PPC LTD

PPC Limited

Zandriviers Drift Mining Right Application

Draft Environmental Impact Report

J36223

DMR ref: NW 30/5/1/2/3/3/2/1/10122 EM

October 2017

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Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
And
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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: PPC Limited

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FILE REFERENCE NUMBER SAMRAD: NW 30/5/1/2/3/2/1/10122 EM

1. IMPORTANT NOTICE

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

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

In terms of section 16(3) (b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has 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 un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—-

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

  (ii) degree to which these impacts—

    (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources, and

    (cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

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

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

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and correspondence address

a) Details of the EAP

i) Details of the EAP

Name of The Practitioner: **Tashriq Naicker**
Tel No.: **012 471 8918**
Fax No. : **012 348 5878**
e-mail address: **tnaicker@gibb.co.za**

ii) Expertise of the EAP

(1) ***The qualifications of the EAP***
(with evidence).

Tashriq Naicker holds a Bachelor of Science (Hons) degree in Environmental Geology. Registered with: South African Council for Natural and Scientific Professionals CandNatSci Registration No : 100052/11; and International Association for Impact Assessment : South African Charter (2880)

Please find attached proof of qualifications in **Appendix H** of this application.

(2) ***Summary of the EAP's past experience.***
(In carrying out the Environmental Impact Assessment Procedure)

Tashriq Naicker is a Senior Environmental Scientist with with over eight (8) years of experience in the environmental management field. His key experience includes Project management, Scoping & Environmental Impact Reporting, Basic Assessments, Environmental Opinions, Geotechnical Risk Assessments, Strategic Integrated Permitting Systems, Legal Environmental Legislation Reviews, Dust and Water Monitoring, Specialist Assistance with regard to bio-monitoring, Water Use Licence Applications, Section 24G Applications as well as Renewable Energy Applications. He has worked extensively in South Africa and also has project experience in Botswana and Zambia.

Please find attached CV for detailed project experience in **Appendix H** of this application.

b) Description of the property

Farm Name:	• Portion 4 of the Farm Zandriviers Drift 188, (previously known as , Portion 2 of the farm Zandriviers Drift 188); • The Remainder of the Farm Zandriviers Drift 188; • The Remainder of the Farm Toekoms 974, (previously known as Portion 1 of the Farm Zandriviers Drift 188);

	• The Remainder of the Farm Klein Moorland 973, (previously known as Portion 1 of the Farm Zandriviers Drift 188); and • The Remainder of the Farm Vogelstruispan 189
Application area (Ha)	2658 Ha
Magisterial district:	Brits
Distance and direction from nearest town	The town of Brits is located approximately 52km south of the study area.
21 digit Surveyor General Code for each farm portion	• T0JQ00000000018800004 (previously T0JQ00000000018800002) • T0JQ00000000018800000 • T0JQ00000000097400000 (previously T0JQ00000000018800001) • T0JQ00000000097300000 (previously T0JQ00000000018800001) • T0JQ00000000018900000

c) Locality map

(show nearest town, scale not smaller than 1:250000).

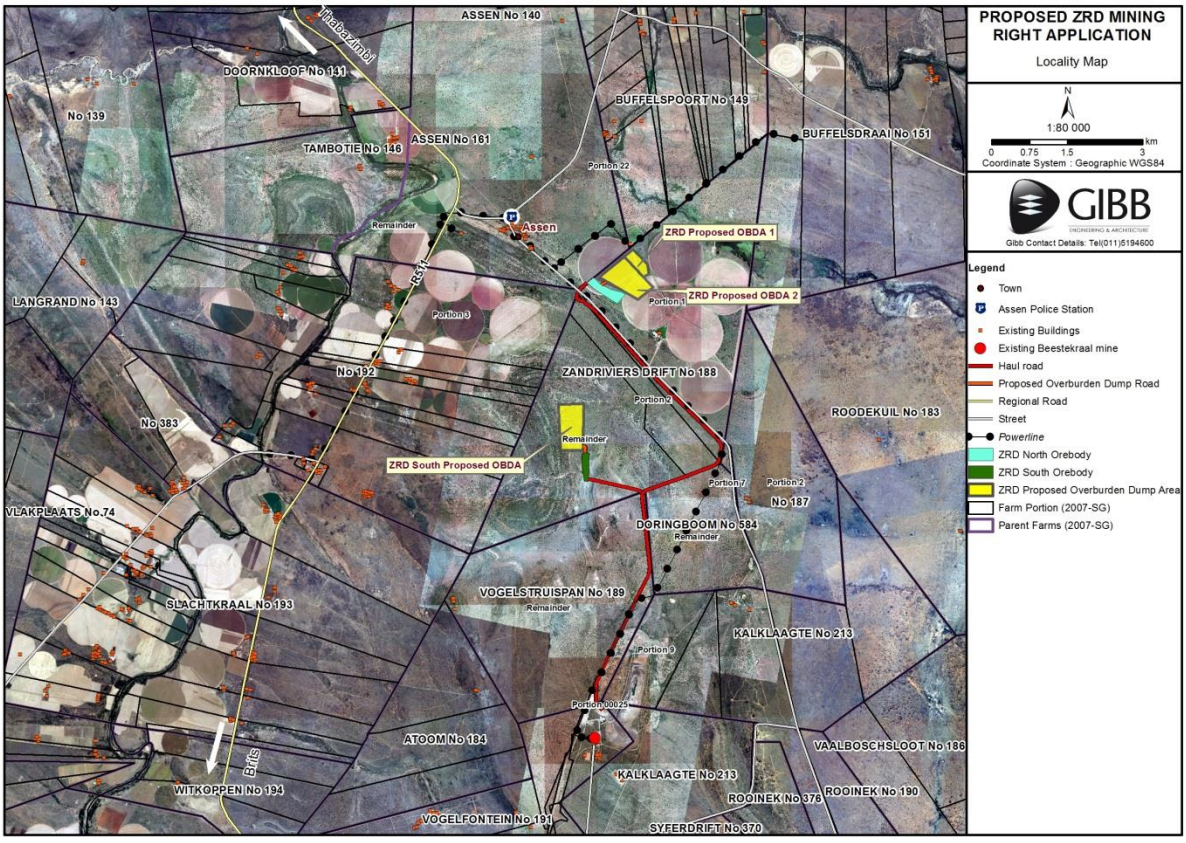


Figure 1: Locality Map of the proposed ZRD Ore Bodies and associated infrastructure (2007)

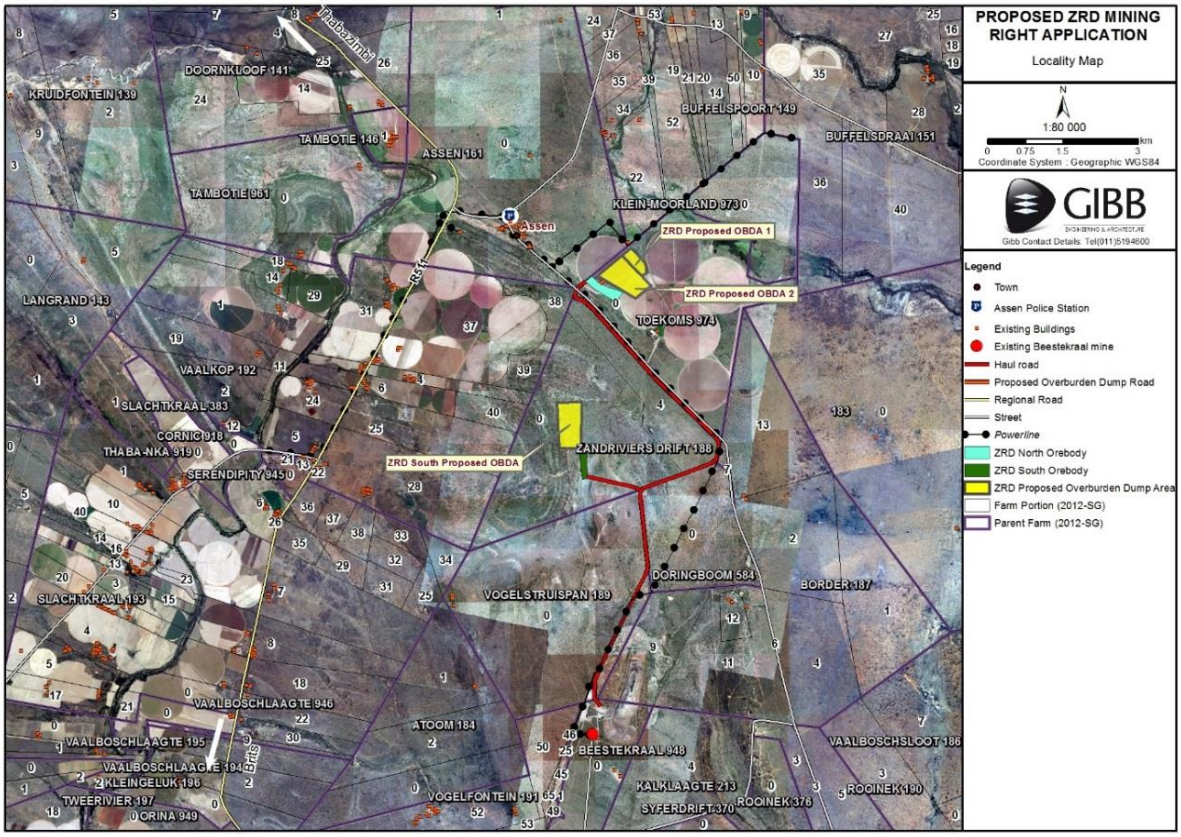


Figure 2: Locality Map of the proposed ZRD Ore Bodies and associated infrastructure (2012)

Please refer to Appendix A of this report for all the maps relevant to this application.

d) Description of the scope of the proposed overall activity

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

(i) ***Listed and specified activities***

Table 1: Mining Activities, Listed Activities and Listing Notice

NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (*GNR 983, GNR984 or GNR985)***
The development of a road (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 or 2010; or **(ii) A road with a reserve wider than 13.5 meters, or where no reserve exists where the road is wider than 8 meters;** But excluding a road (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; or (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter	6 Ha in extent The haul roads associated with the proposed development will have a road width of 15m	X	GNR 327, December 2014, Listed Activity 24 (ii)
The clearance of an area of 20 hectares or more of indigenous vegetation, excluding 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.	90 Ha in extent The aerial extent of the study area to be cleared of vegetation for the proposed establishment of the ZRD limestone mining area and associated infrastructure will be 90 ha.	X	GNR 325, December 2014, Listed Activity 15

Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including – (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource, including activities for which an exemption; or the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary process of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.	1800 Ha study area The proposed project is for the conversion of the ZRD prospecting right to a mining right	X	GNR 325, December 2014, Listed Activity 17

(ii) ***Description of the activities to be undertaken***

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

PROJECT DESCRIPTION

The proposed Zandriviers Drift (ZRD) limestone open cast mining project will be located on the farm Zandriviers Drift 188, Toekoms 974, Klein Moorland 973 and farm Vogelstruispan 189, situated within the greater Assen area, North West Province.

PPC Currently operates an opencast limestone mine and associated crushing plant facility under an existing mining right at the Beestekraal mine. The existing Beestekraal operation is located near the town of Assen (approximately 52 km north of Brits) constituting a small farming community. The study area is situated in the Madibeng Local Municipality and furthermore forms part of the Bojanala District Municipality (BDM) of the North West Province.

The study area for the proposed ZRD mining operations is situated approximately 1km south of Assen covering land situated adjacent to the Assen police station and a few buildings with no major commercial or business value. The study area is approximately 1800 ha in extent and the limestone mining will take place by means of an open cast mine. It is envisaged that the proposed ZRD mine will mine approximately 350,000 tonnes/annum of limestone, where the

limestone will then be transported to the existing Beestekraal mine for further crushing. The project activities assessed as part of this application, includes the following:

- ZRD North Ore Body
- ZRD North Overburden Dump Area Alternatives 1 & 2
- Overburden Dump Road
- Haul road
- ZRD South Ore Body
- ZRD South Overburden Dump Area
- Overburden Dump Road
- Haul Road

The proposed limestone mining will take place via the open cast mining method and the use of excavators and haul trucks to transport the ore to the existing Beestekraal crushing plant. The proposed life of mine for the ZRD north and south operations will be fifteen (15) years each (i.e. life of mine 30 years), with mining taking place to a maximum depth of fifty (50) meters below ground. Mining will start at the ZRD South Ore body and then move to the ZRD North Ore Body.

The open cast mining method will involve stripping usable soil and softer overburden material using a fleet of diesel trucks and shovels. The topsoil and subsoil that has been stripped will be transported to the predetermined storage areas outlined in the rehabilitation programme as set out in the Environmental Management Programme (EMPr). Harder overburden material will be drilled and blasted to break the rock, which will then be removed as waste rock and stored along with the soft overburden in the designated Overburden Dump Areas (OBDA). Once the overburden material has been removed, the limestone ore will be extracted by means of drilling and then hauled to the existing Beestekraal crushing plant. The ore will then undergo primary crushing, secondary crushing and lastly stacking of the product.

Due to the fact that the crushing facilities already exist in close proximity to the proposed ZRD mining areas, it is not deemed feasible to establish a separate crushing plant. For the ZRD North ore body, two (2) site alternatives have been proposed for the location of the ZRD North Overburden Dump Areas (OBDA). Please refer to Figure 1 (2007 cadastral dataset) and Figure 2 (2012 cadastral dataset) above for the locality map of the proposed ZRD mining right application.

e) Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (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 are to be considered in the assessment process);	**REFERENCE WHERE APPLIED** **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** **(E.g. In terms of the National Water Act:- Water Use Licences has/has not been applied for).**
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)	The National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA) and EIA Regulations of 2014 (GNR 982, 983, 984 and 985), is the key national legislation underpinning environmental authorisations in South Africa. The Department of Mineral Resources (DMR) is the Competent Authority (CA) for mining-related applications in terms of NEMA. NEMA and associated regulations are directly relevant to this application.	The proposed development trigger listed activities in terms of the EIA Regulations of 2014 (as listed in Table 1 above).
Environmental Impact Assessment (EIA) Regulations, 2014 (As amended) (Government Notice No. 327, 325 and 324, 7 April 2017)	The EIA regulations describe the EIA process to be followed including the public participation process, and the listed activities that may have a harmful impact on the environment and must be assessed.	The proposed development trigger listed activities in terms of the EIA Regulations of 2014 (as listed in Table 1 above). As such, a Scoping & Environmental Impact Reporting (S&EIR) process is being undertaken for this project.
National Water Act,	This Act provides for the protection and	Due to the fact that the

1998 (Act No. 36 of 1998)	management of water resources. A Water Use License Application is made to authorise water use activities pertaining to the altering of the bed and banks of a watercourse and diverting the flow of water in a watercourse.	proposed need for dewatering activities at the pits, an application for a WUL will need to be submitted in terms of Section 21 (j) of the National Water Act.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	This Act makes provision for the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio prospecting involving indigenous biological resources in terms of the National Environmental Management Biodiversity Act (Act 10 of 2004). The implementation of this Act and associated provisions will lead to the protection of sensitive species.	The proposed development and associated S&EIR process will be undertaken in such a way to ensure effect is given to the NEM:BA where appropriate. An Ecological Impact Assessment has been undertaken for the proposed project and will be submitted along with the Final EIR to the DMR for decision making.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act requires all developers (including mines) to undertake cultural heritage studies for any development exceeding 0.5 hectares in extent. It also provides guidelines for impact assessment studies to be undertaken where cultural resources may be disturbed by development activities. The Heritage Impact Assessment will require approval by the North West Provincial Heritage Resources Agency (NW PHRA) as part of the impact assessment process. The National Heritage Resources Act aims to introduce an integrated system for the management of South Africa's heritage resources. Further, the Act empowers civil society to nurture and conserve their heritage resources so that they can be passed on to future generations. The Act provides a framework for the management of heritage resources in South Africa and to protect heritage resources of national significance. In order to meet these	A Heritage Impact Assessment has been undertaken for proposed project and will be submitted to NW PHRA for comment and decision making.

	objectives, the Act introduces an integrated system that can allow for the identification, assessment and management of heritage resources in South Africa.	
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)	Section 8 of the Act provides for the setting of national air quality standards, monitoring and management of air quality and emissions. Section 32 deals with dust control measures and provides for the Minister to prescribe measures for the control of dust in specified places or areas, either in general of by specified machinery or in specified instances the steps to be taken to prevent nuisance or other measures aimed at the control of dust. Section 21 of the NEMAQA makes provision for the listing of activities which result in atmospheric emissions, which must be licensed prior to commencement in accordance with Section 22 of the NEMAQA.	Since the proposed activities do not trigger any listed activities as per section 21 no Atmospheric Emissions Licence will be required.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).	This act provides for specific waste management measures, by regulating waste management in order to protect health and the ecological degradation and for securing ecological sustainable development; to provide for institutional, arrangements and planning matters, to provide fir national norms and standards for regulating the management of waste.	Waste management principles and provisions will be implemented for the project to ensure adherence to the specific NEM:WA outcomes.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	In terms of section 6 of the Act, the Minister may prescribe control measures with which all land users have to comply. The control measure may relate to the regulating of the flow pattern of run-off water, the control of weeds and invader plants, and the restoration or reclamation of eroded land or land which is otherwise disturbed or denuded. This act will regulate construction activities to prevent the spreading of invasive species and to ensure successful rehabilitation of the receiving environment.	An Agricultural Impact Assessment has been undertaken for proposed project and will be submitted along with the Final EIR to DMR for decision making.
National Forests Act, 1998 (Act No. 84 of 1998)	The proposed project may result in the disturbance or damage to a tree protected under the NFA.	The proposed project may result in the disturbance or damage to a tree protected under

		the NFA.
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The Protected Areas Act provides for the protection and conservation of ecologically viable areas representative of the country's biological diversity, its natural landscapes and seascapes.	The proposed routes both preferred and alternative routes runs through a non-statutory protected area.
Constitution of the Republic of South Africa	The constitution paved the way for the protection of the natural environment and heritage resources through the recognition of the rights to a safe and healthy environment.	The proposed development will be undertaken in line with the requirements of the South Africa Constitution.
National Road Traffic Act, 1996 (Act No. 93 of 1996)	All the requirements stipulated in the NRTA regarding traffic matters will be complied with during the construction, operation and decommissioning phases of the proposed project.	All the requirements stipulated in the NRTA regarding traffic matters will to be complied with during the construction, operation and decommissioning phases of the proposed project.
Provincial and Municipal by-laws	All provincial and municipal by-laws applicable to the study area will need to be complied with during the construction, operation and decommissioning phases of the proposed open cast mine development.	All provincial and municipal by-laws applicable to the study area will need to be complied with during the construction, operation and decommissioning phases of the proposed open cast mine development.
Occupational Health and Safety Act ,1993 (Act No. 85 of 1993)	Identify the hazards and evaluate the risks associated with such work constituting a hazard to the health of such employees.	The proposed development will ensure compliance is met with regards to the provision of this act.
Guideline on Alternatives	The Department must take into account all relevant factors, which may include, inter alia, any feasible and reasonable alternatives to the activity which are the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment	The proposed development and associated S&EIR process is undertaken in line with this guideline.

f) Need and desirability of the proposed activities

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

The need and desirability for the project is supported by the need to graduate the existing prospecting right for the area to a mining right due to the confirmed prevalence of the relevant limestone ore bodies. The proposed development of the ZRD mining operations will result in a number of employment opportunities to undertake the various mining, blasting and drilling operations on site which will inevitably contribute to economic upliftment of local community and the greater region. The project will furthermore provide a secure and long term supply of limestone resource to the cement industry.

In addition, with the implementation of the project it will ultimately lead to the increase in Gross Domestic Product (GDP) for the country which resembles the country's economic wealth and makes it more lucrative overall for foreign investment.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

For proposed ZRD development, two site alternatives were considered for the location of the Overburden Dump Area OBDA) associated with ZRD North ore body. The proposed ZRD North OBDA alternative 1 and 2 are situated approximately 1km south from the farmsteads situated on the farm Assen, on existing agricultural fields with no existing infrastructure on site.

During the selection of the most suitable OBDA site alternative for ZRD North, the following principles will be taken into consideration:

- The opinion of the public, ascertained through the public consultation process;
- Specialist's recommendations;
- Environmental Constraints;
- Minimal environmental impacts;
- Optimisation of existing infrastructure, such as access roads; and
- Economic cost-benefit analyses.

From the detailed environmental impact assessment and associated specialist studies undertaken for the project it was found that two OBDA alternatives associated with ZRD North will have similar impacts on the receiving environmental conditions. As such no significant difference in terms of impact significance and severity can be used as motivation in selecting one of them as the preferred option. In addition to this, no fatal flaws were identified for the implementation of either one of the OBDA alternatives. Therefore, the preferred alternative from the applicant's point of view may be put forward as the preferred alternative for implementation.

The applicant prefers Alternative 2 (OBDA 2) for operational preferences.
As such, the EAP considers ZRD North OBDA 2 to be the preferred site alternative for the project as it allows for the various benefits associated with the project to be realised whilst at the same time having the smallest impact on the receiving environmental conditions.

(i) ***Details of the development footprint alternatives considered***

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

a. ***The property on which or location where it is proposed to undertake the activity***

Two site alternatives for the proposed OBDA associated with ZRD North orebody were assessed as part of the EIR phase of the project. The ZRD North OBDA alternative 1 and 2 are situated approximately 1km south from the farmsteads situated on the farm Assen, on existing agricultural fields with no existing infrastructure on site. The footprint size (in ha) for each one of the OBDA site alternatives, is approximately 35ha each.

During the selection of the most suitable OBDA site alternative for ZRD, the following principles were taken into consideration:

- The opinion of the public, ascertained through the public consultation process;
- Specialist's recommendations;
- Environmental Constraints;
- Minimal environmental impacts;
- Optimisation of existing infrastructure, such as access roads; and
- Economic cost-benefit analyses.

b. ***The type of activity to be undertaken***

No alternatives were identified and assessed for the proposed activities to take place as part of the project, as this application is for the graduation of a prospecting right to a mining right.

c. ***The design or layout of the activity***

No design / layout alternatives have been identified and assessed for the proposed development.

d. ***The technology to be used in the activity***

No technology alternatives are applicable for the proposed development. Current open cast mining methods as employed by PPC within their current operations will be used.

e. ***The operational aspects of the activity***

No operational alternatives have been identified for the proposed development.

f. ***The option of not implementing the activity***

This option assumes that the proposed development of the ZRD North and South Limestone open cast mine will not take place, and a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current environmental condition of the area. Should the decision-making Authority decline the application, the No-Go option will be followed and the status quo in terms of the environment will remain. As a result, the existing prospecting right for the area will not be graduated to a mining right and various employment opportunities

(related to mining, blasting and drilling operations on site) will not be created and no contribution to economic upliftment of local community and the greater region will take place. The No-Go alternative furthermore implies that PPC's ability to provide a secure and long term supply of limestone resource to the cement industry will be affected where other means to achieve this goal will need to be investigated, where possible.

ii) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The reports relevant to the proposed development are written in a way that is accessible to stakeholders in terms of language level, fog index and general coherence (note the DEA Guidelines – the public participation agency must be able to produce readable reports). All Interested and/or Affected Parties (I&APs) will be notified by means of undertaking the following activities:

- Windeed searches;
- Knock and drops of notification letters;
- Public Meeting (during the Scoping and EIR phase of the project);
- Placement of Site Notices in conspicuous places in the vicinity of the study area;
- Placement of Advertisements in the local newspaper;
- Meetings held with relevant associations such as the Farmers Union; and
- Using existing databases from existing mines in the area such as the PPC Ltd Beestekraal mine.

Please refer to Appendix E for the Comments and Response Report (CRR) constituting all comments received and responses provided on the Draft Scoping Report. In addition to this, it important to note that the Draft EIR (with associated specialist studies) and EMPr has been distributed to suitable public venues with comment sheets, which will be collected at the end of the public review and comment period. Registered I&APs have been informed of the location and contact details of the public venues.

Draft Environmental Impact Report (EIR):

A commenting period of at least 30 days (Monday, 02 October 2017 to Wednesday, 01 November 2017 (inclusive)) will be provided to registered I&APs enabling them to comment on the Draft EIR. The availability of the Draft Reports will be announced by way of:

- Telephonic contact with I&APs (where necessary); and
- Personalised letters to all registered I&APs on the database;

The reports will be distributed for comment as follows:

Place	Address	Telephone
Atlanta Supermarket	Along R511 Brits, Thabazimbi	Rakesh Narsi 012 277 1341
Assen Police Station	Assen Beestekraal Brits 0255	Captain Willem Robbertse 012 252 8521
The DEIR is also available on the GIBB website at the following link: • https://projects.gibb.co.za/PPC_ZRD_MRA • A CD copy is available upon request (please contact Mr Yonela Mngqibisa)		

Public review of the Draft Reports was done by the following methods:

- Written comment, including e-mail – a comment sheet asking I&APs to respond to particular questions will accompany the report;
- Verbal comment during stakeholder consultations;
- Verbal comment during public meetings (if any);
- Various public participation products will be produced within the course of this EIA. This will include the following:
  - Invitation letter to comment and be registered on the stakeholder database;
  - Site Notices;
  - Comments and Response Report (CRR);
  - One (1) local newspaper advertisement was placed;
  - Draft report notice letters to stakeholders and I&APs;
  - Public meeting and Focus group meetings; and
  - PDF versions of all documents for publishing on the GIBB project's website.

All comments received on the Draft EIR will be captured and responded to in the updated Comments and Response Report (CRR). Thereafter, the Draft EIR will be finalised into a Final EIR, which will be submitted to the Competent Authority (CA) for their review and decision making. All registered I&APs will be informed of the availability of the Final EIR and means by which to access the report. Any comments received on the Final EIR will be submitted directly to the CA for their review and consideration.

iii) Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses

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 the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner/s					
N/A					
Lawful occupier/s of the land					
N/A					
Landowners or lawful occupiers on adjacent properties					
ROSS & JACOBSZ INC	**X**	27 March 2017	Sir, 1. We refer to the abovementioned matter and confirm that we act on behalf of Louma Boerdery (Pty) Ltd, all the other companies, close corporations and trusts, as well as Mr P IL du Plessis in his person capacity (herein referred to as “Louma Group”), who also instructed	Thank you for your comment provided on the Zandriviers Drift Mining Right Application. We have captured your concerns with regards to the development in our Comment and Response Report, which will be provided to the Department of Mineral Resources along with the Final Scoping Report for their Decision making.	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			us to forward this to you. 2. Please ensure that the Louma Group is registered as an interested and Affected Party (I&AP) For the abovementioned project. 3. Please take further notice that our client will ensure that a representative of the Louma Group attends the public meeting to be held on Tuesday 28 March 2017. 4. Please not that we will, within the period as provided, comment on the Draft Scoping Report and Mining Right application and will also, as far as it may be necessary. Request further information from you. 5. We lastly requested that a CD with your Draft EIR and Mining right application be made available to us. We will ensure that a candidate attorney or messenger collected the CD from your offices, as soon as it available. Please confirm when the CD may be collected. 6. We await your urgent reply.	Please note that we have registered Louma Group on our database and will be notified of any further communication on the project. From our register and records for the Public Meeting Held on Tuesday 28 March 2017 at Farmers Association Hall along the R511, it is shown that there was no representative from the Louma Group in our attendees. As per Adele request for a soft copy of the report, we spoke with Adele telephonically and the disk was ready for collection the following day, however, the lady that was sent by Adele to collect the disc came to the office three days later of your request.	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
ROSS & JACOBSZ INC	**X**	19 April 2017	Sir 1. We refer to the abovementioned matter, as well as our letter dated 27 March 2017. 2. we wish to advise that we have, following your Scoping Report, read together with your notification of an Environmental Authorisation and Mining Right Application dated 15 March 2017 (which was only sent to our client on Thursday 23 March 2017) attempts to consult with counsel, as well as an environmental consultant, in order for us to comment on your draft Scoping Report and Mining Right Application, within the 30-day period, as afforded to our client. 3. we now already place the following on record: 3.1. the month of April has numerous public holidays, which most people utilize as time to go on holiday; 3.2 the school holidays stretch from 1	Thank you for your comment. We have considered your request and can accommodate you by extending the review period to 28 April, 2017.	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			April 2017 to 17 April 2017 and most people are also away on holiday during this period; 3.3 The advocates which we wanted to appoint to assist us in this matter are all unavailable. We confirm that we attempted to brief advocate Anneke Hicks, Advocate Jannet Gildenhuys and Advocate Gerrit Grobler SC; 3.4 The environmental consultants which we to appoint are both unavailable due to other commitments and an alleged conflict of interest due to the work relationship with GIBB. 4. We will contact further environmental consultants during next week, where after we will be able to ascertain what time period is needed, in order for us to properly comment on your draft Scoping Report. 5. Please note that the proposed Zandriviers Drift North Ore Body is located on our client's farm and our client therefore has a real and		

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			substantial interest in the granting of any possible mining right. 6. Please acknowledge receipt of this letter and confirm that you will afford our client sufficient time to properly comment on your draft Scoping report.		
ROSS & JACOBSZ INC	**X**	24 April 2017	Good day, We take note of the content in the trailing mail. However please take note thereof that we hand delivered our objection to your offices, yesterday afternoon.	Thank you for your comment. We hereby confirm receipt of your letter dated 24 April 2017, and a detailed response will be sent to you.	
Van Rensburg Attorneys	**X**	26 April 2017	Dear Sir The above mentioned matter refers. The Interested and/ or Affected Parties are as follows: Location: Portion 19 of the farm Slachtkraal, 193 JQ. Represented by Mr. Naas Du Plessis	Dear Sir Thank you for your comment on the Draft Scoping Report and Mining Right application for the proposed Zandriviers Drift (ZRD) areas and associated infrastructure. Your comment has been captured in the Comment and Response Report, which will be provided to the	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			Contact Details: Cell nr: 082 423 0732 Office nr. 012 277 2919 E-mail address:gerda@hoewal.co.za We confirm that we have a direct personal and business interest in the above mentioned matter. We of the farm, Hoewal Boerdery CC (Portion 18 of the farm Slachtkraal, 193 JQ), adjoined to the proposed mining area wish to lift the following concerns: 1. Any mining activities whatsoever of whichever nature should not interfere with Hoewal Boerder's Farming. These include but not limited to; noise pollution, water pollution, air pollution and / or soil pollution. 2. The mine should carry the responsibility of ensuring that no squatter camps are set up or takes root close to the or adjoined to the borders of	Department of Mineral Resources along with the Final Scoping Report for their Decision making. 1. Please Note that Portion 19 of the farm Slachtkraal, 193 JQ, is not directly adjacent to the proposed ZRD mine activities. Noise pollution, Water pollution, Air pollution, Soil pollution impacts will be assessed in detail during the EIR phase of the project.	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			the farm. 3. Adherence to the National Environmental Management Act (Act No. 107 of 1998) is of the utmost importance and we would like to specifically point out that no mining activities should pollute or alter the current state of the water sources quality which could in any way affect the farm's access to quality of water as it currently is.	2. Please note that PPC does not encourage the establishment of squatter camps. The local authorities will be consulted in preventing the establishment of such camps. 3. Comment noted.	
Municipal councillor			None Received to date		
Municipality					
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e					
SAHRA – Natasha Higgitt	**X**	02 May 2017	The Draft Scoping Report notes that a Heritage Impact Assessment (HIA) will be conducted for the proposed project.	Thank you for your comment provided on the proposed ZRD Mining Right Application. We have captured your	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			<u>Interim Comment</u> The pending HIA must assess all types of heritage as defined in the National Heritage Resources Act, Act No 25 of 1999 (NHRA) which includes but is not limited to palaeontological and archaeological resources, built environment, burial grounds and graves, living heritage and cultural landscapes. The HIA must comply with section 38(3) of the NHRA and must be conducted by relevant qualified specialists. The HIA must be submitted to SAHRA during the Public Review Period for the Draft Environmental Impact Assessment (EIA). The EIA and all appendices must be submitted with the HIA in order for an informed comment to be issued. Should you have any further queries, please contact the designated official using the case number quoted above in the case header.	comment with regards to the development in our Comment and Response Report, which will be provided to the Department of Mineral Resources along with the Final Scoping Report for their Decision making. Please note that as indicated in the Draft Scoping Report, a Heritage Impact Assessment will be conducted during the EIR Phase. The HIA will be attached to the Environmental Report with relevant EIA Public Review and made available to SAHRA for comments.	

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 the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Communities					
Dept. Land Affairs					
Traditional Leaders					
Dept. Environmental Affairs					
Other Competent Authorities affected					
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					

iv) The Environmental attributes associated with the development footprint alternatives

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

a. ***Baseline Environment***

Topography

The topography of the study area is primarily very flat to slightly flat with undulating plains. This is especially true of the ore bodies themselves. Apart from the hill to the immediate west of the ZRD South Orebody, there are no distinctive ridges, rocky outcrops, steep gradients, gorges or ravines within the study area. The most distinctive valley bottoms are narrow and shallow areas in which the prominent Crocodile River meanders. Large mountains, escarpment and valleys are prominent to the north of the study area, approximately 2-3 km away.

The variation in height above sea level across the ore bodies is minimal at approximately 960m to 980m, a variation of about 20m. However, the hill to the immediate west of ZRD South Orebody reaches a height of approximately 1 020m above sea level.

Climate

i. Regional Rainfall

The study area is situated within the summer rainfall region, with the rainy season usually occurring between the months of October to March. The mean annual precipitation (MAP) is approximately 561mm, with the mean annual evaporation (MAE) for the study area being measured as approximately 2061mm per annum.

Please refer below to Table 2 for the Mean Annual Climatic Data for the study area.

Table 2: Mean Annual Climatic Data for Study Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
MAP (mm)	112	82	68	31	8	4	2	3	12	52	81	105	561
MAE (mm)	228	195	190	149	123	97	105	140	185	215	211	224	2061

ii. Temperature

Temperature statistics available for the town of Brits (situated approximately 52km south of the study area) was used as an indication of temperatures for the study area. The monthly distribution of average daily maximum temperatures show that the average midday temperatures for Brits range from 19.8˚C in June to 29.3˚C in January. The region is the coldest during the month of July when the mercury levels drop to 2.1˚C on average during the night.

Geology and Soils

Based on the 1:250 000 Geological Maps (2523 Rustenburg) produced for the greater area, the general study area is underlain by the Dolomitic formations of the Malmani Subgroup, of the Chuniespoort Group. This Malmani Subgroup fragment along the Crocodile River north of Brits, is known as the Assen Formation. The ore-grade limestone at the study area, occurs within the lower layers of the Eccles Formation (VA1) and its base is formed by the Lyttleton Formation (VA2).

All the rock formations in the Crocodile River Fragment have been subjected to deformation due to the high temperature and pressures during the intrusion of the Rashoop Granites to the south. These dolomitic rocks tend to suffer more 'plastic' deformation than other more competent dolomitic rocks, and typically will form a 'box' type fold around a more competent and less 'plastic' rock mass.

The Assen Formation around the study area forms part of an anticlinal structure with a north-west strike direction, while the northern and southern limbs dip at an angle of approximately 35 degrees. The Chert-rich dolomite (Va1), forms the flat topographic area towards the north-west of the ZRD north deposit and to the west of the ZRD south deposit, while the chert-free dolomites of (Va2 or Lyttleton FM) lies just below the small ridge directly south of the site. The ridge itself is made up out of the harder chert – rich dolomites of the Monte-Carlo (Va3).

Please refer below to Figure 3 and 4 below for the regional geology related to the study area.

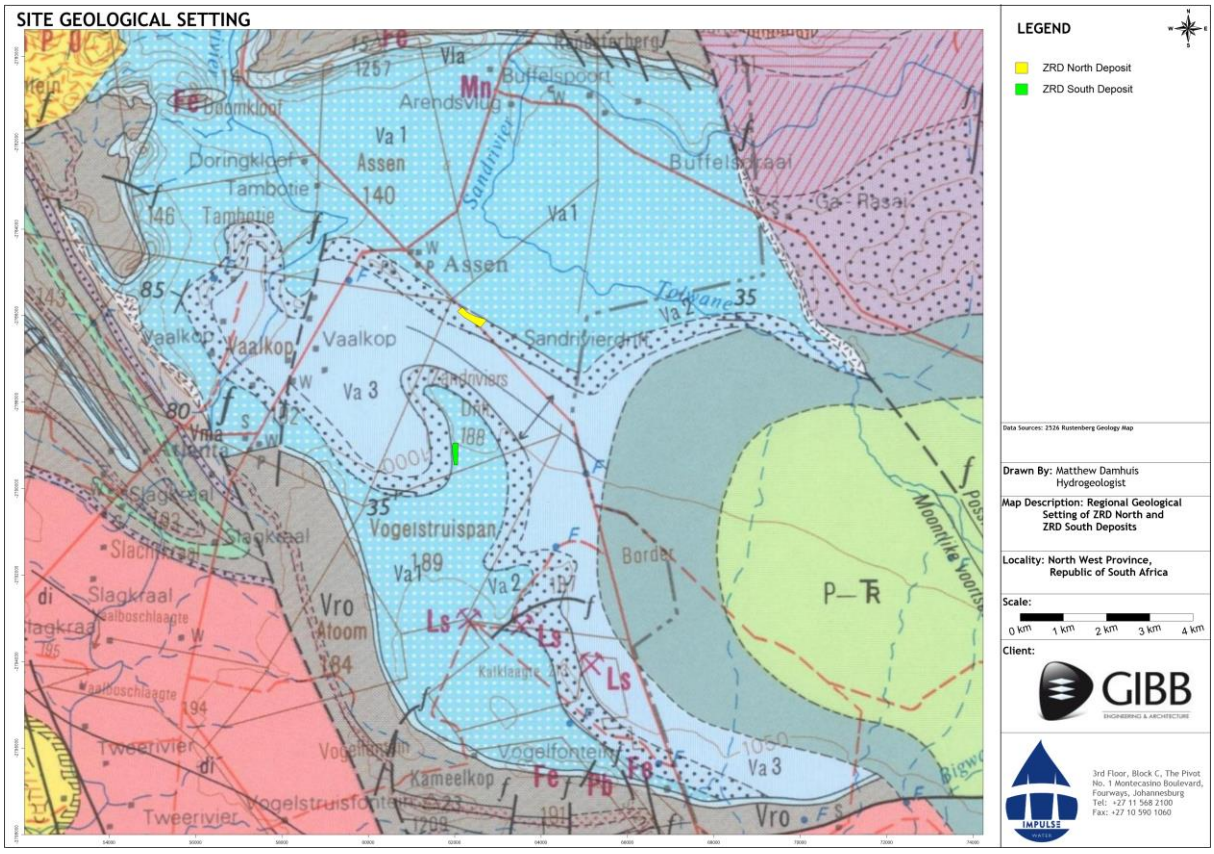


Figure 3: Site Geological Setting

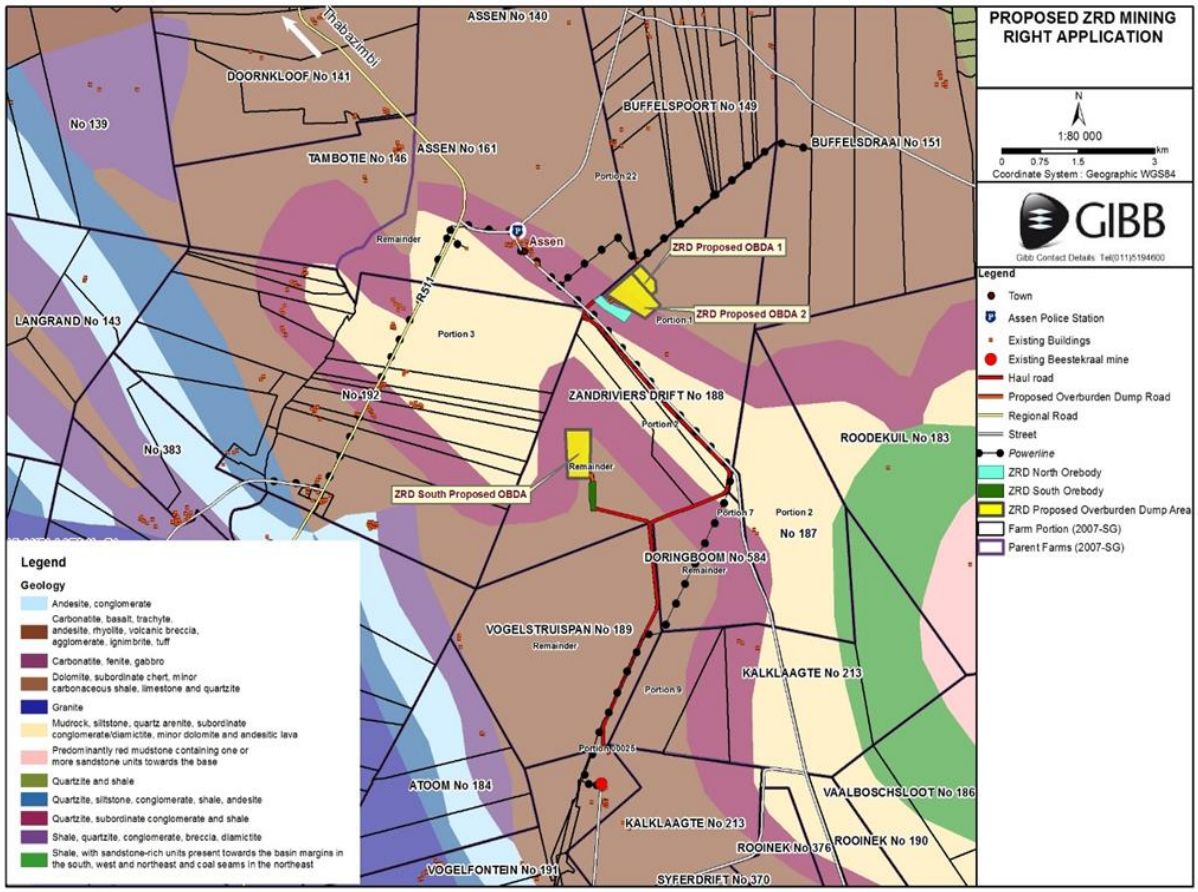


Figure 4: Geological Map of the study area

Hydrology

i. Watercourses throughout the study area

There are no prominent perennial rivers or semi-perennial streams in the immediate demarcated areas of the ZRD North and South Ore bodies, associated dump areas or haul roads. There are also no distinctive drainage lines present either. The closest large river to any of the study site areas is the Crocodile River, which flows north of the two ZRD Ore bodies. The Crocodile River flows in a northerly direction and eventually ties into the Limpopo River. The Pienaars River, which is north of the study area flows into the Crocodile River, while the Tolwane River is a tributary of the Pienaars River.

The Tolwane (Sand) River is approximately 1,6km northeast of the ZRD north Ore body and is also of no significant consequence to the spatial study on the Ore bodies. There are no prominent perennial or even semi-perennial rivers within the area of the ZRD south ore body. The Tolwane (Sand) River flows in a northerly direction into the Pienaars River and then links into the Crocodile River. The Crocodile River flows further north and from there into the Limpopo River.

The closest waterbodies to the study area are two situated to the west and one to the east of the Haul Road. The three (3) waterbodies situated in close proximity to the Haul Road, are regarded as impoundments (manmade dams). The impoundment situated to the east is specifically used for irrigation purposes on the large, pivot irrigated lands. Water is specifically

pumped into this farm dam for this purpose which implies that the farm dam is not an in-channel impoundment. The two (2) waterbodies situated to the west are artificially impounded (dammed) probably to create watering holes for the wild animals on the game farm. These two (2) impoundments are in-channel impoundments. However, the channel is a seasonal drainage line that is very shallow. It is not a river or stream. Notwithstanding, it is still a watercourse (Figure 5).

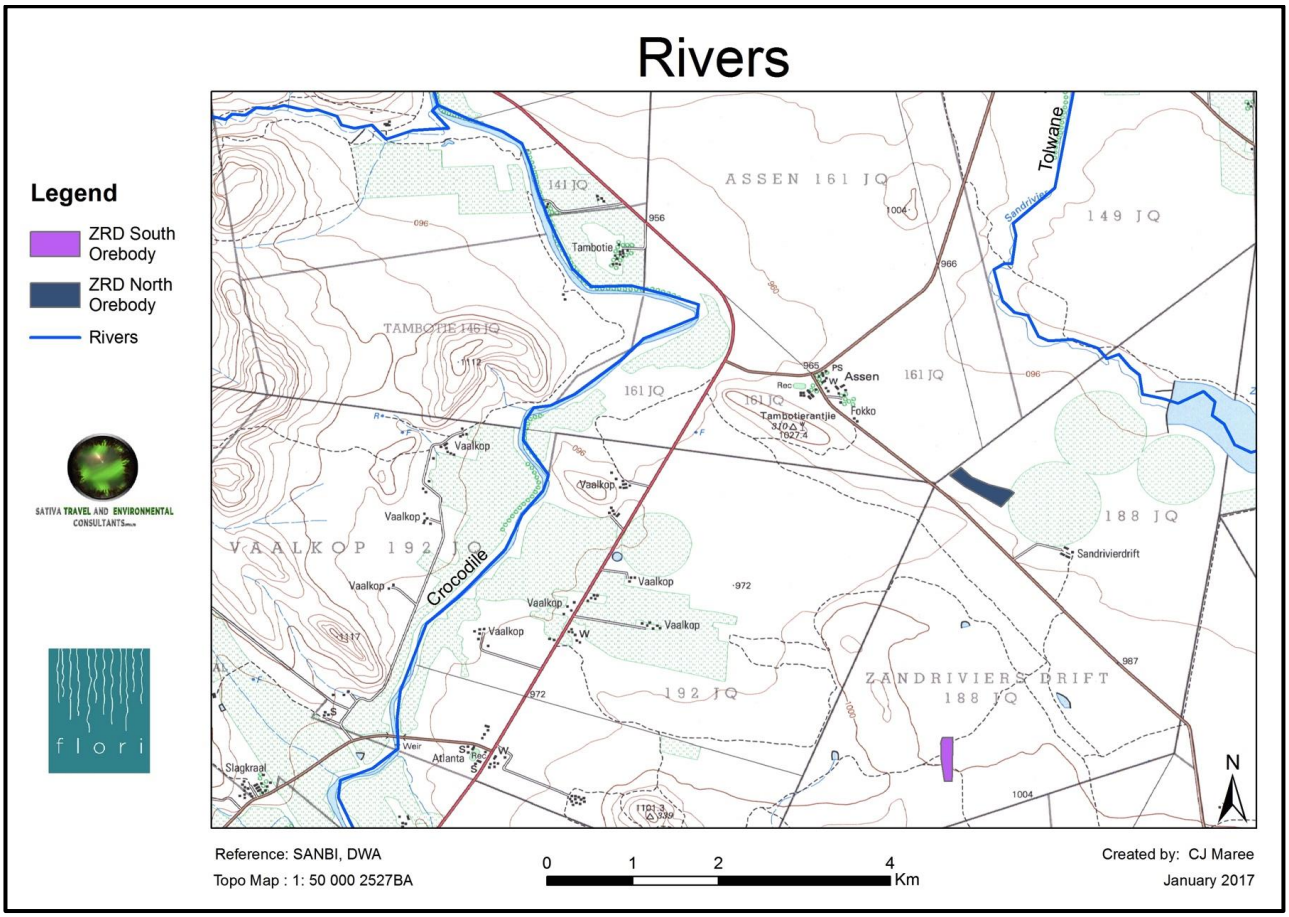


Figure 5: Topographical representation of Rivers in proximity to the study area

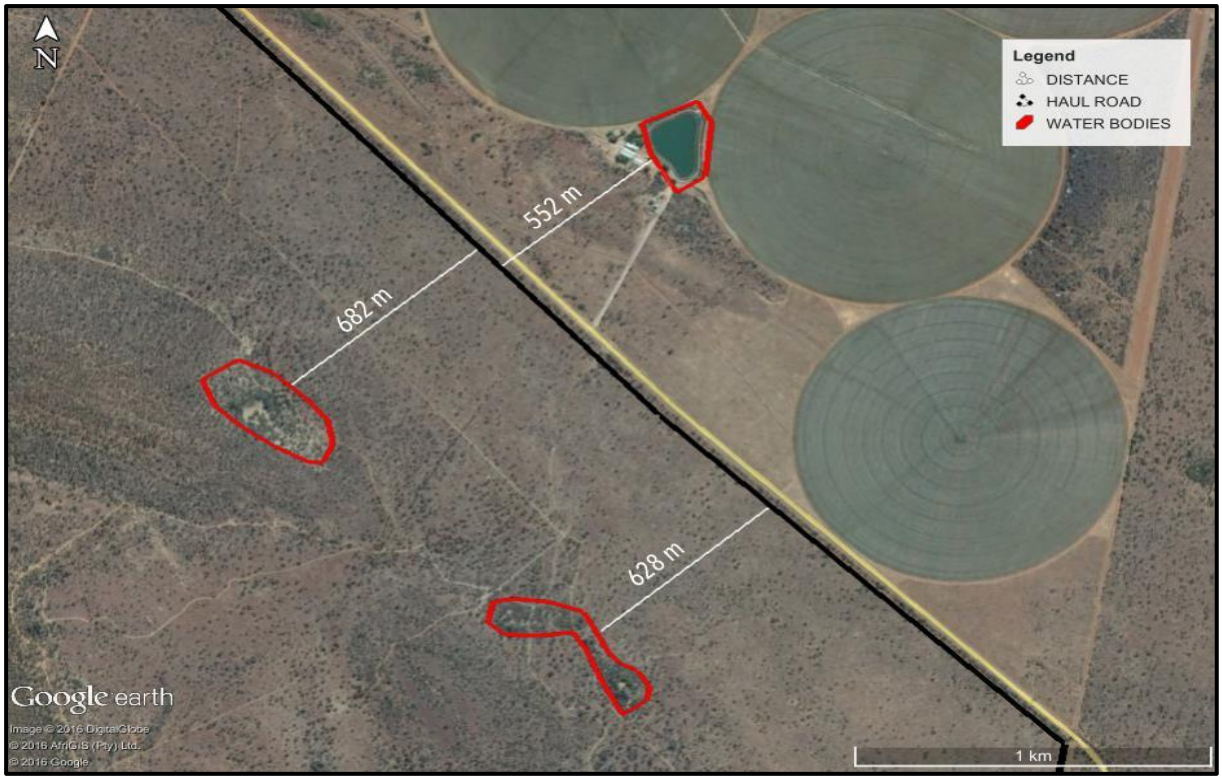


Figure 6: Closest waterbodies (Watercourses) to the study area in the vicinity of the Haul Road

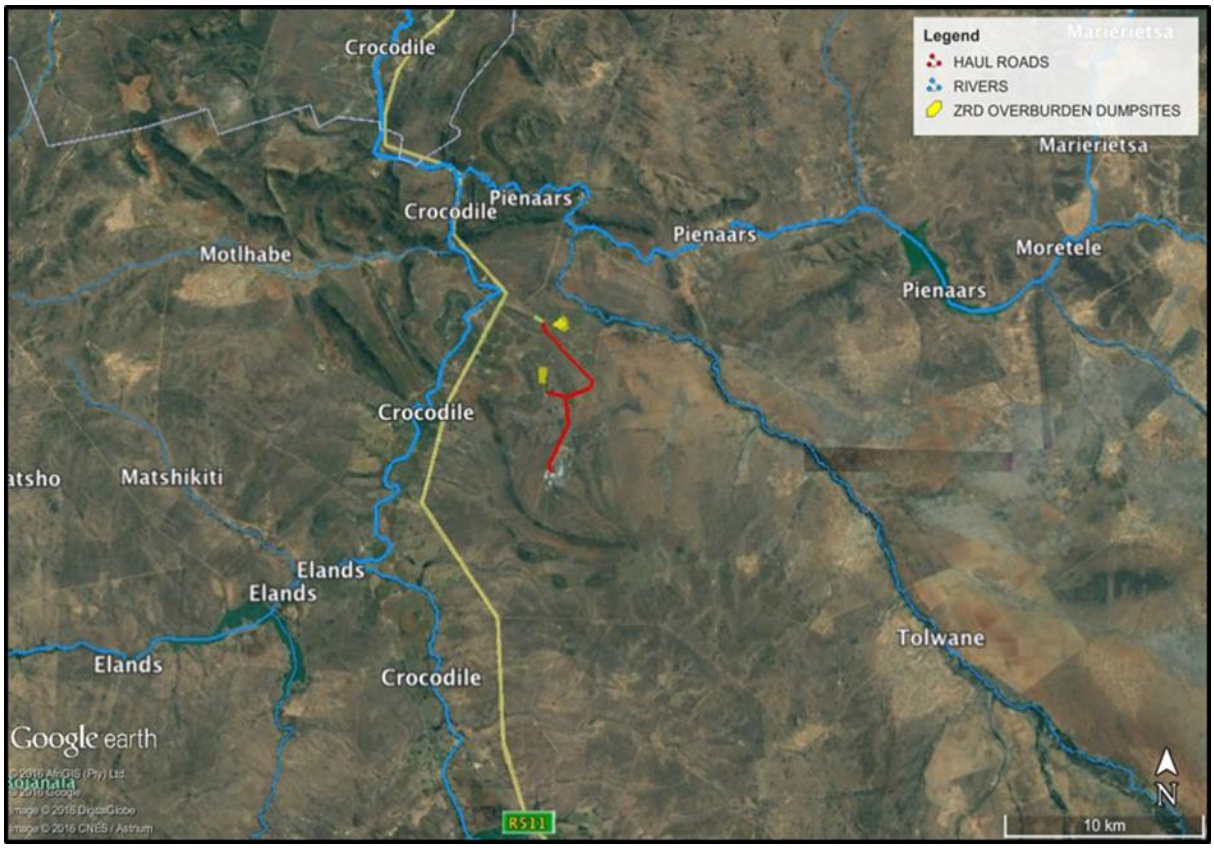


Figure 7: Rivers in the region of the study area

Water Management Areas:

The study area is situated within the Crocodile (West) & Marico Water Management Area (WMA). Furthermore, the study area falls within the jurisdiction of the Limpopo - North West Catchment Management Authority (CMA).

Quaternary Drainage Areas:

The study area extends over two wetland ecoregions namely Central Bushveld Group 2 and Central Bushveld Group 3. Majority of the study area and proposed activities (including the limestone orebodies) are situated within quaternary drainage area A23K, however a small section of the Haul road extending from ZRD north extends into quaternary drainage area A24A. Please refer to Figure 8 below.

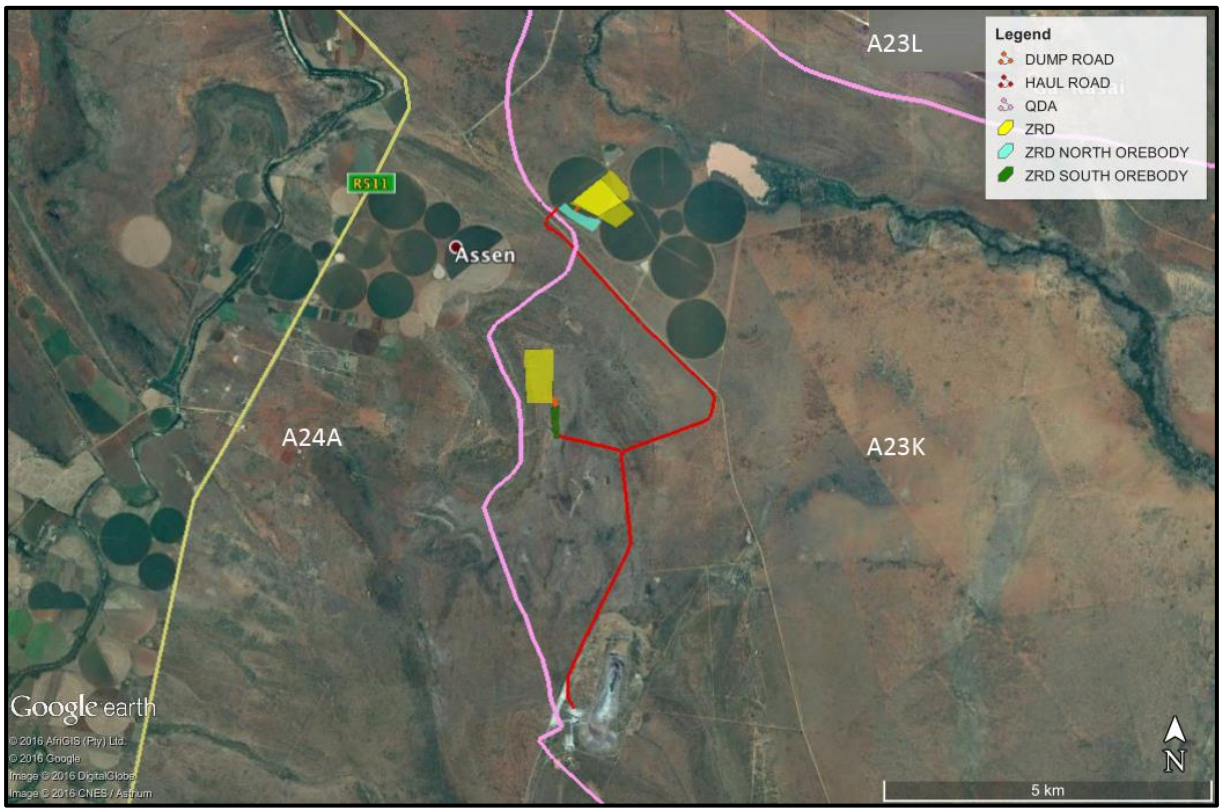


Figure 8: Quaternary Drainage Areas relevant to the proposed development

National Water Act, 1998 (Act No 36 of 1998):

It is important to note that the proposed development activities will not take place within any watercourse resources or within 500m of a wetland feature. However, dewatering of the pits will need to be undertaken during the operational phase of the project.

As such, it is envisaged that the project will require a Water Use Licence (WUL) in terms of Section 21 (j) of the National Water Act, 1998 (Act No. 36 of 1998). Please refer below to Table 3 for the potentially triggered water uses with regards to the proposed development.

Table 3: Triggered Water Uses for the Project

Section 21 of NWA	Activity
(j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people

Air Quality

An Air Quality Impact Assessment was undertaken by EScience Associated (Pty) Ltd in December 2016. The results from the assessment illustrate that the predicted ambient concentrations of PM_{10} for the proposed haul roads will have exceedances of the National Ambient Air Quality standards (NAAQs). These exceedances are limited to in and around the haul roads and thus have an insignificant bearing insofar as environmental receptors are concerned. Furthermore, the predicted ambient concentrations of PM_{25} also show exceedances of the NAAQs, resulting from the haul roads. These exceedances are also limited to in and around the haul roads and thus have an insignificant bearing insofar as environmental receptors are concerned. With the exception of the haul road areas, the predicted cumulative ambient concentrations of PM are well within the NAAQS.

In addition to this, the surrounding land use and the fact that the greater area is already exposed to mining activities, it is envisaged that the project will alter the ambient dust levels during its construction and operational phases due to the vehicles hauling the mined limestone resource from the ore body to the existing Beestekraal mine for further crushing. Vehicles travelling on exposed surfaces, earthworks as well as wind are the main generators of dust. The nuisance and aesthetic impacts associated with the dust generation during construction and operation should be minimal if mitigating measures are implemented effectively.

Dust generation off the earth's surface is generally regarded as a nuisance rather than a health or environmental hazard. On a large scale dust will impair atmospheric visibility; however, in the context of the proposed activity, the impact of dust production on air quality should be minimal taking into account that effective

Ecological

i. Flora

A detailed Ecological Impact Assessment was undertaken by SATIVA Travel and Environmental Consultants (Pty) Ltd in November 2016. Please refer below for a summary of the key findings relating to prevalent fauna and flora conditions throughout the study area.

South Africa is divided up into nine major Biomes. The study area and the surrounding region fall within the Savanna Biome, which is also known as the Bushveld Biome (Figure 10). Savanna vegetation types tend to have a mix of a lower grassy layer, middle shrub layer and an upper woody layer. The mix and ratio of the three layers varies from veldtype to veldtype within the Savanna Biome.

The dominant veldtypes (vegetation types) of the region are Western Sandy Bushveld and Springbokvlakte Thornveld. ZRD South Ore body and haul road are situated in Western Sandy Bushveld. The ZRD North Orebody is situated within Springbokvlakte vegetation, but sits on the edge of Western Sandy Bushveld (Figure 8). For this reason the vegetation communities at the ZRD North Orebody do have characteristics and floral species of both veldtypes. The main haul road from ZRD North Ore Body to the existing processing plant runs through both veldtypes

The ZRD south ore body, associated OBDA and a section of haul road is situated in within the Western Sandy Bushveld. The ZRD north ore body, associated OBDA and a section of the haul road extending from ZRD north, are situated within the Springbokvlakte Thornveld (Figure 9) but sits on the edge of Western Sandy Bushveld (Figure 10). For this reason the vegetation communities at the ZRD North Orebody do have characteristics and floral species of both veldtype. The main haul road from ZRD North Ore Body to the existing processing plant runs through both veldtypes.

The topography is typically flat to slightly undulating plains. Although red-yellow freely draining soils occur the soils of the veldtype are typically heavy turf and clayey soils. Western Sandy Bushveld varies from tall open woodland to low woodland, with broad-leaved as well as microphyllous (fine-leaved or compound leaved) tree species. Dominant species within this veldtype include Acacia erubescens (Blue thorn) in flat areas, Combretum apiculatum (Red bushwillow) in shallow soils of gravelly upland sites and Terminalia sericea (Silver clusterleaf) in deep sands throughout slightly undulating plains.

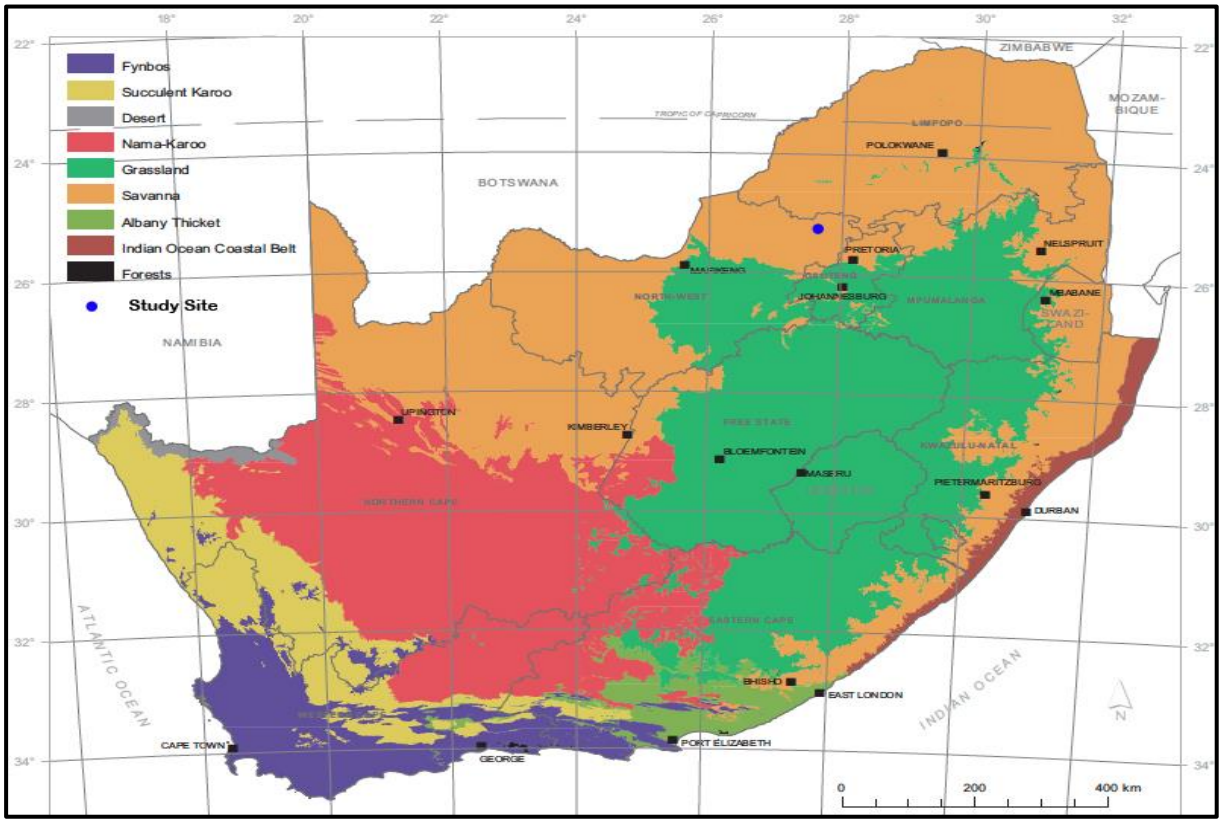


Figure 9: Biomes of South Africa

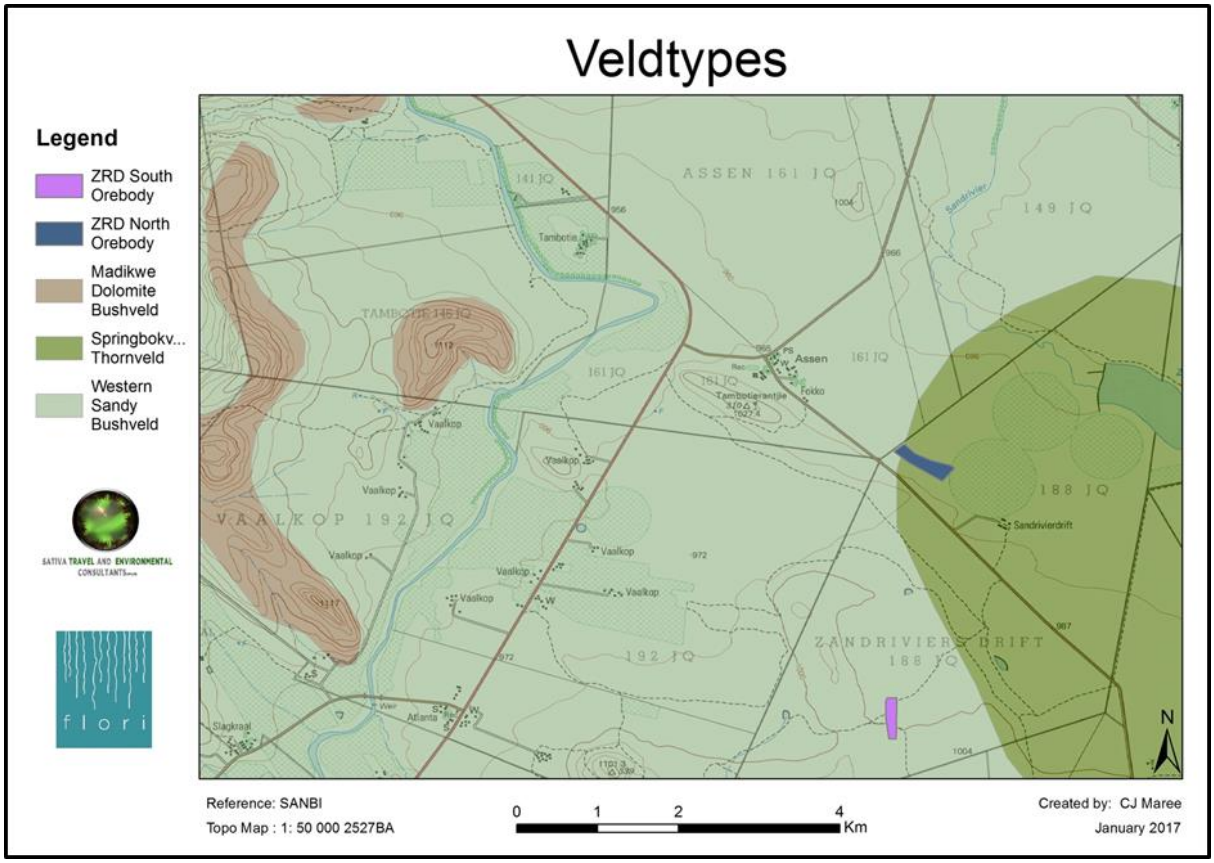


Figure 10: Veldtypes of the Study Area

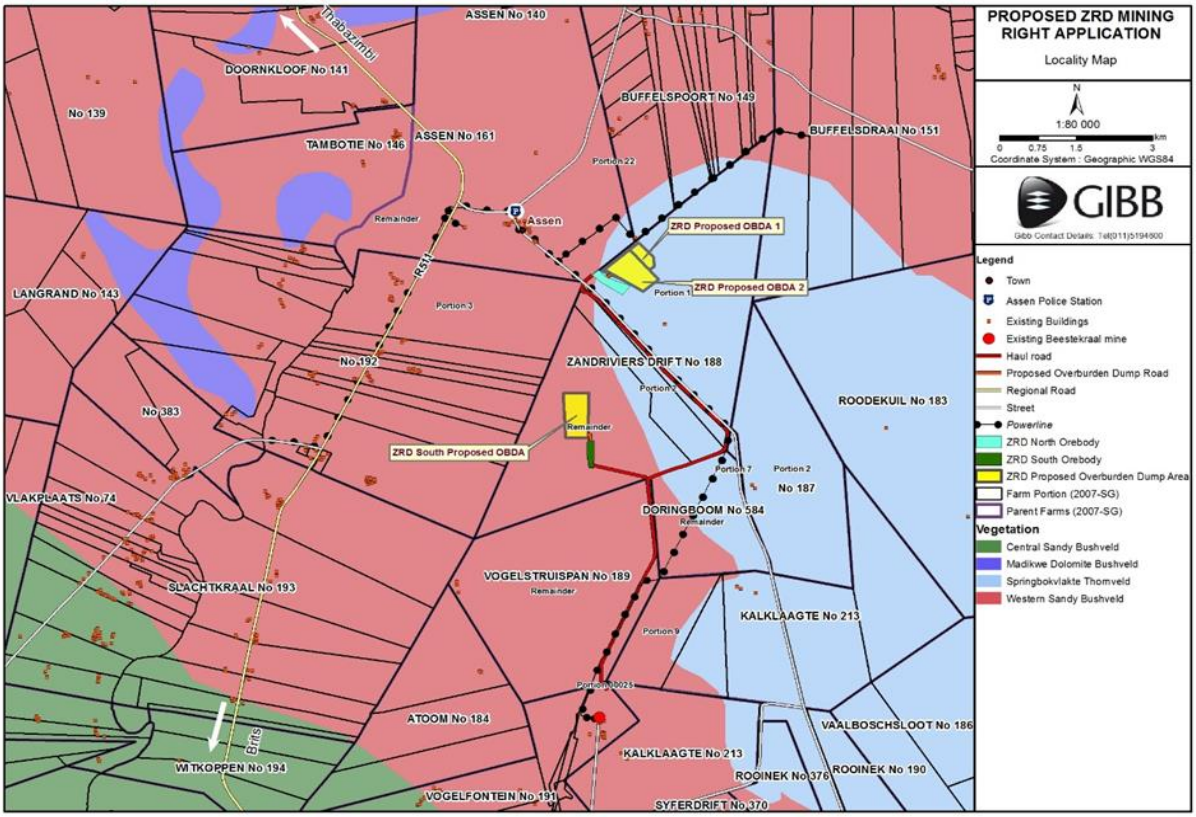


Figure 11: Vegetation Cover Map of the Study Area

ii. Fauna

The ZRD South Ore body, ZRD South overburden dump area and main haul road are situated within a private game farm. Therefore, a number of large mammals and other animals are present on the property. Large mammals seen during the various field investigations include buffalo, blesbok, common duiker, giraffe, kudu, roan antelope, impala, warthog and vervet monkey. Other large animals seen were ostrich.

Red Data Faunal species, as listed below in Table 4, are more than likely to occur in the general vicinity of the study area. The habitats present in the study area are ideal for many of the species listed in Table 8 and care should be taken to avoid impacting on them should they be encountered. During the construction and operation phases care should be taken to avoid any burrows, dens, nesting sites, etc. encountered. The area will be home to a number of snake species as well, some of which may be poisonous and so care should be taken.

Table 4: Priority Faunal Species likely to occur in the area

Species	Common Name	Red Data status	Preferred Habitat	Habitat Restrictions	Present in Study area
Frogs					
Pyxicephalus adspersus	Giant bullfrog	Threatened	Grassland; savannah	Temporary floodplains; pans	Highly Likely
Mammals					
Atelerix frontalis	SA hedgehog	Near Threatened	Most, broad	broad	Highly Likely
Manis temmincki	Pangolin (Scaly anteater)	Vulnerable	Grassland, savannah	Woody; savannah; ants; termites	Possible
Mllivora Capensis	Honey badger (Ratel)	Near threatened	Most, broad	Broad	Possibly
Cloeotis percivali	Short-eared trident bat	Critically endangered	Savannah	Caves and subterranean habitat	Not likely
Pipistrellus rusticus	Rusty bat	Near threatened	Most, broad	Woody savannah, large trees	Not likely
Snakes					
Python natalensis	Southern African python	Vulnerable	Ridges, wetlands	Rocky areas; open water	Highly Likely

Socio-Economic Environment

i. Demographics

According to Stats SA, the Madibeng Local Municipality is located in the Bojanala Platinum District Municipality within the North West Province, situated between the Magaliesberg and the Witwatersrand mountain range.

The Municipality is demarcated into 31 wards of which 10 fall in the urban areas (Brits, Hartbeespoort and Skeerpoort) and 21 in the rural areas and villages. It includes approximately 43 villages and 9 000 farm areas. Madibeng is centrally situated (approximately 50km from Pretoria, 55 km from Johannesburg and 60km from Rustenburg) and is easily accessible with various road networks, amongst others the N4 toll road, which is links from various directions through Madibeng to Mmabatho, as well as a railway line and airport for light aircraft.

Population

The Local Municipality of Madibeng has a total population of 477 381, making it the second most populous municipality in the Bojanala District Municipality after Rustenburg. It is highly rural, with 57% of its population residing in rural areas (tribal or traditional areas), about 28% residing in urban areas and about 15% residing in farming areas. Black Africans are the majority, with an 89% share of the Madibeng Municipality's population. The most commonly spoken language is Setswana.

More than half of the population is male (53%), with 47% constituting females. At age 85 and older, there were more than twice as many women as men. People under 20 years of age made up over a quarter of the population (33.5%), and people aged 65 and older made up 5% of the population.

Municipality	**Total Area of Municipality**	**Total Area of Settlements**	**Area of Settlements as % of Municipal Area**
Madibeng Local Municipality	3.839 km^2	63 639 ha	5%

Socio-Economic status

Madibeng prides itself on a number of economic activities which play a significant role in the growth of the province and country as a whole, and which include agriculture, mining, tourism and manufacturing. Mining is presently predominant with Madibeng being the world's third largest chrome producer, and includes the richest Platinum Group Metals Reserve (situated on the Merensky Reef). Manufacturing is also a dominant sector with a wide variety of industries situated in the various industrial areas.

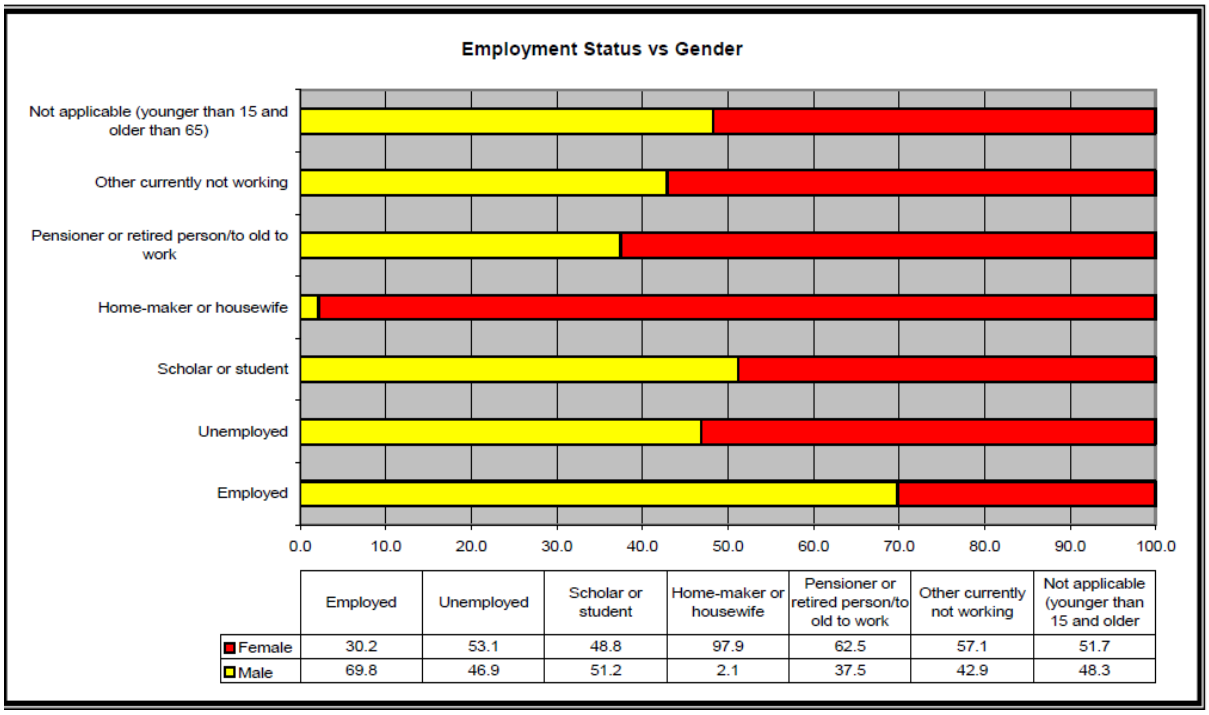
Tourism is one of the strong contenders, if well explored in the area. The possible establishment of the tourism belt is being researched for economic expansion. The advantage of rail and road infrastructure spanning in all lucrative destinations will begin to bear necessary fruit for the prosperity of the people of Madibeng.

Unemployment is still a serious concern in the Bojanala District. According to the 2007-2011 BDM Integrated Development Plan (IDP) the total number of unemployed persons in the

district increased over the period 1996 to 2003 (from 140000 to 217000) and the unemployment rate has stabilized and decreased slightly from 2002 onwards.

The municipality is characterised by high levels of unemployment. In Madibeng, the unemployment rate for those aged 15 to 24 is 38.2%, which is almost 10% more than the overall unemployment rate.

The information depicted in Figure 12 indicates that nearly 70% of the total employed population consists of males, with only 30% females. These figures also clearly indicate that 53% of the total unemployed population is represented by the female population in the district



	Employed	Unemployed	Scholar or student	Home-maker or housewife	Pensioner or retired person/to old to work	Other currently not working	Not applicable (younger than 15 and older
Female	30.2	53.1	48.8	97.9	62.5	57.1	51.7
Male	69.8	46.9	51.2	2.1	37.5	42.9	48.3

Figure 12: Employment status vs Gender (BDM IDP 2007-2011)

Education

The education status of the population older than 20 years of age as depicted in the figure below indicates that the district labour market is characterized by low skills levels. As much as 15.1% of the population older than 20 years have not received any form of schooling and a further 19.7% only some primary education. These figures imply that nearly 35% of the total adult population can be regarded as functionally illiterate. Conversely, only 20.1% of the adult population has completed their high school education and only 5.5% has obtained some form of tertiary education.

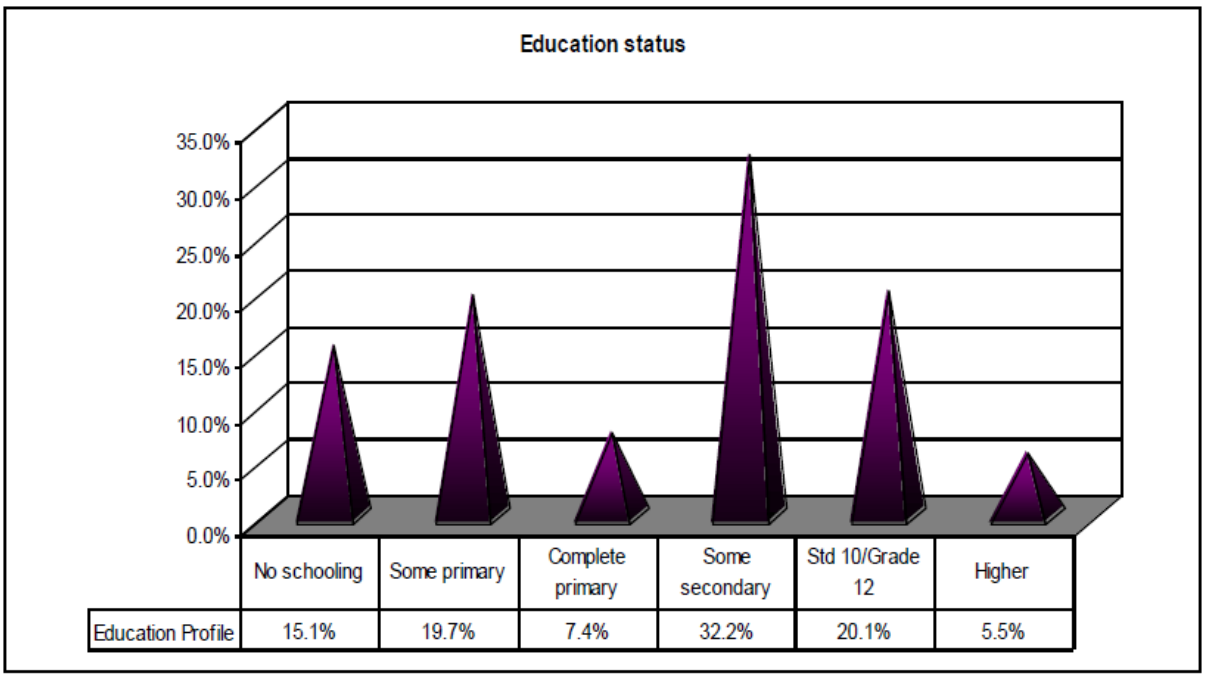


Figure 13: Education status of the Madibeng District Municipality population

Households Income

There are approximately 84,239 household, 20,483 agricultural households with an average household size of 3.3 individuals. Only 30.9 % of households have access to piped water inside dwellings and only 84.5 % of households have access to electricity for lighting

Economic Status

According to the information from Stats SA (2011), the Madibeng District Municipality comprise 30.4% unemployment rate, with 38.2% of this total constituting youth unemployment

Heritage Resources

Heritage sites have special attributes which contribute to the cultural identify of a local population and of humanity as a whole. Heritage sites may be related to religious and cosmological beliefs, constitute a source of aesthetic inspiration, can provide wildlife sanctuaries and form the basis of important local traditions.

The study area is situated within the North West Province of South Africa which boasts a rich traditional homeland of contemporary Western Sotho-Tswana including Hurutshe, Kwena and Kgatla. Previous archaeological and heritage studies in the region indicate that the area constitute a high pre-historic and heritage significance. The region is regarded as a cultural landscape where palaeontological; Stone Age, Iron Age and Historical period sites contribute the bulk of the cultural heritage of the region itself. Stone Age sites are general identifiable by stone artefacts found scattered on the ground surface, as deposits in caves and rock shelters as well as in eroded gully or river sections. Archaeological sites recorded in the project region confirms the existence of Stone Age sites that conform to the generic SA periodization split into the Early Stone Age (ESA) (2.5 million years ago to 250 000 years ago), the Middle Stone Age (MSA) (250 000 years ago to 22 000 years ago) and the Late Stone Age (LSA) (22 000 years ago to 300 years ago). Stone Age sites in the region are also associated with rock painting sites. Cave sites also exist on the landscape south-west of the project area.

A detailed Heritage Impact Assessment (HIA) was undertaken by SATIVA in November 2016. From the assessment it was established that the study area constitute heritage resources of aesthetic, historic, scientific and social value. From an aesthetic value point of view, it has been identified that the overall project area is situated in the valley bushveld environment with landscape that is considered typical for the area that it is found in. The visual and physical relationship between the study area and the surrounding historical Cultural landscape demonstrates the connection of place to the local and oral historical stories of the African communities who populated this region in prehistoric times. The local communities consider the project area as a cultural landscape linked to their ancestors and history. However it is not expected that the development will alter the aesthetic value of the greater area in a radical way due to the fact that development settlements constantly change on their own accord.

From a historic value point of view, it has been identified that several sites of interest (historic homesteads) have been identified throughout the study area. The history of generations of the Sotho-Tswana and Ndebele clans are tied to the geographical region, where the history goes back to the pre-colonial period.

From a scientific value point of view, it should be noted that past settlements and associated roads, mines and other auxiliary infrastructure developments and disturbance within the study area have cumulatively resulted in limited intact landscape with potential to retain intact large scale or highly significant open archaeological site deposits. It should be noted that resources can however be uncovered during subsurface excavations forming part of the development activities. Should this occur, then the earth moving activities will need to be ceased immediately and the findings reported to the Competent Authority.

From a social value point of view, it was identified that the study area is characterised by its local history associated with the rise of Shaka's Zulu Kingdom in the early 1800's, the colonial wars of resistance and the struggle for democracy. Several generations of communities originate from the greater project area and therefore are considered to have ancestral ties to the area. These factors combined illustrate that the study area have a great social significance. It should however be noted that the proposed development is not envisaged to negatively impact on the social value of the surrounding area, due to the fact that it will add value to the human settlements ad activities already taking place. In addition to this, the thick bushes and vegetation constituting social value as sources of important herbs and traditional medicines should be regarded as constituting significant social value.

All recommendations from the HIA have been taken into account and incorporated into the EMPr effective implementation. Please refer to Appendix F for the detailed HIA study.

Ambient Noise

A detailed Noise Impact Assessment was undertaken by Airshed in December 2016. When considered in the context of the surrounding land use and the nature of the proposed development, it is envisaged that the project may alter the ambient noise levels during both the construction and operational phases of the project. The study illustrates that the expected noise levels during the day (06:00 – 22:00) resulting from the mining operations will not exceed the day-time guideline of 55 dBA at receivers. Furthermore, it was calculated that the ambient noise elevation criteria for human receptors will only be exceeded within approximately 200m from areas of activity. In conclusion, no fatal flaws were identified for the

implementation of the development with either one of the alternatives. All specialist mitigation measures and recommendations have been incorporated into the EMPr.

Visual Environment

A level 3 Visual Impact Assessment (VIA) was undertaken by GIBB in November 2016. The study illustrates that scenic value can be described as the reaction to the environmental aesthetics as perceived by an individual or a group and can therefore be subjective. In terms of surrounding landscape, it can be stated that the study area is of a high visual quality, with the natural vegetation and ridges next to the ZRD North and ZRD South site being the greatest resources. Assen is the only town within 5km of both the ZRD North and ZRD South sites and is expected to only have visual exposure to the ZRD North Site for OBDA 1 and OBDA 2. ZRD South is approximately 3km south from Assen and it is expected that the topography and existing dense vegetation would screen the visibility to this site from Assen completely. The level of significance for ZRD South and ZRD North are both calculated at High-Negative, but with certain mitigation measures followed, it could reduce down to Moderate-Negative.

Ridges provide screening to most of the western parts of ZRD North and ZRD South with minimal visibility to the south and visual exposure mainly stretching to the east and north. The second closest town to both sites are Ga-Rasai, located approximately 8km from the ZRD North and 9km from ZRD South. It is expected that the proximity as well as densely vegetated landscape in between the town and mining area, the visual exposure will be very low negative to insignificant.

In addition to this, it was identified that both the ZRD South and North sites are situated within the Koos Meintjies Private Nature Reserve. ZRD South is on PPC owned land and ZRD North is situated on privately owned land. The entire Koos Meintjies Nature reserve falls under the current prospecting right granted to PPC. The nature reserve is **not** a known tourist attraction and no tourist activities occur in this area. The PPC owned section is mainly used for PPC staff for break-away and socializing with team members. Furthermore, the surrounding dirt roads are mainly used by farmers and PPC staff members with a very low traffic flow with thick natural vegetation adjacent to the road servitudes throughout the study area. It is expected that the level of impact on the surrounding roads will be Moderate negative and could be reduced to Moderate-low negative with the implementation of proposed mitigation measures.

From the VIA undertaken, no fatal flaws were identified with the project. Due to the proximity of the ZRD North OBDA alternatives to each other, it is estimated that they will experience similar impacts that can be mitigated to acceptable levels. As such, it is recommended that the proposed project goes ahead with the implementation of either one of the OBDA alternatives. All recommendations and mitigation measures have been incorporated into the project EMPr for implementation.

h) Type of environment affected by the proposed activity

(its current geographical, physical, biological, socio- economic, and cultural character).

Please refer to question g above.

i) Description of the current land uses

Land uses observed throughout the study area mainly constitute agricultural (olive farms, wheat farms, small scale farming etc.), game farms, mining activities and natural land / open space (dense natural vegetation with height of approximately 4m). The land use in the demarcated areas of the ore bodies varies slightly from one to the other. The ZRD north ore body is situated completely within currently cultivated lands. The ZRD South ore body constitutes bushveld and is situated within a private game farm area belonging to PPC Ltd.

The low-density urbanisation in the area is in the form of some farm homesteads and the small Assen hamlet, consisting of a police station and general store. The cultivation in the area is mainly in the form of high-intensity, pivot-irrigated maize production. Please refer to Figure 14 below for the Land Use Map of the study area including all infrastructures such as powerlines and pipelines.

j) Description of specific environmental features and infrastructure on the site

The proposed development is situated within a cultural landscape that is integrated with existing mining activities to the north and south of the study area, game farming, and small olive farming. PPC housing facilities are considered the closest residential area, situated north of both ZRD ore bodies. The town of Assen is located within a 5km radius of the study area.

k) Environmental and current land use map

(Show all environmental, and current land use features)

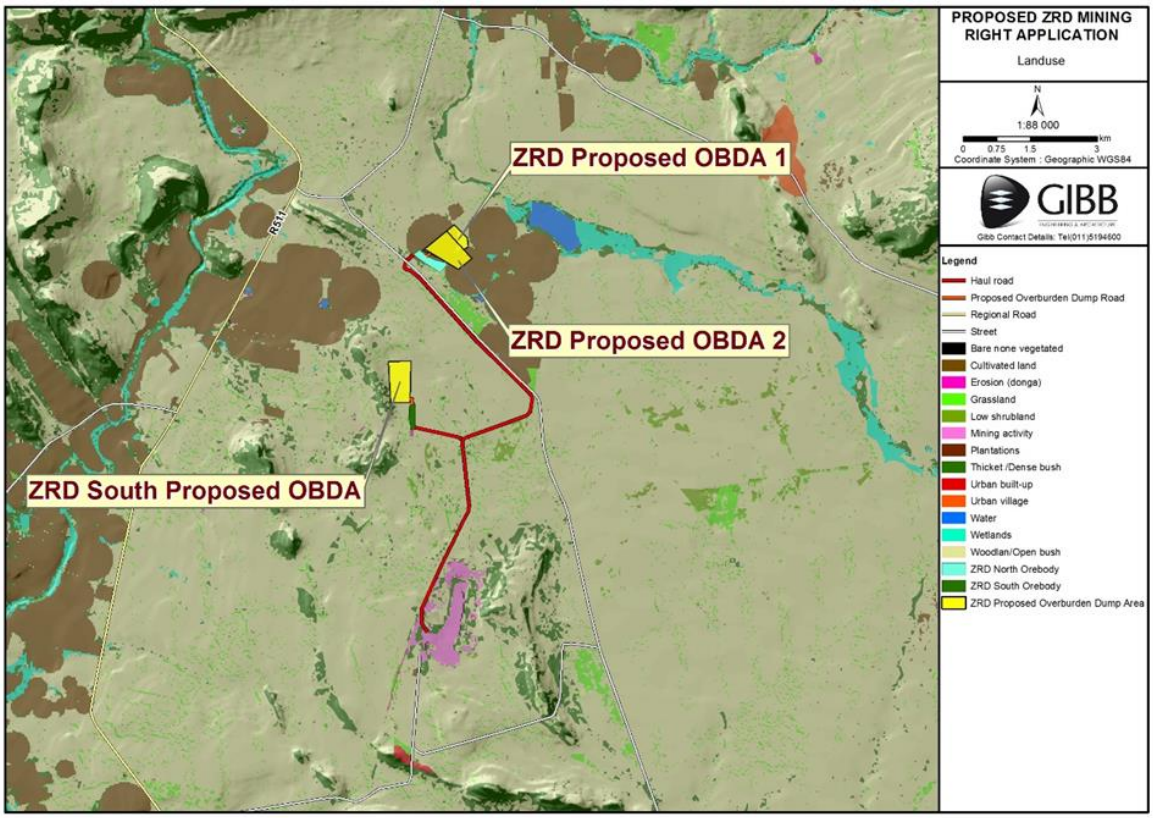


Figure 14: Land Use Map of the Study Area

(i) ***Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts***
(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Given the nature of the activity, a conservative pre-mitigation approach has been taken.

ZRD NORTH OBDA 1 (ALTERNATIVE 1)

LOSS OF VEGETATION & FAUNAL DISPLACEMENT				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Loss of vegetation and faunal displacement due to the establishment of OBDA's, haul roads, and stockpiles associated with the proposed ore body mining activities*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-8*	*3*
EXTENT	*2*	*The extent of the impact is rated as site as it will affect only the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-24***	***low negative***		
PROPOSED MITIGATION MEASURES				
Any temporary storage facilities to be setup in existing built-up areas or disturbed areas only;				
No temporary facilities or portable toilets to be setup within 100m of any watercourses, including wetlands;				
Haul roads need to be maintained throughout the lifespan of the project;				
No removal of protected trees may take place without having the necessary permits in place;				

An erosion plan needs to be developed and implemented as part of the project activities;				
A stormwater management plan needs to be developed and implemented on site;				
Construction activities need to be limited to the footprint of the proposed development to avoid impacting on surrounding environmental conditions unnecessarily;				
Only clear vegetation where absolutely necessary; and				
Stockpile areas will be decided and approved by the Project Manager and appointed ECO before construction commences on site and should not be located within drainage lines.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-6*	*1*
EXTENT	1	*The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Neglible***	***Unlikley***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-3**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

DESTRUCTION / DAMAGE TO HERITAGE RESOURCES				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Damage and / or destruction of features constituting heritage significance due to the development of the haul road, OBDAs, mining areas and associated infrastructure*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				

DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-18*	*3*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.*	***Moderately Detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*1*	*Irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-54***	***moderate - negative***		
PROPOSED MITIGATION MEASURES				
Location of mining infrastructure should be restricted to minimum footprint impact especially where such infrastructure fall within busy areas. Such bushy sections have local ethno-botany significance as sources of traditional herbs and medicines. As such disruption and vegetation clearance should be kept to a minimum;				
The footprint impact of the development should be kept to a minimal as this will limit the possibility of encountering chance finds within the servitude;				
Preserved bushveld areas should be protected for ethnobotany significance. As such, this development should avoid excessive vegetation clearance during the development;				
Any archaeological remains uncovered during development must be investigated by an archaeologist accredited with ASAPA, following which a permit needs to be obtained from SAHRA before these ruins may be altered. Should any resources be disturbed during subsurface construction, the finds should be left in situ subject to further instruction from the project archaeologist or heritage authorities;				
The development footprint impact of the proposed haul road and mine should be kept to a minimal to limit the potential of encountering chance finds within the servitude;				
Should archaeological or human remains be disturbed during the development activities, then immediate remedial rescue and salvage work will need to be undertaken without delay;				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-8*	*1*
EXTENT	1	*The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur*		

SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	1	*Irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-8**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

LOCALISED GROUNDWATER DEWATERING				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Localised groundwater dewatering during the construction phase of the activity for the purpose of drinking and / or dust suppression making use of additional boreholes*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-10*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Likely***

IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-20***	***low - negative***		
PROPOSED MITIGATION MEASURES				
Borehole abstraction (if any) should be managed effectively and borehole water levels and abstraction volumes from borehole should be recorded at least weekly.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-6*	*1*
EXTENT	1	*The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*Irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-6**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

GROUNDWATER & SURFACE WATER CONTAMINATION				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Groundwater contamination due to domestic waste and hydrocarbon spillages from construction activities and associated contaminating substances seeping into the local groundwater resource during the construction phase*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				

DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-15*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-3*	*The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.*	***Moderately Detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-30***	***low - negative***		
PROPOSED MITIGATION MEASURES				
All staff and supervisors at workshops, yellow metal laydown areas and fuel storage areas should be trained in hydrocarbon spill response;				
Each laydown area and / or fuel storage area should be equipped with the appropriate spill response kits, where any contaminated soil will need to be disposed of correctly at a suitable location; and				
All domestic waste generated will need to be disposed of at a suitable landfill site along with proper housekeeping practices that should be maintained on site.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-10*	*1*
EXTENT	3	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Unlikely***

IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-10**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

CHANGE IN VISUAL AESTHETICS				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Visual impact on sensitive receiving environments, towns, farmsteads and major roads situated within a 5km radius due to the development of the overburden dump areas, vegetation clearance and development of the access road*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-8*	*3*
EXTENT	*2*	*The extent of the impact is rated as site as it will affect only the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-24***	***low - negative***		
PROPOSED MITIGATION MEASURES				
Ensure that vegetation is not unnecessarily removed during the construction phase. Maintain as much natural vegetation around the site as possible;				
Reduce the construction period through careful logistical planning and productive implementation of resources;				
Rehabilitate all disturbed areas immediately after construction; and				
Restrict construction activities to daylight hours in order to reduce lighting impacts				

POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-4*	*1*
EXTENT	2	*The extent of the impact is rated as site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Neglible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-4**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

INCREASED NOISE GENERATION				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	*Increased noise generation during construction activities and its associated nuisance impact on the receiving environment*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-5*	*3*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and*	***Neglible***	***Definite***

		processes are minimally affected		
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-15***	***very low negative***		
PROPOSED MITIGATION MEASURES				
All diesel-powered equipment and plant vehicles should be kept at a high level of maintenance. This should particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment should serve as trigger for withdrawing it for maintenance;				
Noise generation should be limited, as such vendors should be required to guarantee optimised equipment design noise levels; and				
A mechanism to monitor noise levels, record and respond to complaints and mitigate impacts should be developed				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-4*	*1*
EXTENT	2	*The extent of the impact is rated as site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Neglible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-4**	**very low negative**		
CONFIDENCE LEVEL				
Medium				
INCREASED OCCURRENCE AND SPREAD OF DISEASES (SOCIAL)				
PROJECT PHASE	*Construction Phase*			
DIRECT IMPACT	--			
INDIRECT IMPACT	*Potential increase in the occurrence and spread of diseases such as HIV/AIDs due to an influx of construction workforce (migrant workers) to the local area and associated towns*			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**

PRE-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-10*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-20***	***low - negative***		
PROPOSED MITIGATION MEASURES				
HIV & AIDS awareness talks should be given to the workers on a regular basis by the relevant personnel; and				
Local labour must be employed as far as possible.				
POST-MITIGATION				
DURATION	2	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-5*	*1*
EXTENT	3	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Neglible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-5**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

OPERATIONAL PHASE

DEGRADATION OF AIR QUALITY CONDITIONS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Degradation of air quality conditions due to mine vehicles travelling on the unpaved haul roads between the orebodies, overburden dump areas and existing Beestekraal mine*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-12*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-28***	***low - negative***		
PROPOSED MITIGATION MEASURES				
Overburden stockpiles will need to be vegetated;				
Unpaved haul roads will need to be watered (or alternative methods used) as part of dust suppression requirements;				
All domestic waste generated will need to be disposed of at a suitable landfill site along with proper housekeeping practices that should be maintained on site; and				
Vehicle speeds to be limited on haul roads.				
POST-MITIGATION				
DURATION	*2*	*The duration of the activity associated with the impact will last 6-18 months and as such is rated as Short term*	*-10*	*1*

EXTENT	3	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-10**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

CHANGE IN VISUAL AESTHETICS				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Visual impact on sensitive receiving environments, towns, farmsteads and major roads situated within a 5km radius due to the overburden waste being stored in the designated overburden dump areas, reaching a maximum height of 15m*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-14*	*3*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or*	***Moderately Detrimental***	***Definite***

		vulnerable systems or communities are negatively affected		
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-42***	***moderate - negative***		
PROPOSED MITIGATION MEASURES				
Ensure that vegetation is not unnecessarily removed during the construction phase. Maintain as much natural vegetation around the site as possible;				
Limit operational activities to daylight hours in order to reduce lighting impacts. Should operations continue during night time, ensure careful and strategic placement of lights; and				
Rehabilitate all disturbed areas immediately (as far as practicable).				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-6*	*1*
EXTENT	2	*The extent of the impact is rated as site as it will affect only the development area*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Neglible***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-6**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

INCREASED NOISE GENERATION	
PROJECT PHASE	*Operational Phase*
DIRECT IMPACT	*Increased noise generation during operational activities and its associated nuisance impact on the receiving environment*
INDIRECT IMPACT	--
CUMULATIVE IMPACT	--

DIMENSION	RATING	MOTIVATION	CONSEQUENCE	LIKELIHOOD
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long term*	*-7*	*2*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	*-1*	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Slightly Detrimental***	***Likely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-14***	***very low negative***		
PROPOSED MITIGATION MEASURES				
All diesel-powered equipment and plant vehicles should be kept at a high level of maintenance. This should particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment should serve as trigger for withdrawing it for maintenance;				
Noise generation should be limited, as such vendors should be required to guarantee optimised equipment design noise levels;				
A mechanism to monitor noise levels, record and respond to complaints and mitigate impacts should be developed; and				
Adjacent landowners should be notified of blasting times in advance.				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long term*	*-7*	*2*
EXTENT	3	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		
SEVERITY	-1	*The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected*	***Slightly Detrimental***	***Likely***

IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-14**	**very low negative**		
CONFIDENCE LEVEL				
Medium				

LOCALISED GROUNDWATER DEWATERING				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Localised groundwater dewatering affecting adjacent farms during the operational phase of the activity for the purpose of mining activities*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long term*	*-12*	*1*
EXTENT	*2*	*The extent of the impact is rated as site as it affects only the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***unlikely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-12***	***Very low - negative***		
PROPOSED MITIGATION MEASURES				
This impact is unlikely to occur as the geohydrological assessment has proven that the dewatering of the pit will not affect adjacent water users. However should adjacent water users be negatively affected, alternate access to water sources should be investigated by the mine; and				
Ground water levels should be monitored regularly to identify any negative trends proactively. Appropriate intervention methods must be design and implemented by the mine.				

POST-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long term*	*-12*	*1*
EXTENT	*2*	*The extent of the impact is rated as site as it affects only the development area*		
SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Unlikely***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-12***	***Very low - negative***		
CONFIDENCE LEVEL				
Medium				

DECREASE IN AGRICULTURAL POTENTIAL				
PROJECT PHASE	*Operational Phase*			
DIRECT IMPACT	*Loss of arable land due to the establishment and operation of the proposed ZRD mining areas, haul roads, OBDAs and associated infrastructure*			
INDIRECT IMPACT	--			
CUMULATIVE IMPACT	--			
DIMENSION	**RATING**	**MOTIVATION**	**CONSEQUENCE**	**LIKELIHOOD**
PRE-MITIGATION				
DURATION	*4*	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-14*	*3*
EXTENT	*3*	*The extent of the impact is rated as Local as it affects the development area and adjacent properties*		

SEVERITY	*-2*	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Moderately Detrimental***	***Definite***
IMPACT ON IRREPLACEBLE REOURCES	*0*	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	***-42***	***moderate - negative***		
PROPOSED MITIGATION MEASURES				
Where topsoil or fines are available, these should be backfilled last in order to provide as smooth and least dangerous a surface as possible on areas that will be rehabilitated;				
Prior to the commencement of site clearing activities, an invitation needs to be extended to the Traditional Healers Association to harvest materials useful to their practices;				
It is recommended that an entrepreneurially minded SMME be established to undertake the harvesting and marketing of commercially valuable timber. This is preferable compared to stockpiling and burning;				
Topsoil up to a depth of 600mm will need to be placed on its own stockpile and a fast growing runner grass will need to be planted on it in order to minimize dust dispersal and stormwater erosion;				
Soft plinthite stratum will need to be placed on its own stockpile and kept damp, it natural state;				
Topsoil should be firmly bedded but not compacted. This will create a receptive bed for grasses, shrubs and trees as they commence to re-seed and re-establish themselves;				
Waste rock will need to be placed on its own stockpile; and				
POST-MITIGATION				
DURATION	4	*The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term*	*-12*	*2*
EXTENT	2	*The extent of the impact is rated as site as it will affect only the development area*		
SEVERITY	-2	*The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected*	***Slightly Detrimental***	***Likely***

IMPACT ON IRREPLACEBLE REOURCES	0	*No irreplaceable resources will be impacted.*		
SIGNIFICANCE	**-24**	**low - negative**		
CONFIDENCE LEVEL				
Medium				

ZRD SOUTH OBDA 2 (ALTERNATIVE 2)

PLEASE NOTE THAT IMPACTS ASSOCIATED WITH ALTERNATIVE 2 IS THE SAME AS THAT FOR ALTERNATIVE 1.

(ii) ***Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks***
(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

IMPACT ASSESSMENT METHODOLOGY

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed development.

For each of the main project phases the existing and potential future impacts and benefits (associated only with the proposed development) were described using the criteria listed in below. This was done in accordance with the EIA regulations of 2014 (as amended), promulgated in terms of Section 24 of the NEMA and the criteria drawn from the IEM Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts, published by the DEAT (April 1998).The assignment of ratings has been undertaken based on past experience of the EIA team, as well as through research. Subsequently, mitigation measures have been identified and considered for each impact and the assessment repeated in order to determine the significance of the residual impacts (the impact remaining after the mitigation measure has been implemented).

Criteria	**Rating Scales**	**Notes**
Nature	Positive	An evaluation of the effect of the impact related to the proposed development
	Negative	
Extent	Footprint	The extent of the impact is rated as footprint as it only affects the area in which the proposed activity will occur
	Site	The extent of the impact is rated as site as it will affect only the development area
	Local	The extent of the impact is rated as Local as it affects the development area and adjacent properties
	Regional	The extent of the impact is rated as Regional as the effects of the impact extends beyond municipal boundaries
	National	The extent of the impact is rated as National as the effects of the impact extends beyond more than 2 regional/ provincial boundaries
	International	The extent of the impact is rated as International as the effect of the impact extends beyond country borders
Duration	Temporary	The duration of the activity associated with the impact will last 0-6 months and as such is rated as Temporary
	Short term	The duration of the activity associated with the impact will last 6-18 months and as

		such is rated as Short term
	Medium term	The duration of the activity associated with the impact will last 18 months-5 years and as such is rated as Medium term
	Long term	The duration of the activity associated with the impact will last more than 5 years and as such is rated as Long Term
Severity	High negative	The severity of the impact is rated as High negative as the natural, cultural or social functions and processes are altered to the extent that the natural process will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.
	Moderate negative	The severity of the impact is rated as Moderate negative as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected
	Low negative	The severity of the impact is rated as Low negative as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected
	Low positive	The severity of the impact is rated as Low positive as the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally improved
	Moderate positive	The severity of the impact is rated as Moderate positive as the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are positively affected
	High positive	The severity of the impact is rated as High positive as the natural, cultural or social functions and processes are altered to the extent that valued, important, sensitive or vulnerable systems or communities are substantially positively affected.

Potential for impact on irreplaceable resources	No	No irreplaceable resources will be impacted.
	Yes	Irreplaceable resources will be impacted.
Consequence	Extremely detrimental	A combination of extent, duration, intensity and the potential for impact on irreplaceable resources
	Highly detrimental	
	Moderately detrimental	
	Slightly detrimental	
	Negligible	
	Slightly beneficial	
	Moderately beneficial	
	Highly beneficial	
	Extremely beneficial	
Likelihood of the impact occurring	Unlikely	It is highly unlikely or less than 50 % likely that an impact will occur.
	Likely	It is between 50 and 75 % certain that the impact will occur.
	Definite	It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.
Significance	Very high - negative	A function of Consequence and Likelihood
	High - negative	
	Moderate - negative	
	Low - negative	
	Very low	
	Low - positive	
	Moderate - positive	
	High - positive	
	Very high - positive	

Table 5: Impact Assessment Criteria and Rating Scales

Duration		Extent		Irreplaceable Resources		Severity		Consequence = (Duration+Extent+Irr) x Severity		Likelihood		Significance		Confidence
1	Temporary	1	Footprint	1	Yes	-3	High - negative	-25 to -33	Extremely detrimental	1	Unlikely	-73 to -99	Very high - negative	Low
2	Short term	2	Site	0	No	-2	Moderate - negative	-19 to -24	Highly detrimental	2	Likely	-55 to -72	High - negative	Medium
3	Medium term	3	Local			-1	Low -negative	-13 to -18	Moderately detrimental	3	Definite	-37 to -54	Moderate - negative	High
4	Long term	4	Regional					-7 to -12	Slightly detrimental			-19 to -36	Low - negative	
		5	National			1	Low -positive	0 to -6	Negligible			0 to -18	Very low - negative	
		6	International			2	Moderate - positive							
						3	High - positive	0 to 6	Negligible			0 to 18	Very Low - positive	
								7 to 12	Slightly beneficial			19 to 36	Low - positive	
								13 to 18	Moderately beneficial			37 to 54	Moderate - positive	
								19 to 24	Highly beneficial			55 to 72	High - positive	
								25 to 33	Extremely beneficial			73 to 99	Very high - positive	

ASCRIBING SIGNIFICANCE FOR DECISION-MAKING

The best way of expressing these cost benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood)1 of that event. Many risks are accepted or tolerated on a daily basis because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, is potentially death but the likelihood of such an event happening is so low that parachutists are prepared to take that risk and hurl themselves out of an airplane. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe. It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die.

Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

CONSEQUENCE

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked and likelihood to be defined of that consequence. In Table 6 below a scoring system for consequence ranking is shown. Two important features should be noted in the table, namely that the scoring doubles as the risk increases and that there is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

Table 6:Ranking of consequence

Environmental Cost	**Inherent risk**
Human health – morbidity / mortality, loss of species	High
Material reductions in faunal populations, loss of livelihoods, individual economic loss	Moderate – high
Material reductions in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate – low
Negative change – with no other consequences	Low
Environmental Benefits	**Inherent benefit**
Net improvement in human welfare	Moderate – high
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic Development	Moderate – Low
Positive change – with no other consequences	Low

[1] Because 'probability' has a specific mathematical/empirical connotation the term 'likelihood' is preferred in a qualitative application and is accordingly the term used in this document.

LIKELIHOOD

Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/empirical expression. A set of likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring, is presented in Table 7.

Table 7:Likelihood categories and definitions

Likelihood Descriptors	Definitions
Highly unlikely	The possibility of the consequence occurring is negligible
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely
Likely	The consequence may not occur but a balance of probability suggests it will
Highly likely	The consequence may still not occur but it is most likely that it will
Definite	The consequence will definitely occur

It is very important to recognise that the likelihood question is asked twice. The first time the question is asked is the likelihood of the cause and the second as to the likelihood of the consequence. In the tables that follow the likelihood is presented of the cause and then the likelihood of the consequence is presented. A high likelihood of a cause does not necessarily translate into a high likelihood of the consequence. As such the likelihood of the consequence is not a mathematical or statistical 'average' of the causes but rather a qualitative estimate in its own right.

RESIDUAL RISK

The residual risk is then determined by the consequence and the likelihood of that consequence. The residual risk categories are shown in Table 8 where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in Table 9.

Table 8:Residual risk categories

		Residual risk				
Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 9: Implications for decision-making of the different residual risk categories

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

(iii) The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

There were no concerns raised by the community and / or affected parties with regards to the proposed layout options.

It should however be noted that alternative site options has been identified for the site location of the proposed ZRD Overburden Dump Area (OBDA). The environmental impacts associated with the OBDA site alternatives have been assessed in detail as part of the Environmental Impact Assessment. The specific environmental sensitivities associated with each site alternative are used to determine the preferred site alternative for the proposed development.

The specific environmental impacts associated with the proposed development is provided in the sections below.

(iv) The possible mitigation measures that could be applied and the level of risk

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

There were no concerns raised by the community and / or affected parties with regards to the proposed layout options.

(v) Motivation where no alternative sites were considered

It is important to note that two site alternatives have been assessed for the proposed ZRD OBDA. The specific environmental sensitivities associated with the proposed alternatives were identified and assessed as part of the Environmental Impact Assessment for this project. The specific environmental impacts are provided in the sections below.

(vi) ***Statement motivating the alternative development location within the overall site***

(Provide a statement motivating the final site layout that is proposed)

The need and desirability for the project is supported by the need to graduate the existing prospecting right for the area to a mining right due to the confirmed prevalence of the relevant limestone ore bodies. The proposed development of the ZRD mining operations will result in a number of employment opportunities to undertake the various mining, blasting and drilling operations on site which will inevitably contribute to economic upliftment of local community and the greater region. Individual training and upskilling opportunities will also become available with the implementation and operation of the proposed mine. The project will furthermore provide a secure and long term supply of limestone resource to the cement industry.

In addition, with the implementation of the project it will ultimately lead to the increase in Gross Domestic Product (GDP) for the country which resembles the country's economic wealth and makes it more lucrative overall for foreign investment.

From the detailed environmental impact assessment and associated specialist studies undertaken for the project it was found that two OBDA alternatives associated with ZRD North will have similar impacts on the receiving environmental conditions. As such no significant difference in terms of

impact significance and severity can be used as motivation in selecting one of them as the preferred option. In addition to this, no fatal flaws were identified for the implementation of either one of the OBDA alternatives. Therefore, the preferred alternative from the applicant's point of view may be put forward as the preferred alternative for implementation.

The applicant prefers Alternative 2 (OBDA 2) for implementation due to operational requirements.

As such, the EAP considers **ZRD North OBDA 2** (with the rest of the mining infrastructure as shown on the layout plan) to be the preferred site alternative for the project as it allows for the various benefits associated with the project to be realised whilst at the same time having the smallest impact on the receiving environmental conditions.

l) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) 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.)

PLEASE REFER TO SECTION K ON PAGE 42 ABOVE.

m) **Assessment of each identified potentially significant impact and risk**

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).**	**POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**SIGNIFICANCE** if not mitigated	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
PLEASE REFER TO SECTION K ON PAGE 42 FOR THE COMPREHENSIVE ENVIRONMENTAL IMPACT ASSESSMENT INCLUDING IDENTIFIED RISKS, ASSOCIATED SIGNIFICANCE AND MITIGATION MEASURES FOR IMPLEMENTATION						

n) **Summary of specialist reports**

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

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.
Agricultural Impact Assessment	**From the detailed study undertaken no fatal flaws were identified with regards to the implementation of the project. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • Where topsoil or fines are available, these should be backfilled last in order to provide as smooth and least dangerous a surface as possible for areas to be rehabilitated; • Prior to the commencement of site clearing activities, an invitation needs to be extended to the Traditional Healers Association to harvest materials useful to their practices; • It is recommended that an entrepreneurially minded SMME be established to undertake the harvesting and marketing of commercially valuable timber. This is preferable compared to stockpiling and burning; • Topsoil up to a depth of 600mm will need to be placed on its own stockpile and a fast growing runner grass will need to be planted on it in order to minimize dust dispersal and stormwater erosion; • Topsoil should be firmly bedded but not compacted. This will create a receptive bed for grasses, shrubs and trees as they commence to re-seed and re-establish themselves; and • Soft plinthite stratum will need to be placed on its own stockpile and kept damp, it natural state; • Stockpiles of topsoil should be covered by a fast growing,	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme

	well rooted grass such as kikuyu in order to stabilize the surface of the stockpile, thus minimizing stockpile erosion and, at the same time, limiting the incidence of nuisance dust; • Waste rock will need to be placed on its own stockpile; and • There is no need to turn over or otherwise 'work' the stockpile. The best way to preserve soil structure is to rest the soil.		
Heritage Impact Assessment	**From the detailed study undertaken no fatal flaws were identified with regards to the implementation of the project. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • The Project Public Participation Process (PPP) should ensure that any cultural heritage related matters for this project are given due attention whenever they arise and are communicated to PHRA throughout the proposed project development. This form of extended community involvement would pre-empty any potential disruptions that may arise from previously unknown cultural heritage matter that may have escaped the attention of this study**;** • Location of mining infrastructure should be restricted to minimum footprint impact especially where such infrastructure falls within bushy areas. Such bushy sections have local ethno-botany significance as sources of traditional herbs and medicines. As such disruption and vegetation clearance should be minimal. Preserved bushveld areas should be protected for ethnobotany significance. As such this development, should avoid excessive vegetation clearance during the development**;** • The footprint impact of the mine development should be kept to minimal to limit the possibility of encountering chance finds within servitude; • Should any archaeological materials / resources be uncovered, then work should be ceased immediately and the SAHRA will	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme

	need to be notified. No activity may resume until appropriate management provisions are put in place; • Should archaeological or human remains be disturbed during the development activities, then immediate remedial rescue and salvage work will need to be undertaken without delay; • Although the possibility of conflict between the community and the proposed development related to culture heritage is unlikely, PHRA should acknowledge on behalf of the community, that the project area is situated in a culturally significant landscape associated with African local history and cultural activities. PHRA may also acknowledge that such significance is not tied to physical sites or archaeological sites only, but to intangible heritage such as popular memories, oral history, ancestral remembrance, religious rituals, aesthetic; and • Appreciations, living experiences and folklores. As such, the community retains the right to have their constitutionally guaranteed cultural heritage rights respected and protected without being limited to existence of physical evidence such as archaeological sites. Should such issues arise in association with this proposed development, the proponent, PHRA and community should devote adequate attention to address them.		
Ecological Impact Assessment	**From the detailed study undertaken no fatal flaws were identified with regards to the implementation of the project. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • Protected trees occur in the study area. These trees are: Marula, Shepherd's tree, Camelthorn and Leadwood. Tree permits will be required to remove these trees; • Full rehabilitation will need to take place for the mining pit and OBDA at closure of the mine; • No protected trees may be removed without the necessary permits;	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme

	• No access or haul roads allowed to be developed in the area of the hill situated west of the ZRD South orebody; and An erosion plan will need to be implemented and monitored.		
Air Quality Impact Assessment	**From the detailed study undertaken it was estimated that the predicted ambient concentrations of PM10 for the roads will have exceedances of the National Ambient Air Quality standards (NAAQs), resulting from the haul roads emissions. In addition to this the predicted ambient concentrations of PM25 also show exceedances of the NAAQs resulting from the haul roads. These exceedances are limited to in and around the haul roads and therefore will have an <u>insignificant</u> bearing insofar as environmental receptors are concerned.** **The overall predicted cumulative ambient concentrations of PM are well within the NAAQs. As such no fatal flaws were identified with regards to the implementation of the project. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr** <u>Specialist Recommendations:</u> • Overburden stockpiles to be vegetated. • Unpaved haul roads will need to be watered (or alternative methods used) as part of dust suppression requirements.	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme
Noise Specialist Report	**From the detailed study undertaken it was found that predicted noise levels are not expected to exceed the day-time guideline of 55 dBA. No fatal flaws were identified with regards to the implementation of the project. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • All diesel-powered equipment and plant vehicles should be kept at a high level of maintenance. This should particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme

	characteristics of equipment should serve as trigger for withdrawing it for maintenance; • Noise generation should be limited, as such vendors should be required to guarantee optimised equipment design noise levels; • A mechanism to monitor noise levels, record and respond to complaints and mitigate impacts should be developed**;** • Sampling should be carried out using a Type 1 sound level meter (SLM) that meets all appropriate International Electrotechnical Commission standards and is subject to annual calibration by an accredited laboratory; • The following acoustic indices should be recorded and reported – L_{Aeq} (T); L_{Aleq} (T); Statistical noise level L_{A90}; L_{Amin} and L_{Amax}; Octave band or 3rd octave band frequency spectra; • The SLM should be located approximately 1.5m above ground and no closer than 3m to any reflecting surface; • Efforts should be made to ensure that the measurements are not affected by residual noise and extraneous influences, i.e. wind, electrical etc.; and • A detailed log and record should be kept. Records include site details, weather conditions during sampling and observations made regarding the acoustic climate of each site.		
Visual Impact Assessment	**From the detailed study undertaken no fatal flaws were identified with regards to the implementation of the project. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • Ensure that vegetation is not unnecessarily removed during the construction period. Vegetation bordering the OBDA and service roads should not be removed in order to reduce visual exposure. Maintain as much natural vegetation around the site as possible throughout the operational phase of the project; • Limit operational activities to daylight hours in order to reduce lighting impacts. Should operations continue during night time, ensure careful and strategic placement of lights;	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme

	• Rehabilitate all disturbed areas immediately after construction (areas surrounding the OBDA); • Rehabilitate of the landscape as much as possible in order for the landscape to better absorb the OBDA. At close-out of the project, the OBDA should be planted with indigenous local vegetation in order for this site to be absorbed by the landscape to decrease the impact after mining has been conducted; • Should the construction of lights be necessary on site, use specifically designed lighting equipment that minimises the upward spread of light near to and above the horizontal. Care should be taken when selecting luminaries to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum; and • Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is not more than 70°. Higher mounting heights allow lower main beam angles, which can assist in reducing glare. In areas with low ambient lighting levels, glare can be very obtrusive and extra care should be taken when positioning and aiming lighting equipment**.**		
Wetland Impact Assessment	**From the detailed study undertaken no fatal flaws were identified with regards to the implementation of the project. None of the proposed mining areas and associated infrastructure is situated in close proximity to any watercourse resources. It is therefore recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • Stormwater management plans must be compiled and implemented**.**	**X** **All recommendations made by the specialist has been incorporated throughout the S&EIR process**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation measures **Part B** – Environmental Management Programme
Geohydrological Impact Assessment	**From the detailed study undertaken thirty (30) groundwater features were identified comprising of 9 farm boreholes, 18 exploration core holes and 3 open boreholes that are not currently in use. The general site area is underlain by Dolomitic formations of the Malmani Subgroup, of the Chuniespoort**	**X** **All recommendations made by the**	**Section K on Page 42** of the Report – Environmental Impact Assessment and associated mitigation

	Group, where this Malmani Subgroup fragment along the Crocodile River is known as the 'Assen Formation'. **The area has an average groundwater depth of 14.75m below ground level, where the general flow direction is towards the North.** **Impacts associated with the proposed development and operation of the mining operations are limited to localised dewatering, potential for hydrocarbon spillages and impacts from domestic waste generation. It is important to note that no fatal flaws were identified for the project and therefore it is recommended that the project proceed with the implementation of the proposed mitigation measures as part of the EMPr.** <u>Specialist Recommendations:</u> • Borehole abstraction (if any) should be managed effectively and borehole water levels and abstraction volumes from borehole should be recorded at least weekly; • All staff and supervisors at workshops, yellow metal laydown areas and fuel storage areas should be trained in hydrocarbon spill response; • Each laydown area and / or fuel storage area should be equipped with the appropriate spill response kits, where any contaminated soil will need to be disposed of correctly at a suitable location; and • All domestic waste generated will need to be disposed of at a suitable landfill site along with proper housekeeping practices that should be maintained on site	**specialist has been incorporated throughout the S&EIR process**	measures **Part B** – Environmental Management Programme

Attach copies of Specialist Reports as appendices in Appendix F.

o) **Environmental impact statement**

(vii)Summary of the key findings of the environmental impact assessment

ALTERNATIVE 1 - ZRD North OBDA 1		
Impact	***Significance before mitigation***	***Significance after mitigation***
Construction Phase		
LOSS OF VEGETATION & FAUNAL DISPLACEMENT	low negative	very low negative
DESTRUCTION / DAMAGE TO HERITAGE RESOURCES	moderate - negative	very low negative
LOCALISED GROUNDWATER DEWATERING	low - negative	very low negative
GROUNDWATER & SURFACE WATER CONTAMINATION	low - negative	very low negative
CHANGE IN VISUAL AESTHETICS	low - negative	very low negative
INCREASED NOISE GENERATION	very low negative	very low negative
INCREASED OCCURRENCE AND SPREAD OF DISEASES (SOCIAL)	low - negative	very low negative
Operational Phase		
CHANGE IN VISUAL AESTHETICS	moderate - negative	very low negative
DEGRADATION OF AIR QUALITY CONDITIONS	low - negative	very low negative
LOCALISED GROUNDWATER DEWATERING	Very low - negative	very low negative
DECREASE IN AGRICULTURAL POTENTIAL	moderate - negative	low - negative

ALTERNATIVE 2 - ZRD North OBDA 2		
Impact	***Significance before mitigation***	***Significance after mitigation***
Environmental impacts associated with Alternative 2 are similar to that of Alternative 1		

(viii) ***Final Site Map***

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as **Appendix A**

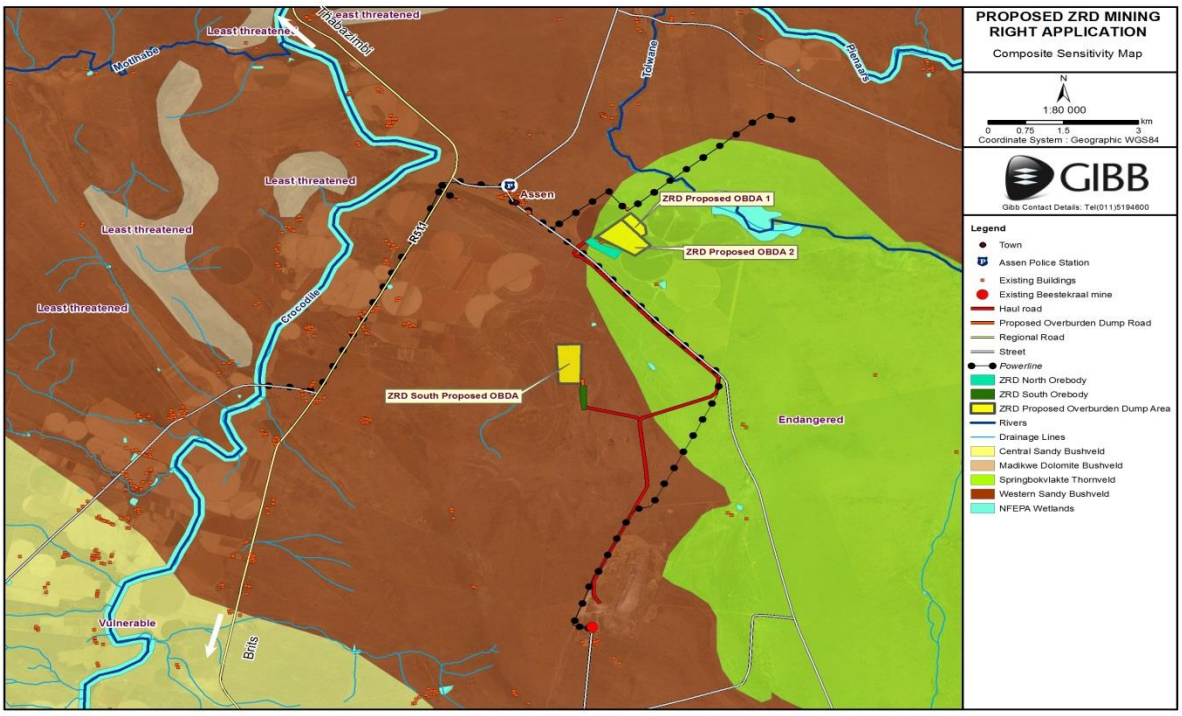


Figure 15 Composite Environmental Sensitivity Map with Final Site Layout

(ix) ***Summary of the positive and negative implications and risks of the proposed activity and identified alternatives***

A detailed environmental impact assessment was undertaken for the project in order to establish the environmental sensitivities associated with the area and potential impact that the development may have on the receiving environmental conditions. It is envisaged that the development will have a positive impact on the socio-economic conditions of the surrounding area due to the fact that it will provide employment and training opportunities required for the various mining, blasting and drilling operations on site. This will inevitably contribute to economic upliftment of the local community and the greater region. In addition to this, the project will provide a secure and long term supply of limestone resource to the cement industry and ultimately lead to the increase in Gross Domestic Product (GDP) for the country which resembles the country's economic wealth and makes it more lucrative overall for foreign investment.

A variety of potential negative environmental impacts have been identified for the project which relates to nuisance factors (air, noise, traffic, visual), water quality degradation, loss of habitat, destruction of heritage resources, as well as a potential for increased spread of diseases. It should however be noted that with the implementation of the proposed mitigation measures the overall significance of the negative environmental impacts will range between low to very-low negative. The two ZRD OBDA alternatives are expected to have similar environmental impacts on the receiving environment.

From the environmental impact assessment undertaken for the project and associated alternatives, the EAP has formulated the key environmental consequences to aid the Department with decision making purposes. This implies that in making the decision to authorise the project, the Department accepts the key environmental consequences (as outlined below) and associated mitigation measures for implementation.

Please refer below for the key environmental consequences that needs to be taken into account for decision making purposes.

Table 10: Key Environmental Consequences for Decision Making

Potential Environmental Cost	LOSS OF HABITAT	
Inherent risk	**MODERATE**	
Causes of risk	**Likelihood of causes**	
	OBDA 1	**OBDA 2**
Loss of Vegetation	Likely	Likely
Agriculture Potential	Unlikely	Likely
Likelihood of consequence	**Unlikely but possible**	**Likely**
Residual risk	**Moderate**	**Moderate**

Potential Environmental Cost	INCREASED MORBIDITY	
Inherent risk	**High**	
Causes of risk	**Likelihood of causes**	
	OBDA 1	**OBDA 2**
Increase in HIV/AIDS/STDs	Likely	Likely
Likelihood of consequence	**Likely**	**Likely**
Residual risk	**High**	**High**

Potential Environmental Cost	NUISANCE	
Inherent risk	**MODERATE-LOW**	
	OBDA 1	**OBDA 2**
Noise	Definite	Definite
Visual	Likely	Likely
Dust Generation	Likely	Likely
Likelihood of consequence	**Unlikely but possible**	**Unlikely but possible**
Residual risk	**Low**	**Low**

Potential Environmental Cost	LOSS OF HERITAGE RESOURCES WITH CULTURAL SIGNIFICANCE	
Inherent risk	**MODERATE**	
Causes of risk	**Likelihood of causes**	
	OBDA 1	***OBDA 2***
Construction and excavation activities on site	Likely	Likely
Likelihood of consequence	**Unlikely but possible**	**Unlikely but possible**
Residual risk	**Moderate**	**Moderate**

p) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.

PLEASE REFER TO SECTION N ABOVE FOR THE SPECIALIST RECOMMENDATIONS. PLEASE NOTE THAT THE EMPR AS DETAILED BELOW MUST BE A LEGALLY BINDING DOCUMENT AND SHOULD BE IMPLEMENTED ACCORDINGLY.

q) Final proposed alternatives

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

Based on the information obtained as part of the environmental impact assessment and associated mitigation measures, either one of the two site alternatives for the proposed ZRD North OBDA 1 & 2 may be developed with the implementation of the required mitigation measures. The reason for this is due to the fact that no fatal flaws were found with either one of the OBDA alternatives and the fact that the alternatives will have similar environmental impacts.

The applicant prefers alternative 2 (OBDA 2) for implementation due to operational requirements.

Based on the information provided above, the EAP recommends that the development proceed with Alternative 2 (OBDA 2) being the preferred alternative along with the effective implementation of all mitigation measures provided as part of the EMPr.

r) Aspects for inclusion as conditions of Authorisation

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

Please refer below for the additional management aspects to be included in the conditions of the Environmental Authorisation, should the project be authorised:

- The EMPr is a legally bounding document and must be implemented throughout the project lifetime;
- An independent ECO will need to be appointed to ensure the compliance with the EMPr; and
- A Water Use Licence must be obtained for all triggered water use activities forming part of the project, prior to construction.

s) Description of any assumptions, uncertainties and gaps in knowledge

(Which relate to the assessment and mitigation measures proposed)

Please refer below for the list of assumptions and limitations forming part of this report:

- Impacts and assumptions made with regards to the ZRD orebody and associated infrastructure (haul road, OBDA, stockpile area etc.) are made on the current status quo of the area.

<u>Visual Impact Assessment:</u>

- In order for the VIA to be conducted, a maximum height of 15m was assigned (as provided by PPC) to the proposed OBDA's. Furthermore, vegetative cover was not taken into account in the generation of the Digital Elevation Model (DEM) which implies that the visual impact illustrates the worst case scenario;

Air Quality Impact Assessment:

- The air quality impact associated with the roads were modelled as an exaggeration of actual conditions due to a number of factors namely; the roads where modelled as not being wetted and the EPA emission factor over exaggerates emissions. Therefore the emissions predicted for the development of the ZRD Mine illustrates the worst case scenario;
- Wet deposition has not been modelled as part of this assessment, therefore implying that the effects of atmospheric scrubbing from precipitation have not been simulated;

Heritage Impact Assessment:

- The assessment was influenced by the unpredictability of buried archaeological remains and the difficulty in establishing intangible heritage values. Archaeological deposits usually occur below the ground level. Should any artefacts or skeletal material be revealed during construction, then all activities will need to be halted and the competent be notified;
- The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion or field ploughing. The proposed mining infrastructure will be limited to specific right of corridors as detailed in the development layout;
- The construction team will need to provide link and access to the road servitude, where service sites will use the existing access roads;
- No excavations or sampling were undertaken, due to the fact that a permit from heritage authorities is required to disturb a heritage resource. As such, the results of the assessment are based on indicators observed on surface. Furthermore, the study did not include any ethnographic and oral historical studies nor did it investigate the settlement history of the area;

Noise Impact Assessment:

- The quantification of sources of noise was restricted to activities associated with the ZRD North and South orebodies, overburden dump areas, and haul roads. Routine noise impacts from operations were estimated and simulated;
- In the absence of detailed mining fleet information, it was assumed that in addition to mine vehicles, drill rigs, excavators, loaders, dozers and graders will be used;
- In the absence of on-site meteorological data, use was made of simulated data for Northam;

Geohydrological Impact Assessment:

- Aquifer parameters such as transmissivity and storage were taken from literature and aquifer tests conducted at the site by Rison (2011) are assumed to be applicable to the site environment;
- Recharge values were taken from literature and previous studies at the site. The values are assumed to be applicable to the site environment;
- There will be no waste storage infrastructure at the site (e.g. waste rock dump, tailings storage facility etc.), thus no contaminant transport modelling was done for the site;
- It was assumed that mining would commence in January 2018 for a period of thirty (30) years with both ZRD North and ZRD South being mined for fifteen (15) years respectively; and
- The complexities of fractured rock aquifers imply that the model can only be used as a guide to determine the order of magnitude of dewatering and contaminant transport; and
- The interpretation of modelled results should be based on the assumptions the model was built on and actual results will vary as unknown aquifer conditions and parameters vary in the natural system.

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

It has been illustrated that with the implementation of the proposed mitigation measures and EMPr, all identified environmental impacts can be mitigated to acceptable levels, thus allowing the proposed development to proceed. No fatal flaws were identified with either one of the alternatives. It is important to note that the environmental impacts associated with the two OBDA site alternatives are very similar, as such the preferred alternative from the applicant's point of view is put forward as the preferred alternative for implementation.

Based on the information provided above, the EAP recommends that the proposed development be authorised by the Department with the implementation of OBDA alternative 2 and associated mitigation measures forming part of the EMPr.

(i) Reasons why the activity should be authorized or not

Please refer to Section P above

It is envisaged that the development will have a myriad of positive impacts on the socio-economic conditions of the surrounding area due to the fact that it will provide employment and training opportunities required for the various mining, blasting and drilling operations on site. This will inevitably contribute to economic upliftment of the local community and the greater region. In addition to this, the project will provide a secure and long term supply of limestone resource to the cement industry and ultimately lead to the increase in Gross Domestic Product (GDP) for the country which resembles the country's economic wealth and makes it more lucrative overall for foreign investment.

The positive benefits that will result from the implementation of the project far outweigh the potential negative impacts to the receiving environment. With the implementation of the proposed mitigation measures and EMPr, the potential impacts can be mitigated to very-low negative significance. Therefore, it is the EAP's recommendation that the proposed development be authorised by the Department with the implementation of site alternative 1 and associated mitigation measures forming part of the EMPr.

(ii) ***Conditions that must be included in the authorisation***

Please refer below for the additional management aspects to be included in the conditions of the Environmental Authorisation, should the project be authorised:

a. Specific conditions to be included into the compilation and approval of EMPr

PLEASE REFER TO THE EMPR BELOW

b. Rehabilitation requirements

PLEASE REFER TO THE EMPR BELOW

(1) Rehabilitation requirements

Rehabilitation Principles	Standard or criteria	Monitoring and reporting
Develop clearly-defined rehabilitation plans prior to the commencement of mining	• Rehabilitation plans developed by surveyor indicating final elevations of land form. Materials balance monitored to ensure free draining topography is achievable • Must be free draining towards clean water drain with slopes not exceeding 1:150	• Rehabilitation plans developed • Rehabilitation progress is reported
Always remove and retain topsoil from disturbed footprints areas for subsequent rehabilitation. Where possible, retain cleared vegetation for replacement on disturbed areas	• All topsoil must be stripped (350 – 500mm on average) from all disturbance footprint (pit, mine infrastructure and stockpile areas)	Topsoil stripping volumes are measured and reported Stripping areas inspected to ensure all available topsoil are stripped.
Where topsoil is stockpiled, stockpiles should be seeded to reduce erosion	• Due to long time frames, topsoil dumps are to be hydroseeded to prevent soil loss form erosion	• Stockpiles demarcated and audited to ensure soil conservation measures are adequate
Shaped landforms should be stable, adequately drained and suitable to achieve long term land use identified	• Overburden dumps areas to be shaped to 1:5 slope, • Mine disturbance footprints shall be graded (free draining), ripped and topsoiled. These area will then be hydro-seeded to ensure revegetation	• Detailed designs to be drafted for implementation • Hydro-seeding program with indigenous seed mix implemented • Rehabilitation success to be monitored
Landforms should be compatible with surrounding landscape to reduce visual impact	• Overburden dumps areas to be shaped to 1:5 slope and shall be free draining • At closure, all mine overburden and ore dumps are to be excavated and placed in the pit to reduce visual impact.	• Detailed designs to be drafted for implementation
Include adequate monitoring and management measures to prove sustainability of land use and issuance of a closure	• Monitoring program developed, must include specific surface, ground water and bio monitoring locations.	• Monitoring program implemented and reported on

Rehabilitation Principles	Standard or criteria	Monitoring and reporting
certificate.	• Annual rehabilitation audits to be undertaken	Biannual audit should: • Assess the ongoing rehabilitation condition of the area; • Consolidate the record on the rehabilitation condition; • Recommend measures necessary for maintaining the land in the state required under the closure plan in terms of land capability and use. • Ensure measures recommended under the rehabilitation audit process will be implemented
Identify and understand all legal and other requirements to ensure compliance	Determine compliance requirements in light of new requirements to NEMA.	Develop approval register and audit compliance
Always seek to reinstate the natural drainage patterns where feasible	• Water cut-off drain located off the disturbed area.	
Erosion protection measures to be planed and implemented during rehabilitation	Topsoiled areas to be hydroseeded to enable successful revegetation	Hyroseeding program to be implemented Rehabilitated areas to be inspected. Sedimentation of downstream environment to be monitored and auctioned where required.
Compacted areas should be ripped accordingly to facilitate root penetration unless subsurface conditions dictate otherwise	• All mine disturbance footprint that were to be rehabilitated will be ripped to a depth of 250 mm prior to topsoil placement	Ripping included in rehabilitation process and areas inspected to ensure compliance.
Plant species selected for revegetation should be consistent with post mining land use, control erosion and contribute to stable and compatible ecosystem formation	• Indigenous seed mix used in all seeding areas.	Seed mix to include: • Rhodes, Teff, Buffalo, Finger and possibly Sawtooth Love, Iron grass

Rehabilitation Principles	Standard or criteria	Monitoring and reporting
		Broad-leaved Cuy grass, Rooigrass, Feathered Chioris and Couch Grasses This should be finalised in consultation with the suitable specialised restoration ecologist
Declared weeds and pest should be prevented for establishing on rehabilitated areas	Alien species are controlled on site and prevented from establishing on rehabilitated areas. Control required may include both physical and chemical means as approved by the relevant authority	Draft and implement alien species control plan.
Post closure water management liability is accounted for	PPC will maintain borehole monitoring	Post closure groundwater model is updated periodically to ensure pot closure ground water risks are acceptable to downstream users

u) Period for which the Environmental Authorisation is required.

The EA is required for a period of Five (5) years.

v) Undertaking

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

I, Tashriq Naicker, confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the EMPr

w) Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

The financial provision for the rehabilitation in terms of this closure plan will be set aside using the closure cost assessment framework provided for by the Department of Mineral Resources. The master rates used in the assessment are the master rates provided by the DMR and escalated annually with the CPI. A summary of the master rates is provided in **Appendix 1 of the closure plan report**. The closure costs will be reviewed annually within the budget cycle.

The total rehabilitation cost estimate for the mining operation over a period of 30 years has been estimated at R 27 080 011 (excl VAT). Annually this will equate to an average of R902 667 per year, giving a progressive 10 year total of R 9 026 670 (as stipulated in the Mine Works Programme).

The total closure costs for the site over a LOM of 30 years is calculated to be **R 27 080 011 (excl VAT)**.

(i) Explain how the aforesaid amount was derived

The financial provision for the rehabilitation in terms of this closure plan will be set aside using the closure cost assessment framework provided for by the Department of Mineral Resources. The master rates used in the assessment are the master rates provided by the DMR and escalated annually with the CPI. A summary of the master rates is provided in **Appendix 1 of the closure report**.

(ii) Confirm that this amount can be provided for from operating expenditure

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

Please refer to the Mining Work Programme for confirmation of financial competence.

x) Deviations from the approved scoping report and plan of study

(i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

There were no deviations from the approved methodology as part of the Final Scoping Report.

(ii) ***Motivation for the deviation***

There were no deviations from the approved methodology as part of the Final Scoping Report.

y) Other Information required by the competent Authority

(i) ***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:-***

a. ***Impact on the socio-economic conditions of any directly affected person***
(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, o*r*, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

It is important to note that PPC owns the property on which the proposed mining operations will take place for the first 15 years (ZRD South). Landowner negotiations will occur with the Landowner of the Farm upon which ZRD North is situated should the DMR grant the mining right. Furthermore, it is envisaged that the development will have a myriad of positive impacts on the socio-economic conditions of the surrounding area due to the fact that it will provide employment and training opportunities required for the various mining, blasting and drilling operations on site. This will inevitably contribute to economic upliftment of the local community and the greater region. In addition to this, the project will provide a secure and long term supply of limestone resource to the cement industry and ultimately lead to the increase in Gross Domestic Product (GDP) for the country which resembles the country's economic wealth and makes it more lucrative overall for foreign investment.

b. ***Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.***
(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(*i*)(vi) and (vii) of that Act, attach the investigation report as **Appendix 2.19.2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

There are no impacts on heritage resources that have not been mitigated.

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

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as **Appendix 4)**.

Two site alternatives have been identified and assessed for the location of the ZRD North OBDA. It is important to note that no fatal flaws were identified for the implementation of the project with either one of the alternatives. The alternatives assessed were deemed feasible for implementation by the applicant. Due to the fact that the potential environmental impacts are similar for both alternatives, the applicant's preference is put forward as the preferred alternative. Therefore, the EAP recommends OBDA alternative 2 (OBDA 2) as the preferred alternative for implementation along with recommended mitigation measures.

The positive benefits that will result from the implementation of the project far outweigh the potential negative impacts to the receiving environment. With the implementation of the proposed mitigation measures and EMPr, the potential impacts can be mitigated to very-low negative significance. Therefore, it is the EAP's recommendation that the proposed development be authorised by the Department with the implementation of OBDA alternative 2 and associated mitigation measures forming part of the EMPr.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

aa) Draft environmental management programme.

(i) Details of the EAP,

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

Name of Consultant: GIBB (Pty) Ltd
Contact person: Mr Tashriq Naicker
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(ii) ***Description of the Aspects of the Activity***

(Confirm 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 (1)(h) herein as required).

The Impact Assessment Methodology as well as the identified Impacts that the proposed project may have on the environment has been included in Section 1 (h) of Part A above.

(iii) ***Composite Map***

(Provide a map **(Attached as an Appendix**) 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)

Please refer to Appendix A for a Composite Environmental Sensitivity Map of the project.

(iv) ***Description of Impact management objectives including management statements***

a. ***Determination of closure objectives.***

(ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

The EMPr provides the following broad closure vision:

- The post mining land of disturbed footprint, excluding the pits will be restored to arable and or grazing conditions as far as practicable.
- Rehabilitation will restore surface mining areas to pre-mining mining land capability as far as practical to its original 'grass land' production potential.

The closure objectives to achieve this are detailed in Error! Reference source not found.**11.**

Table 11: Closure objectives

Closure objective	Closure criteria
Ensure physical stability and public safety of mine areas	• Opencast pit highwalls will be cut back by 10 meters and graded to a 1:3 slope. • Rehabilitated overburden rockdump will remain in situ and slopes will not exceed 1:5. • All mine related infrastructure to be dismantled and removed. • All disturbance footprint to be topsoiled, seeded and revegetated to ensure stability
Restore pre-mining land use to grazing potential	• Opencast mining pits will remain and grazing potential can't be restored • All disturbance footprints to be rehabilitated per standard to ensure sustainable indigenous veld grass is established.
Ecological biodiversity	• Grassland diversity is re-established.

All infrastructure will be removed, however future monitoring boreholes will remain where required.

b. ***The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity***

The following measures provide guideline solutions to frequently anticipated issues on most development activities:

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds etc. is ultimately the responsibility of the applicant/developer. Section 28, National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA].
- The study area must be clearly defined according to the project authorisation. All workforce members and other construction personnel are not to go beyond the designated footprint.
- The Contractors must adhere to agreed and approved access points and haul roads.
- No camping is allowed on any private property without approval.
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time. All damage to be repaired immediately and to the satisfaction of the owner.
- The Contractor must adhere to all conditions of contract including this EMPr.
- Proper planning of the construction process must be undertaken to allow for disruptions due to rain and very wet conditions.
- All private and public manmade structures near the project site must be protected against damage at all times and any damage must be rectified immediately.
- Proper site management and regular monitoring of site works.
- Proper documentation and record keeping of all complaints and actions taken.
- Regular site inspections and good control over the construction process throughout the construction period.
- A positive attitude towards Environmental Management by all site personnel must be motivated through regular and effective awareness and training sessions.
- An EO, on behalf of PPC, is responsible for the implementation of this EMPr. The EO and not the Contractor is to deal with any landowner related matters.
- Environmental Audits to be carried out prior, during and upon completion of construction.

c. Potential risk of Acid Mine Drainage.
(Indicate whether or not the mining can result in acid mine drainage).

Due to the fact that the proposed development involves open cast limestone mining, it is not envisaged that acid mine drainage will occur.

d. ***Steps taken to investigate, assess, and evaluate the impact of acid mine drainage***

Not Applicable

e. ***Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage***

Not Applicable

f. ***Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.***

Not Applicable

g. ***Volumes and rate of water use required for the mining, trenching or bulk sampling operation.***

It is important to note that water required for the mining operations and domestic use, will be sourced from the existing Beestekraal mine situated further south of the proposed ZRD mining areas. However occasional dewatering of aquifers within the mining areas will be required as water from the underground resource seeps into the open cast mining pits. Dewatering at the mining pits should take place at a rate which will maintain a groundwater level of at least 5m below the active pit floor during all operations. The dewatering product should be used in the mining activities wherever possible, or discharged into the environment via natural channels or suitable temporary storage facility for future use.

h. ***Has a water use licence has been applied for?***

A water use license (WUL) will be concurrently applied for with the mining right.

The project will require dewatering of the mining pits during the operational phase of the project. As such, it is envisaged that the project will require a WUL in terms of Section 21 (j) of the National Water Act, 1998 (Act No. 36 of 1998). Please refer below tot Table 12 for the potentially triggered water uses with regards to the proposed development.

Table 12: Triggered Water Uses for the Project

Section 21 of NWA	Activity
(j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people

i. ***Impacts to be mitigated in their respective phases***

Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre-Construction, Construction, Operational, Rehabilitation, Closure, Post closure.	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Excavating	pre-construction, Construction and operation		Dust control measures Noise control measures Storm water system		
Blasting	construction		access control measures		
Stockpiles	construction, operation and closure		Rehabilitation of disturbed land Dust control Measures Storm water system		
Loading, Hauling and Transporting	pre-construction, construction and operation		Noise control measures Dust Control Measures		
Processing Plant	Construction and Operation		Rehabilitation of disturbed land Dust control Measures Storm water system Noise control Measures		
EMP to be updated and included in the Final EIR.					

PLEASE REFER TO PART A, SECTION K

j. Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ();

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).**	**POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**

PLEASE REFER TO PART A SECTION K ABOVE AND PART B SECTION CC BELOW.

IT SHOULD BE NOTED THAT THE STANDARD TO BE ACHIEVED FOR EACH IMPACT IS TO MITIGATE THE IMPACT TO AN ACCEPTABLE LEVEL SO THAT THE RESIDUAL RISKS ARE ACCEPTABLE.

k. Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)

PLEASE REFER TO PART A SECTION K ABOVE AND SECTION CC BELOW.

bb) **Financial Provision**

(i) Determination of the amount of Financial Provision.

a. ***Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.***

Please refer to the attached closure and rehabilitation plan in Appendix I for detailed information.

The closure plan objectives are to return the sites to a condition as close as possible to its current land use once mining is completed. This is in line with the objectives as outlined in the EIA regulations of 2014 (as amended) and the MPRDA.

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

All stakeholders, landowners and Interested and Affected Parties were consulted during the Public Participation Process during the Scoping phase of the project, and their inputs with regards to the impacts of the proposed project on the environment in relation to the closure have been included as part of this report. Please refer to the Comments and Response Report in Appendix E6

c. ***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.***

PLEASE REFER TO APPENDIX I FOR THE CLOSURE AND REHABILITATION PLAN.

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

The estimated Environmental Rehabilitation costs have been included in the total financial provisions for the proposed project.

The financial provision for the rehabilitation in terms of this closure plan will be set aside using the closure cost assessment framework provided for by the Department of Mineral Resources. The master rates used in the assessment are the master rates provided by the DMR and escalated annually with the CPI. A summary of the master rates is provided in **Appendix 1**. The closure costs will be reviewed annually within the budget cycle.

The total rehabilitation cost estimate for the mining operation over a period of 30 years has been estimated at R 27 080 011 (excl VAT). Annually this will equate to an average of R902 667 per year, giving a progressive 10 year total of R 9 026 670 (as stipulated in the Mine Works Programme). The total closure costs for the site over a LOM of 30 years is calculated to be **R 27 080 011 (excl VAT)**.

As outlined in the Closure and Rehabilitation Plan, the objective is to return the site to as close as possible land use prior to mining. There are a few aspects such as the OBDA and the pit itself where this will not be possible. The top bench of the pit will be sloped and fenced off so as to prevent unauthorised access to the site. The OBDA will be revegetated and sloped in terms of rehabilitation.

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

The estimated Environmental Rehabilitation costs have been included in the total financial provisions for the proposed project.

Category	Cost Estimate
a) Progressive total for Rehabilitation	R 9 026 670
b) Cost to mitigate socio-economic conditions of directly affected persons	R 0.00
Total Cost	**R 9 026 670.00**

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

Please refer to the Mining Works Programme for financial competence and confirmation.

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

(i) Monitoring of Impact Management Actions

(ii) ***Monitoring and reporting frequency***

(iii) ***Responsible persons***

(iv) ***Time period for implementing impact management actions***

(v) ***Mechanism for monitoring compliance***

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
Project contract and programme Contingencies for minimising negative impacts anticipated to occur during the construction phase needs to be implemented. Ensure environmental awareness and formalise environmental responsibilities and implementation	**Project contract and programme**	(a) The EMPr must be included as part of the tender documentation thereby making it part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract. (b) A copy of this EMPr must be available on site. The Contractor must ensure that all the personnel on site, sub-contractors and their team, suppliers, etc. are familiar with and understand the specifications contained in the EMPr.	**Proponent**	**As and when required**

Appointments and duties of project team	**Pro forma document and contracts**	(a) The contact details for the ECO, Contractor and SHE officer must be completed as part of the pro-forma documents and a copy kept on site. This document must be made available to the approving authority on request. (b) Subcontractor(s) contracts with the principle contractor must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr.	**Proponent**	**Once - off**
	Roles and responsibilities	Before construction activities commence, role players must have a clear indication of to their role in the implementation of this EMPr	**Proponent**	**Once - off**
Method Statements	**Method Statements**	(a) Certain method statement must be provided by the contractor. All activities which require method statements may only commence once the method statements have been approved by the engineer and or ECO as applicable. (b) Where applicable, the	**PM/ Contractor**	**Prior to commencing activities requiring method statements, on site.**

		contractor will provide job-specific training on an ad hoc basis when workers are engaged in activities, which require method statements		
Emergencies, non-compliance and communication	**Emergencies and communication**	(a) The contractor must provide method statements on the protocols to be followed, and contingencies to be put in place for the following potential incidents before construction may begin: Contamination of natural water resources from spills; contamination of soils from spills; and fire. (b) Communication in emergencies must follow the suggested lines of communication	**Contractor**	**On-going**
	Non-compliance	(a) The contractor understands that failure to adhere to the requirements of the EMPr will result in fines over and above the costs incurred for any remediation required as result of the specific non-compliance.	**Contractor**	**On-going**
Construction Camp set up (If Required) Careful planning of the construction camp can ensure that the time and	**Layout**	(a) The choice of the Contractor's camp requires the Project Manager's permission and must ensure that the camp is located in an area that will ensure a minimum impact. (b) The contractor should submit plans of exact location, extent	**PM**	**Prior to moving on site**

costs associated with environmental management and rehabilitation are reduced.		and construction details of the temporary construction camp facilities to the Project Manager for approval, prior to establishment of the camp. The layout plans should reflect the proposed camp's location in relation to any existing infrastructure (water mains, electricity cables, sewage mains, etc.) on site. Access to the construction camp must be through an existing route or one that is clearly demarcated and agreed upon. (c) The construction camp can comprise of the following (as required): a. Site office b. Ablution facilities c. Designated first aid area d. Eating area e. Storage areas		
	Ablutions	(a) Existing ablution facilities at the PPC Beestekraal site will be used as the base camp for the contractors. Temporary / portable facilities will be established on site as well. (b) No temporary facilities or portable toilets to be setup	**PM**	**During site setup**

		within 100m of any watercourse, including wetlands		
	Provision for camp waste disposal	(a) Bins and skips shall be provided at convenient intervals for disposal of waste within the construction camp/site. **(b)** Recycling and provision of separate waste receptacles for different types of waste should be encouraged.	**PM/Contractor**	**On-going**
Establishing storage areas Storage areas can be hazardous and unsightly. These storage areas can also cause environmental pollution if not designed and managed properly.	**General Substances and Materials**	(a) When deciding on the location of temporary stockpiles, the following needs to be considered: • road access, • length of time the stockpile will exist. (b) Additionally all stockpiles should be located away from sensitive ecosystems and protected from the prevailing winds. (c) Storage areas must be designated, demarcated and fenced if necessary. (d) Storage areas should be secured, to minimize the risk of crime and contamination.	**EO/ECO approval**	**During site set up.**
	Hazardous Substances and Materials	(a) Fuel must be stored in a bunded area with at least a volume of 110% of the largest tank. (b) No smoking shall be allowed in	**EO/ECO approval**	**During site set up**

		the vicinity of the fuel storage area. Erect at least one no-smoking warning sign, which is clearly visible at the fuel storage area, to warn all staff of associated dangers. (c) Provide adequate firefighting equipment at or close to the fuel storage and dispensing area(s). (d) Keep fuel under lock and key at all times. (e) Hazardous chemical working/ refuelling areas must be bunded with an impermeable liner. (f) Ensure that there is always a supply of absorbent material readily available to absorb/break down any hydrocarbon spillage. (g) In the case of a spill, contaminated material must be removed from the site as soon as possible and disposed of at an appropriate hazardous waste facility.		
Education of site staff on general Environmental Conduct These points must be communicated to all staff before the project commences on site	**Environmental Education and Awareness**	Ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include: • What is meant by 'Environment'? • Why do we have to protect the environment?	**EO/ECO**	**During staff induction**

		• How construction activities can impact on the environment. • How can these impacts be mitigated. • Awareness of emergency and spills response provisions. • Social responsibility during construction e.g. being considerate to local residents. It is the contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass the information onto the construction staff. (a) Translators are to be used where necessary. (b) The use of pictures and real-life examples is encouraged as these are easier to remember. (c) The need for a 'clean site' policy also needs to be explained to the construction workers.		
	Worker Conduct on Site	Under no circumstances may open areas or surrounding bush be used as toilet facilities. A general regard for the social and ecological well-being of the site and	**PM/Contractor**	**During staff induction, followed by on-going monitoring.**

		adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • No alcohol/drugs to be present on site. • No fire arms allowed on site or in vehicles transporting staff to/from the site (unless by security personnel)/PPC policy will be implemented in this regard. • Construction staff is to make use of facilities provided for them, as opposed to ad hoc alternatives. • Train departmental heads in the managing of water balance, water pollution and water conservation within their sectors • Train all employees in the implementation of standard operating procedures (SOP's) (e.g. hydrocarbon management, sewerage plant management, monitoring and record keeping • Mechanisms shall be created and implemented to provide information and raise awareness among		

		employees, customers and suppliers and other stakeholders to enhance knowledge and understanding of water resources, aquatic environments and conservation issues • Reduce operational activities to daylight hours in order to reduce lighting impacts. Should operations continue during night time, ensure careful and strategic placement of lights.		
Water Quality Incorrect disposal of substances and materials and polluted run-off can cause serious negative impacts on surrounding water resources.	**Water Quality**	(a) Equipment and machinery must be in good operating condition, clean (power washed), free of leaks, excess oil and grease. (b) Ensure that machinery is operated by a skilled driver who has been trained to use it correctly and who will be able to identify if something is wrong with the engine and conduct regular inspections identifying engine related leaks. (c) Proper stormwater management plans and erosion plans should be compiled and implemented (d) The simulated groundwater	**EO/ECO**	**During site set up.**

		inflows into the mine workings are minimal and could be sufficiently controlled using a sump pump where the water is evacuated from the pit and discharged. A dedicated in-pit sump should be included in the mine planning and should extend 5-10 m ahead of mining, with a capacity of 800 m^3 to allow for direct rainfall and groundwater inflows. (e) Dewatering at the pit should take place at a rate which will maintain a groundwater level at least 5 m below the active pit floor during all operations. The dewatering product should be used in the mining activities wherever possible, or discharged into the environment or suitable storage facility. (f) Make one individual person at a management level responsible for the management of the overall mine water balance. (g) Open pit water dewatering will take place using in pit sumps; (h) Implementation a ground water monitoring program, which includes; Groundwater levels and quality; in pit water quality (i.e. at the sump)		

		(i) In pit water quality and discharge quality and volume		
Set up of waste management activities	**Waste management**	(a) A dedicated area must be allocated for waste sorting and storage. (b) Individual waste skip or wheelie bins for different types of waste should be provided (if none currently exist).	**EO/ECO**	**During site set up**
Security and safety	**Risk Associated with materials on site**	(a) Material stockpiles or stacks such as cement, steel, bricks, corrugated iron sheeting, plastic piping, etc. must be stable and well packed to avoid collapse and possible injury to site workers, stockpiles must also be covered to avoid seepage and ground water pollution (where applicable). (b) No materials are to be stored in unstable or high risk areas such as in close proximity of the entrance road, excavated areas, etc.	**PM/Contractor**	**On-going**
Site Access	**Access to the site**	(a) Access from the existing secondary dirt road will be used to Access the ZRD North Ore body until PPC construct their own haul road to the Beestekraal Mine. Access through PPC property via the constructed haul road will be used to access the ZRD south Ore body. The Access to the Haul road across the public dirt	**Proponent**	

		road must be well maintained and established by means of access control. The public utilising this road have right of way.		
Maintenance of construction camp	**Ablution**	(a) Temporary / Portable ablution facilities will be established on site. (b) No temporary facility or portable toilets to be setup within 100m of any watercourse, including wetlands	**Proponent**	**As per PPC procedures**
	Eating Areas	**(a)** Eating areas should be serviced and cleaned regularly to ensure the highest possible standards of hygiene and cleanliness. **(b)** All litter throughout the site should be picked up and placed in the appropriate recycling bins provided.	**Contractor**	**Weekly inspection**
	Housekeeping	The contractor shall ensure that his camp and working areas are kept clean and tidy at all times.	**Contractor**	**Weekly**
Staff Conduct	**Environmental Education and Awareness / Safety**	(a) The contractor must monitor the performance of construction workers to ensure that all the topics that where covered in the induction meeting is properly understood, and followed. (b) Make all employees aware of water conservation/ water	**Contractor**	**Daily**

		demand management; water pollution avoidance and minimization measures, and reporting procedures and registry of incidents. (c) Train departmental heads in the managing of water balance, water pollution and water conservation within their sectors (d) Train all employees in the implementation of standard operating procedures (SOP's) (e.g. hydrocarbon management, sewerage plant management, monitoring and record keeping **(e)** Mechanisms shall be created and implemented to provide information and raise awareness among employees, customers and suppliers and other stakeholders to enhance knowledge and understanding of water resources, aquatic environments and conservation issues.		
Waste Management Activities in the construction site such as office work, usage of construction materials, etc., generate different types of waste that requires to be managed	**On-site waste management**	• Waste is grouped into "general" or "hazardous", depending on its characteristics. The classification determines the handling methods and the ultimate disposal of the material. The Contractor/ECO / (EO) must classify waste into	**Contractor/EO/PM**	**During the start-up of construction on site and on-going thereafter.** **During waste collection** **Prior to signing an agreement with the waste removal contractor.**

properly. These wastes could result in environmental pollution such as soil contamination/ pollution or health hazards to employees working on-site, if not managed properly.		general or hazardous based on the toxicity or hazard nature of waste. • Waste must be placed in the designated or marked skips/bins which must be emptied on a regular basis by a contracted waste collector. These should remain within the demarcated areas and should be designed to prevent refuse from being blown out by wind. • Separation of waste and recycling of paper, glass, cans, scrap, metals, plastic bottles, etc., must be considered prior to disposal. The disposal at the landfill site should be considered as the last option, after having taken into consideration the prevention of waste generation, reduction waste generation, reuse and recycling. • Hazardous waste that require disposal (oily rags, used fuel/oil, etc.) must be placed in a suitable leak proof skip or wheelie bin for disposal at an approved hazardous waste disposal facility. • The contractor is responsible for arranging the removal of all waste from site generated through construction activities.		

		Waste must be removed to a registered, appropriate disposal and recycling facilities. • No burning and littering of waste on site should be allowed. • Request the following from the waste contractors that are used to collect waste: • Copies of the weighbridge receipt from the waste removal contractor for all waste collected on site.		
Dangerous and toxic materials This section aims to provide measures to prevent pollution of soil, surface and ground water resources in the immediate and surrounding environments. It also proposes measures to minimise the chances of transgression of the acts controlling pollution	**Provision of storage facilities**	(a) Materials such as fuel, oil, must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. (b) Sufficient care must be taken when handling these materials to prevent pollution. Training on the handling of dangerous and toxic materials must be conducted for all staff prior to the commencement of construction. (c) In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) must be informed immediately. (d) Storage areas must display the	**Contractor**	**On-going/ daily**

		required safety signs depicting “no smoking”, No Naked lights” and “Danger” containers must be clearly marked to indicate contents as well as safety requirements. **(e)** The contractor must supply a method statement for the storage of hazardous materials at tender stage. **(f)** Material Safety Data Sheets (MSDS) must be prepared for all hazardous substances on site and supplied by the supplier where relevant. MSDS’s must be updated as required.		
Bulk storage of fuels and oils (as applicable) This section aims to provide measures to prevent pollution of soil, surface and ground water resources in the immediate and surrounding environments. It also proposes measures to minimise the chances of transgression of the acts controlling pollution.	**Bulk storage of fuels and oils**	(a) The contractor must provide and maintain a method statement for “Diesel tanks and refuelling procedures”. (b) Bulk fuel storage tanks on the site must be on an impervious surface that is bunded and able to contain at least 110% of the volume of the tanks. The filler tap must be inside the bunded area where possible and the bund wall must not have a tap or valve. (c) The bunded area should have a water/ fuel sump separator. (d) A Flammable Liquid License must be obtained for diesel volumes greater than 200	**Contractor**	**Once of as required**

		litres. (e) Bulk fuel storage tanks must be located in a portion of the construction camp where they do not pose a high risk in terms of water pollution (i.e. they must be located away from water courses and drainage lines) (f) Bulk fuel storage tanks must be placed so that they are out of the way of traffic, so that the risk of the tanks being ruptured or damaged by vehicles is minimised. (g) Bulk fuel storage areas should be covered during the rainy season. **(h)** No fuel storage, refuelling, vehicle maintenance or vehicle depots should be allowed within 30 m of the edge of any wetlands or drainage lines. **(i)** Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, should be located on impervious bases and should have bunds around them. Bunds should be sufficiently high to ensure that all the fuel kept in the area will be captured in the event of a major spillage.		

Use of dangerous and toxic materials This section aims to provide measures to prevent pollution of soil, surface and ground water resources in the immediate and surrounding environments. It also proposes measures to minimise the chances of transgression of the acts controlling pollution.	**Use of dangerous and toxic materials**	(a) The contractor must keep the necessary materials and equipment on site to deal with spills/ fire of the materials present should they occur. (b) The contractor must set up a procedure (which will be stipulated in a method statement) for dealing with spills/ fire, which will include notifying the ECO and the relevant authorities prior to commencing with construction. These procedures must be developed with consultation and approval by the appointed EO. **(c)** A record must be kept of all spills and the corrective action taken. **(d)** It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage.	**Contractor**	**As required**
Stockpile handling Stockpiles need to be managed in accordance with the outlined specifications in order to minimise the scarring of the soil surface and land features, disturbance and loss of soil, construction	**Stockpiles**	• All stockpiled material must be easily accessible without any environmental damage. • All temporarily stockpiled material must be stockpiled in such a way that the spread of materials are minimised. • The stockpiles may only be placed within the demarcated areas the location of which	**Contractor**	**On-going/ daily**

footprint, sedimentation of nearby drainage lines; maintain the integrity of the topsoil for landscaping, containment of invasive plant growth as well as the contamination of storm water run-off.		must be approved by the ECO. • The contractor must avoid all clearly marked vegetated areas that will not be cleared. • Storm water run-off from the stockpile sites and other related areas must be directed into the storm water system with the necessary pollution prevention measures such as silt traps and may not run freely into the immediate and surrounding environments. • Stockpiles are to be stabilised if signs of erosion are visible. • During construction, all materials and stockpiles will be covered with tarps to prevent erosion, as well as dust arising from it, and to mitigate the visibility thereof (where required and as directed by the ECO). • Soils from different horizons must be stock piled such that topsoil stockpiles do not get contaminated by sub-soil material. • Topsoil stockpiles must be clearly demarcated as no-go areas. • Any temporary storage or accommodation facilities to be set up in existing built up areas or disturbed areas only. • Overburden stockpile to be		

		vegetated		
Fire Management This section aims to provide measures to minimise the destruction of natural fauna and flora as well as maintain the general safety on site.	**Fire management**	(a) The contractors must provide and maintain a method statement for "fires", clearly indicating where and for what fires will be utilised plus details on the fuel to be utilised (b) Absolutely no burning of waste is permitted. (c) No open fires permitted on site at any time. (d) No wood is to be collected, chopped or felled for fires from private or public property as well as from no-go or sensitive areas within the site and any surrounding natural vegetation. **(e)** Employ a fire officer for on-site control. **(f)** Fire-fighting equipment to be kept on site and serviced regularly.	**Contractor**	**On-going/ daily**
Fauna and flora This section aims to provide measures to minimise the disturbance to animals. This section aims to provide measures to minimise the disturbance to vegetation, prevent litigation concerning	**Fauna management**	(a) All activities on site must comply with the regulations of the Animals Protection Act, 1962 (Act No. 71 of 1962), as amended. (b) All construction workers must be informed that the intentional killing of any animal is not permitted as faunal species are a benefit to society. Poaching is illegal and it must be a condition of employment that any employee caught poaching	**Contractor**	**On-going/ daily**

removal of vegetation, encourage natural habitat fauna, minimise scarring of the soil surface and land features, minimise disturbance and loss of topsoil as well as the risk of fauna and flora destruction.		will be dismissed. Employees must be trained on how to deal with fauna species as intentional killing will not be tolerated. In the case of a problem animal e.g. a large snake, a specialist must be called in to safely relocate the animal if the EO or ECO is not able to. (c) Environmental induction training and awareness must include aspects dealing in safety with wild animals into and on site. Focus on animals such as snakes and other reptiles that often generate fear by telling workers how to move safely away and to whom to report the sighting. Workers should also be informed where snakes most often hide so that they can be vigilant when lifting stones, etc. (d) Vegetation clearance should be conducted systematically to allow fauna to move away. **(e)** Construction activities and vehicle traffic should be restricted to daylight hours when the majority of faunal species are inactive. **(f)** Sensitive habitats that include riparian areas, floodplains, rocky habitat, ridges, wetlands		

		and other sensitive sites should be avoided as far as is possible.		
	Flora management	• Trees and natural vegetation or any other natural features inside and outside the work area, which will not be cleared for construction purposes as indicated by the ECO, must be clearly demarcated and not be defaced, removed, painted for benchmarks or otherwise damaged, even for survey purposes. The latter can only be done if stipulated in the Environmental Authorisation and must be overseen by the EO and ECO. Any feature defaced by the contractor must be reinstated to the satisfaction of the ECO and penalties/fines may be imposed by the ER. • The contractor must rehabilitate any disturbed areas once construction activities have terminated for e.g. by removing all contaminated soils. The crew camp during construction must be located in an area that will be developed to impervious surfaces after construction, so as to ensure that natural vegetation cover is not disturbed. A method statement must be provided and	**Contractor**	**As and when required**

		maintained by the contractor. • Once construction is complete, rehabilitation of un-built areas must be undertaken in order to restore the aesthetic & ecological value of the area. It is recommended that the ECO be consulted with regard to the most appropriate rehabilitation vegetation and structures. Active re-vegetation must take place with locally indigenous vegetation under the supervision of the ECO. • No open fires shall be allowed on site under any circumstances, fires will only be permitted in adequate facility within the crew camp, Forest Act, 1984 (Act No. 122 of 1984). • Vegetation should be removed only where construction is to take place. • Should any sensitive species be found, management measure should be adopted for the species and fenced if applicable. • Sensitive plant species should be removed and relocated from points of direct impact before construction starts. • Sensitive habitats that include		

		riparian areas, floodplains, rocky habitat, ridges, wetlands and other sensitive sites should be avoided as far as is possible. • A strategy must be developed prior to construction to prevent the spread and dispersal of alien plants. • No protected tress may be removed without the necessary permits, erosion plan to be implemented and monitored; • No access or haul roads allowed in the area of the south of the hill to the west. Any access by the contractors to the nearby hill to be limited. • No riparian vegetation immediately outside of the belt servitude may be removed; • Ensure that vegetation is not unnecessarily removed during the construction period. Maintain as much natural vegetation around the site as possible • Reduce the construction period through careful logistical planning and productive		

		implementation of resources; • Reduce construction activities to daylight hours in order to reduce lighting impacts; and • Rehabilitate all disturbed areas immediately after construction • Ensure that vegetation is not unnecessarily removed during the construction period. Maintain as much natural vegetation around the site as possible; • Ensure that vegetation is not unnecessarily removed during the construction period. Vegetation bordering the OBDA, and service roads should not be removed in order to reduce visual exposure. • Identify sensitive viewer locations from where the clearance of vegetation next to the OBDAs is highly visible, and identify patches of vegetation or individual trees that can be used as landscaping features.		
Wetland and Riparian Features	**Footprint Management**	(a) Limit the footprint area of the construction activities to what is absolutely essential in order	**Contractor**	**On-going/ daily**

This section aims to provide measures to minimise the damage caused by construction activities on the various riverine and wetland features found throughout the study area.		to minimise environmental damage, especially where encroach upon the wetland boundary. Construction vehicles must use existing roads where possible. (b) During construction all construction materials should be kept out of the wetland areas as well as any active stream channels; (c) In any areas where disturbance of banks or wetland vegetation occurs, bank and bed profile should be re-instated in such a way as reinstate predevelopment habitat conditions (d) Keep all demarcated sensitive zones outside of the construction area off limits during the construction and rehabilitation phases of the development. (e) Appropriate sanitary facilities must be provided during the construction phase and all waste removed to an appropriate waste facility.		
	Vehicle Access	• All construction footprint areas should remain as small as possible and should not encroach onto surrounding more sensitive areas. It must	**Contractor**	**On-going/ daily**

		be ensured that these areas are off-limits to construction vehicles and personnel as far as possible. • In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil. • All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil. • All spills should be immediately cleaned up and treated accordingly.		
	Soil Conditions	(a) All soils compacted as a result of construction activities falling outside of project footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral	**Contractor**	**On-going/ daily**

		habitat. (b) Monitor all systems for erosion and incision. **(c)** No riparian vegetation immediately outside of the servitude belt may be removed **(d)** Water is to be applied to unpaved haul roads		
Heritage Features This section aims to provide measures to minimise the damage caused by construction activities on the various heritage resources found throughout the study area.	**Burial grounds and grave**	• The field survey did not identify any burial sites within the proposed mine development site. Although the possibility of encountering previously unidentified burial sites is low on the proposed mine development site, should such sites be identified during subsurface construction work, they are still protected by applicable legislations and they should be protected • A valid permit for the relocation of the graves must be obtained from SAHRA, SAPS, Dept. of Health, etc.	**Contractor**	**As and when required**
	Heritage Features	(A) any artefact of cultural significance found on site, work must cease at the site of the find and this person must report this find to their immediate Supervisor; A valid permit for the relocation of the graves must be obtained from SAHRA, SAPS, etc.	**Contractor**	**As and when required**

		Location of mining infrastructure should be restricted to minimum footprint impact especially where such infrastructure fall within bushy area. Such bushy sections have local ethno-botany significance as sources of traditional herbs and medicines. As such disruption and vegetation clearance should be minimal Preserved bushveld areas should be protected for ethnobotany significance. As such this development, should avoid excessive vegetation clearance during the development. A professional archaeologist should be retained to monitor all significant earth moving activities that may be implemented as part of the proposed road development. The monitoring process would ensure that should any archaeological or human remains be disturbed during subsurface construction work at the sites of Interest, immediate remedial rescue and salvage work would commence without delay.		
Construction vehicles / equipment Engine machines such as compressors, pumps, air	**Construction equipment**	(a) Vehicles and machinery are to be kept in good working order and to meet manufactures specification for safety, fuel consumption and emission.	**Contractor/EO**	**On going**

conditioners and arc welders can have small leaks (usually oil) that can accumulate to become spills, which require clean-up. These leaks become more evident if the equipment remains in the same place for an extended period of time. Damaged fuel tanks, fuel hoses, and fuel pumps can be sources of significant fuel leaks. Hydraulic systems can blow gaskets or hoses resulting in large quantities of hydraulic fluid spilled to the ground.		(b) Should excessive emissions be observed, the site manager needs to implement an effective vehicle and equipment service and maintenance plan. (c) Vehicle parking and equipment storage must be done on a hardened and sealed surface area such that oil, fuel and other fluid leaks do not pollute soil or ground water sources. (d) Must have Backup pumps (in pit sum) (e) Continues maintenance of pump and supply (f) Allow for in pit pumps to be installed with a maximum capacity of 800 m3/ day discharge, and prevent ponding in the pit to avoid contamination of the water.		
	Construction activities – dust and noise generation	• The paved areas of the site will limit the amount of dust on site, and general housekeeping should be done. • Avoid unnecessary movement of transportation vehicles on site. • Apply appropriate dust suppression methods. • No potable water may be used for dust suppression (as far as is practically possible). • Construction time must be	**Contractor/EO**	**On going**

		restricted to SANS daytime hours (06:00-18:00), unless adjacent landowners are notified otherwise. • All noise and sounds generated during the proposed activity must comply with the relevant SANS codes and standards. • All construction equipment or machinery should be switched off when not in use. • Construction equipment must be kept in good working condition. • Plant and vehicles must be in good working order and inspected daily. • Use silencers on all equipment, where appropriate. • Dust suppression along the gravel road to be implemented • Reduce operational activities to daylight hours in order to reduce lighting impacts. Should operations continue during night time, ensure careful and strategic placement of lights.		
Emergency Response to spillages This section aims to provide measures to manage spillages from equipment used on site and measures for other	**Emergency Response to spillages**	The contractor shall take into account the following prevention measures to be applied during spillages. • Immediately repair all leaks of hydrocarbons, oil, etc. • Take reasonable measures to prevent the spills or leaks.	**Contractor**	**During spillages**

construction materials handled on site.		• Dispose contaminated materials to a location designated thereto. The contractor shall have its own spill response plan in the event of any spills (oil, fuel, hazardous materials) from his machinery or equipment used on site.		
Air Pollution	**Air Pollution**	• Material spillages should be cleaned regularly as they occur. • Raw materials may not be stored in an open area. • Vehicle speeds must be restricted on the unpaved haul roads.	**PM/EO**	**The monitoring of the air pollution preventative measures need to occur on a frequency determined by manufacture guidelines / the AEL/ or the ECO**
General Housekeeping	**Housekeeping**	**(a)** Housekeeping must continue as per the existing site's policy and practices to ensure limited fugitive dust fallout. **(b)** The material storage facilities should be kept in an orderly manner and spills should be cleaned up immediately to prevent the material from been blown around the site.	**Site Manager**	**Weekly**
Waste Management	**Waste Management**	(a) Waste generation must be managed according to international best practice. (b) All materials that can be recycled must be recycled where possible.	**Proponent**	**In accordance with PPC specifications and guidelines**

Emergency Response for spillages	**Soil Contamination**	(a) Contaminated soil must be removed and disposed of at an appropriate registered landfill site.	**Proponent**	**In accordance with PPC specifications and guidelines**
Decommissioning Activities and associated Heavy Machinery and Equipment	**Alteration of Hydrology of Drainage lines and Wetlands**	(a) All decommissioning vehicles should be kept in good working condition; (b) All decommissioning vehicles should be parked in demarcated areas when not in use, and the soil in this area should be rehabilitated (if required); (c) No vehicles, machinery, personnel, construction material, fuel, oil or waste should be allowed outside of the demarcated working areas; (d) No fuel storage, refuelling, vehicle maintenance or vehicle depots should be allowed within 1000 m of the edge of any wetlands or drainage lines; **(e)** Vehicles and machinery should not be washed within 100 m of the edge of any wetland or drainage line; and **(f)** No effluents or polluted water should be allowed to discharge into any drainage lines or wetland areas.	**Proponent**	**In accordance with PPC specifications and guidelines**
Site Rehabilitation of Disturbed Areas Surrounding the ZRD Overburden Areas and	**Rehabilitation of the environment surrounding the newly constructed ZRD Overburden Areas**	(a) Ensure that all disturbed areas are stabilised as soon as possible after disturbance / usage. Particular attention	**Proponent**	**On-going**

Orebodies	**and Orebodies**	must be paid to slopes greater than 20° (1:5) and other areas prone to erosion which should be appropriately vegetated. Rehabilitated areas that are susceptible to erosion due to their position in the landscape should be adequately protected by soil conservation measures; (b) Ensure that all construction access roads are closed and the area rehabilitated upon completion of the construction works, unless otherwise specified by the EO and agreed with the landowner; (c) Remove from the site all construction equipment, surplus material, waste and temporary structures and works of every kind before the final hand-over. After completion of construction, the site should be properly cleaned of any construction waste, litter etc. and adequately rehabilitated/re-vegetated (as directed by the ECO); (d) Rehabilitate any environmental damage caused by construction activities before the final hand-over; (e) Removal of all excavated material (rocks, excess soil,		

		etc.) and construction rubble after construction is completed; (f) Re-vegetated areas should be monitored by the Environmental Control Officer within 3 months after re-vegetation and during the next growing season to ensure that the vegetation has stabilised to the level prior to construction; (g) Rehabilitated areas showing inadequate surface coverage (less than 30% within 9 months after rehabilitation) should be prepared and re-vegetated from scratch with a suitable grass mix that is compatible with the surrounding vegetation; (h) Exotic weeds and invaders that are likely to establish on the rehabilitated areas are to be controlled to allow natural vegetation to properly establish; (i) Damage to rehabilitated areas should be repaired promptly; and (j) The erosion risk will be reduced significantly during the dry season (i.e. winter). Therefore, depending on the construction schedule, excavation activities should aim to be focussed during		

		winter. (k) Full rehabilitation of pit at closure in line with closure plan; **(l)** Rehabilitate all disturbed areas immediately after construction (areas surrounding the OBDA) **(m)** Rehabilitate of the landscape as much as possible in order for the landscape to better absorb the OBDA. At close-out of the project, the OBDA should be planted with indigenous local vegetation in order for this site to be absorbed by the landscape to decrease the impact after mining has been conducted.		

(vi) ***Indicate the frequency of the submission of the performance assessment report.***

An Environmental Audit conducted by an environmental control officer should be conducted once every month to assess compliance with the EMPR during the Pre-construction and construction phases.

Thereafter, a Performance Assessment Report should be submitted to the DMR on an annual basis.

(vii) ***Environmental Awareness Plan***

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

The Environmental Officer (EO) or Environmental Control Officer (ECO), is responsible for ensuring everyone on site is given an environmental awareness induction session which not only clearly defines what the environment is and gives specifics detailing the local environment but outlines the requirements of the EMPr as a management tool to protect the environment.

Refresher courses must be conducted as and when required. The EO must ensure daily toolbox talks include alerting the workforce to particular environmental concerns associated with the tasks for that day or the area/habitat in which they are working. Awareness posters and a hand out must be produced to create awareness throughout the site (as needed).

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

The following measures provide guideline solutions to frequently anticipated issues on most development activities:

- The prevention of any site degradation due to non-compliance, administrative or financial problems, and inactivity during the construction phase, illegal activities, delays caused by archaeological finds etc. is ultimately the responsibility of the applicant/developer. Section 28, National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA].
- The study area must be clearly defined according to the project authorisation. All workforce members and other construction personnel are not to go beyond the designated footprint.
- The Contractors must adhere to agreed and approved access points and haul roads.
- No camping is allowed on any private property without approval.
- Damage to private or public property such as fences, gates and other infrastructure may occur at any time. All damage to be repaired immediately and to the satisfaction of the owner.
- The Contractor must adhere to all conditions of contract including this EMPr.
- Proper planning of the construction process must be undertaken to allow for disruptions due to rain and very wet conditions.
- All private and public manmade structures near the project site must be protected against damage at all times and any damage must be rectified immediately.
- Proper site management and regular monitoring of site works.
- Proper documentation and record keeping of all complaints and actions taken.
- Regular site inspections and good control over the construction process throughout the construction period.
- A positive attitude towards Environmental Management by all site personnel must be motivated through regular and effective awareness and training sessions.
- An EO, on behalf of PPC, is responsible for the implementation of this EMPr. The EO and not the Contractor is to deal with any landowner related matters.
- Environmental Audits to be carried out prior, during and upon completion of construction.

dd) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

As is necessary to get an accurate forecast of the final closure costs, the financial provisions made for the proposed mine will have to be reviewed on an annual basis as is required by the EIA regulations of 2014.

(i) UNDERTAKING

The EAP herewith confirms

a. the correctness of the information provided in the reports

X

The information contained in the report is factually correct and a true representation of the information at hand.

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

X

All comments received from I&APs and corresponding responses provided throughout the S&EIR process have been captured in the Comments and Responses Report attached in Appendix E of this report. All comments and recommendations received have been taken into consideration with regards to the project and incorporate where appropriate.

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

X

Detailed specialist studies have been undertaken for the project, where all recommendations (where relevant) received from the relevant specialists have been incorporated into the S&EIR process as well as the project specific EMPr.

d. the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

X

Two site alternatives have been identified and assessed for the location of the OBDA associated with the ZRD North orebody. It is important to note that no fatal flaws were identified for the implementation of the project with either one of the alternatives. The alternatives assessed were deemed feasible for implementation by the applicant, where the results from the detailed environmental impact assessment indicate that the potential environmental impacts will be similar for both alternatives. As such, the applicants preferred option is put forward as the preferred alternative for implementation along with associated mitigation measures. As such, alternative OBDA 2 is the preferred option for implementation.

The positive benefits that will result from the implementation of the project far outweigh the potential negative impacts on the receiving environment. With the implementation of the proposed mitigation measures and EMPr, the potential impacts can be mitigated to very-low negative significance. Therefore, it is the EAP's recommendation that the proposed development be authorised by the Department with the implementation of site alternative 1 and associated mitigation measures forming part of the EMPr.

-END-