-type: none"> <li>Surface water</li> </ul>		<ul style="list-style-type: none"> <li>Prevent through compliance with NWA.</li> <li>Control through stormwater management.</li> <li>Control through protection of wetland areas not directly affected by the borrow pit locations.</li> <li>Remedy through rehabilitation of wetland areas</li> </ul>	<ul style="list-style-type: none"> <li>Impact to be controlled</li> <li>Borrow pit area to be rehabilitated</li> </ul>
	<ul style="list-style-type: none"> <li>Social impact</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding landowners and businesses</li> <li>Noise</li> <li>Visual</li> <li>Traffic</li> <li>Health and safety</li> </ul>		<ul style="list-style-type: none"> <li>Control through complaints register.</li> <li>Control of noise, visual and traffic impacts.</li> <li>Control through compliance with Occupational Health and Safety Act (Act No. 85 of 1993)</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to be controlled</li> <li>Compliance with Occupational Health and Safety Act (Act No. 85 of 1993)</li> </ul>
	<ul style="list-style-type: none"> <li>Traffic disruptions due to vehicles transporting material</li> </ul>	<ul style="list-style-type: none"> <li>Road users</li> <li>Traffic</li> </ul>		<ul style="list-style-type: none"> <li>Control through limiting the speed of vehicle movement.</li> <li>Control through the implementation of appropriate traffic safety measures</li> </ul>	<ul style="list-style-type: none"> <li>Traffic disruptions to be controlled</li> </ul>
	<ul style="list-style-type: none"> <li>Visual impact</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding landowners and businesses</li> </ul>		<ul style="list-style-type: none"> <li>Prevention through the minimisation of damage to the natural environment.</li> <li>Prevent by clearing of waste and rubble from the site.</li> <li>Remedy through the rehabilitation of the borrow pit area.</li> </ul>	<ul style="list-style-type: none"> <li>Visual impacts to be prevented</li> <li>Borrow pit area to be rehabilitated</li> </ul>
	<ul style="list-style-type: none"> <li>Clearance of indigenous vegetation</li> <li>Loss of vegetation</li> <li>Invasion of alien species</li> </ul>	<ul style="list-style-type: none"> <li>Flora</li> </ul>		<ul style="list-style-type: none"> <li>Management of pollution control.</li> <li>Control through alien invasive eradication programme.</li> <li>Prevention through the promotion of environmental awareness.</li> <li>Remedy through rehabilitation of borrow pit area</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to be controlled</li> <li>Borrow pit site to be rehabilitated</li> </ul>
	<ul style="list-style-type: none"> <li>Disturbance of heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>Heritage</li> </ul>		<ul style="list-style-type: none"> <li>Prevent through reporting and evaluation of any archaeological or heritage resources found on site.</li> <li>Control through the application for permits from the relevant heritage if heritage resources are to be impacted upon.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to be prevented</li> </ul>
	<ul style="list-style-type: none"> <li>Pollution through poor waste management</li> </ul>	<ul style="list-style-type: none"> <li>Waste</li> </ul>		<ul style="list-style-type: none"> <li>Management of pollution control.</li> <li>Prevent by clearing of waste and rubble from the site.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to be controlled</li> </ul>



### 36 Impact Management Actions

Table 36-1: Impact Management Actions

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Mining – sourcing construction material by creating the borrow pit: <ul style="list-style-type: none"> <li>• Excavations; and</li> <li>• Blasting.</li> </ul> The excavation of the borrow pit is for material required for the upgrading of the road between Tweeling and Frankfort.	<ul style="list-style-type: none"> <li>• Loss of topsoil</li> </ul>	<ul style="list-style-type: none"> <li>• Control through appropriate stripping and stockpiling measures</li> </ul>	Pre-Construction Phase	Compliance with mitigation measures included in the BAR and the EMPr, as well as EA conditions will ensure that environmental management standards and practices are met.  The environmental parameters to be included as part of the environmental monitoring programme, which is to be undertaken by the Contractor, includes the following: <ul style="list-style-type: none"> <li>• Air Quality –                             <ul style="list-style-type: none"> <li>○ Dust fallout;</li> <li>○ Particulate matter (PM10);</li> </ul> </li> <li>• Noise; and</li> <li>• Water quality.</li> </ul>
	<ul style="list-style-type: none"> <li>• Unsuitable geological conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Control through compliance with the Geotechnical Investigation</li> </ul>		
	<ul style="list-style-type: none"> <li>• Clearance of indigenous vegetation</li> <li>• Loss of habitat</li> <li>• Loss of plant species of conservation concern on site</li> </ul>	<ul style="list-style-type: none"> <li>• Control through clearing to be kept to a minimum</li> <li>• Remedy through rehabilitation of the borrow pit area</li> <li>• Stop through obtaining permits</li> </ul>		
	<ul style="list-style-type: none"> <li>• Loss and displacement of animals on site</li> </ul>	<ul style="list-style-type: none"> <li>• Control through no faunal species being disturbed, trapped, hunted, or killed</li> <li>• Control through training of construction workers to recognise threatened animal species</li> </ul>		
	<ul style="list-style-type: none"> <li>• Noise pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Control through the compliance with SANS 10103:2008.</li> </ul>	Construction and Operation Phase	Dust fallout - Comply with ASTM D1739; SANS 1929, SANS 69.
	<ul style="list-style-type: none"> <li>• Air pollution through excessive dust</li> </ul>	<ul style="list-style-type: none"> <li>• Control through appropriate dust suppression measures.</li> <li>• Control through limiting the speed of vehicle movement.</li> <li>• Prevention through the covering of material during transportation.</li> </ul>		Noise levels - Comply with SANS 10103:2008.
	<ul style="list-style-type: none"> <li>• Soil erosion and contamination</li> </ul>	<ul style="list-style-type: none"> <li>• Control through erosion control measures.</li> <li>• Control through stormwater management.</li> <li>• Remedy through the re-use of topsoil for rehabilitation.</li> </ul>		All water discharges to comply with legal requirements associated with the NWA.
	<ul style="list-style-type: none"> <li>• Surface water pollution</li> <li>• Inadequate stormwater management</li> <li>• Loss/disturbance of wetland areas</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent through compliance with NWA.</li> <li>• Control through stormwater management.</li> <li>• Control through protection of wetland areas.</li> <li>• Remedy through rehabilitation of wetland areas</li> </ul>		Analysis is to be undertaken at a SANS 17025 certified laboratory.
	<ul style="list-style-type: none"> <li>• Social impact</li> </ul>	<ul style="list-style-type: none"> <li>• Control through complaints register.</li> <li>• Control of noise, visual and traffic impacts.</li> <li>• Control through compliance with Occupational Health and Safety Act (Act No. 85 of 1993)</li> </ul>		Compliance with Occupational Health and Safety Act (Act No. 85 of 1993)
	<ul style="list-style-type: none"> <li>• Traffic disruptions due to vehicles transporting material</li> </ul>	<ul style="list-style-type: none"> <li>• Control through limiting the speed of vehicle movement.</li> <li>• Control through the implementation of appropriate traffic safety measures</li> </ul>		
	<ul style="list-style-type: none"> <li>• Visual impact</li> </ul>	<ul style="list-style-type: none"> <li>• Prevention through the minimisation of damage to the natural environment.</li> <li>• Prevent by clearing of waste and rubble from the site.</li> <li>• Remedy through the rehabilitation of the borrow pit area.</li> </ul>		
	<ul style="list-style-type: none"> <li>• Clearance of indigenous vegetation</li> <li>• Loss of vegetation</li> <li>• Invasion of alien species</li> </ul>	<ul style="list-style-type: none"> <li>• Management of pollution control.</li> <li>• Control through alien invasive eradication programme.</li> <li>• Prevention through the promotion of environmental awareness.</li> </ul>		
	<ul style="list-style-type: none"> <li>• Disturbance of heritage resources</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent through reporting and evaluation of any archaeological or heritage resources found on site.</li> <li>• Control through the application for permits from the relevant heritage, if heritage resources are to be impacted upon.</li> </ul>		
<ul style="list-style-type: none"> <li>• Pollution through poor waste management</li> </ul>	<ul style="list-style-type: none"> <li>• Management of pollution control.</li> <li>• Prevent by clearing of waste and rubble from the site.</li> </ul>			

## 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.

The main aim in developing Maximus's rehabilitation plan is to mitigate the impacts caused by the mining activities and to restore land back to a satisfactory end land use. The rehabilitation plan must be developed as early as possible and maintained throughout the LoM. It is important that the project's closure plan is clearly defined and understood by all involved before starting the process and is complementary to the rehabilitation objectives. The closure vision for the Maximus aggregate mining project is intended to inform the closure objectives and as such is currently stated as:

***To implement a post mining landscape that is safe, stable, and non-polluting over the long term, through collaboration with affected I&APs***

The overall closure objectives for the proposed project are as follows:

- Adequate reinstatement and rehabilitation of construction and borrow pit area; and
- Conduct concurrent or progressive rehabilitation of areas affected by construction and operation activities associated with the borrow pit.
- Minimise the area to be disturbed and to ensure that the areas disturbed during the activities are rehabilitated, as per the measures provided in the EMPr and the conditions of the Environmental Authorisation.
- Remove mine infrastructure that cannot be used by a subsequent landowner or a third party.
- Where infrastructure can be used by a third party, arrangements will be made to ensure their long-term sustainable use;
- Clean up all stockpiles and loading areas and rehabilitate these as far as possible to a land capability similar to that which existed prior to mining;
- Rehabilitate the disturbed land to a state that facilitates compliance with applicable environmental quality objectives,
- Landscape the rehabilitated areas in alignment with the surrounding topography to prevent the unnecessary pooling of water which will reduce the runoff in the catchment;
- Implement progressive rehabilitation measures, beginning during the construction phase wherever possible, reducing the overall visual impact;
- Physically and chemically stabilise any remaining structures to minimise residual risks;
- Leave a safe and stable environment for both humans and animals;
- To limit soil and surface/groundwater contamination by managing all water on site;
- Comply with local and national regulatory requirements;
- Form active partnerships with local communities to take care of management of the land after mining, where possible; and
- To maintain and monitor all rehabilitated areas following re-vegetation and, if monitoring shows that the objectives have been met, making an application for closure.

Successful rehabilitation must be monitored to ensure sustainability. This requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

### **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 I&APs 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.**

The proposed borrow pit area will cover an area approximately 3.27612 ha in extent. The location and extent of the infrastructure sites cannot be determined at this stage. Mapping of the actual mining activities cannot be undertaken.

The potential impacts will be limited in spatial extent and management plan is provided in such a manner as to ensure concurrent rehabilitation. The rehabilitation of the site will entail:

- The removal of all logistical facilities, the ripping/scarifying of the affected area and allowing for natural regrowth to occur so that the site can form part of the surrounding veld.
- 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 until an effective vegetation cover of 45% must be achieved. Re-seeding will be undertaken if the vegetation cover has not been achieved.

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

The Rehabilitation Plan has been compiled in support of the primary closure objectives which are to remove the mining infrastructure and rehabilitate the land to a suitable land use which represent pre-mining conditions and provides a safe and sustainable environment for surrounding receptors.

### **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/mining 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 site.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure).

The estimated environmental cost expenditure related to the project is anticipated to be R 129 931.00 as shown in Table 37-1.

**Table 37-1: Environmental Cost Estimate Expenditure**

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	200	17.32	1	1	3464
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	500	43.19	1	1	21595
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	419.16	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	228.63	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	482.67	1	1	0
<b>6</b>	<b>Opencast rehabilitation including final voids and ramps</b>	<b>ha</b>	<b>0.5</b>	<b>245652</b>	<b>0.52</b>	<b>0.5</b>	<b>31934.76</b>
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 waste deposits and evaporation ponds (non-polluting potential)	ha	0	210087.08	1	1	0
8 ( C )	Rehabilitation of processing waste 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	0.2	133622.5	1	1	26724.5
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	0.5	17782.46	1	1	8891.23
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
						Sub Total 1	92609.49
1	Preliminary and General (12.0% of Subtotal 2)		11113.1388	<b>weighting factor 2</b>			11113.1388
						1	

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
2	Contingencies (10.0% of Subtotal 2)				9260.949		9260.949
					Subtotal 2		112983.58
					VAT (15%)		16947.54
					<b>Grand Total</b>		<b>129931</b>

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

estimated environmental cost expenditure related to the project is anticipated to be R 129 931.00 at this stage as provided in Table 37-1.

Maximus will fund the operation and hereby undertakes to fund the operations and to manage the operations. The applicant (Maximus) hereby confirms that the financial provision will be provided as determined in Table 37-1.

## **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)**

In order to plan, construct and operate the proposed project, it is important that all parties understand their duties and responsibilities. Maximus and their contractors will be responsible for the construction of the proposed project and ensure that all activities undertaken by Maximus are undertaken in compliance with the project's EA and EMPr. Maximus will monitor construction activities at a frequency, which will be determined by the construction schedule. The following sections describe the functions of the key team members.

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

- DMR,
- 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 Competent Authority (Department of Mineral Resources (DMR))**

The DMR plays a lead role in the implementation of environmental policies, legislation, and regulations. Their role is to ensure that the construction and operation of the proposed aggregate mine is conducted in a sustainable manner, in compliance with the relevant environmental legislation. DMR is responsible for approving the EMPr for the project and any revisions and amendments thereto.

#### **38.3.2 Project Developer (Maximus)**

The Project Developer (Maximus) 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 Maximus will appoint the Environmental Control Officer, EHS Manager and Site Manager.

Maximus will be responsible for:

- Ensuring that all team members are aware of their roles and responsibilities;
- Taking overall responsibility for all activities that occur in the proposed project and associated infrastructure;

- Ensuring that all commitments/conditions contained in the EA and EMPr are communicated and adhered to by Maximus employees to all team members and contractors.

During the *construction phase* Maximus must:

- Appoint a Project Management Team to oversee the Contractor and act as a liaison between the Environmental Control Officer (ECO) and the Contractor;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedies problems timeously and to the satisfaction of the authorities;
- Appoint an independent and suitably qualified ECO to ensure that the Contractor abides by the EMPr;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

During the *operation phase* Maximus must:

- Ensure that the Project Management Team oversees the Contractor/s and act as a liaison between the ECO and the Contractor/s;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedy problems timeously and to the satisfaction of the authorities;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

During *decommissioning phase* Maximus must:

- Ensure that the Project Management Team oversees the Contractor/s and act as a liaison between the ECO and the Contractor/s;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedy problems timeously and to the satisfaction of the authorities;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.
- environmental legislation by parties.

### **38.3.3 Operations Manager**

The Operations Manager will report to the Maximus and be responsible for:

- Complying with the EMPr and EA commitments and any other legislative requirements as applicable to their workings;
- Adhering to any instructions issued by the project manager on advice of the ECO.

### **38.3.4 Contractor (s) and sub-contractors**

The Contractor (s) (including Sub-Contractors) will report to the Project Management Team and be responsible for:

- Appointing an Environmental Representative who will ensure that all construction activities on site are undertaken in accordance with the EMPr;



- Drafting Environmental Method Statements to mitigate environmental impacts;
- Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;
- Ensuring that all employees and sub-contractors comply with this EMPr;
- Complying with the EMPr and EA commitments and any other legislative requirements as applicable to their workings;
- Adhering to any instructions issued by the project manager on advice of the ECO;
- Submitting an environmental report at identified site meetings on the environmental incidents that have occurred within the period before the site meeting;
- Arranging that all employees and those of the subcontractors receive appropriate training prior to the commencement of construction, taking cognisance of this EMPr and EA.

The Contractor has a duty to demonstrate respect and care for the environment in which they are operating. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

### **38.3.5 Environmental Control Officer**

The ECO will report to Maximus and the ECO shall be an independent qualified environmental professional with the relevant environmental expertise and shall be responsible for:

- Fully understanding the commitments in the EMPr and EA;
- Ensuring that the EA conditions are upheld;
- Familiarising him / herself with the project and EMPr, and ensuring compliance with the relevant legislation applicable to the project and Maximus Safety Health and Environmental Policy and procedures;
- Advising management on environmental issues and recommendations for the proposed development;
- Informing key, on-site staff through initial environmental awareness briefing of their roles and responsibilities in terms of the EMPr;
- Communicating the contents of the EMPr and EA to the contractor and sub-contractor staff members. Training will be required to ensure all staff members are aware of the requirements of the EMPr;
- Liaising with environmental statutory bodies, including but not limited to, DMR and DWS, where deemed necessary;
- Monitoring the implementation of the EMPr and EA throughout the project, by means of site inspections and meetings;
- Arranging for liaison with I&APs on environmental issues of concern;
- Authorising the removal of personnel and / or equipment should they contravene the conditions of the EMPr and EA;
- Compiling a checklist of areas of non-compliance;
- Identifying areas of non-compliance, and recommending measures to rectify them in consultation with Maximus and the Contractor;

- Ensuring follow-up and resolution of all non-compliance;
- Compiling monthly progress reports for submission to the Project Manager and DMR;
- Reporting directly to Maximus ;
- Reviewing and approving Environmental Method Statements submitted by the contractor to mitigate environmental impacts;
- The audit report will be submitted to the Contractor for comment prior to submission to the Maximus ;
- Undertaking a post-construction inspection, which may result in recommendations for additional clean-up and rehabilitation measures; and
- Undertaking regular site inspections to assess compliance with the EMPr and EA and take appropriate action to rectify non – conformances.

### **38.3.6 Safety, Health and Environmental Representative**

The Safety, Health and Environmental (SHE) Representative will report to Project Management Team and be responsible for:

- Ensuring that all environmental and health and safety conditions are undertaken by all staff and contractors on site;
- Overseeing all work done by the ECO; and
- Ensuring that corrective actions are followed up and closed out.

## **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
<p><b>Mining</b> – sourcing construction material by creating the borrow pit:</p> <ul style="list-style-type: none"> <li>Excavations; and</li> <li>Blasting.</li> </ul> <p>The excavation of the borrow pit is for material required for the upgrading of the road between Tweeling and Frankfort.</p>	<ul style="list-style-type: none"> <li>Noise pollution</li> <li>Blasting related impacts</li> </ul>	<ul style="list-style-type: none"> <li>Noise levels - Comply with SANS 10103:2008.</li> <li>Comply with blasting-related legislation and standards.</li> </ul>	<ul style="list-style-type: none"> <li>Project Manager and ECO – to check</li> <li>Contractor to implement management actions</li> </ul>	<ul style="list-style-type: none"> <li>Monitor weekly during construction and operation phase</li> </ul>
	<ul style="list-style-type: none"> <li>Dust generation</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of Particulate matter (PM10)</li> <li>Dust fallout - Comply with ASTM D1739; SANS 1929, SANS 69</li> </ul>		<ul style="list-style-type: none"> <li>Monitor weekly during construction and operation phase</li> <li>Compile monthly reports</li> <li>Daily visual inspections</li> </ul>
	<ul style="list-style-type: none"> <li>Vegetation clearing</li> <li>Encroachment of alien vegetation</li> </ul>	<ul style="list-style-type: none"> <li>Develop alien invasive monitoring programme and eradication programme</li> <li>Develop a rehabilitation plan to be implemented once construction is completed.</li> </ul>		<ul style="list-style-type: none"> <li>Daily visual inspections</li> </ul>
	<ul style="list-style-type: none"> <li>Soil erosion</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspections</li> <li>Stormwater management measures to be in place</li> </ul>		<ul style="list-style-type: none"> <li>Daily inspections and clean-up</li> </ul>
	<ul style="list-style-type: none"> <li>Waste management</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspections</li> <li>Daily clean-up of site</li> </ul>		<ul style="list-style-type: none"> <li>Monitor weekly during construction and operation phase</li> <li>Compile monthly reports</li> </ul>
	<ul style="list-style-type: none"> <li>Surface water pollution</li> <li>Impact to wetland areas</li> </ul>	<ul style="list-style-type: none"> <li>All construction activities and water discharges to comply with legal requirements associated with the NWA.</li> <li>Ensure maintenance of stormwater management infrastructure.</li> <li>Develop a rehabilitation plan to be implemented once construction is completed.</li> </ul>		

### **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	<p>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.</p> <p>Establish a basic knowledge of the environmental legal framework and consequences of non-compliance.</p> <p>Clarify the content and required actions for the implementation of the Environmental Management Plan.</p> <p>Confirm the spatial extent of areas regarded as sensitive and clarify restrictions.</p> <p>Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.</p>
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 mining activities:

- Description of the approved mining activities and content of the mining permit;
- 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 with potentially affected landowners.

In the event 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 has been requested by the Competent Authority to date.

## 41 UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports;
- b) the inclusion of comments and inputs from I&APs 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.



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Signature of the environmental assessment practitioner:

Ndi Geological Consulting Services (Pty) Ltd

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Name of company:

19 April 2022

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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: I&AP Engagement Documents**

## **Appendix 5: Supporting Impact Assessment**

**Appendix 6: Preliminary Layout Plan, including Environmental Attributes**

## **Appendix 7: Composite Map**