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# **BASIC ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN**

**CIM INTERNATIONAL BANABATAU (PTY) LTD  
MINING PERMIT APPLICATION**

**PORTION OF PORTION 8  
OF THE FARM  
HONINGNESTKRANS 269 JR**

**FILE REFERENCE NUMBER SAMRAD: GP 30/2/1/3/2 (10307) MP**

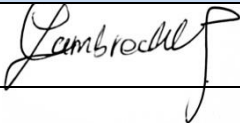
**NOVEMBER 2018**

## DOCUMENT HISTORY

### Document Control, Quality Control and Disclaimer

<b>Report</b>	<b>BASIC ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE PROPOSED AND MINING PERMIT ON A PORTION OF PORTION 8 OF THE FARM HONINGNESTKRANS 269 JR</b>		
<b>Client</b>	CIB INTERNATIONAL BANABATAU (PTY) LTD		
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<b>Report Number</b>	CIM/2018/11/MP	<b>Report Status</b>	Public Review
<b>Draft Report</b>	12 November 2018	<b>Report Date</b>	12 November 2018

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### BASIS OF REPORT

This document has been prepared by Elemental Sustainability with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it in accordance with the appointment from the applicant.

This document has been prepared in accordance with the Department of Mineral Resources (DMR) Basic Assessment Report template format, and was informed by the guidelines posted on the official DMR website. This is in accordance with the requirements of the Minerals and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA). Given this, Elemental-S has included additional information in the Introduction section of the report that it deems necessary and relevant to setting the scene for the environmental impact assessment (BAR) process. In addition, this report has been compiled in line with the requirements of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA) and EIA regulations (2014), as amended.

Information reported herein may be based on the interpretation of public domain data collected by Elemental Sustainability (Pty) Ltd, and/or information supplied by the applicant and/or its other advisors and associates. The data has been accepted in good faith as being accurate and valid. This document may contain information of a specialised and/or highly technical nature and the reader is advised to seek clarification on any elements which may be unclear to it.



## mineral resources

Department:  
Mineral Resources  
**REPUBLIC OF SOUTH AFRICA**

### **BASIC ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

### **FOR LISTED ACTIVITIES ASSOCIATED WITH APPLICATION FOR A SAND MINING PERMIT, GAUTENG PROVINCE.**

**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).**

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**FILE REFERENCE NUMBER SAMRAD: GP 30/2/1/3/2 (10307) MP**

## 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.

## OBJECTIVE OF THE BASIC 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;
- (d) Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (e) Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (f) Identify suitable measures to manage, avoid or mitigate identified impacts; and
- (g) Identify residual risks that need to be managed and monitored.

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## PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

### 1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

#### 1.1 Details

##### 1.1.1 Details of the EAP

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##### 1.1.2 Expertise of the EAP

###### 1.1.2.1 The qualifications of the EAP (with evidence)

Please refer to Table 1 for a summary of the qualification and experience of the EAP. Refer to Appendix 1 and 2 for more details (CV).

*Mr Du Toit Wilke (Pri.Sci.Nat)*

- University of Pretoria, MSc Geography – 2015
- University of Pretoria, BSc Hons Environmental Science – 2010
- University of Pretoria, BSc Environmental Science – 2009

*Ms Corlien Lambrechts (Cand.Sci.Nat):*

- University of Pretoria, BSc Hons Zoology – 2015
- University of South Africa / North West University, BSc Environmental Management and Zoology - 2009

###### 1.1.2.2 Summary of the EAP's past experience (In carrying out the Environmental Impact Assessment Procedure)

*(Attached the EAP's curriculum vitae as Appendix 2)*

Provided here is a summary of the qualification and experience of the EAP. Refer to Appendix 2 for more details (experience).

**DuToit Wilken** is an Environmental Scientist with more than 8 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He is registered as a Pri.Sci.Nat.

(SACNASP), Natural Scientist, Registration number 118911. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Mining within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation.

A significant element of public participation is required throughout the life cycle of an EIA process. DuToit has successfully liaised with interested and affected parties, ensuring that all communication procedures and dialogues are open and transparent, and that capacity building is conducted where necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

**Corlien Lambrechts** is an Environmental Scientist with 6 years of applicable experience in the relevant field of Environmental Management and has qualifications in Environmental Management and Zoology. She is registered as a Cand.Sci.Nat. (SACNASP), Candidate Natural Scientist, Registration number 100003/17. She fulfills the requirements for Pr.Sci.Nat and has applied for upgrade with the South African Council for Natural Scientific Professions.

In 2015 she enrolled for her Honors degree in Zoology at the University of Pretoria where she completed a project in the Cathedral Peak Drakensberg Mountain range studying differences in community structures of invertebrate species between natural grasslands and grasslands subjected to rehabilitation by South African Environmental Observation Network (SAEON) and in association with the University of Pretoria Centre of Invasion Biology (CIB). During her career within the Environmental management field, she has been involved in a wide variety of Ecological and Environmental applications and compilation of reports, which include as relevant to the compilation of this report: Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports and Environmental Management Plans, Environmental Audit Reports, Water-Use Application Reports and Mining Right Applications.

## 2 DESCRIPTION OF THE PROPERTY

### 2.1 Site Location

Table 2-1: Property description and surveyor codes

<b>Farm Names:</b>	Honingnestkrans 269 JR	Portion of Portion 8
<b>Application area (Ha):</b>	5 ha	
<b>Magisterial district:</b>	City of Tshwane Metropolitan Local Municipality and City of Tshwane District	
<b>Distance and direction from nearest town:</b>	It is located approximately 10km North of Pretoria. Soshanguve South – 7.5km (West) Akasia – 8.5km (South West)	
<b>21 digit Surveyor General Code for each farm portion:</b>	T0JR0000000026900008	

### 2.2 Locality map (show nearest town, scale not smaller than 1:250 000)

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

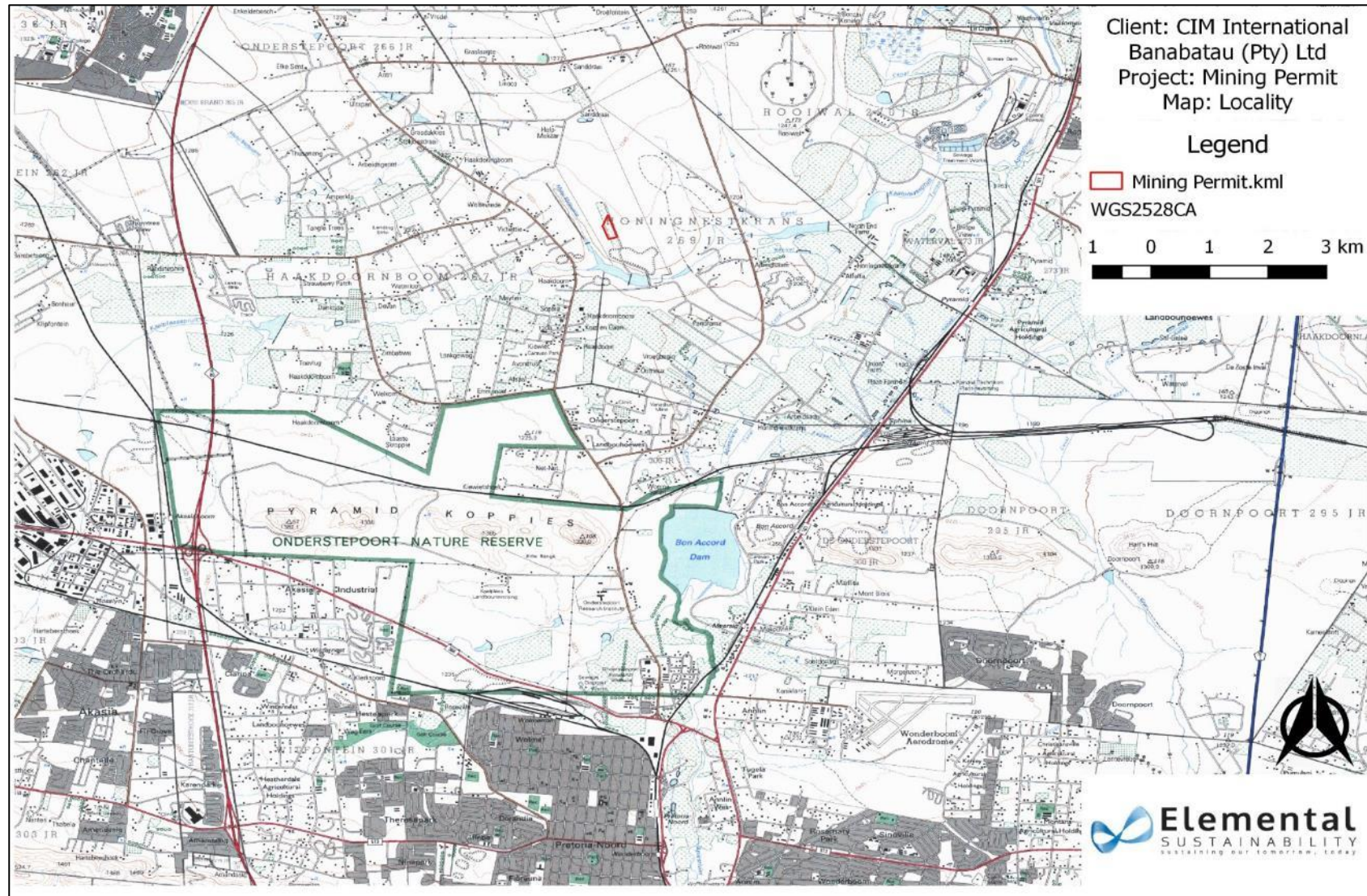


Figure 2-1: Regional Locality map of CIM International Banabatau (Pty) Ltd Sand Mining Permit Application

## 2.3 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.*

CiM International intends to apply for a mining permit in terms of the Mineral and Petroleum Resources Development Act (MPRDA) (No. 28 of 2002) for sand and stone aggregate over a portion of Portion 8 of the Farm Honingnestkrans 269 JR.

An application for a mining right (GP 30/5/1/2/2 (10028) MR) over a portion of portion 8 of the Farm Honingnestkrans 269 JR for stone aggregate was refused by the Department of Mineral Resources (DMR) in 2017 as a result of failure to comply with the provisions of Regulation 46(a), (b)(ii) and (v), (c)(ii) and (ii), and section 23(1)(h).

CiM International Mining Permit will include an integrated Environmental Authorisation application in terms of NEMA and NWA. The proposed mining activity is for sand and stone aggregate (G5, G6, G7 & G8). The proposed mining area stretches in area of approximately 5.0 hectares in size. The mine resembles an open pit mining method. The depth of the gravel mine will be variable but can be up to 2.5 -3 metres deep with an estimated production of between 40 000 and 80 000 cubic meters per year.

This mining method is very simplistic. The bulk of the mining method consists of loading and hauling. No crushing, screening, washing and blasting will be necessary. Loading and hauling will be conducted by front end loaders. The transport of the product will be conducted by third parties.

Once the removal of economic material has been completed the sites will be rehabilitated. The post closure land use will be identified during the Environmental Impact Assessment process and the land could be suitable for grazing or agriculture purposes.

As a result of the above activities vegetation clearance will also be required.



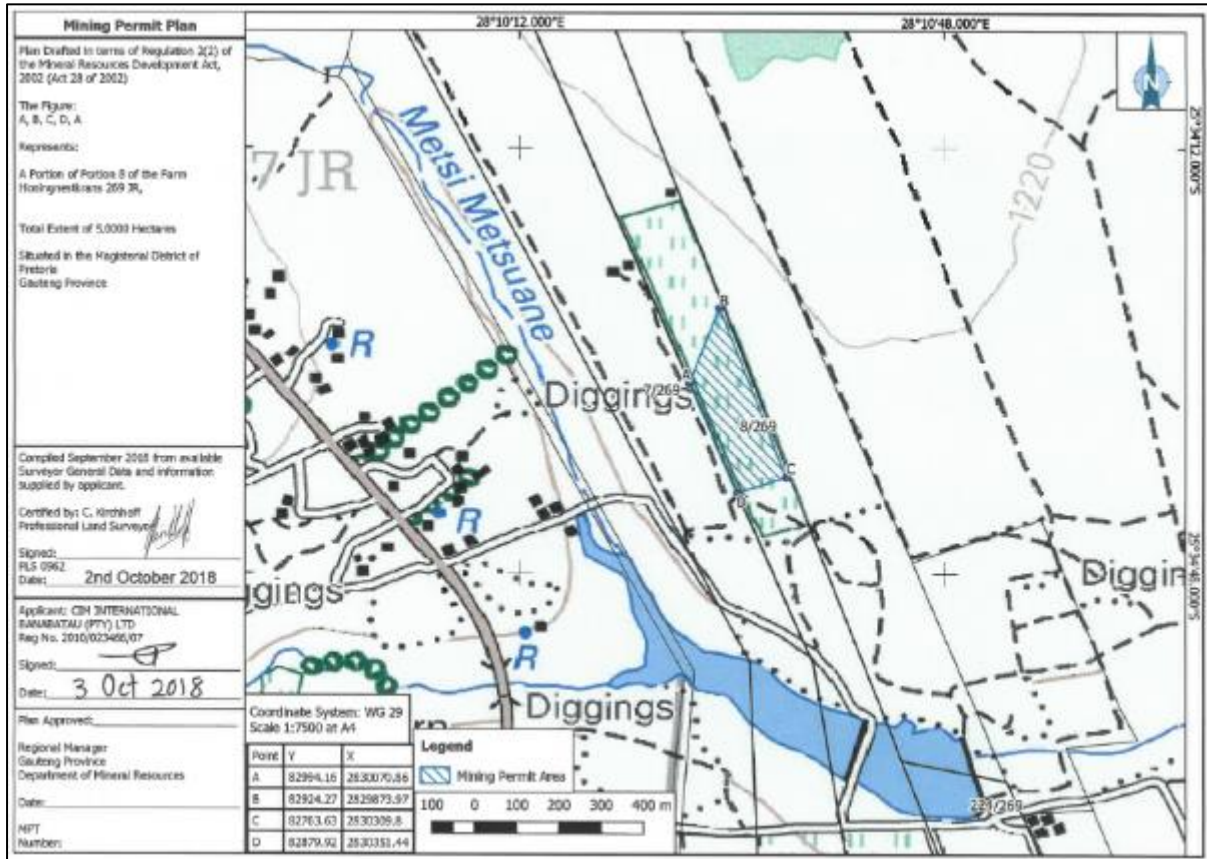


Figure 2-2: Local description and Activity (Reg 2.2 Map)

### 3 LISTED AND SPECIFIED ACTIVITIES

Legislation	Listed activities	Authorisation required and key process elements	Competent Authority
NEMA and the EIA Regulations, 2014, [as amended].	<p><b>GNR 327 – Listing Notice 1:</b></p> <ul style="list-style-type: none"> <li>- <b>Activity 21</b> (Mining Permit);</li> <li>- <b>Activity 27</b> (Clearing of land)</li> <li>- <b>Activity 30</b> (Section 53(1) process or activity in terms of NEM:BA)</li> <li>- <b>Activity 34</b> (Expansion/ change of existing facilities)</li> </ul> <p><b>GNR 324 – Listing Notice 3:</b></p> <ul style="list-style-type: none"> <li>- <b>Activity 23</b> (Expansion of a bridge, infrastructure by 10m2)</li> </ul>	Environmental Authorisation: application for environmental authorisation; a Basic Assessment, EMP and a public participation process.	DMR – Gauteng Province
NWA and Regulations Regarding the Procedural Requirements for WULA's.	(a) ground water abstraction; (c) water flow; (g) waste disposal; and (i) watercourse alteration;	Water Use Licence: application for a water use licence, integrated technical support document and public participation process.	DWS

**Table 3-1: Listed activities triggered (Figure 4-1)**

<b>NAME OF ACTIVITY</b>  <i>E.g. for mining,- 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.)</i>	<b>Aerial extent of the Activity</b>  <b>Ha or m<sup>2</sup></b>	<b>LISTED ACTIVITY</b>  <i>(Mark with an X where applicable or affected).</i>	<b>APPLICABLE LISTING NOTICE</b>  <i>(GNR 544, GNR 545 or GNR 546)</i>  <b>GNR 327 (April 2017)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b>  <i>(Indicate whether an authorisation is required in terms of the Waste Management Act).</i>  <b>(Mark with an X)</b>
<b>CONSTRUCTION PHASE</b>				
<ul style="list-style-type: none"> <li>• <b>Sand Mining:</b> Clearing of vegetation / land and topsoil and excavation for the access and haul roads and opencast areas.</li> <li>• Constructing roads</li> <li>• Potential disturbance of water courses (within 500 m)</li> <li>• Change of Land use</li> </ul>	5.0 ha	<b>X</b>	Listing Notice 1: GN327 (21) <i>GNR327 (21): Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including —</i> <i>(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource[,]; or [including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)]</i> <i>(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.</i>	
<ul style="list-style-type: none"> <li>• Vegetation clearance for sand Mining: Clearing of vegetation / land and topsoil and excavation for the access and haul roads and opencast areas.</li> </ul>	5.0 ha		Listing Notice 1: GN327 (27) <i>GN327(27) The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of</i>	

<b>NAME OF ACTIVITY</b>  <i>E.g. for mining,- 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.)</i>	<b>Aerial extent of the Activity</b>  <i>Ha or m<sup>2</sup></i>	<b>LISTED ACTIVITY</b>  <i>(Mark with an X where applicable or affected).</i>	<b>APPLICABLE LISTING NOTICE</b>  <i>(GNR 544, GNR 545 or GNR 546)</i>  <b>GNR 327 (April 2017)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b>  <i>(Indicate whether an authorisation is required in terms of the Waste Management Act).</i>  <b>(Mark with an X)</b>
			<i>indigenous vegetation is required for— the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</i>	
<b>Sand Mining:</b> Stockpiling of topsoil positioned for later rehabilitation. Constructing roads & Clearing of land. Changing the land-use. Potential disturbance of water courses	5.0 ha	<b>X</b>	As above	
Dust Suppression	Extent of dirt roads open, non-paved areas.	-	NOT LISTED	NOT LISTED
<b>Upgrade/Reinforcement of existing road/bridge over dam</b>				
<ul style="list-style-type: none"> <li>Potential disturbance of water courses</li> <li>Upgrade of existing road over the dam</li> </ul>	Require licensing under NWA for Section 21(c) and (i) water uses – <u>To be confirmed</u>	<b>X</b>	Listing Notice 1: GNR327(34)  <i>GNR327(34)The expansion [or changes to] of existing facilities or infrastructure for any process or activity where such expansion [or changes] will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution.</i>	
<ul style="list-style-type: none"> <li>Activity adjacent/within Threatened Ecosystems – Bridge crossing upgrade (Possible Ecological Impacts within Threatened Ecosystems)</li> </ul>	Require licensing under NWA for Section 21(c) and (i) water	<b>X</b>	Listing Notice 1: GNR327(30)  <i>GNR327(30): Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of</i>	

<b>NAME OF ACTIVITY</b>  <i>E.g. for mining,- 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.)</i>	<b>Aerial extent of the Activity</b>  <i>Ha or m<sup>2</sup></i>	<b>LISTED ACTIVITY</b>  <i>(Mark with an X where applicable or affected).</i>	<b>APPLICABLE LISTING NOTICE</b>  <i>(GNR 544, GNR 545 or GNR 546)</i>  <b>GNR 327 (April 2017)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b>  <i>(Indicate whether an authorisation is required in terms of the Waste Management Act).</i>  <b>(Mark with an X)</b>
	uses – <u>To be confirmed</u>		2004).	
<ul style="list-style-type: none"> <li>Potential disturbance of water courses</li> <li>Upgrade of existing road over the dam</li> </ul>	<u>Size to be confirmed</u>	X	Listing Notice 3: GNR324(23)  GNR324(23): <i>The expansion of—</i> <i>(iii) bridges where the bridge is expanded by 10 square meters or more;</i> <i>(xii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</i> <i>where such [development] expansion occurs—</i> <i>(a) within a watercourse;</i> <i>(b) in front of a development setback adopted in the prescribed manner; or</i> <i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</i>	
<b>OPERATIONAL PHASE</b>				
Clearing of vegetation and topsoil by bulldozer/front-end-loader.	5.0 ha	X	As above	
<b><u>Sand Mining:</u></b> Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Hauling of sand and stone aggregate to market.	5.0 ha	X	As above	
Loading, hauling and transport by truck of product to market	N/A	-	NOT LISTED	
Loading, hauling and transport by truck of topsoil to	N/A	-	NOT LISTED	

<b>NAME OF ACTIVITY</b>  <i>E.g. for mining,- 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.)</i>	<b>Aerial extent of the Activity</b>  <b>Ha or m<sup>2</sup></b>	<b>LISTED ACTIVITY</b>  <i>(Mark with an X where applicable or affected).</i>	<b>APPLICABLE LISTING NOTICE</b>  <i>(GNR 544, GNR 545 or GNR 546)</i>  <b>GNR 327 (April 2017)</b>	<b>WASTE MANAGEMENT AUTHORISATION</b>  <i>(Indicate whether an authorisation is required in terms of the Waste Management Act).</i>  <b>(Mark with an X)</b>
topsoil stockpiles				
Dust Suppression	Extent of dirt roads open, non-paved areas.	-	NOT LISTED	NOT LISTED

## 4 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

*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.*

### 4.1 Road Upgrade

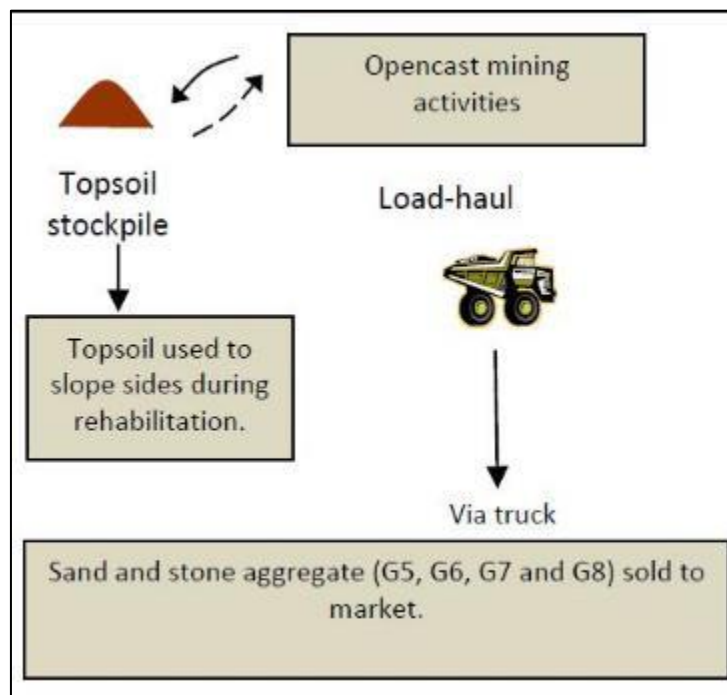
The access road to the mine is 8 m wide and forms an existing water crossing over the dam leading to the proposed site for sand mining. This road may need to be assessed and upgraded for the purpose of carrying more traffic and heavy machinery to the site.

In accordance with the National Water Act, 1998 (Act 36 of 1998), any reinforcements and upgrades of this existing road may need to be licensed under Section 21 (c) and (i) of the NWA and thereby trigger Activity 34.

### 4.2 Mining Permit Activities

#### 4.2.1 Conceptual Flow

The conceptual flow diagram associated with the proposed project is illustrated below:



#### 4.2.2 Construction Phase

The Construction Phase will consist of the following activities:

- Clearing of vegetation / land and topsoil and excavation for the access and haul roads and opencast areas; this will be required to clear the areas where construction will take place and remove topsoil to be protected and allowing for later usage;
- Constructing roads: Construction of roads to the proposed development site and the upgrade of existing roads (such as the road over the dam);
- Clearing of land: Removing of all vegetation, rocks or other aspects which will make way for development of the sand quarry;

- Changing the land-use: Since the vegetation will be removed, the land use will change to that of Mining;
- Potential disturbance of water courses: Two areas assessed as wetlands/drainage lines occur within 500 m of the proposed Mining Permit footprint and will be licensed as such (along with the road upgrade at the dam crossing);
- Stockpiling of topsoil positioned for later rehabilitation: Topsoil removed during land clearing activities, will be stockpiled and protected until rehabilitation of the affected areas will take place;
- Immediate rehabilitation of all areas affected by impacts, such as spills, visible erosion dongas etc.; and
- Dust Suppression: Dust suppression will take place at areas where soil surfaces are exposed, such as haul roads. This will prevent dust/air quality impacts but also serve to protect the soil resource.

### 4.2.3 Operational Phase

The Operational phase will consist of the following activities:

- Clearing of vegetation and topsoil by bulldozer/front-end-loader: Not clearing all vegetation and land at the onset of construction will protect the soil resource and prevent air and water quality impacts; Only selected areas of footprint should be cleared as that area is to be developed;
- Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m;
- Hauling of sand and stone aggregate to market: Material removed will be sold to the market for either processing or as product. No processing will occur on-site as part of this application;
- Loading, hauling and transport by truck of product to market;
- Loading, hauling and transport by truck of topsoil to topsoil stockpiles: Topsoil will be stockpiled and protected by erosion prevention methods to be used for rehabilitation during the Closure phase;
- Concurrent rehabilitation (if possible) by implementing a roll-over method; and
- Dust Suppression: Dust suppression will take place at areas where soil surfaces are exposed, such as haul roads. This will prevent dust/air quality impacts but also serve to protect the soil resource.

### 4.2.4 Closure

A formal Closure application will need to be launched to implement the closure phase of the activities. Generally, the Closure phase will entail the following activities:

- Removal of all stockpiles and infrastructure;
- Rehabilitation of the quarry/impacted areas;
- Restoring of topsoil layer and re-vegetation; and
- Restoring the natural land use prior to mining.

### 4.2.5 Services and other Infrastructure

#### 4.2.5.1 Water

Potable water will be obtained for the workers from groundwater sources. No water is required for the mining method or for processing. Water accumulated in the pit will be used for dust suppression. Water for dust suppression will be sources from surface or groundwater sources.

#### **4.2.5.2 Power**

No power is required for the mining operation. All equipment utilised for the mining process will be diesel operated.

#### **4.2.5.3 Waste**

No general waste will be generated within the mining area. Any hydrocarbon waste generated will be sold to be recycled.

#### **4.2.5.4 Waste Rock**

No waste rock will be generated by the mining activity.

#### **4.2.5.5 Topsoil Dumps**

Topsoil will be stripped from the area and utilised as a safety berm before used for rehabilitation of the slopes.

#### **4.2.5.6 Sewage**

Portable toilets will be made available to employees.

#### **4.2.5.7 Transport**

Internal gravel haul roads would be established to allow for the movement of vehicles on-site. Existing road network and access roads to the area will be utilised.

#### **4.2.5.8 Other support infrastructure**

Other support facilities that would be utilised include the following:

- Existing facilities located on portion 8 will be utilised for the re-fuelling of equipment and storage of equipment.
- Existing diesel storage facilities and workshop will be utilised.

#### **4.2.6 Mining Method**

The mine resembles an open pit mining method. The depth of the gravel mine will be variable but can be up to 2.5 – 3 metres deep and with an estimated production of between 40 000 and 80 000 cubic meters per year.

#### **4.2.7 Commodity to be mined (Mineral Deposit)**

The proposed mining activity is for sand and stone aggregate (G5, G6, G7 and G8).





**Figure 4-1: Activity plan(s) showing layout of proposed Mining Permit (white) adjacent to existing mining footprint**



Figure 4-2: Road upgrade/reinforcement in relation to MP footprint

## 5 POLICY AND LEGISLATIVE CONTEXT

Applicable Legislation And Guidelines Used To Compile The Report	Reference Where Applied	How Does This Development Comply With And Respond To The Legislation And Policy Context
<i>(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)</i>	<i>(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)</i>	<i>(E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)</i>
<p>Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended]</p> <ul style="list-style-type: none"> <li>• Section 24</li> </ul> <p><i>Environment: Everyone has the right-</i></p> <p><i>(a) to an environment that is not harmful to their health or well-being; and</i></p> <p><i>(b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-</i></p> <p><i>i) prevent pollution and ecological degradation;</i></p> <p><i>ii) promote conservation; and</i></p> <p><i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</i></p>	N/A	<p>The proposed development has the potential to harm the environment and poses a risk to the health and wellbeing of people. The development however, also has the potential to secure sustainable development through reusing process products and thereby limiting the use of natural resources.</p> <p>The Applicant has the overall responsibility to ensure that the rights of people in terms of Section 24 of the Constitution are protected in terms of the proposed development activity.</p>
<p>National Environmental Management Act (No. 107 of 1998) [as amended]</p> <ul style="list-style-type: none"> <li>• Section 28 (1)</li> </ul> <p><i>Duty of Care and responsibilities to minimise and remediate environmental degradation.</i></p>	Section 5 and Section 3	The Applicant is the developer and overall responsibility of the mine rests with him, especially in terms of liabilities associated with the operational phase.
<p>EIA Regulations, 2014 (Government Notices 982 -984) [as amended]</p> <p><i>The proposed construction, operational and closure activities of the proposed development triggers listed activities in terms of Listing Notice 1 and Listing Notice 3, which requires a Basic Assessment Process.</i></p> <p><u>Listing Notice 1 - Activity 21:</u> <i>Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources</i></p>	Refer to activities listed in Table 3-1.	Basic Assessment Report: (This document).

# Elemental

## S U S T A I N A B I L I T Y

*Development Act, 2002*

*(Act No. 28 of 2002), including —*

*(a) associated infrastructure, structures and earthworks, directly related to the*

*extraction of a mineral resource[,] ; or [including activities for which an*

*exemption has been issued in terms of section 106 of the Mineral and*

*Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)]*

*(b) the primary processing of a mineral resource including winning, extraction,*

*classifying, concentrating, crushing, screening or washing;*

*but excluding the secondary processing of a mineral resource, including the smelting,*

*beneficiation, reduction, refining, calcining or gasification of the mineral resource in*

*which case activity 6 in Listing Notice 2 applies.*

*Listing Notice 1 - Activity 27:*

*The clearance of an area of 1 : hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—*

*(i) the undertaking of a linear activity; or*

*(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*

*Listing Notice 1: GNR327(30)*

*GNR327(30): Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).*

*Listing Notice 3 - GNR324 (12):*

*Gauteng: Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;*

*ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or*

*iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.*

*Listing Notice 1: GNR327(34)*

# Elemental

## S U S T A I N A B I L I T Y

<p><i>GNR327(34) The expansion [or changes to] of existing facilities or infrastructure for any process or activity where such expansion [or changes] will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution.</i></p> <p><i>Listing Notice 3: GN324(14)</i>  <i>GN324(14) The development of—</i>  <i>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</i>  <i>where such development occurs—</i>  <i>(a) within a watercourse; or</i>  <i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</i></p> <p><i>Listing Notice 3: GNR324(23):</i>  <i>GNR324(23): The expansion of—</i>  <i>(iii) bridges where the bridge is expanded by 10 square meters or more;</i>  <i>(xii) infrastructure or structures</i>  <i>where the physical footprint is expanded by 10 square metres or more;</i>  <i>where such [development] expansion occurs—</i>  <i>(a) within a watercourse;</i>  <i>(b) in front of a development setback adopted in the prescribed manner; or</i>  <i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</i></p>		
<p>EIA Regulations, 2014 (Government Notices 982 - 984) (as amended) by GNR 324 – 327 in 2017.</p> <p><i>Chapter 6: Regulation 39 to 44: Public Participation;</i>  <i>Chapter 4: Application for Environmental Authorisation:</i>  <i>Part 2 Basic Assessment</i>  <i>Appendix 1: Basic Assessment Report</i>  <i>Appendix 4: Environmental Management Programme</i>  <i>Appendix 5: Closure Plan</i>  <i>Appendix 6: Specialist Reports</i></p>	<p>N/A</p>	<p>The EIA Regulations, 2014 [as amended] prescribes inter alia:  The manner in which public participation needs to be conducted as well as the requirements of a basic assessment process and the content of a basic assessment report and environmental management programme.</p> <p>The content of specialist reports, closure plans and environmental audit reports are also provided.</p>
<p>Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) [as amended]:  <i>Chapter 2 (5): Legal nature of right holders;</i></p>	<p>Mining Permit Application (this document).</p>	<p>The authorisations applied for will be that of a Mining Permit (this document) as well as a Prospecting Right (other concurrent application with DMR)</p>

# Elemental

## S U S T A I N A B I L I T Y

<p><i>Chapter 4: Mineral and Environmental Regulation</i></p> <p>(9) Order of processing of applications  (10) Consultation with Interested and Affected Parties;  (11) Transferability and encumbrance of rights;  (27) Mining permit application.  (37) Environmental Management Principles  (38) Integrated environmental management and responsibility to remedy  (48) Restriction or prohibition of prospecting and mining on certain land</p>		
<p>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended]</p> <ul style="list-style-type: none"> <li>• Section 16</li> </ul> <p>General duty in respect of waste management;</p> <ul style="list-style-type: none"> <li>• Section 17;</li> </ul> <p>Reduction, re-use, recycling and recovery of waste;</p> <ul style="list-style-type: none"> <li>• Section 18; and</li> </ul> <p>Extended producer responsibility; and</p> <ul style="list-style-type: none"> <li>• Section 21</li> </ul> <p>General requirements for storage of hazardous and general waste.</p>	<p>Refer to Section 4.2.5.3, Section 4.2.5.4 regarding waste, and also Section 24.3 and Section 24.2. for water uses</p>	<p>No hazardous waste or waste application is required for this development. No residue deposits will be formed on the property. The topsoil will be removed; the other aggregate material will be sold.</p> <p>Waste water and waste will be licensed in accordance with the National Water Act, 1998 (Act No. 36 of 1998) as a section 21(g) water use.</p>
<p>National Water Act, 1998 (Act No. 36 of 1998) [as amended]</p> <ul style="list-style-type: none"> <li>• Section 3</li> </ul> <p>Regulation of flow and control of all water</p> <ul style="list-style-type: none"> <li>• Section 19</li> </ul> <p>Prevention of pollution to watercourses</p> <ul style="list-style-type: none"> <li>• Section 21</li> </ul> <p>The water use activities associated with the proposed development requires compliance with the requirements of the NWA as listed under GN No. 19182. An application for an integrated water use license is lodged in terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998) [as amended] to undertake the following activity:</p> <p>Section 21: (g) disposing of waste in a manner which may detrimentally impact on a water resource.</p> <p>Section 21(j); Removing, discharge or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people</p>	<p>Section 24.3 and Section 24.2</p>	<p>The mine is in the process of application for the following Section 21 water uses:</p> <ul style="list-style-type: none"> <li>• Section 21(a): Talking of water from a water resource (borehole)</li> <li>• Section 21(b): Storage of water (already a registered water use on property, 2014)</li> <li>• Section 21(c): Impeding or diverting the flow of water in a watercourse</li> <li>• Section 21(g): Disposing of water in a manner which may detrimentally impact on a water resource.</li> <li>• Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.</li> </ul>
<p>Mine Health and Safety Act, 1996 (Act No. 29 of 1996) [as amended] and associated regulations</p>	<p>All Management and Mitigation measures will aim to prevent</p>	<p>The act provides for measures to prevent threats to the health and safety of humans in the development area.</p>

# Elemental

## SUSTAINABILITY

<p><i>Chapter 2, Sections 2 – 4</i>  <i>Responsibilities of owner</i></p> <ul style="list-style-type: none"> <li><i>Chapter 2, Sections 5 – 13</i></li> </ul> <p><i>Responsibilities of manager;</i></p> <ul style="list-style-type: none"> <li><i>Chapter 2, Sections 14 – 18;</i></li> </ul> <p><i>Documentation requirements;</i></p> <ul style="list-style-type: none"> <li><i>Chapter 2, Section 19 – 20 and 22 to 24</i></li> </ul> <p><i>Employee's rights and duties; and</i></p> <ul style="list-style-type: none"> <li><i>Chapter 2, Section 21</i></li> </ul> <p><i>Manufacturer's and supplier's duty for health and safety.</i></p>	<p>impacts, both to the environment and in terms of health and safety.</p>	<p>Since this is a small scale operation associated with a Mining Permit, the impacts foreseen are insignificant. Risk should be managed accordingly to prevent any impacts.</p>
<p>National Heritage Resources Act, 1999 (Act No. 25 of 1999)</p> <ul style="list-style-type: none"> <li><i>Section 44 (1);</i></li> </ul> <p><i>Preservation and protection of heritage resources;</i></p> <ul style="list-style-type: none"> <li><i>Section 3 Types and ranges of heritage resources (i) (i);</i></li> </ul> <p><i>Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.</i></p>	<p>Section 9.1.13 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Protection of indigenous heritage resources on the property.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended]</p> <ul style="list-style-type: none"> <li><i>Section 32</i></li> </ul> <p><i>Control of dust</i></p> <ul style="list-style-type: none"> <li><i>Section 34</i></li> </ul> <p><i>Control of noise</i></p>	<p>Section 9.1.10 (Air quality) and Section 9.1.12 (Noise) in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Impacts on surrounding landowners need to be managed through dust and noise mitigation measures.</p>
<p>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended]</p> <p>In terms of section 21 of the NEM:AQA a list of scheduled processes were published in GNR893 (November 2013).</p>	<p>Section 9.1.10 (Air quality) and Section 9.1.12 (Noise) in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>None of the listed scheduled processes as public in GNR 893 are trigger by the mining permit application.</p>
<p>National Dust Control Regulations, 2013 (Government Notice 827 of 2013)</p> <ul style="list-style-type: none"> <li><i>Section 3</i></li> </ul> <p><i>Dust fall standard</i></p> <ul style="list-style-type: none"> <li><i>Section 4</i></li> </ul> <p><i>Dust fall monitoring program</i></p> <ul style="list-style-type: none"> <li><i>Section 6</i></li> </ul> <p><i>Measures for control of dust</i></p> <ul style="list-style-type: none"> <li><i>Section 7</i></li> </ul> <p><i>Ambient air quality monitoring (PM<sub>10</sub>)</i></p>	<p>Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Dust fall out need to be monitored in accordance to the standards set out in the monitoring programme with the specified measures due to the Applicant being liable to offences and penalties associated with non-conformance to dust which may influence employees and surrounding landowners.</p>

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<ul style="list-style-type: none"> <li>• Section 8</li> </ul> <p>Offences</p> <ul style="list-style-type: none"> <li>• Section 9</li> </ul> <p>Penalties</p>		
National Ambient Air Quality Standard (NAAQS) (29 June 2012 (No. 35463)).	Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.	Standard for ambient air quality in South Africa. Monitoring requirements, limits and standards.
SANS 1929: Ambient Air Quality – Limits for Common Pollutants	Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.	Impacts on surrounding landowners need to be managed through dust mitigation measures.
SANS 1137: Standard test method for the collection and measurement of dust fall (settleable particulate matter).	Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.	Impacts on surrounding landowners need to be managed through dust mitigation measures.
ASTM d 1739, 1970 or equivalent approved protocol for dust monitoring.	Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.	Impacts on surrounding landowners need to be managed through dust mitigation measures.
Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] <ul style="list-style-type: none"> <li>• Section 12 (1)</li> </ul> <p><i>Duty of the landowner to prevent fire from spreading to neighbouring properties.</i></p>	Mitigation measures prescribed within the impact management and mitigation tables included within this document.	Cautionary steps in avoiding the spread of fires to and from neighbouring properties.
National Environmental Management Protected Areas Act, 2003 (No 57 of 2003) [as amended] The act aims to provide for the protection and conservation of ecological viable areas representative of South Africa's biodiversity diversity and its natural landscape and seascape. <i>(48) Prospecting and mining activities in protected area</i>	Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.	No person may conduct commercial prospecting, mining exploration, production or related activities in special nature reserve, national parks or nature reserves. In protected environments, declared in terms of section 28. In a protected area referred to in section 9(b), (c) or (d).  No protected areas in terms of section 9(b), (c), (d) or section 28 are present



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<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [as amended]</p> <ul style="list-style-type: none"> <li>• Section 9</li> </ul> <p><i>Norms and standards</i></p> <ul style="list-style-type: none"> <li>• Section 27</li> </ul> <p><i>Delegation of power and duties</i></p> <ul style="list-style-type: none"> <li>• Section 30</li> </ul> <p><i>Financial accountability</i></p> <ul style="list-style-type: none"> <li>• Section 43</li> </ul> <p><i>Biodiversity management plans.</i></p>	<p>Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Indigenous vegetation need to be protected and managed in accordance with management measures set out in the management plans developed for the mine and the Applicant need to ensure he is aware of and covers his liabilities.</p>
<p>National Heritage Resources Act, 1999 (Act No. 25 of 1999)</p> <ul style="list-style-type: none"> <li>• Section 34(1): Protection of structures older than 60 years</li> <li>• Section 38: Statutory Comments to be obtained from the South African Heritage Resources Agency (SAHRA)</li> <li>• Section 44 (1); Preservation and protection of heritage resources;</li> <li>• Section 3 Types and ranges of heritage resources (i);</li> </ul> <p><i>Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.</i></p>	<p>Section 9.1.13 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>A heritage impact assessment was completed in 2018 and is included within this document.</p>
<p>Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014)</p> <ul style="list-style-type: none"> <li>• Notice 2</li> </ul> <p><i>Exempted Alien Species in terms of Section 66 (1)</i></p> <ul style="list-style-type: none"> <li>• Notice 3</li> </ul> <p><i>National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 &amp; 11</i></p> <ul style="list-style-type: none"> <li>• Notice 4</li> </ul> <p><i>Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 &amp; 12</i></p>	<p>Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>It is the responsibility of the Applicant to ensure that all prohibited plant and animal species are eradicated as far as possible.</p>
<p>Conservation of Agricultural Resources Act (no. 43 of 1983)</p> <ul style="list-style-type: none"> <li>• Section 5: Prohibition of spreading of weeds</li> <li>• Section 12: Maintenance of soil conservation works and maintenance of certain states of affairs</li> </ul> <p><i>Section 16: Regional Conservation Committees</i></p>	<p>Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Listed invader/alien plants occurring on site which requires management measures to be implemented. No agricultural activities are taking place on the site or area.</p>
<p>Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended]</p> <ul style="list-style-type: none"> <li>• Section 2: Declaration of grouped hazardous substances;</li> <li>• Section 4: Licensing;</li> <li>• Section 16: Liability of employer or principle</li> <li>• Section 9 (1): Storage and handling of hazardous chemical</li> </ul>	<p>Mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>The Applicant must ensure the safety of people working with hazardous chemicals (specifically fuels), as well as safe storage, use and disposal of containers during the on-site operational phase together with the associated liability should non-compliance be at the order of the day.</p>

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<p><i>substances;</i></p> <p><b>Section 18: Offences</b></p>		<p>No hazardous chemicals will be stored on the site</p>
<p>Gauteng Transport Infrastructure Act, 2001 (Act No. 8 of 2001) [as amended]; Where mining operations are to be undertaken, Section 49 of the Gauteng Transport Infrastructure Act, 2001 (Act No 8 of 2001) shall apply.</p>	<p>This section of the document.</p>	<p>An application must be submitted to the Department for a way leave if any part of a proposed service falls within 95m (measured from the centreline of any of the Department's existing or future road(s)/railway line or within a 500 m radius of any intersection on said road(s)/railway line.</p>
<p>Restitution of Land Rights Amendment Act, 2014 (Act 15 of 2014). The act deals with Land claims.</p> <p>The validity of the amendment Act was challenged in the Constitutional Court. The Constitutional Court found the Amendment Act to be invalid because of the failure of Parliament to facilitate public involvement as required by the Constitution. The Amendment Act ceased to be law on 28 July 2018. The Constitutional Court ordered that the claims that were lodged between 1 July 2014 and 27 July 2016 are validly lodge, but it interdicted the Commission from processing those claims until the Commission has finalised the claims lodged by 31 December 1998 or until Parliament passes a new law providing for the re-opening of lodgement of land claims. It is important to note that the provisions of section 11(7) of the Restitution of land Rights Amendment Act, 1994 do not apply until after the Commission has accepted the claim for investigation and published its details in the Government Gazette.</p>	<p>This section of the document.</p>	<p>No land claims for the property are known at this stage.</p> <p>Where section 11(7) of Restitution of land Rights Amendment Act, 1994 applies, the land claim commission will be inform a month before any activity is undertake on the property.</p>
<p>Guideline on the need and desirability in terms of the Impact Assessment (EIA) Regulations, 2010 (Updated 2017)</p>	<p>Section 6</p>	<p>This guideline has been taken into account as part of project planning.</p>
<p>Public Participation 2012, (GN 807). Integrated Environmental Management Guideline Series 7, DEA</p>	<p>Section 7</p>	<p>This guideline has informed the public participation process for the project.</p>
<p>Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations, 2015 (Notice 1147 of 2015)</p> <ul style="list-style-type: none"> <li>• <i>Regulation 5: Scope of financial provision</i></li> <li>• <i>Regulation 6: Method for determining financial provision</i></li> </ul> <p><b>Regulation 12: Preparation and submission of plans and reports</b></p>	<p>Section 17</p>	<p>An applicant must determine the financial provision through a detailed itemisation of all activities and cost, calculated based on the actual cost of implementation of the measures required. The Regulation requires the development of a number of documents.</p>
<p>Regulations on use of Water for Mining and Related Activities Aimed at the Protection of Water Resources, 1999 (Notice 704 of 1999).</p> <ul style="list-style-type: none"> <li>• <i>Regulation 4: Restrictions on location of mining activities</i></li> <li>• <i>Regulation 7: Protection of water resources</i></li> </ul> <p><b>Regulation 12: Technical investigation and monitoring.</b></p>	<p>Section 24.2, Section 24.3 as well as all mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Every person in control of a mine or activity must take measures to manage water in an effective manner as prescribe by the regulation.</p>
<p>NWA: Government Notice 509 General authorisation for water use as defined in Section 21(c) and 21(i), July 2016.</p>	<p>Section 24.2, Section 24.3 as well as all mitigation measures</p>	<p>The outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest</p>

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<p>DWS will likely request a WUL application, since more than one water use are present on the property.</p>	<p>prescribed within the impact management and mitigation tables included within this document.</p>	<p>distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; In the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or A 500 m radius from the delineated boundary (extent) of any wetland or pan. Two wetlands have been identified within the 500m zone. However it is considered unlikely that the proposed mining activities will pose a risk to the wetland. The road crossing upgrade will also require licensing under the NWA for Section 21(c) and (i).</p>
<p>Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995) • <i>Section 4: Duties of persons who may be exposed to hazardous chemical substances</i> <i>Section 9A (1): Penalties</i></p>	<p>All mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>No Hazardous substances will be stored on the site.</p>
<p>Deeds Registries, 1937 (Act No. 47 of 1937) [as amended]</p>	<p>All mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Registration of servitudes and deed titles.</p>
<p>NEMA: Government Notice. 805 Companion Guideline on the Implantation of the Environmental Impact Assessment Regulations, 2010, October 2012.</p>	<p>All mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>The application for Environmental Authorisation is submitted in terms of the EIA Regulations.</p>
<p>NEMA: GN. 807 Public Participation Guideline, October 2012.</p>	<p>All mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Consultation with Interested and Affected Parties and Communities.</p>
<p>National Development Plan 2030 (2012)</p>	<p>Section 6 and Section 9.1.15 as well as all mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Land use planning</p>
<p>National Framework for Sustainable Development (2008)</p>	<p>Section 6 and Section 9.1.15 as well as all mitigation measures prescribed within the impact management and mitigation tables included within this document.</p>	<p>Land use planning</p>
<p>National Strategy for Sustainable Development and Action Plan 2011 – 2014 (NSSD 1) (2011)</p>	<p>Section 6 and Section 9.1.15 as well as all mitigation measures</p>	<p>Land use planning</p>

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	prescribed within the impact management and mitigation tables included within this document.	
Gauteng Spatial Development Framework (SDF)	Section 6 and Section 9.1.15 as well as all mitigation measures prescribed within the impact management and mitigation tables included within this document.	Land use planning activities within the Gauteng area
Gauteng Spatial Development Plan (SDP)	Section 6 and Section 9.1.15 as well as all mitigation measures prescribed within the impact management and mitigation tables included within this document.	Land use planning activities within the Gauteng area
Gauteng Province Environmental Management Framework – City of Tshwane SDF.	Section 6 and Section 9.1.15 as well as all mitigation measures prescribed within the impact management and mitigation tables included within this document.	The study area where the mining activity is proposed, is located within the Gauteng Province and falls within a Management Zone as discussed within Need and Desirability (Section 6).
Development Guidelines for Ridges (GDARD)	Section 9.1.10 in the baseline information as well as mitigation measures prescribed within the impact management and mitigation tables included within this document.	No Ridges have been identified to occur on-site as delineated within the Gauteng Province by GDARD.
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.	Mitigation measures prescribed within the impact management and mitigation tables included within this document.	Impacts on surrounding landowners need to be managed through noise mitigation measures.
SANS 10228:2006 The Identification and Classification of Dangerous Goods for Transport	Mitigation measures prescribed within the impact management and mitigation tables included within this document.	All dangerous goods to be transported to and from the site need to be managed according to these standards.
Gauteng Conservation Plan: Version 3.3	Section 9.1.10.1.	Identifies Critical Biodiversity Areas, Ecological Support Areas, and irreplaceable, protected and important areas.

## 6 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).*

Aggregates are the granular raw materials that are used to make construction products which are used to build our houses, roads, schools, office, hospitals, and other developments within our urban and rural environments.

Aggregates broadly come from three sources:

- Primary aggregates, which are newly extracted from the ground or sea bed;
- Secondary aggregates, which are the by-product either from the extraction or other materials or a manufacturing process, and can either be either natural (such as china clay waste) or manufactured (for example power station ash and steel slag); and
- Recycled aggregates, which are produced from crushed demolition waste.

For many purposes aggregates from these different sources can be substituted for one another, for example gravel or crushed rock can be used for concrete. However some end uses, such as rail ballast and roadstone, require particular types of aggregate due to requirements on size, strength and durability.

Aggregates used in asphalt for road surfaces must have a high Polished Stone Value (high PSV) to ensure that tyres will grip the surface and such aggregates only come from certain types of rock.

Aggregates are a low value and heavy raw material, which means that transportation costs can make up a significant proportion of the final price the customer pays. For this reason aggregates are typically not transported more than 100 km.

The main benefits of the proposed Sand Mining Permit are:

- Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees;
- Extending the current sand mining activities already on the adjacent properties/portions, this may result in increased job security to employees already skilled in sand mining within the area.
- Implementation of the proposed project will result in skills development associated with and mining;
- It contributes to the economic welfare of the surrounding community by creating working opportunities;
- It contributes to the upliftment of living standards and the health and safety of the local community.
- The project will result in economic mining of a known resource;
- The net benefit to South Africa is a product produced specifically the local commodity market, as it is noted in background information that the aggregates and sand will be mainly used in the construction of infrastructure such as stormwater channels and roads to be supplied to the local Tshwane municipality.

The project is aligned with the objectives of the MPRDA (Act 28 of 2002)

- To promote economic growth and mineral development in the Republic

- To promote employment and advance the social and economic welfare of all South Africans
- To ensure that the nation's mineral resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development; and
- To ensure that mining developments contribute towards the social-economic development of the area in which they are operating

The Department of Environmental Affairs (DEA) published a Guideline on Need and Desirability (2017) in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended). The key components are listed and discussed below:

- Securing ecological sustainable development and use of natural resources
- Promoting justifiable economic and social development.

### **Ecological sustainable developments and use of natural resources**

The project area has been selected on the basis of the presence of economically mineable resources. The farm has been subjected to sand mining in the past and is already disturbed due to previous mining and agricultural activities. Main impacts are related to the vegetation clearance required for the mining of sand as well as the resulting noise and dust which may be generated. Stormwater management will be important to prevent sedimentation of water resources in the vicinity and an application under Section 21(c) and (i) will be launched since the activities fall within 500 m of two water resources as assessed by a Wetland specialist. An existing access road over the dam (water crossing) will need to be upgraded and this will also be included in the WUL /General Authorisation Application (*To be confirmed*). Section 21(c) and (i) water uses, whether GA or WUL, is regulated by strict guidelines, rehabilitation, work method statements and mitigation measures, all of which aim to prevent and restore possible environmental impacts.

No processing related surface infrastructure will be constructed. Measures to mitigate the impacts to these resources will be included in the EMPr.

### **Promoting justifiable economic and social development**

Community/society priorities are officially expressed through public documents including the provincial growth and development strategy and spatial development framework documents. The proposed project will benefit society and the surrounding communities both directly and indirectly by providing job security at the proposed operation and through the extraction of aggregates within the Gauteng Province. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees.

According to DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs, to describe the need for a development, it must be determined whether it is the right time for locating the type of land use and/or activity being proposed. To describe the desirability for a development, it must be determined, whether it is the right place for locating the type of land use and/or activity being proposed. Need and desirability can be equated to the concept of wise use of land which can be determined through asking the question: "what is the most sustainable use of land?" Considering the above, the need and desirability of an application must be addressed separately and in detail answering *inter alia* the following questions:

**Table 6-1: Need and desirability considerations**

Securing ecological sustainable development and use of natural resources	
<p>1.1</p> <p>How will this development (and its separate elements/aspects) impact on the ecological integrity of the area? How were the following ecological integrity considerations taken into account?</p> <p>1.1.1 Threatened Ecosystems, 1.1.2 Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3 Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”), 1.1.4 Conservation targets, 1.1.5 Ecological drivers of the ecosystem, 1.1.6 Environmental Management Framework, 1.1.7 Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).</p>	<p>It is stated for Ecological Support Areas 1: <i>Incompatible Land Uses: “Urban land-uses including Residential (including golf estates), Business, Mining &amp; Industrial; Infrastructure (roads, power lines, pipelines). Intensive Animal Production ( all types including dairy farming associated with confinement, imported foodstuffs, and improved/irrigated pastures) Arable Agriculture (forestry, dry land &amp; irrigated cropping).</i> <u>Note: Certain elements of these activities could be allowed subject to detailed impact assessment to ensure that developments were designed to maintain overall ecological functioning of ESAs.</u></p> <p><i>It is stated for Other Natural Areas: No management objectives, land management recommendations or land-use guidelines are provided as these areas are outside the ambit of the Bioregional Plan. These areas are nevertheless subject to all applicable town and regional planning guidelines and policy. Where possible existing transformed areas should be favoured for development before "Other natural areas" as before "Other natural areas" may later be required either due to the identification of previously unknown important biodiversity features on these sites, or alternatively where the loss of "Critical Biodiversity Areas" has resulted in the need to identify alternative sites."</i></p> <p>As mentioned, Sand Mining is already a known land use on the property of Honingnestkrans (adjacent portions to those applied for in this application). The continuing of this land use in the vicinity will bring additional socio-economic benefits such as increased work opportunities for this specific skill-type. It will also aid by mining the known resource within a beneficent timeframe as the Mining Permit is only valid for a period of 2 years, where after it may be either lapsed/renewed or may be subject to a Mining Right Application</p>
<p>1.2</p> <p>How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>Impacts predicted for the development are low and sand mining is a low impact activity, specifically if it is not located within a watercourse. The two wetlands identified are located within 500 m and these will be licensed with the National Water Act, 1998 (Act No.36 of 1998) (WUL Application) and thereby be regulated by additional rehabilitation and monitoring features to ensure that no harm befalls these sensitive systems. General impacts, such as dust, noise, etc. have been covered within the Environmental management</p>

		programme (EMP) proposed for the Sand Mine activities. Several mitigation measures and monitoring features have been included in the EMP to ensure minimal and managed operation of the footprint area designed for the Mining Permit.
1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	<p>Mitigation and Management measures prescribed will aid to avoid and lower any possible impacts that may result from the development. Final rehabilitation will restore Land capability and Land use to a pre-mining state.</p> <p>The Section 21(c) and (i) wetlands to be authorised (within 500m bufferzone) will require a rehabilitation and monitoring programme for the wetlands. These may include Alien and Invasive Monitoring and vegetation establishment along areas requiring rehabilitation. The prevention and repair of eroded site, etc. All of these may have positive impacts on the ecological environment.</p>
1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	<p>No waste will be generated other than general waste and litter during the life of the mine and these should be kept in designated areas and disposed of to a licensed landfill facility. Other wastes that may cause soil contamination are from the use of vehicles and loaders during the mining process, which may lead to hydrocarbon spills. Regulations for soil clean-up and management has been prescribed in the EMP.</p> <p>Portable toilets are recommended for the operation and a contractor will be required for the maintenance and service of these systems.</p>
1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	A specialist heritage study was conducted for the project and two areas of concern were found. None of these fall within the footprint of the proposed Mini Permit.
1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	<p>The operation will remove a known resource (Sand – limited resource) within the designated area. This cannot be reversed. The study area has been transformed as noted in the specialist investigations and the sand mining already in the vicinity.</p> <p>Through implementing good practice environmental management measures and mitigation measures, it will ensure that both human and environment are not negatively affected by the development.</p> <p>Since the Honingnestkrans farm are a known sand resource, which allows for mining of sand outside of river systems and beds, this is a benefit, which allows for sand mining without requiring compromising other sensitive habitats such as riverbeds (where sand resources more often occurs).</p>



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		No offset strategies will be required for the water uses (Section 21(c) and (i) water uses as they have been subjected to a Risk Assessment as prescribed by DWS. The impact is considered to be Low and no wetland will be lost as a result of activities.
1.7	<p>How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</p> <p>1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life).</p> <p>1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)</p> <p>1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?</p>	<p>Renewable natural resources may be the use of borehole water to a limited amount on-site for the operations. This is sustainable as the amount utilised will be regulated by a WUL application and water monitoring, such as groundwater level monitoring was prescribed in the EMPR.</p> <p>The sand mine has a limited requirement in terms of water, since only domestic and dust suppression will take place on-site. No processing, washing and screening or any other surface infrastructure is proposed, which may require additional water.</p>
1.8	<p>How were a risk-averse and cautious approach applied in terms of ecological impacts?</p> <p>1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>1.8.2 What is the level of risk associated with the limits of current knowledge?</p> <p>1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>The Environmental risk assessment for all environmental features has been included within Section 10 and Section 11.</p> <p>An Ecological, Wetland and Heritage specialist study was completed for the project to ensure the impacts of these aspects have been properly assessed and will be catered for within the Environmental Management Programme (EMP).</p>
1.9	<p>How will the ecological impacts resulting from this development impact on people's environmental right in terms following.</p> <p>1.9.1 Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and</p>	<p>Noise, dust and visual pollution can slightly increase if managed incorrectly. Possibly water pollution, if impacts are not managed effectively, but with the proper mitigation and good practice environmental management measures, it will result in minimal impacts. These impacts will be assessed and detailed prevention and mitigation measures will be recommended.</p>

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	remedy negative impacts? 1.9.2 Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Ecological aspects and specialist impact assessments have been included in the document and risk assessments utilised to guide the Environmental Management Program.
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	The Environmental risk assessment for all environmental features has been included within Section 10 and Section 11.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	An Ecological, Wetland and Heritage specialist study was completed for the project to ensure the impacts of these aspects have been properly assessed and will be catered for within the Environmental Management Programme (EMP).
1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Cumulative impacts may be the accumulation of all the existing, historic and proposed sand mining activities on Honingnestkrans which may result in negative impacts, however, if the Mining Permit application (concurrent application) and the Prospecting Right Application (this application) implement mitigation measures and management correctly, cumulative negative impacts as a result of the combined sand mining of the area, will be low since sand mining is in essence a low small scale mining operation.
<b>"Promoting justifiable economic and social development"</b>		
2.1	<p>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:</p> <p>2.1.1 The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</p> <p>2.1.2 Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</p> <p>2.1.3 Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</p> <p>2.1.4 Municipal Economic Development Strategy ("LED Strategy").</p>	<p>According to the City of Tshwane Maps, the proposed Mining Permit is situated in Region 2 (Ward 96). The farm Honingnestkrans 696 JR falls within the Urban Edge as edited in 2017 and within the Management Zone.</p> <p><i>The Management zones are areas not considered suitable for urban development as they are not well located in terms of the larger urban structure and areas of opportunity. They may also be characterised by environmental sensitivities as indicated by the Biodiversity Plan and the Tshwane Open Space Framework, which are important to protect from a metropolitan perspective. Rural development such as low density eco and equestrian estates will be supported depending on services that can be provided.</i></p> <p><i>Within these Management Zones land uses and densities, which do not fit into the denser urban complex, should be permitted. Uses supported in the management zone would include Lodges, Wedding Venues, storage facilities, place of refreshment, children party venues, agricultural industries and abattoirs. The availability of services and the ease of</i></p>

		<p>access to major roads will play an important role in the evaluation of no residential uses as mentioned above. Non-residential uses serving the rural population and surrounding urban areas should be concentrated in Community Service Centres as indicated on</p> <p>The following Management Zones are earmarked in Region 2:</p> <ul style="list-style-type: none"> <li>• The land between the N1 in the east and the Mabopane highway in the west, excluding the sensitive land adjacent to the Apies River.</li> <li>• The farm portions on both sides of the Apies River.</li> <li>• The southern part of the Onderstepoort Nature Reserve that is separated from the reserve by the N4 Platinum highway.</li> </ul> <p>Non- agricultural uses will only be promoted if the amenity of the rural area remains intact and the impacts of the development on neighbouring properties are minimal.</p> <p>The project is aligned with the objectives as sand mining is already an ongoing and historic activity on the Honingnestkrans farm and therefore will not compromise the integrity of the surrounding land uses and neighbouring properties.</p> <p>As mentioned above for the Management zone, “Within these Management Zones land uses and densities, which do not fit into the denser urban complex, should be permitted.” Although Sand mining was not listed in the example of land uses encouraged, Sand mining already exist on the property and cannot fit into the denser urban complex.</p>
2.2	<p>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</p> <p>2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</p>	<p>Also refer to the comments made above.</p> <p>The proposed project will benefit society and the surrounding communities both directly and indirectly by providing job security at the proposed operation and through the extraction of aggregates within the Gauteng Province. Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees.</p> <p>The project will make use of local workers and service providers and this must be kept record of to ensure the local economic development (as prescribed in the EMPR).</p>
2.3	<p>How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?</p>	<p>Refer to comments made above. All aspects and comments received from I&amp;APs during the process will be reasonably addressed and incorporated into the final BAR submitted to the DMR. Local economic growth and work opportunities will be main benefits from the project if approved and may address some of the physical, psychological, development,</p>

		<p>cultural and social needs.</p> <p>Main benefits from the sand mining, which may possibly address community needs are mentioned below (also refer next comment) and is in-line with the Tshwane Rural Component Vision.</p> <p><u>The Tshwane Rural Component Vision will promote:</u></p> <ul style="list-style-type: none"> <li>• Promote an effective response to rural poverty.</li> <li>• Ensure food security by maximizing the use and management of natural and other resources.</li> <li>• Create vibrant, equitable and sustainable rural communities.</li> <li>• Contribute towards the redistribution and sustainable use of all potential agricultural land.</li> <li>• Support rural economies based on agriculture, and where possible by mining, tourism and agro processing.</li> <li>• To create employment and business opportunities for the existing rural population.</li> <li>• Aims to prevent natural disasters like erosion and pollution and other detrimental effects on natural resources.</li> <li>• Formalize residential settlements according to the Rural Component Framework.</li> <li>• Promote accessibility to community facilities, work opportunities and housing for all</li> <li>• Maintain of acceptable standard for roads and other mode of transport</li> <li>• Provide public transport services for the more densely populated rural areas.</li> <li>• Identify of multipurpose community centres to provide for business, medical, educational, recreational, social and other needs at the most optimum and accessible locations.</li> <li>• Address adequate and respectable services must be addressed to improve living conditions.</li> <li>• Attend to the matter of ownership and tenants' rights must receive attention especially in areas where tribal land ownership exists.</li> </ul>
2.4	<p>Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?</p>	<p>The main benefits of the proposed Sand Mining Permit are:</p> <ul style="list-style-type: none"> <li>• Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees;</li> <li>• Extending the current sand mining activities already on the adjacent properties/portions, this may result in increased job security to employees already skilled in sand mining within the area.</li> </ul>

		<ul style="list-style-type: none"> <li>• Implementation of the proposed project will result in skills development associated with and mining;</li> <li>• It contributes to the economic welfare of the surrounding community by creating working opportunities;</li> <li>• It contributes to the upliftment of living standards and the health and safety of the local community.</li> <li>• The project will result in economic mining of a known resource;</li> <li>• The net benefit to South Africa is a product produced for the world and specifically the local commodity market, as it is noted in background information that the aggregates and sand will be mainly used in the construction of infrastructure such as stormwater channels and roads to be supplied to the local Tshwane municipality.</li> </ul> <p>The project is aligned with the objectives of the MPRDA (Act 28 of 2002)</p> <ul style="list-style-type: none"> <li>• To promote economic growth and mineral development in the Republic</li> <li>• To promote employment and advance the social and economic welfare of all South Africans</li> </ul>
2.5	<p>In terms of location, describe how the placement of the proposed development will;</p> <p>2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</p> <p>2.5.2. reduce the need for transport of people and goods,</p> <p>2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</p> <p>2.5.4. compliment other uses in the area,</p> <p>2.5.5. be in line with the planning for the area,</p> <p>2.5.6. for urban related development, make use of underutilised land available with the urban edge,</p> <p>2.5.7. optimise the use of existing resources and infrastructure,</p> <p>2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</p> <p>2.5.9. discourage "urban sprawl" and contribute to compaction/densification,</p> <p>2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p>	<p>Alternatives have been assessed during the process and the best suited alternative has been described within this application. Refer to Section 6.1 below for all aspects taken into account. The proposed layout is the best suited and feasible alternative, taking into account the 50m buffer of the SASOL line, the already transformed footprint, wetlands within the project area and the known resource occurring within that area.</p> <p>The upgrade of the existing water crossing will also be an important part of the application to ensure the safety of the road, the workers and other adjacent land users, as well as the water environment.</p>

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	<p>2.5.11. encourage environmentally sustainable land development practices and processes</p> <p>2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</p> <p>2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</p> <p>2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</p> <p>2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</p>	
2.6	<p>How were a risk-averse and cautious approach applied in terms of socio-economic impacts</p> <p>2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</p> <p>2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>Gaps and limits in knowledge have been given within the document as “<i>Thorough investigations have been done and alternatives assessed. At this stage of the process no formal design is available for the upgrade of the water crossing and this will have to be done for the WUL licensing process along with possible stormwater design, such as placement of topsoil berms to avoid water ingress into the quarry.</i>”</p> <p>The gaps in knowledge will be filled by the WUL process and therefore the risk may be argued as low.</p>
2.7	<p>How will the socio-economic impacts resulting from this development impact on people’s environmental right in terms following:</p> <p>2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>2.7.2. Positive impacts. What measures were taken to enhance positive impacts?</p>	<p>Refer to all other aspects regarding the Socio-Economic environment, benefits and disadvantages. All of the relevant aspects have also been addressed within the BAR and may be viewed within the Impact Assessment, Management and Mitigation tables as contained within this document.</p>
2.8	<p>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development’s socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</p>	<p>The area where the mining permit is proposed, is currently not utilised except as wilderness and grazing. The Land uses was described as follows:  <i>The southern portion of the site is cultivated. Some portions in the far southern section of the site were fallow and Vachellia karoo (sweet thorn) trees and grasses re-established.</i></p> <p><i>The area north of the dammed Kaalspruit has been mined and supported a number of invasive plant species. Smaller localised disturbances were recorded.</i></p> <p><i>The grass underneath the Eskom powerline that stretches along the western boundary of the site has been mowed. The grassland on the northern portion of the site has been</i></p>

		<p><i>grazed in the past, while much of the portion that was assessed in the 2015 report was historically cultivated and likely planted with pasture grass.”</i></p> <p>Clearly, these areas have been transformed and the Sand mining will not affect livelihoods and ecosystem services related to the footprint area. Other impacts such as dust and noise may affect neighbouring properties and these will be mitigated to a Low impact as per mitigation and monitoring measures described within the EMPR.</p>
2.9	What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?	Health and Safety considerations, such as implementation of the bufferzone close to the SASOL gas line. No other socio-economic considerations are relevant, except for work creation of local communities within the area, but these will be same for any footprint chosen on the Honingnestkrans farm. The environmental, known resource and financial restraints associated with sand mining (as a small operation) were the deciding factors concerning the best suited option.
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?	Refer to comments made above. To extract the known resource optimally within a short timeframe will benefit the local economy and the building environment, which is dependent on sand as a construction and road building material. All alternative scenarios have been discussed within Section 6.1 and Section 6.2 below.
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	<p>The main benefits of the proposed Sand Mining Permit are:</p> <ul style="list-style-type: none"> <li>• Direct economic benefits will be derived from wages, taxes and profits. Indirect economic benefits will be derived from the procurement of goods and services and the spending power of employees;</li> <li>• Extending the current sand mining activities already on the adjacent properties/portions, this may result in increased job security to employees already skilled in sand mining within the area.</li> <li>• Implementation of the proposed project will result in skills development associated with and mining;</li> <li>• It contributes to the economic welfare of the surrounding community by creating working opportunities;</li> <li>• It contributes to the upliftment of living standards and the health and safety of the local community.</li> <li>• The project will result in economic mining of a known resource;</li> <li>• The net benefit to South Africa is a product produced for the world and specifically the local commodity market, as it is noted in background information that the aggregates and sand will be mainly used in the construction of infrastructure such as stormwater</li> </ul>

		<p>channels and roads to be supplied to the local Tshwane municipality.</p> <p>The project is aligned with the objectives of the MPRDA (Act 28 of 2002)</p> <ul style="list-style-type: none"> <li>• To promote economic growth and mineral development in the Republic</li> <li>• To promote employment and advance the social and economic welfare of all South Africans.</li> </ul>
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Disturbances in terms of Noise, Dust, Waste and Health and Safety have been assessed according to a Risk Matrix and included within this report. Mitigation and Management measures are prescribed for every possible impact which may result from the Mining permit being granted.
2.13	<p>What measures were taken to:</p> <p>2.13.1. ensure the participation of all interested and affected parties,</p> <p>2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</p> <p>2.13.3. ensure participation by vulnerable and disadvantaged persons,</p> <p>2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</p> <p>2.13.5. ensure openness and transparency, and access to information in terms of the process,</p> <p>2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and</p> <p>2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?</p>	Refer to Section 7 of the report. Communication with relevant departments as well as the City of Tshwane Ward Councillor has and will be used to guide the public participation process and the relevant stakeholder and communities involved. Public Participation will be conducted in accordance with the guidelines and regulations, starting on the 13 <sup>th</sup> of November 2018. All comments received will be incorporated into the final BAR as will be submitted to DMR.
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to comments made above.
2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	The Mining permit holder will need to draft an Environmental Policy and a Health and Safety Policy, which will regulate activities on the sand mining area. All workers and contractors will need to abide to the policies and framework as specified.
2.16	Describe how the development will impact on job creation in terms of, amongst	Refer to comments made above. Since the application is for a Mining Permit, it is in nature



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	<p>other aspects:</p> <p>2.16.1. the number of temporary versus permanent jobs that will be created,</p> <p>2.16.2. whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),</p> <p>2.16.3. the distance from where labourers will have to travel,</p> <p>2.16.4. the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</p> <p>2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</p>	<p>a temporary or short term activity (2 years), which will be rehabilitated afterwards to match the pre-mining land use. The company is also applying for a Prospecting Right, which, if favourable results are obtained, may lead to the application of long term sand mining (permanent jobs etc.)</p> <p>The land is not currently used for agriculture or other beneficial or financial means and therefore it may be argued that the mining permit will be a beneficial short term land use.</p>
2.17	<p>What measures were taken to ensure:</p> <p>2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</p> <p>2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</p>	<p>The applicant is in application for the following aspects across different legislation requirements:</p> <ul style="list-style-type: none"> <li>• Mining Permit (DMR, GDARD)</li> <li>• Prospecting Permit (DMR, GDARD);</li> <li>• WUL (Department of Water and Sanitation –DWS).</li> <li>• All legislation which has been incorporated within these processed were discussed within Section 5: Policy and Legislative Content above.</li> </ul>
2.18	<p>What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</p>	<p>Refer to comment above as these aspects have already been addressed within previous discussions.</p>
2.19	<p>Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</p>	<p>Yes, for a sand mining operation with limited financial means, all impacts have been addressed optimally.</p>
2.20	<p>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</p>	<p>Mitigation and management measures have been described for all environmental aspects identified and is incorporated into the EMPr.</p>
2.21	<p>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</p>	<p>Alternatives and analysis have already been addressed above, refer to comments made,</p>
2.22	<p>Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?</p>	<p>Refer to comments made above regarding positive and negative socio-economic impacts. Other projects in relation/adjacent to the application footprint also include sand mining on the Honingnestkrans farm and Land uses may be viewed within figures provided. Cumulative impacts have been discussed where relevant and are not easily accurately quantifiable.</p>

## 6.1 Motivation for the overall preferred site, activities and technology alternative

### 6.1.1 Preferred site / locality

The preferred site for the proposed mining permit is the most ideal placement as the adjacent areas has been subjected to sand mining and the proposed footprint has known reserves which could be economically extracted.

The project originally applied for a large scale Mining Right of 10 ha in 2014, which was not suitable at that stage and with the information available. Therefore, the two new applications, the proposed Mining Permit (this application, 5 ha on Portion 8) and the Prospecting Right (separate application) will also serve as a more suited alternative and allow for information gathering of the extent of the resources on the remaining areas of Honingnestkrans. This was originally investigated as the preferred site.

In terms of the separate applications for the Sand Mining expansion, minerals can only be mined where identified and verified, therefore it was not practical to select any other sites. The site as proposed for the Mining Permit (Portion 8) has a known resource which will be extracted if the Mining Permit is accepted. No processing and secondary activities form part of the application and therefore no infrastructure related footprints are applicable.

The applicable area have been determined from a preliminary evaluation of how they are most optimally configured outside of the 1:100 floodline and away from potentially sensitive areas, in favour of proposed positioning on previously disturbed farming and agricultural land.

The location has been positioned to incorporate the 50m buffer delineated around a SASOL pipeline found on-site (Figure 6-1 below).

### 6.1.2 Preferred Activities

#### Mining methods

Different sand mining methods may be assessed, but the proposed method is the best suited as the reserve is shallow 2.5m/3m. This mining method is very simplistic. The bulk of the mining method consists of loading and hauling.

### 6.1.3 Technology and Operational alternatives

Since no crushing, screening, washing or blasting will be necessary; no technology alternatives exist to be assessed in terms of alternative technologies.

- The preferred alternative is loading and hauling by end loaders; and
- The transport of the product will be conducted by third parties.

#### Site Access

The option assessed for site access and to incorporate the movement of heavy vehicles on the premises. The best suited situation is to upgrade the existing water crossing over the dam to ensure safety. Since this needs to be done to ensure the integrity of the road, this aspect is included within this application.

The access to the site is provided by the local farm access road which intersects with the Honingnestkrans Rd to the southeast of the study area.

### **The occurrence of Servitudes and other**

There are no rail lines in the close proximity. There is high voltage powerlines in close proximity on the portion adjacent to the study area.

Located on the study site, an existing servitude for a gas line occurs. To ensure that no impacts reach the gas line, a 50 m buffer area was set to act as the edge of the Mining Permit footprint.



**Figure 6-1: 50 m buffer delineated around SASOL pipeline to avoid risk (RED: 50m Buffer)**

### **The operational aspects of the activity**

No other alternatives were investigated as the operational aspects of these activities will have minimal impacts, since only extraction of the sand resources are proposed and no primary or secondary processing.

The construction phase will have the largest impacts. Emergency and maintenance measures to ensure risk management will be most important aspects during the operational phase.

#### **6.1.4 Option of not implementing the activity**

The no-go option refers to the alternative of the proposed development not going ahead at all. This alternative will avoid potentially positive socio-economic and negative impacts on the environment and the status quo of the area would remain. The environmental conditions associated with the NO-GO Activity will be the same as described for the baseline information (current Environmental Condition) within Section 9 below. No deviation from the baseline is expected if the No-Go option is facilitated.

Possible negative impacts that may be the result of not implementing the activity, it the loss of a known economic resource and limiting socio-economic benefits associated with an economic activity.

Since sand mining is currently and historically taking place on the adjacent portions within Honingnestkrans, not approving further sand mining areas for the future may lead to the end of sand mining enterprises on a known available resource (Honingnestkrans) and may lead to a decrease in market supply within the area.

## 6.2 Full description of the process followed to reach the proposed preferred alternatives within the 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*

### 6.2.1 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;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Refer to Section 6.1 above for the Motivation of the preferred options and alternatives for discussions on Table 6-2.

**Table 6-2: Evaluation of Site Configuration Options**

CRITERIA FOR COMPARISON	PREFERRED LAYOUT, APPENDIX 4
Incorporated within the project site	Yes.
Material Transport and process flow	Good. The upgrade of the existing water crossing will enable efficient and safe product flow to the market.
Soils	No difference in impacts between sites.
Potential Dust nuisance to residence	No difference in impacts between sites as the adjacent areas has already been subjected to sand mining. Dust suppression on the footprint will mitigate potential additional dust generation.
Potential for contamination of surface water.	No infrastructures/mining within flood lines. To be addressed in the Water use license/GA application if required. A Wetland assessment was conducted and the footprint does fall within 500 m of two wetlands, which will be licensed in accordance with Section 21(c) and (i) water uses. The water crossing upgrade will also be included.
Geology and fracture/ fault intensity	A geotechnical investigation was conducted as part of the original scope work for a Mining Right application.
Potential exposure to spills and seepage	Low/insignificant risk of affecting groundwater since the sand mining quarry will only be up to 3 m deep. No processing or secondary activities are proposed.
Safety	Good, no difference in impact between sites. The upgrade of the existing water crossing will ensure

CRITERIA FOR COMPARISON	PREFERRED LAYOUT, APPENDIX 4
	safety when using the access road.  A buffer zone was also implemented for the Gas/SASOL servitude which is to the north of the proposed footprint on Portion 8 of the farm Honingnestkrans 696JR. A 50m buffer zone has been delineated to ensure that the pipeline will not be at risk.
Potential ecological harm	No significant difference, DAFF permit required for removal of protected species if the species can't be avoided. However, the ecological assessment did not detect protected species which require movement/in-situ protection or intervention. The wetland assessment predicted low/insignificant impacts on the wetlands within 500m.
Biodiversity, fauna and flora	No significant difference, DAFF permit required for removal of protected species if the species can't be avoided. Refer to comments made above.
Visual intrusion	No significant difference as the surrounding land use is that of sand mining (both current and historic).
Impact on land use	No significant difference as the surrounding land use is that of sand mining (both current and historic).
Impact on archaeological interest sites	No significant difference. A heritage assessment was done for the application
Socio-economic impacts	No significant difference.

## 7 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.*

### 7.1 Notification of I&AP's

Following the project initiation, correspondence will only be directed to registered I&AP's after they have registered, after being identified as an I&AP and invited to register. Accordingly, to ensure that all potential I&AP's were made aware of the project and had the opportunity to register, the initial advertising was as thorough as possible.

#### 7.1.1 Newspaper Advertisement

Newspaper adverts to advertise the onset of the PPP for the project:

- Pretoria News, published on Tuesday the 13<sup>th</sup> of November 2018.

#### 7.1.2 Site Notice

To inform the surrounding public, I&APs, communities and immediately adjacent landowners of the proposed, site notices was placed at various sites and locations which are visible and accessible in relation to the Honingnestkrans development (two separate applications) (and specifically related to where the new activities are proposed, i.e. Portion 8 is subjected to the Mining Permit application).

To inform the surrounding public, I&APs, communities and immediately adjacent landowners to farm

about the proposed Environmental authorisation application, site notices were placed at various places and locations which are visible and accessible within and surrounding the proposed project area.

**Table 7-1: Site notice placement details**

A3 Posters placed within the project area	• Sun set View Resort – Dam Road (25° 37.513'S and 28° 11.657'E)
	• SPAR – Lavender Road (25° 37.670'S and 28° 12.255'E)
	• Areas associated with the application (Exact locations to be confirmed)

### 7.1.3 Direct Notification of Identified I&AP's

A Background Information Document (BID) was compiled giving detail on the applicant, the Environmental Assessment Practitioner (EAP), the scope and locality of the proposed project, the environmental impact assessment process, purpose and process of public participation and included an invitation to register as an I&AP and to provide comment which was distributed to all of the registered interested and affected parties. Site notices and background information documents (BID) were distributed for various stakeholders, farmers and I&APs within the immediate area.

I&AP's who participated in the Public Involvement Process by attending meetings, providing comments in writing and making verbal contact will be included in this list. Government authorities will also be captured as registered I&APs. The BID documentation was sent to all of the registered and identified I&AP's. Stakeholders on the database will be notified of the availability of the application reports via email, fax and post. The reports will also be made available at the Local Municipality Offices.

## 7.2 Public Meetings

A public meeting is proposed and the date is to be confirmed. The Attendance register will be included in Appendix 6 and the summary of comments and issues will be included in within Table 7-2.

The concept of open meetings will be adopted because it allows for more interaction between project proponents and members of the community/public and entails one to one discussions and small group discussions, picture and map illustrations about the proposed mining project in pursuit of full comprehension by I&APs about the proposed project.

Public Participation Meeting to be held	
Date	22 November
Time	18:30 – 21:00
Venue	Sun Set View Resort – Bon Accord
Co-ordinates	(25° 37.513'S and 28° 11.657'E)

### 7.3 Summary of issues raised by I&APs

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

The table below will be updated with the comments received during the Public Participation period.

**Table 7-2: Summary of issues raised by I&APs**

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

<b>Interested and Affected Parties</b>		<b>Date</b>	<b>Issues raised</b>	<b>EAPs response to issues as mandated by the applicant</b>	<b>Section and paragraph reference in this report where the issues and or response were incorporated.</b>
List the names of persons consulted in this column, and		<b>Comments Received</b>			
Mark with an X where those who must be consulted were in fact consulted.					
None received as yet.					
<b>Municipality</b>	<b>X</b>				
City of Tshwane Local Municipality: Municipal Councillor for Ward 96					
<b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS</b>	<b>X</b>				
SAHRA	<b>X</b>				
SASOL	<b>X</b>				
<b>Communities</b>	<b>X</b>				
N/A					
<b>Dept. Land Affairs</b>	<b>X</b>				
Department of Rural Development and land reform					
<b>Traditional Leaders</b>					
N/A					
<b>Dept. Environmental Affairs</b>					
GDARD					
<b>Other Competent Authorities affected</b>					
Department of Mineral Resources	<b>X</b>				
Department of Roads and Transport	<b>X</b>				
<b>OTHER AFFECTED PARTIES</b>					
None received as yet.					
<b>INTERESTED PARTIES</b>					



<b>Interested and Affected Parties</b>	<b>Date</b>	<b>Issues raised</b>	<b>EAPs response to issues as mandated by the applicant</b>	<b>Section and paragraph reference in this report where the issues and or response were incorporated.</b>
List the names of persons consulted in this column, and	<b>Comments Received</b>			
Mark with an X where those who must be consulted were in fact consulted.				
None received as yet.				

## 8 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)*

***The best suited position and layout of the activity is the one represented within this document as it is cognisance of all environmental features and possible impacts (Refer to Figure 4-1).***

## 9 BASELINE ENVIRONMENT

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

### 9.1 Type of environment affected by the proposed activity

*(Its current geographical, physical, biological, socio- economic and cultural character)*

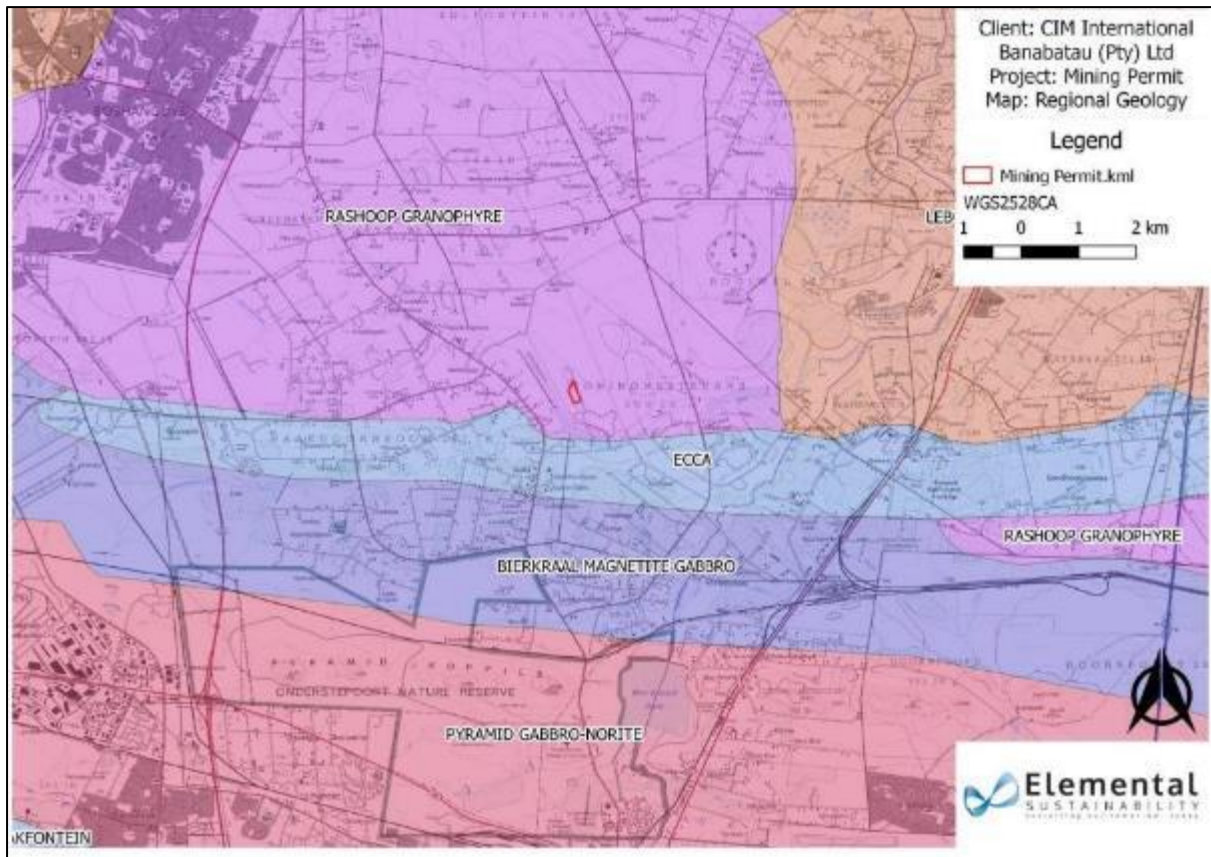
#### 9.1.1 Geology

##### 9.1.1.1 Regional Geology

The Bushveld Complex is located in the central northeast portion of the Kaapvaal Craton in southern Africa, and has an estimated total area of 65 000 km<sup>2</sup> (Hunter, 1976).

The Complex is composed of four lobes in the north, east, south and west about an east-northeast and north-northwest set of axes, and it has a long axis of approximately 470 km and a short axis of approximately 380 km. The proposed footprint lies to the north west of Pretoria (Tshwane district) and falls within the Rашoop Granophyre Suite Geological structure.

The whole area is underlain by granophyre, pseudogranophyre and microgranophyre of the Rашoop Granophyre Suite (Bushveld Complex, Vaalian). Specifically, sandstone, conglomerate and silt stone of the Alma Formation and sandstone, siltstone and shale of the Vaalwater Formation are characteristic of this area.



**Figure 9-1: Regional Geology description of the area**

#### 9.1.1.2 Local Geology

A Geotechnical survey of the site was conducted in 2014 and the information remains valid. The site is blanketed by colluvial gravels and residual sand derived from weathered granophyre belonging to the Bushveld Complex. Isolated outcrops of hard rock granophyre corestones (boulders) and sheets of soft rock hardpan ferricrete occur in the central and northern part of the study area. The property has been apportioned into two fairly general material horizons,

**Soil Zone “A”** covers the *major portion* of the site (some 25 hectares) and a generalized description of the typical soil profile that may be encountered here, is as follows:

**0,0 - 0,4:** Abundant coarse, hard Nodular Ferricrete and scattered Quartz Gravels, clast supported in a subordinate matrix of moist, khaki brown becoming dark yellowish brown, clayey sand; ferruginised pebble marker. Overall consistency is loose. Covered in places by light brown, loose, silty sand of colluvial origin.

**0,4 - 0,7:** Abundant coarse, soft and hard, orange and yellow, Nodular Ferricrete, clast supported in a matrix of moist, dark yellow, silty sand; ferruginised residual granophyre. Overall consistency is loose.

**0,7 - 2,3:** Moist, dark reddish orange speckled yellow and white, dense, relict jointed, clayey gravelly coarse SAND containing thin bands of dark yellow, ferruginised material; residual granite. Small to medium-sized, hard rock granophyre corestones (small boulders) are occasionally present within the profile.

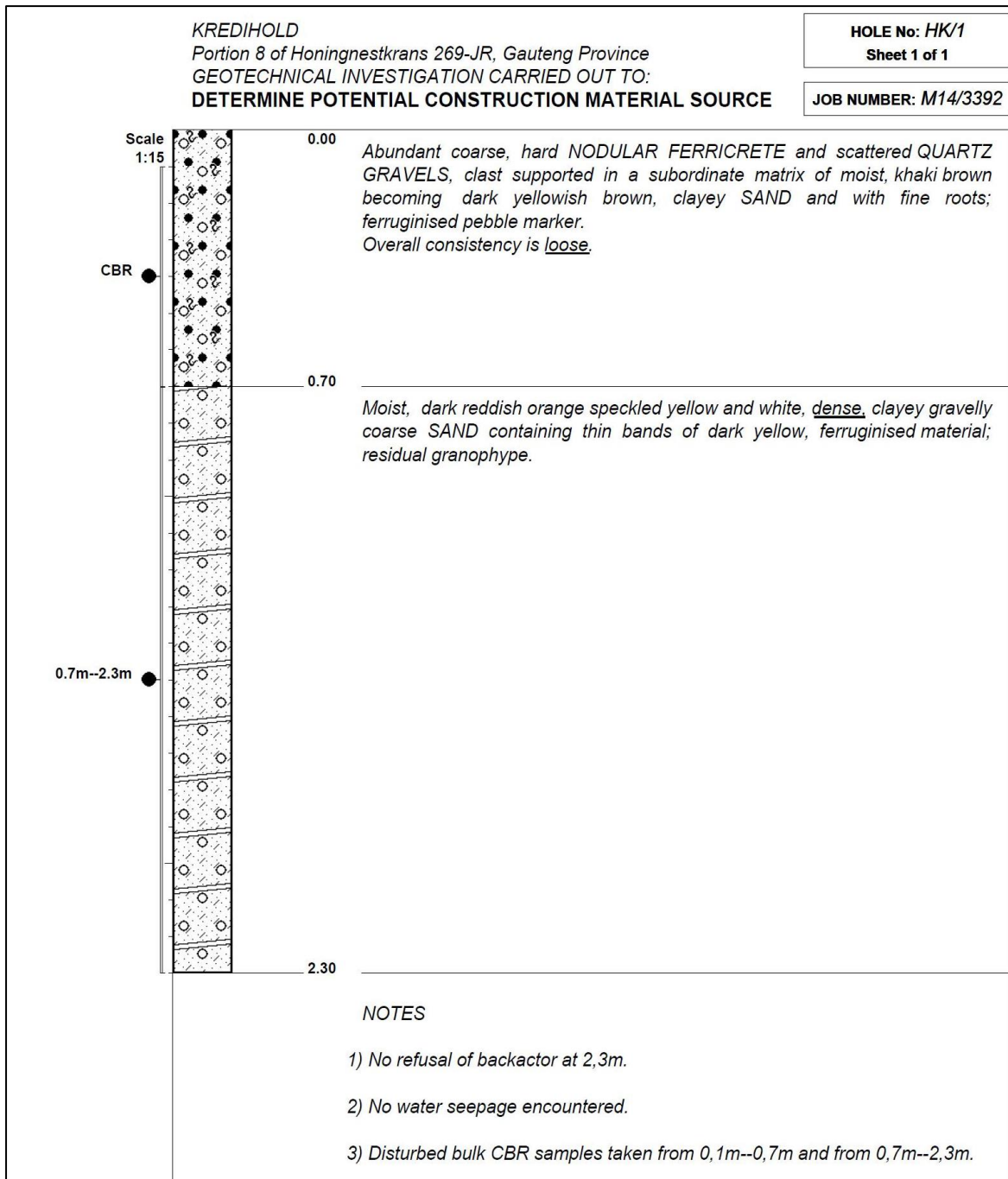
**Soil Zone “B”** is characterized by outcrop and sub-outcrop of soft rock hardpan ferricrete. Isolated

outcrops of hard rock granophyre boulders occur scattered across this area as well.

Slow excavation to gradual refusal of the backactor was experienced in Soil Zone "A" from below 1,8m in very dense residual granophyre and occasionally at shallower depth in hard rock corestones (small boulders). Abrupt refusal of the machine was experienced in Soil Zone "B" in hardpan ferricrete at a depth of less than 1,0m below surface. The water table, whether perched or permanent, was not encountered during the investigation in any test pit.

Based on the results of the foundation indicator tests and the compaction tests, it is evident that the blanketing gravelly horizon that extends down to a maximum depth of 1,0m below surface, should qualify as G5 quality material. It should be noted here that the gravelly horizon undulates and that the thickness thereof varies considerably over relatively short distances. The underlying residual granophyre has a higher plasticity index and lower compacted strength and the quality thereof ranges from G6 to G8 quality.

Several testing samples were taken as represented in the Geotech Specialist investigation and one of the soil profiles are given below as an example of typical soil conditions expected on Portion 8 of Honingnestkrans. For details regarding all testing trenches and soil profiles, refer to the Specialist investigation attached as Appendix.



**Figure 9-2: General Soil Profile from GEOTECH specialist investigation**

### 9.1.2 Climate

The study area receives summer rainfall and winters are typically very dry with frequent frost (Mucina & Rutherford, 2006). The site is situated in a tropical savannah (bushveld) region, which is climatically located on a more moderate to warmer region typical of the sub-tropical climate north of the Magaliesberg on lower altitudes. The area has a Mean Maximum Temperature of 29,1 to 31°C. The site itself has a Mean Minimum Temperature of 0, 1 to 2 °C.

### 9.1.2.1 Rainfall and Evaporation

The site falls within the summer rainfall area with dry winters. Mean Annual Precipitation (MAP) is from 500-700mm, gradually decreasing towards the northwest of the region while increasing gradually towards the southeast. From October to March the precipitation is at its highest, contributing to 83% of the MAP.

**Table 9-1: Mean climatic rainfall conditions for project area**

Month	Average Monthly Rainfall (mm)	Mean Monthly Evaporation (mm)
January	118.8	193
February	88.5	164.3
March	59.2	156.9
April	44.5	122.8
May	11.8	101.5
June	5.4	80.5
July	2.2	87.6
August	3.9	122.7
September	16.7	161.8
October	46.9	191.8
November	93.6	184.6
December	124.6	193.4
Annual	617.2	1 760.9

### 9.1.2.2 Wind characteristics

There are considerable special and periodic variations in ground winds in the Pretoria region. This is induced by topographical conditions influencing the flow conditions of air that is unique for several regions in Pretoria. Apart from this Pretoria is characterized by very low wind velocities.

The prevailing wind in the study area at the proposed site is south west to west-south-west. Regionally Pretoria receives wind that is predominantly north-east. The topography of the area causes low-level airflow along the valleys between the different ridges on Pretoria.

The available wind data for Pretoria as obtained from the National Weather Bureau indicate that the average wind direction and speed are as follow:

The prevailing wind, on a regional basis, is predominantly north-northeast, north-northwest and north.

The highest occurrence of wind is during October (28% calms) while the lowest wind occurrence is during July (55% calms). Wind in the Pretoria region is relatively poor with average 7km per hour compared to stronger winds of an average of 12km per hour that occur on the Witwatersrand.

### 9.1.3 Topography

The topography will be slightly variable ranging from slightly elevated in the North-east of the site and decreasing towards the South-west.



Figure 9-3: Regional Topography in relation to Mining Permit

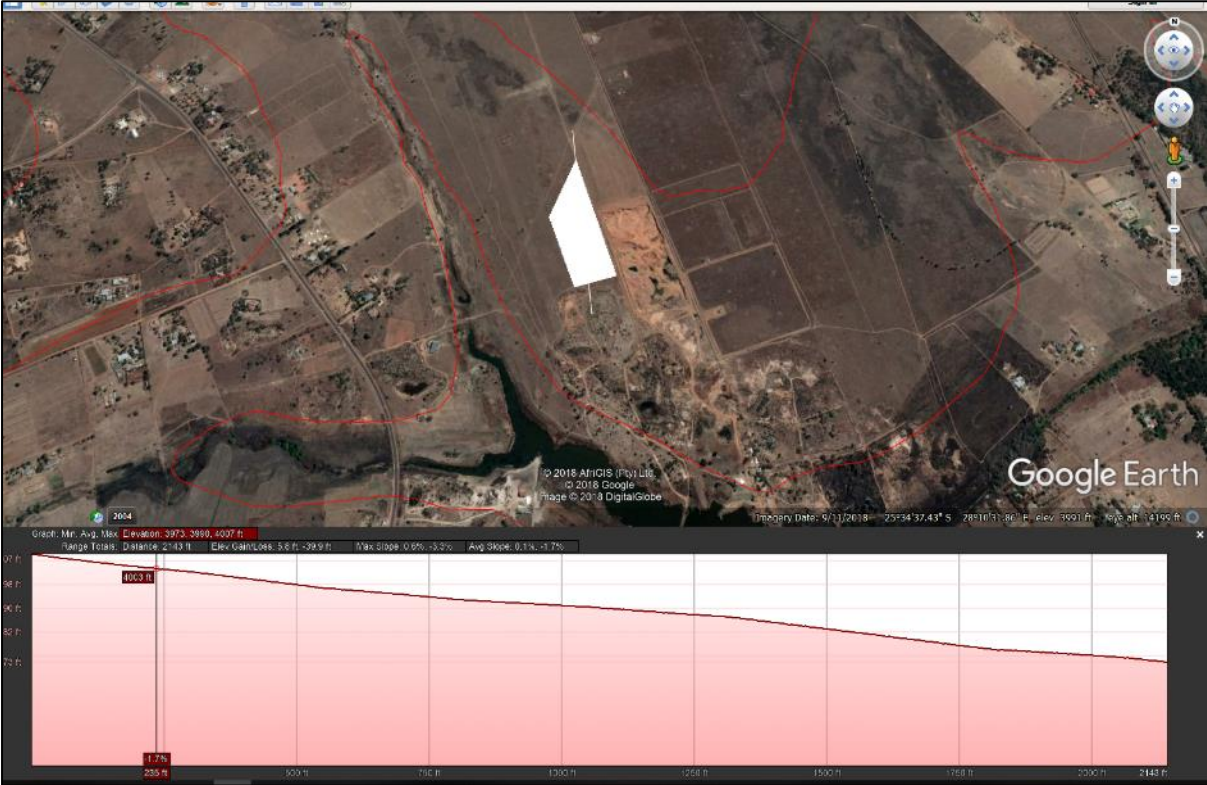


Figure 9-4: North towards South Elevation profile



**Figure 9-5: West towards East Elevation profile**

#### 9.1.4 Soils

The land type of the area coincides with the soil. This land type and soils is classified as Fa (soils with structure favouring arable land use is scarce or absent, dominated by low swelling clays). The soil in the area is well-drained, deep Hutton or Clovelly soils often with a catenary sequence from Hutton at the top to Clovelly on the lower slopes. Soils in the direct vicinity are Glenrosa and/or Mispah forms (other soil may occur) and lime is rare or absent in this landscape. The soil pattern coincides with soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. The land/soil has a low to moderate wind or water erosion hazard. The soil found on the surface of the site is Ferricrete.

It has a level to gentle slope and the soil may have low to very high erodibility. The current vegetation growth (what is left) plays however a crucial role in stabilizing these soils. The average depth of the soil along the north and east facing slopes as measured between the ground level and the start of a weathered layer of norite, is 0,5 to 3,0m.

Also refer to information gathered from the Geotech specialist study as included within Section 9.1.1.2 above.

From the Ecological assessment (Dimela Eco Consulting (Pty) Ltd, 2018), the following information regarding soils as encountered was provided: MsA soils in the most north-western tip of the site are shallow (300-600mm) and could include with rock outcrops. GS1/R in the northern section of the site comprise yellow-brown/brown weak blocky coarse loamy sand/sandy loam on saprolite/rock. The group dSd21 in the southern section of the site comprises of deep red soils and were cultivated. mSd21 is moderately deep soils on gravel or saprolitic diabase. Ms/R comprises brownish/grey structureless loamy sand on sandstone/quartzite with outcrops and sAr40 comprise shallow black clay



soil. W indicate areas where mining and quarrying took place.

### 9.1.5 Land Capability

#### 9.1.5.1 Land Use

The southern portion of the site is cultivated. Some portions in the far southern section of the site were fallow and *Vachellia karoo* (sweet thorn) trees and grasses re-established.

The area north of the dammed Kaalspruit has been mined and supported a number of invasive plant species. Smaller localised disturbances were recorded.

The grass underneath the Eskom powerline that stretches along the western boundary of the site has been mowed. The grassland on the northern portion of the site has been grazed in the past, while much of the portion that was assessed in the 2015 report was historically cultivated and likely planted with pasture grass.

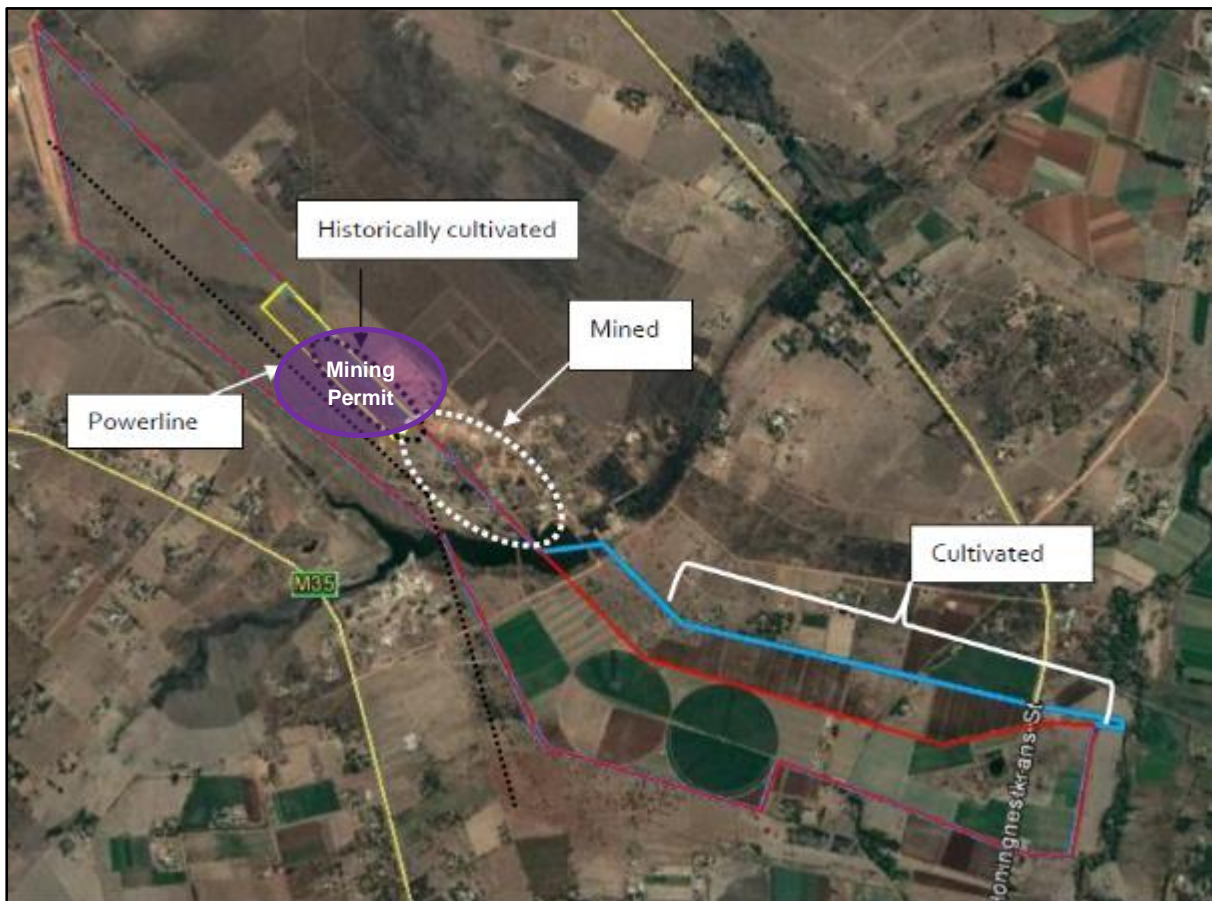


Figure 9-6: Land use description

### 9.1.6 Surface water

#### 9.1.6.1 Rivers and Drainage areas

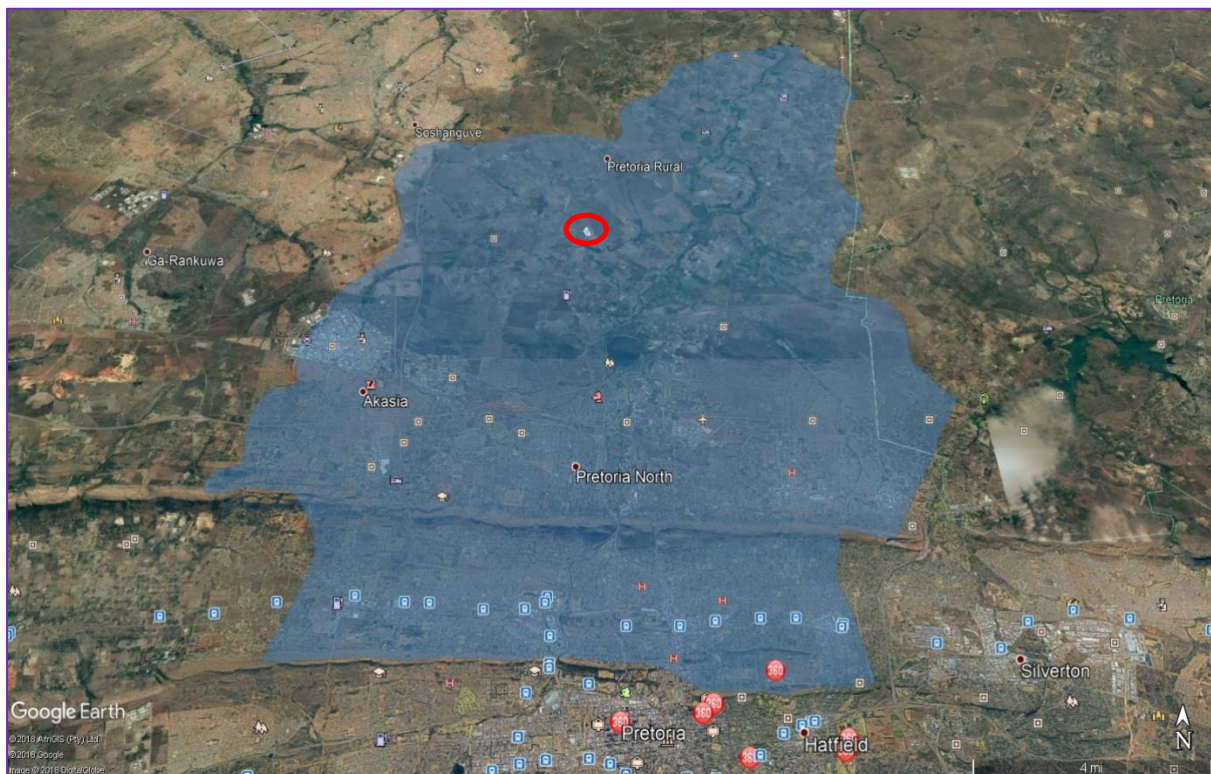
The proposed mining area will have an insignificant contribution towards the A23E Catchments area, due to its size and the distance from any drainage on the area. The water authority for this project will be the regional office of the Department of Water and Sanitation (DWS). No wetlands were recorded on the proposed mining area. However, to gain access to the study site an existing water crossing over a dam area will have to be used and upgraded.

Two wetlands namely a channelled valley bottom wetland and a seepage wetland are located 330m and 260m of the site respectively. The proposed crossing and road upgrade is located over a dammed section of the channelled valley bottom wetland approximately 780m downstream of the site. This channelled valley bottom wetland drains into the Apies River approximately 4.2km to the east of the crossing.

The depth of the ground water table is deeper than 3m but is influenced by seasonal factors. There are no boreholes on the area that will be mined in future.

The ground water has been used for many years for domestic purposes. No ground water will be used on the proposed mining site for purposes other than domestic use. The mining activities do not use water. Water is used for dust suppression on compacted soil surfaces to curb dust generation.

The project site is located within the Limpopo Water Management Area is a large and complex WMA comprising the Crocodile West, Marico, Limpopo and Luvuvhu catchment areas. Much of the area has low rainfall with significant inter-dependencies for water resources between catchments and with neighbouring WMAs.



**Figure 9-7: Quaternary Drainage Area in relation to site (A23E)**

WR2012 Information per Quaternary Catchment (A23E)	Values (mm/a)
Water Management Area	Limpopo: Region A (2016 New WMA)
MAP	674.18
MAR	29.3

### 9.1.6.2 Surface water quality

The project site is situated in the IUA1 as delineated in Government Notice No. 1388 of 8 December 2017. IUAs are classified in terms of their extent of permissible utilisation and protection as either Class I: indicating high environmental protection and minimal utilisation; Class II indicating moderate protection and moderate utilisation; and Class III indicating sustainable minimal protection and high utilisation. The IUA1 has been classed as Class III.

### 9.1.6.3 Background water Quality

Water quality monitoring of the surface water resources within the WMA is limited, with large percentage of the catchment area having no monitoring data available. Based on the data that is available, the present state of the salinity related water quality variables varies within the Crocodile West, Marico, Limpopo and Luvuvhu catchment areas. This is related to the development and associated impacts.

Within the Crocodile West catchment which is well monitored, the water resources are significantly impacted in terms of salinity, with the exception of the upper Elands catchment which has good quality water (ideal state). The water quality of the majority catchment area is predominantly in a tolerable state with respect to salinity; however the lower Crocodile River is in an unacceptable state. The Crocodile River and tributaries are impacted significantly by urbanisation, wastewater discharges and mining activities (platinum).

The water quality of the Upper Marico River is relatively good with water quality being in an acceptable state. The water quality of the lower Marico falls in the tolerable range in terms of salinity related water quality. High agricultural return flow is the major impacting activity. Water quality monitoring in the catchment is limited.

The water quality within the Limpopo and Luvhuvhu catchment area that is monitored is in an acceptable to ideal range for salinity. However, the salinity status is unacceptable in the upper Sand River catchment (A71A) and in Limpopo River at Musina.

The Sand River is impacted by coal mining in the area, and the Limpopo River's water quality is driven by the seasonal flows from Botswana, intensive irrigated agriculture and mining activities. There is potential for further coal mining within the catchment area

The information provided below was obtained from the Department of Water and Sanitation Monitoring programmes across South Africa (Resource Quality Information System – RQS) and only limited data is available for the area where the Sand mining is proposed, however, since it is the only data available at this stage, it is provided as background water quality data.



**Figure 9-8: DWS Monitoring points located downstream of the development**

**Table 9-2: Data available downstream of proposed development (A23\_100001112)**

Date/time	EC	NH4_N_Diss_Water	NO3_NO2_N_Diss_Water	pH	PO4_P	SO4
8/30/2006 10:25	76	2.4	3.4	7.8	4.2	64
1/18/2008 9:38	68	7.1	2.3	7.6	2.9	48
3/11/2008 13:08	177	2.9	0.05	8.1	3	152
4/9/2008 12:20	66	0.6	5.2	7.1	1.9	60
5/6/2008 12:22	58	0.7	2.5	8	1.2	66

**Table 9-3: Data available downstream at DWS sampling point (A23\_100001171)**

Date/time	Cl	EC	NH4_N	NO3_NO2_N	pH	PO4_P	SO4
1/18/2008 9:06	#N/A	34	0.05	0.4	8.4	0.05	31
3/11/2008 10:50	#N/A	44	0.7	0.4	7.2	0.2	53
4/9/2008 10:33	#N/A	44	0.4	0.8	7.8	0.05	59
5/6/2008 10:14	#N/A	46	0.2	0.5	8.7	0.05	60
6/18/2008 13:12	#N/A	#N/A	#N/A	1	7.9	0.05	55
7/16/2008 9:12	#N/A	#N/A	#N/A	1.2	8.2	0.05	54
7/16/2008 9:12	#N/A	59	0.2	#N/A	#N/A	#N/A	#N/A
10/21/2008 12:36	#N/A	#N/A	#N/A	0.4	7.6	6.6	#N/A
11/19/2008 10:23	#N/A	#N/A	#N/A	0.4	7.5	0.05	37
12/10/2008 8:40	#N/A	#N/A	#N/A	0.3	7.5	0.3	91
8/25/2009 12:39	#N/A	#N/A	#N/A	1.7	8.2	0.2	47
9/22/2009 10:44	#N/A	#N/A	#N/A	0.4	7.8	0.05	26
10/22/2009 10:59	#N/A	#N/A	#N/A	1.1	7.5	0.05	44
11/25/2009 10:59	#N/A	#N/A	#N/A	0.4	7.3	0.05	33
1/14/2010 10:28	#N/A	#N/A	#N/A	0.2	7.8	0.05	36
2/26/2010 10:52	#N/A	#N/A	#N/A	0.5	7.6	0.2	35

# Elemental

S U S T A I N A B I L I T Y  
sustaining our tomorrow, today

8/8/2012 8:00	#N/A	56.3	0.22	1.2	7.9	0.1	53
10/25/2012 8:00	#N/A	39	0.13	0.88	7.8	0.1	32
11/30/2012 8:00	#N/A	33.1	0.16	0.64	7.6	0.1	36
2/1/2013 8:00	#N/A	36	0.89	0.48	7.6	0.1	2.5

#### **9.1.6.4 Local Hydrology**

The Kaalspruit flows through the middle of the site in an easterly direction and is dammed on the site. The Apies River is situated about 150m east of the southern tip of the site. The non-perennial Metsi Metsuane River flows from north to south along the western boundary of the site, joining the Kaalspruit just west of the site.

The Kaalspruit and associated areas forms part of an Ecological Support Area (ESA) of the Gauteng Conservation Plan. The Apies River south of the site also forms part of an ESA.

#### **9.1.6.5 100 Year Run-off and Flood line Determination**

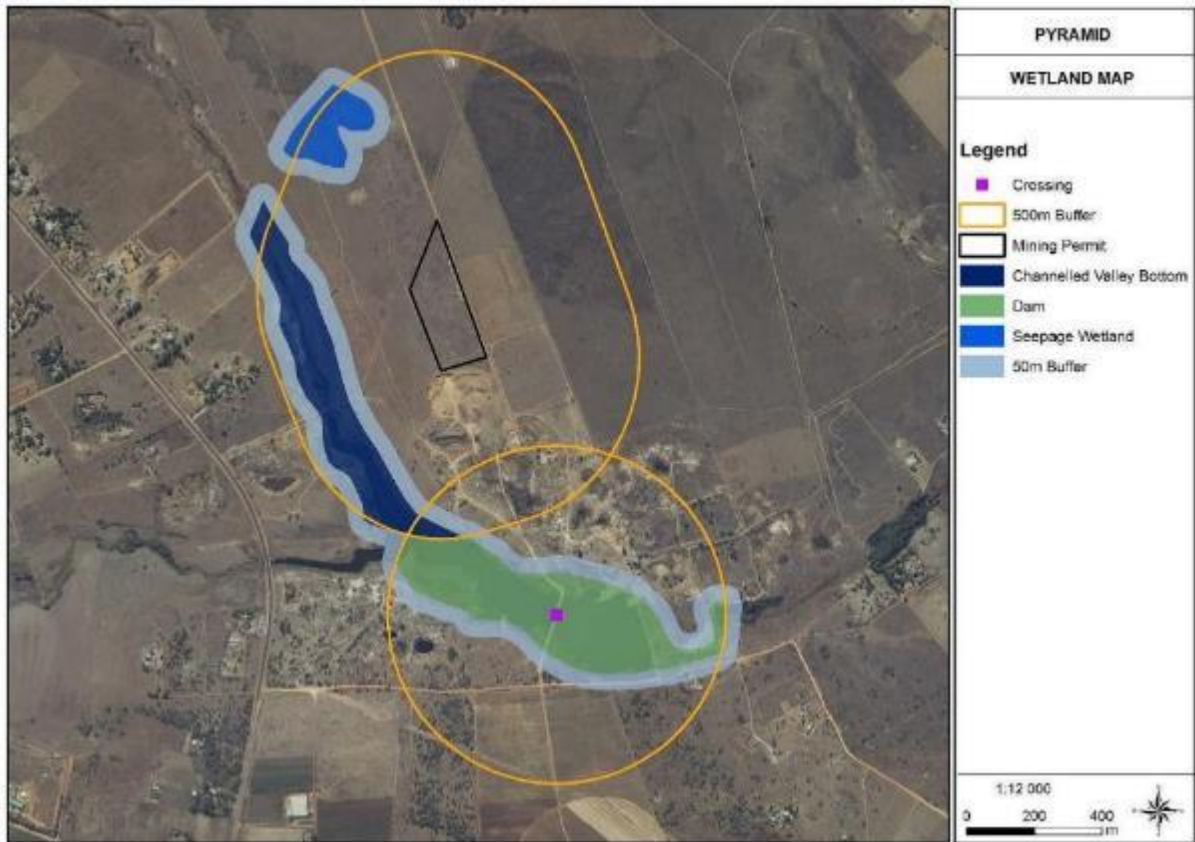
No formal floodline determination was done for the project; however, a wetland assessment was conducted to determine the risk of the activities on the two wetlands within 500m and the river crossing which will be upgraded. No activities will be within 100 m (refer to details provided in Section 9.1.7). These will be licensed according the Section 21(c) and (i) of the National Water Act, 1998 (Act No.36 of 1998).

#### **9.1.7 Wetlands**

A specialist wetland assessment was done for the proposed activities on Honingnestkrans (Limosella Consulting (Pty) Ltd, 2018). No wetlands were recorded on the proposed mining area. However, to gain access to the study site an existing water crossing over a dam area will have to be used and upgraded. Two wetlands namely a channelled valley bottom wetland and a seepage wetland are located 330m and 260m of the site respectively. The proposed crossing and road upgrade is located over a dammed section of the channelled valley bottom wetland approximately 780m downstream of the site. This channelled valley bottom wetland drains into the Apies River approximately 4.2km to the east of the crossing.

Several current and old quarry areas are located south and east of the study site. These areas exhibit several wetland features and standing water. This is however due to artificial sources and is not identified as natural wetlands of importance although it does provide habitat for several faunal and floral species.

The wetlands delineations below are informed by the Galago, 2015 delineations and were verified during the site assessment. A 50m buffer zone was calculated based on the method described in Macfarlane et al, 2015.



**Figure 9-9: The location and extent of watercourses and its associated generic buffer in relation to the study site.**

**9.1.7.1 Wetland/Riparian Functional Assessment**

The proposed crossing is located over a dammed section of a tributary of the Apies River. As a result, the hydrology and geomorphology is considered greatly altered from the reference state. The vegetation composition of the dam is generally exotic with some indigenous species. The species recorded include *Phragmites mauritianum*, *Typha capensis*, *Melia azedarach*, *Acacia mearnsii*, *Ricinus communis* var. *communis*, *Tagetes minuta*, *Verbena bonariensis* and *Morus alba* var. *alba*. The general characteristics are summarised visually in the figures below.





## Figure 9-10: Characteristics of the dammed section of the channelled valley bottom

### 9.1.7.1.1 Present Ecological Status (PES)

The dammed section of the channelled valley bottom scored an **E – Largely Modified**. The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable. The wetland's condition is likely to remain stable over the next 5 years.

### 9.1.7.1.2 Ecological Importance and Sensitivity (EIS)

The EIS score of **the dammed section of the channelled valley bottom** fall into a category characterised by **Moderate** ecological importance and sensitivity of **C**. Wetlands in this category are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water in major rivers (DWAF, 1999)

The Recommended Ecological Management Category is C following Rountree et al, 2013.

## 9.1.8 Water Authority

The relevant Water Authority is the Regional Department of Water and Sanitation (DWS) offices located in Pretoria.

## 9.1.9 Groundwater

Previous assessments for the site conducted in 2015 indicate that the water table is approximately 20-40meters deep.

No hydrogeological assessment was done for the Honingnestkrans Mining Permit or Prospecting as the aggregate/sand resource is shallow and ends between 2.5 – 3m below ground level. The Geotech survey noted that no water was encountered during any of the trenches/test pits and surveys conducted during sampling of the site.

There are no boreholes on the area that will be mined. The ground water has been used for many years for domestic purposes. No ground water will be used on the proposed mining site for purposes other than domestic use and dust suppression.

## 9.1.10 Ecology

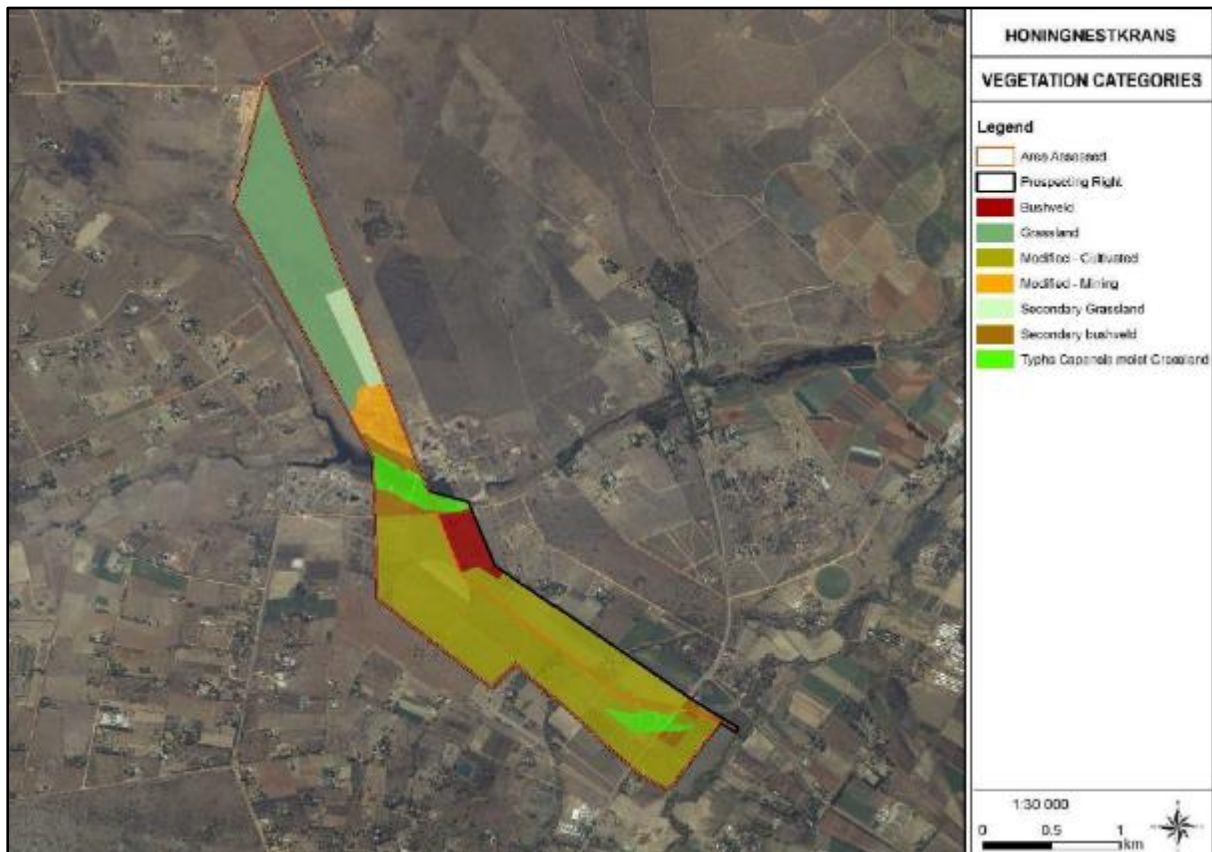
A specialist investigation was done to determine the current condition as well as the impacts that may result from the proposed developments for both the Mining Permit (*this application*) and the Prospecting – *separate application* (Dimela Eco Consulting (Pty) Ltd, 2018)

The site stretches of two vegetation types. The northern portion of the site falls within the Central Sandy Bushveld which is regarded as Vulnerable. The southern portion of the site is situated within the Marikana Thornveld vegetation type that is regarded as Endangered. The Marikana Thornveld is also listed as a Vulnerable ecosystem as the remaining natural habitat is only about 60% of its original extent.

Broad vegetation groups identified on the site were based on the overall similarity in species composition, vegetation structure and disturbance regimes. Due to the various current and past

disturbances on the site, a number of vegetation groups were delineated.

1. Modified and degraded;
2. Secondary bushveld;
3. Secondary grassland;
4. Grassland; and
5. *Typha capensis* vegetation associated with watercourses



**Figure 9-11: Vegetation Units as delineated during the field assessment**

Six plant species of conservation concern may have a possibility of occurring on the site. Three of these species (*Argyrobium campicola*, *Habenaria kraenzliniana* and *Stenostelma umbelliferum*) were historically recorded within 5km of the site and has a high likelihood of occurring. None of these species were recorded; however, these species are cryptic when not in flower.

*C graminicola* occurred sporadically within the grassland vegetation on the site. This species is listed as protected in the Transvaal Nature Conservation Ordinance Act No. 12 of 1983. These plants are not to be removed, damaged, or destroyed without permit authorisation from Gauteng Department of Agriculture and Rural Development (GDARD).

Much of the site comprised modified or secondary vegetation that pose no constraints to the activity. However, the grassland vegetation in the north of the site as well as the *Typha capensis* vegetation associated with watercourses were regarded as being of medium and high sensitivity. Grassland vegetation may support some plant species of conservation concern. The species that may be present will occur sporadically or scattered within the grassland and not grouped in a specific area. If

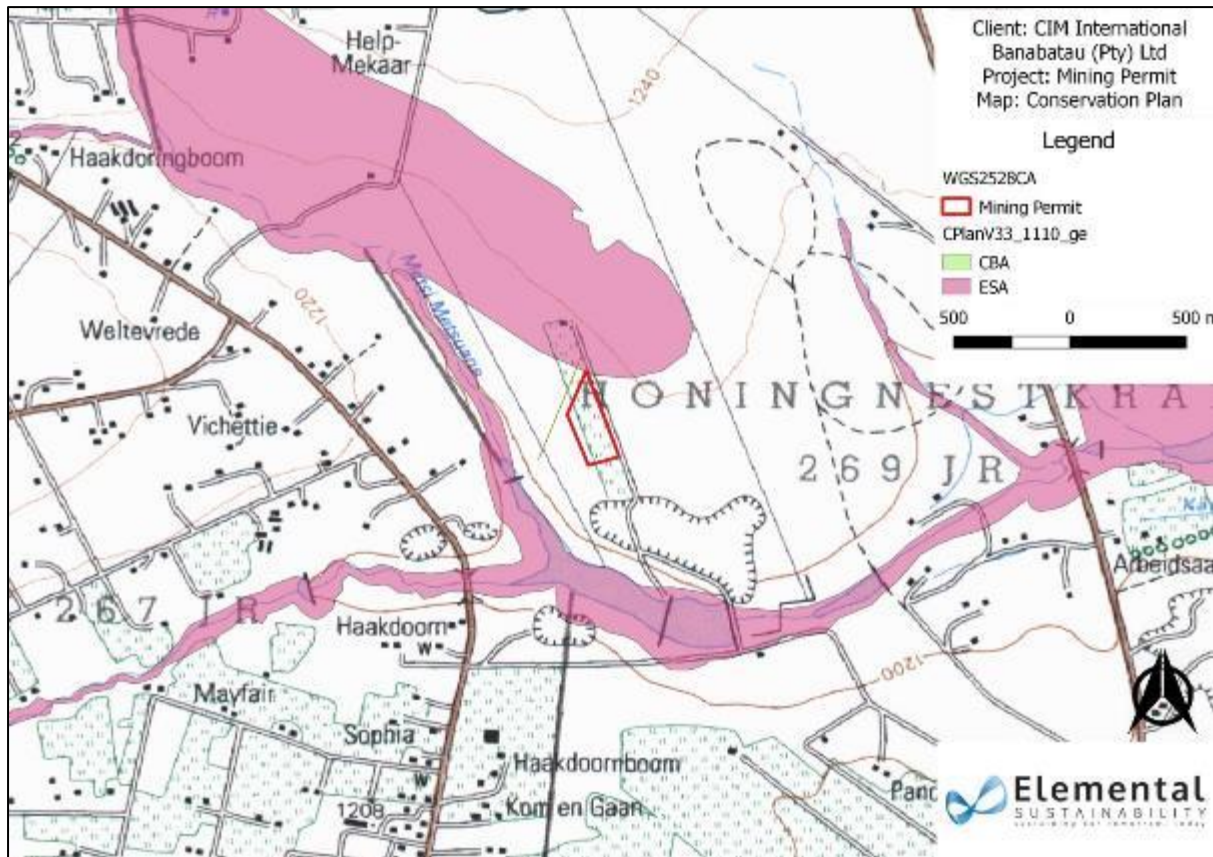
the footprint is kept to a minimum, the species could be avoided, particularly if the footprint is scanned for such species prior to commencement. The *Typha capensis* vegetation is associated with wetland conditions which increases the sensitivity of such vegetation.

The main conservation objectives for vertebrates are to try and protect as much of the natural habitat as possible and ensure the minimum impact in sensitive areas like the Kaalspruit and other wetlands on site. The activities are expected to have almost no significant impact on Red Data vertebrate species that might make at best only peripheral use of the study area. From a vertebrate perspective, there is no objection against prospecting or mining if the mitigation measures are adhered to. However, a full survey of the whole area is necessary before any mining takes place.

#### **9.1.10.1 Gauteng Conservation Plan**

The Gauteng Conservation Plan (Version 3.3) (GDARD, 2011) classified areas within the province based on its contribution to reach the conservation targets within the province. These areas are grouped as Critical Biodiversity Areas (CBAs) or Ecological Support Corridors (ESAs). The CBAs comprise 'Irreplaceable' areas that must be conserved and areas classified as 'Important' to reach the conservation targets of the Province. ESA's are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration to ensure sustainability in the long term.

According to the Gauteng Conservation Plan (version 3.3), the Kaalspruit and associated areas forms part of an ESA. The Apies River south of the site also forms part of an ESA. ESA's are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration.



**Figure 9-12: Gauteng Conservation Plan**

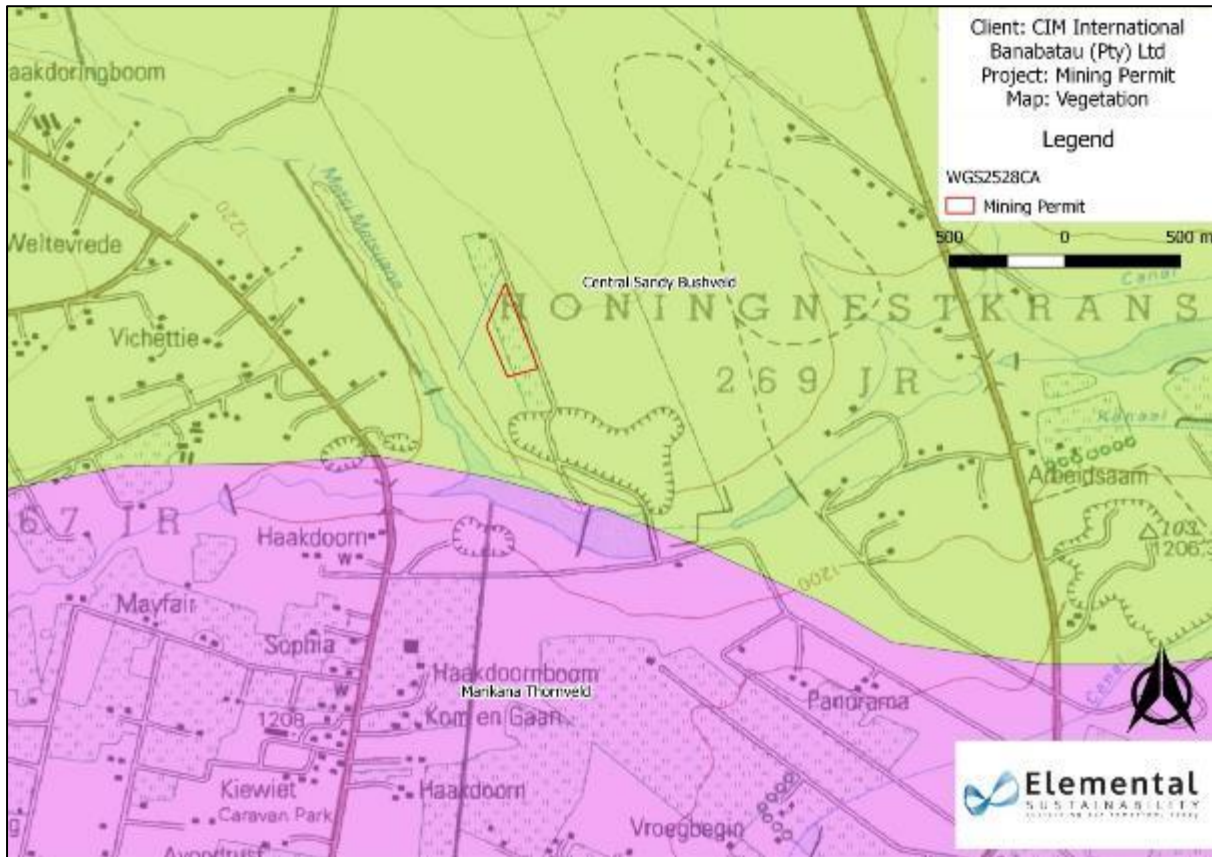
**9.1.10.2 Overview of historic vegetation type**

The site is situated within the Savanna biome of South Africa and in specific within the Central Bushveld Bioregion. The Savanna biome is the largest biome in southern Africa, occupying over one-third of the surface area of the country (Mucina & Rutherford, 2006). It is characterised by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense, as Woodland, and the intermediate stages are commonly known as Bushveld (Mucina & Rutherford, 2006).

The site stretches of two vegetation types. The northern portion of the site falls within the Central Sandy Bushveld which occurs on low undulating areas, sometimes between mountains, and sandy plains and catenas supporting tall, deciduous *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils and low, broad-leaved *Combretum* woodland on shallow rocky or gravelly soils (Mucina & Rutherford, 2006). Species of *Vachellia*, *Senegalia*, *Ziziphus* and *Euclea* are found on flats and lower slopes on eutrophic sands and some less sandy soils such as the site. *Vachellia tortilis* may dominate some areas along valleys. The herbaceous layer is grass-dominated with relatively low basal cover on dystrophic sands. Less than 3% of this vegetation type is statutorily conserved and it is regarded as Vulnerable.

The southern portion of the site is situated within the Marikana Thornveld vegetation type (Mucina & Rutherford, 2006). In its undisturbed, natural state, the Marikana Thornveld comprises open *Vachellia karroo* woodland occurring in undulating landscapes and some lowland hills. Shrubs are denser in drainage lines, termitaria and on rocky outcrops (Mucina & Rutherford, 2006). This vegetation type is

impacted and up to 50% is transformed by cultivation and urban expansion (Mucina & Rutherford, 2006). This vegetation type is regarded as Endangered as less than 50% of its original extent is currently still in a natural state and it is not well protected in formal reserves (Mucina & Rutherford, 2006).



**Figure 9-13: Two Vegetation types as described in (Musina & Rutherford, 2011)**

**9.1.10.3 Listed Ecosystems**

The National Environmental Management: Biodiversity Act (Act 10 of 2004) provides for listing threatened or protected ecosystems in one of four categories: critically endangered (CR), endangered (EN), Vulnerable (VU) or Protected (Section 52(1)(a) of the National Environmental Management: Biodiversity Act (Government Gazette 34809, Government Notice 1002, 9 December 2011)). The ecosystem status is based on the percentage of original area remaining untransformed (by croplands, mining, urban development & roads) in relation to the biodiversity target and a threshold for ecosystem functioning. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems.

The Marikana Thornveld is listed as a Vulnerable ecosystem as the remaining natural habitat is only about 60% of its original extent.

**9.1.10.4 Existing Vegetation and Avifauna Report (Done in 2015)**

Enviflora conducted a vegetation and avifauna assessment on a portion of portion 8 of the site in

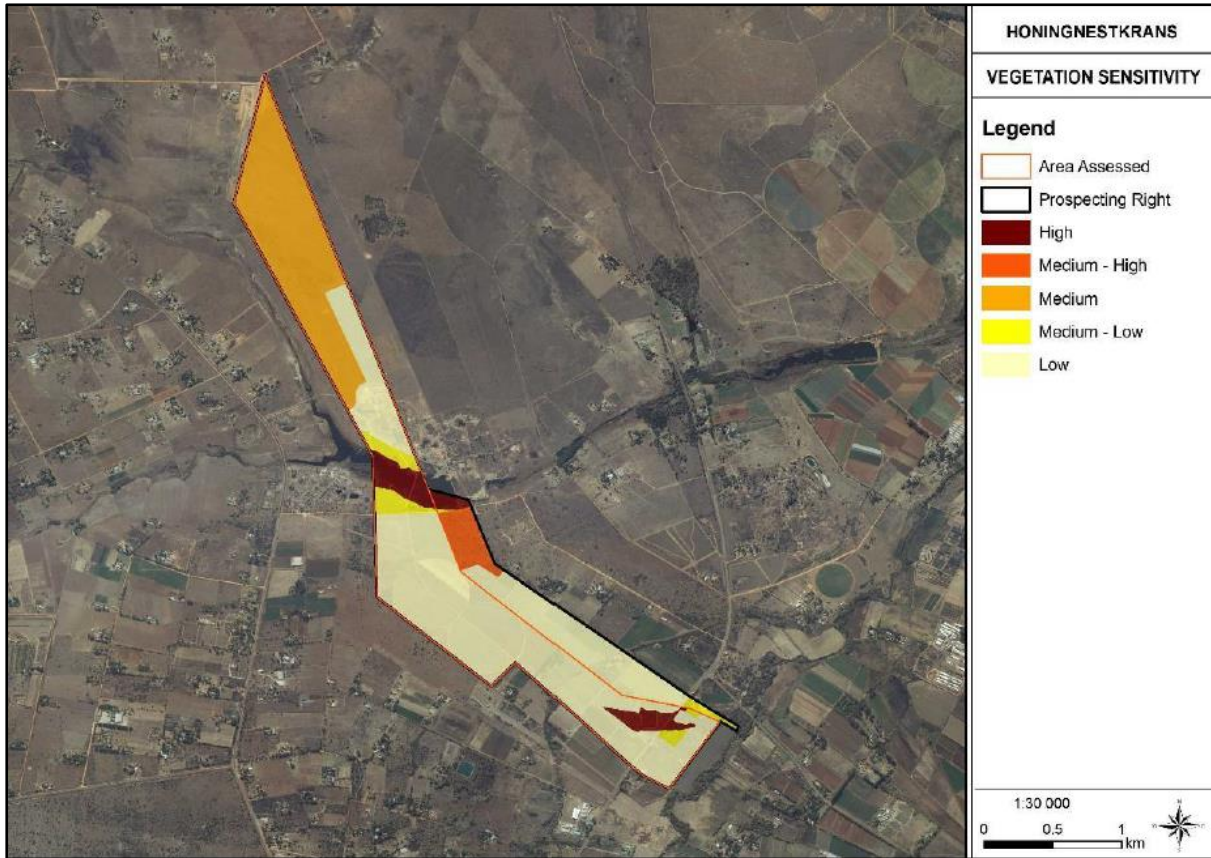
2015 (Enviflora, 2015). The study found that the site consisted of grassland vegetation which has evidently been subjected to veld fires in the past, as well as some grass harvesting for cattle feed. No savannah characteristics existed on the site and the vegetation was not representative of the Central Sandy Bushveld. Furthermore, no plant species of conservation concern were recorded. The study site and immediate surrounds were considered as being of low to medium conservation value.

The results of the avifauna assessment stated that the habitats on site may favour some Red Data avifaunal species (Secretary bird & African Grass-owl,) in terms of suitable foraging habitat on and surrounding the study site. Due to the high level of human disturbance and movement in and around the study area, no suitable breeding and roosting habitat was found for Red Data avifaunal species. Avifaunal species observed on or that are likely to occur on the study site are the more common avifaunal species associated with the various habitat systems and species that are able to adapt to areas transformed by man and the site was considered as low conservation value for Red Data avifauna species.

#### **9.1.10.5 Sensitivity Mapping**

Much of the site comprised modified or secondary vegetation that pose no constraints to activities proposed. However, the grassland vegetation in the north of the site as well as the *Typha capensis* vegetation associated with watercourses were regarded as being of medium and high sensitivity to the proposed activities.

Grassland vegetation may support some plant species of conservation concern. The species that may be present will occur sporadically or scattered within the grassland and not grouped in a specific area. If the footprint is kept to a minimum, the species could be avoided, particularly if the footprint is scanned for such species prior to commencement. The *Typha capensis* vegetation is associated with wetland conditions which increases the sensitivity of such vegetation. However, mitigation measures can be implemented to limit the impact on such vegetation.



**Figure 9-14: Sensitivity as determined**

**9.1.10.6 Plants of Conservation Concern (Red Data species)**

**9.1.10.6.1 Threatened species or species of concern**

The Threatened Species Programme of the South African National Biodiversity Institute (SANBI) published the Red List of South African Plants (Raimondo *et al*, 2009). An online version provides up to date information on the national conservation status of South Africa's indigenous plants. The Red List includes the Threatened species and makes provision for additional categories. These are referred to as Plants of Conservation Concern and are those plants that are important for South Africa's conservation decision making processes and include all plants that are Threatened, Extinct in the wild, Data deficient, Near-threatened, Critically rare, Rare and Declining. These plants are also referred to as Red and Orange Listed plants.

A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) checklist (SANBI, 2009), Raimondo *et al*, (2009) and information received from the Gauteng Department of Agriculture and Rural Development (GDARD) (Mills, 2018). The list consisted of eighteen (18) plants of conservation concern that were previously recorded in the quarter degree squares that the site is situated in. However, only six (6) may have a possibility of occurring on the site (Appendix C in the Ecological Assessment). Three of these species (*Argyrolobium campicola*, *Habenaria kraenzliniana* and *Stenostelma umbelluliferum*) were historically recorded within 5km of the site and has a high likelihood of occurring. None of these species were recorded; however, these species are cryptic when not in flower.

#### 9.1.10.6.2 Provincially protected species

A number of provincially protected plants are listed in the Transvaal Nature Conservation Ordinance Act No. 12 of 1983. These plants are not to be removed, damaged, or destroyed without permit authorisation from Gauteng Department of Agriculture and Rural Development (GDARD). All *Crinum* species naturally occurring in Gauteng are listed as protected and therefore the *Crinum graminicola* species on site can only be removed or destroyed once a permit authorising the activity is granted by the Gauteng Department of Agriculture, and Rural Development (GDARD). *C. graminicola* occurred sporadically within the grassland vegetation on the site.

#### **9.1.10.7 Vertebrates**

##### 9.1.10.7.1 Red Listed Mammal Species Identified:

There is a slight possibility that two shrew might occur on the study site, the Maquassie musk shrew (*Crocidura maquassiensis*) with Red Data status of “Vulnerable” and the swamp musk shrew (*Crocidura mariquensis*) with Red Data status of “Near Threatened” (Child et.al. 2016). Shrews exist at the apex of the food pyramid, which means that their population numbers are inevitably significantly lower than that of similar-sized herbivorous mammals and especially of their smaller prey species.

Hedgehogs are “Near Threatened” as result of interference by humans and their pets. Under natural conditions, the passive defence mechanisms of these rather docile insectivores are sufficient to maintain breeding populations in a healthy condition. Considering the relatively undisturbed nature of the site and connectivity, it is considered possible that a small population of hedgehogs persists.

Brown hyenas have been prosecuted to the point that they are deemed as “Near Threatened”. Brown hyenas are known to range far and wide and it must therefore be accepted that vagrants occasionally wander onto the study site.

The site includes the Kaalspruit, which is a tributary of the Apies River. It is possible that the Cape clawless otter (*Aonyx capensis*) with the Red Data status of “Near Threatened” and even the Spotted-necked otter (*Hydricotis maculicollis*) with the Red Data status of “Vulnerable” do occur on the study site.

There is a small possibility that the African striped weasel (*Poecilogale albinucha*) with the Red Data status of “Near Threatened” could occur on the site.

Considering the attraction of the wetlands (Kaalspruit) it is most likely that the Red Listed bats like Mauritian tomb bat (*Taphozous mauritanus*), Blasius’s horseshoe bat/peak-saddle horseshoe bat (*Rhinolophus blasii*) and short-eared trident bat (*Cloetis percivali*) would hawk there for invertebrates at dawn.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

##### 9.1.10.7.2 Red Listed Bird Species Identified

Based on the most recent assessment of the threatened status of South Africa's avifauna (Taylor, et.al. 2015), a total of 22 Red Data avifaunal species are expected possibly to use the site and its surroundings, given the quantity and quality of the habitats available. The species listed are also influenced by their occurrence in the extensive Magaliesberg Mountain Range to the south of the site.



With perhaps the exception of Grass Owls, no Red Data species will breed on the study site. Due to the limited extent and quality of the habitats, half the species are expected to be at best erratic visitors and the other half are only expected as infrequent vagrants, their inclusion being primarily due to the Precautionary Principle. As can be seen from the estimates of the habitats as support for the basic requirements of the species, they are considered at best as only mediocre for all the threatened species.

#### 9.1.10.7.3 Red Data Listed Herpetofauna identified

The study site falls outside the natural range of the Nile crocodile (*Crocodylus niloticus*) and this species should not occur on the study site.

The study site falls within the natural range of the Southern African python (*Python natalensis*). According to Bradley (1990), Southern African pythons favour moist, rocky, well-wooded valleys, plantations or bush country, but seldom if ever stray far from permanent water. The study site is not large enough (234ha) to support a viable population. It is often estimated that a single python needs at least a 100 ha area to forage. A few pythons may use the site as part of their home range. Good python habitat occurs south of the study site in the Magaliesberg Biosphere Reserve, but they would not migrate to and from the study site itself under normal circumstances due to various anthropogenic influences.

The Southern African python's national status has improved from "Vulnerable" (Branch, 1988) to regional "Least Concern" (Alexander, 2014), although it is currently still a ToPS-listed species (Threatened or Protected Species).

The study site falls inside the natural range of the striped harlequin snake (*Homoroselaps dorsalis*), but the study site contains no moribund termitaria, where this species is most likely to be found. It is difficult to confirm whether this cryptic snake is present on any study site, but a small possibility exists that this snake species occurs on this study site.

The study area falls inside the natural range of the coppery grass lizard (*Chamaesaura aenea*), but the site is severely disturbed. Therefore, only a small possibility exists that this lizard occurs here.

The site and its buffer areas contain temporary water bodies, which are potential breeding places for giant bullfrogs (*Pyxicephalus adersus*). Giant bullfrogs prefer warm, stagnant water, which giant bullfrog tadpoles need for rapid development (Van Wyk, Kok & Du Preez, 1992). Bullfrog breeding sites are mostly temporary in order to avoid predation from fish. Some of the water bodies on the study site have gentle slopes, which giant bullfrogs prefer. A gentle slope allows for shallow water (less than 10cm deep), which enables the female bullfrog to stand when she lays her eggs outside the water for the male to fertilise. Many parts of the study site consist of sandy soil and are very suitable as dispersal areas, which combine feeding and aestivation. It is essential that the soil be suitable for burrowing on a daily basis during the short activity period at the beginning of the rainy season and for deeper retreats during the resting periods.

It is important to note that in the latest literature (Measey (ed.) 2011 and Carruthers & Du Preez, 2011); the giant bullfrog's status has changed officially from "Near Threatened" (Minter *et al*, 2004) to "Least Concern" in South Africa. In Gauteng, South Africa, the decline in numbers has led to the species being regarded as a conservation concern (Du Preez & Carruthers, 2017).

## 9.1.11 Air Quality

No Air quality assessment was done for the Honingnestkrans Mining Permit or Prospecting. The expected impact as a result of the Sand Mining is dust generation, which will be mitigated by dust suppression.

## 9.1.12 Noise

Existing sources of noise in the area include the operational mines, community related noise / sounds (e.g. children playing), and roads.

### **4.1.1.2 Potential Noise sources from the development**

Construction activities would include:

- Upgrades to the existing water crossing;
- Site establishment (such as vegetation clearance);
- Vegetation and topsoil removal; and
- Removal of resource and transport to markets

## 9.1.13 Sites of Archaeological, Historical and Cultural Interest

A specialist investigation was done to determine the heritage baseline and the impacts that may be expected for both the Mining Permit (*this application*) and the Prospecting – *separate application* (Coetzee, 2018).

### **9.1.13.1 Previous Research for Honingnestkrans**

#### **9.1.13.1.1 Mining Right application for a quarry on Portion 8 of the farm Honingnestkrans 269 JR**

A Phase 1 HIA, conducted by Leonie Marais-Botes Heritage Practitioner (2015) for a mining right application on a portion of portion 8 of the farm Honingnestkrans 269 JR revealed no material of heritage importance.

However, the exact area surveyed is not clear. According to the report, one intact structure and the remains of another were identified, but did not exceed 60 years of age. The locations of these structures are not mentioned.

It should also be noted that the DMR refused the mining right application.

#### **9.1.13.1.2 Onderstepoort Ext. 33, 34, A, B and C Development**

A Heritage Impact Assessment was done for the establishment of Onderstepoort Ext. 33, 34, A, B & C located on portions 68, 69, 112, 113, 114, 115 and 116 of the farm Onderstepoort 266 JR within the Tshwane Metropolitan Municipality. The development consists of developing residential, commercial, infrastructural and municipal components. The site is located 5.6 km northwest of the proposed activities concerned in this report and borders Soshanguve. PGS Heritage & Grave Relocation Consultants surveyed the area and located 14 heritage sites: Two cemeteries and 12 structures.

These sites include several stone-walled enclosures that might date to the South African War, circular stone-walled enclosures dating to the Late Iron Age, more recent rectangular cement brick dwellings and brick structures (Birkholtz 2012).

#### 9.1.13.1.3 Onderstepoort X42 mixed use Township establishment

Van Der Walt (2015) conducted an Archaeological Impact Assessment on portions 297, 299 and 303 of the farm Haakdoornboom 276 JR for the establishment of the Onderstepoort Ext. 42 mixed use township. Although the general area is well known for LIA material culture, the study did not identify any heritage material exceeding 60 years of age. This might possibly be due to the high level of disturbance associated with the project area. The site is located about 5 km west of the proposed activities concerned in this report.

#### 9.1.13.1.4 Quarry expansion and development on the farm De Onderstepoort 300 JR

Pelser (2017) conducted a Phase 1 AIA for the expansion of an existing quarry on portions 53, 127 and 131 of the Farm De Onderstepoort 300 JR and a new development on portion 135 of the same farm. The study mainly identified heritage sites dating to the LIA, as well as recent historical features and a graveyard. Historical and more recent quarrying caused portions 53, 127 and 131 to be relatively disturbed. Portion 135 is less disturbed and some historical diggings are found in the vicinity. The graveyard consists of roughly 50 graves, most of which are without dates but appear to exceed 60 years of age. Other remains include an abandoned brick works facility of which the date is unknown and several stone-walled features dating to the LIA. The LIA sites include cattle kraals, possible hut bays and agricultural terracing. Accordingly these sites are typical of Tswana settlements dating to between the late 17th and mid-19th Centuries (Pelser 2017).

### **9.1.13.2 Statement of Significance**

#### 9.1.13.2.1 The study area: Portions 7, 8 and 224 of the Farm Honingnestkrans 269 JR

As can be seen from previous research done in the area the general region is significant from a heritage perspective. Heritage sites are likely to include graveyards, Iron Age/Farmer and Historical remains. Since heritage sites, such as graves, are not always clearly identifiable as it might consist of stone cairns, care must be exercised.

Figure 9-15 indicates the study area on a 1939 topographical map, meaning that the features visible on the map are 79 years of age. A high concentration of huts can be observed around the middle of the area demarcated for prospecting (*concurrent application*). The topographical map dating to 1965 (Figure 9-16) shows a concentration of huts in the same location as the 1939 map, as well as further to the north and a grave to the south. Residences are also visible around the middle of the project area, as well near the southern boundary. Material culture visible on Figure 9-16 will be 53 years of age. Figure 9-17 indicates the study area on an aerial backdrop dating to 1958, making the visible remains 60 years of age. On this map several residential areas can be observed, as well as a disturbed area where the huts on the topographical map appear.

Based on the inspection of the historical and topographical maps two potentially sensitive areas have been identified. It should be noted, however, that the potentially sensitive areas might not be limited by these boundaries.

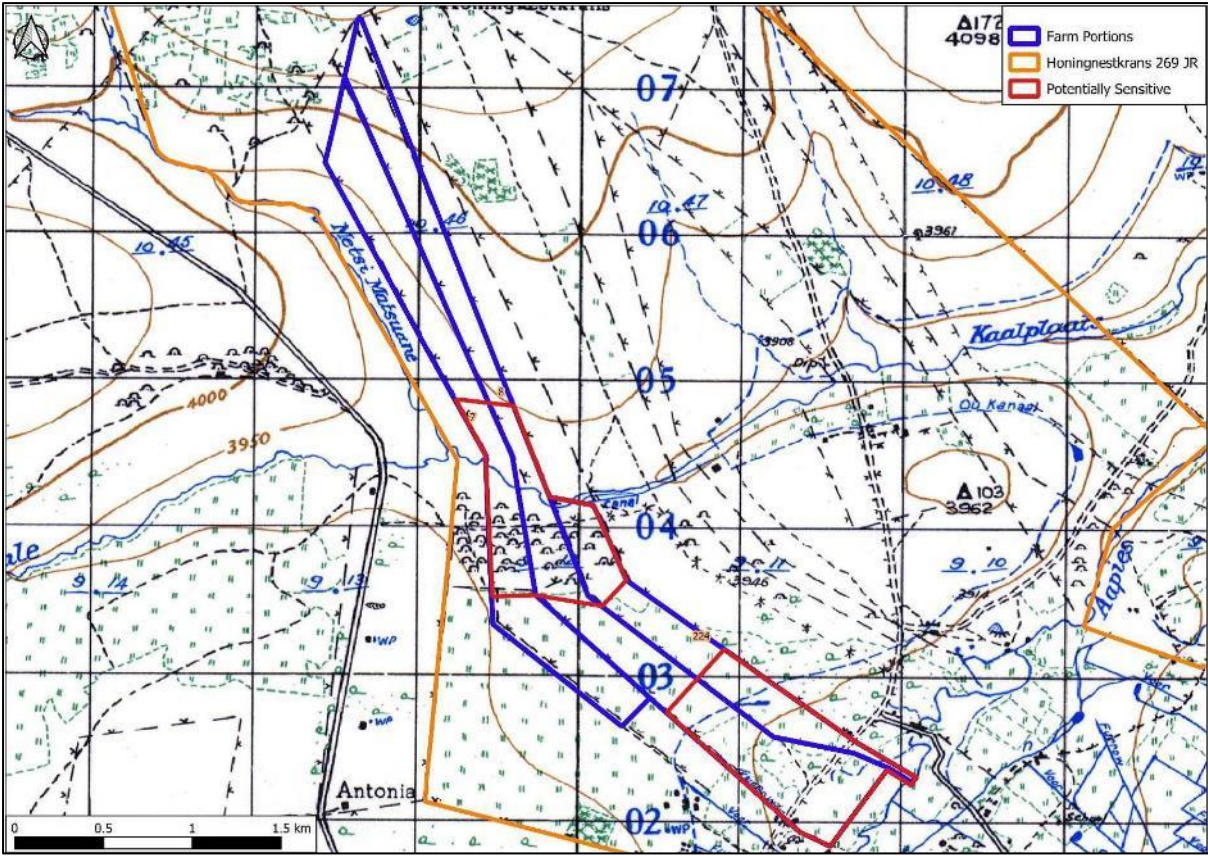


Figure 9-15: Segment of 1939 SA 1: 50 000 CA indicating the study area

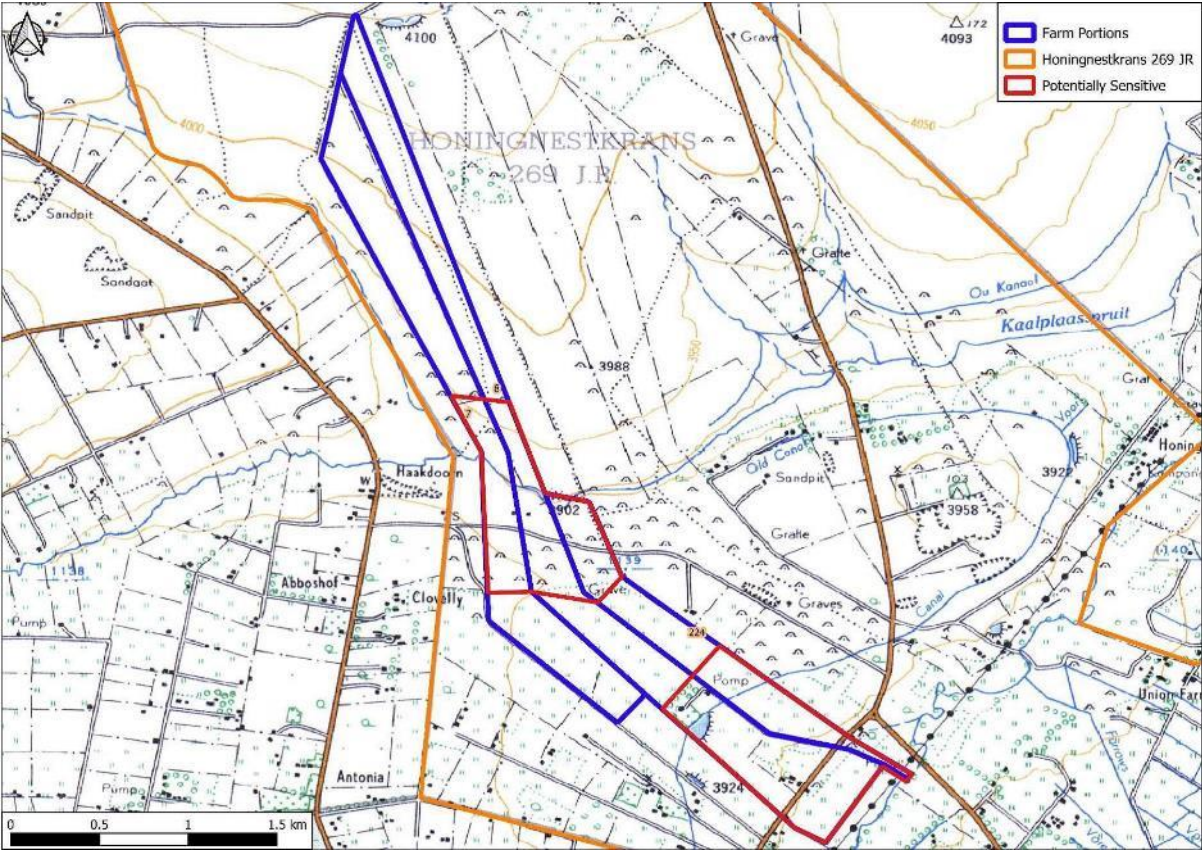
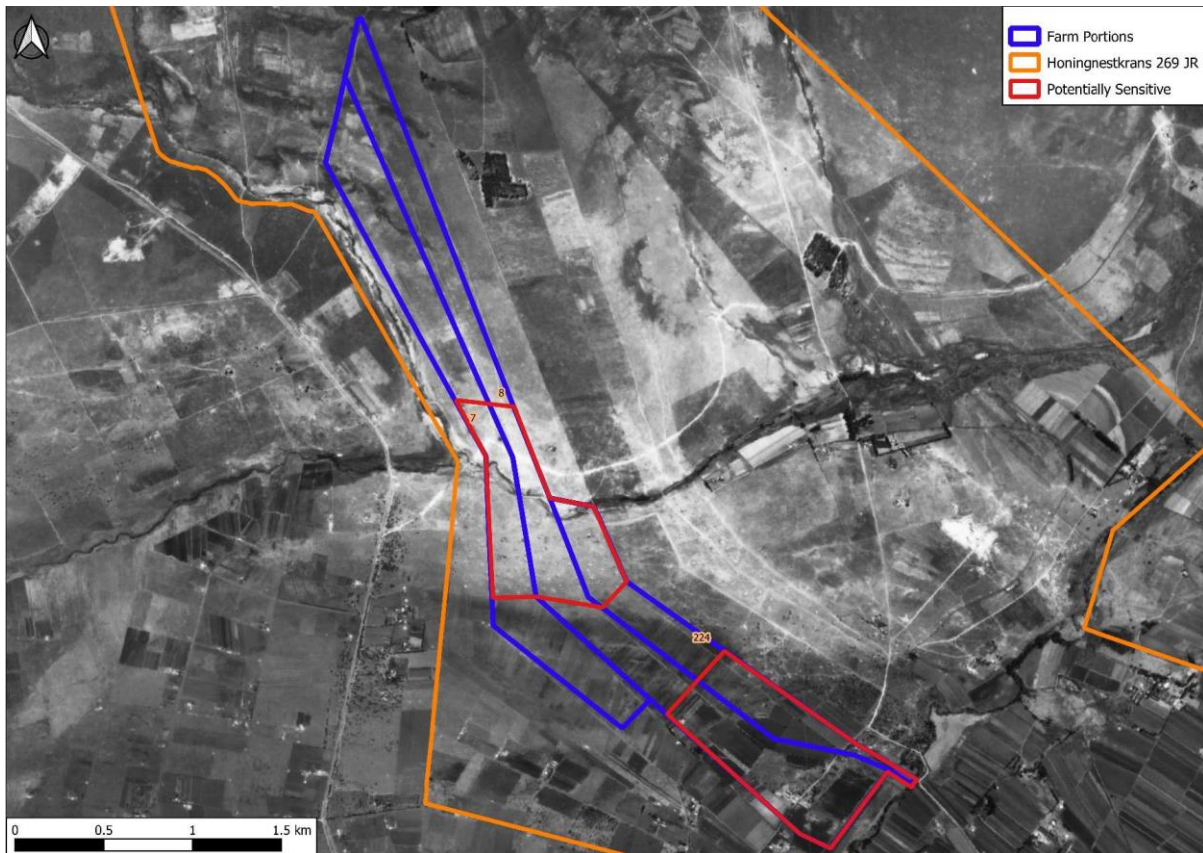


Figure 9-16: Segment of 1965 SA 1: 50 000 2528CA indicating the study area



**Figure 9-17: Site on aerial backdrop dating to 1958**

#### 9.1.14 Visual Aspects

No Visual assessment was done for the activities as the area has already been subjected to alterations and previous sand mining operations and the impact from the mining permit footprint will be similar to the existing impacts on site.

##### 4.1.1.2 Landscape Integrity

Landscape integrity is visual qualities represented by the following qualities, which enhance the visual and aesthetic experience of the area:

- Intactness of the natural and cultural landscape. The proposed development is already disturbed by the various activities as identified within this document.
- Lack of visual intrusions or incompatible structures. Various visual intrusions are already present; and
- Presence of a 'sense of place. The "sense of place" has already been much degraded as a result of the existing and ongoing sand mining activities and the farms surrounding the various developments are the only aspects keeping the natural veld characteristics that may be seen.

Another factor which will influence the degree of visual impacts is the backdrop against which it is viewed. When viewed from close up, landscape elements are usually seen against the sky and are more visible. When the same elements are viewed from close up against a backdrop of similar colour, they tend to be more "hidden". Short range visual impacts of will be limited to some extent by having the backdrop of the already existing sand mining footprints and activities.

Regionally, the visual character can be described as rurally agricultural, interspersed with sand mining land uses. Thus, although the proposed Sand Mining activities is more visible in this area than in areas with greater topographical ruggedness or a higher level of visual variation, it is not an uncommon sight and can be considered compatible with the regional visual character of the City of Tshwane, even though the presence of additional sand mining footprint causes a negative visual intrusion on the landscape.

### **9.1.15 Regional Socio-Economic Structure**

No Socio-Economic study was done for the proposed development and the information to provide the Socio-Economic backdrop of the region was provided by Region 2 RSDF 2017 (City of Tshwane, 2017).

#### **9.1.15.1.1 *Regional Characteristics***

The region presents a diverse character and distinct areas can be identified:

- The urban North, including the urban core area of Hammanskraal (Kudube x4) accommodating low-income persons on relatively small individual erven.
- The central and eastern Agriculture and Conservation Zones (west and east of the N1 highway) primarily undeveloped.
- The Southern Zone including the urban core area around Kolonnade centre and the Zone of Choice, a low density formally developed suburban area.

The northern areas of the region include Hammanskraal, Kudube, Stinkwater, Suurman and Babelegi and are located on the northern periphery of the CoT. The area although urban in character is not integrated with the larger urban environment of the metropolitan area.

The area is characterised by low density settlements, with concentrations of subsidised housing and informal settlements. Limited economic activities occur and most employment opportunities are in the Inner City, although this area is far from the city centre. The area accommodates the Babelegi industrial area, previously subsidised by government to provide job opportunities. This area has however been seriously affected by the cutting of subsidies and toll road strategy.

Residents are very dependent on public transport. There are crucial gaps in the transportation network, both in terms of road and rail. The area is further characterised by a poor network of social infrastructure, limited retail facilities, limited investment by the private sector and major backlogs in infrastructure provision. Problems in the area relate to poverty, unemployment, low incomes, and inaccessibility to jobs, services, amenities and housing.

The central and eastern parts of the region has a rural character and low population density, it falls outside the urban edge although it is bordered on three sides by urban development and is experiencing development pressure.

Very limited economic activities occur in the area and it is not well integrated into the urban fabric, with limited accessibility. Although the area is crossed by railway lines there is no commuter service in the area. The Apies River connects this area to the city. The Dinokeng initiative is in operation in the area to the east of the N1. This will contribute to the economic opportunities in the area through the development of tourism and related activities and services.

The southern part of Region 2 is a low density formally developed suburban area, with developed

nodes of economic activities. The bulk of economic activity in Region 2 is located here. The area around the Kolonnade shopping centre has specifically emerged as an area of economic opportunity, together with the strong linear development along Sefako Makgatho Drive. The Wonderboom airport is also situated in this area.

The impact of the natural structuring element (Magaliesberg) that restricts north-south movement supports the significance of the east-west linkages and informs a linear development pattern. The tolling of the N1 has a significant impact on the area, especially in view of its already limited north-south access.

There is limited potential for corridor development along the N4/PWV2, especially in areas which are more accessible in terms of off-ramps. This area is identified in terms of the CoT City Strategy as the Zone of Choice.

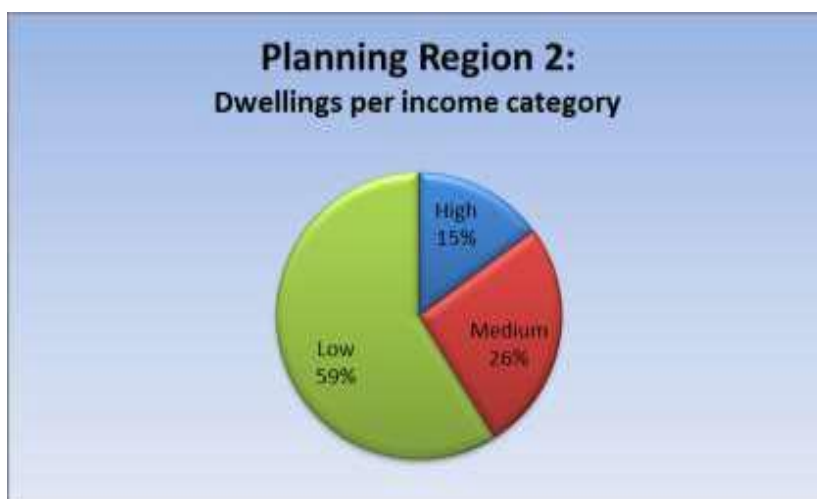
The zone of choice, running in a broad band to the north of the Magaliesberg, is proposed as a strategic investment focus area to have a positive catalytic effect on development within the northern areas of the CoT. The strategic value of this area lies in its proximity to the Capital Core, existing infrastructure (e.g. N4) and the momentum of existing developments.

The proposed Rainbow Junction is seen as a flagship development in the Zone of Choice, one of the largest developments in the north, expected economic investment in and around the region.

#### 9.1.15.1.2 Demographic Statistics

Region 2 is 1 062km<sup>2</sup> in extent and 12 wards falls within this region. This is the region with the 3rd largest geographical area because of the inclusion of a large rural area

An estimated population figure for this area suggests 369 623 people and 117 882 households, therefore a household size of approximately 3,5 persons. (Stats SA: Census 2011 and IHS Global Insight)



**Figure 9-18: Dwellings per income category**

Approximately 33% of the economically active population of Region 2 is unemployed, higher than the national average of 25%. The number of unemployed for Region 2 is 17% of the total of unemployed (economically active people) of the CoT.





Figure 9-19: Dwellings per Income Categories

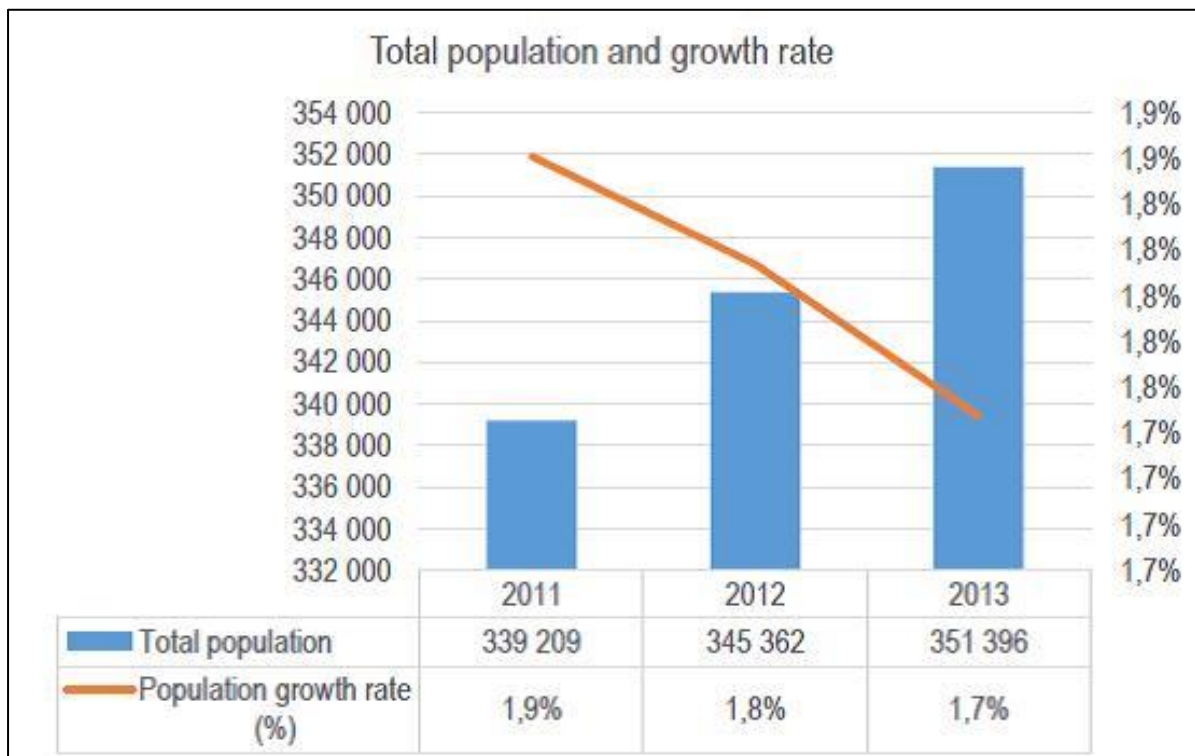
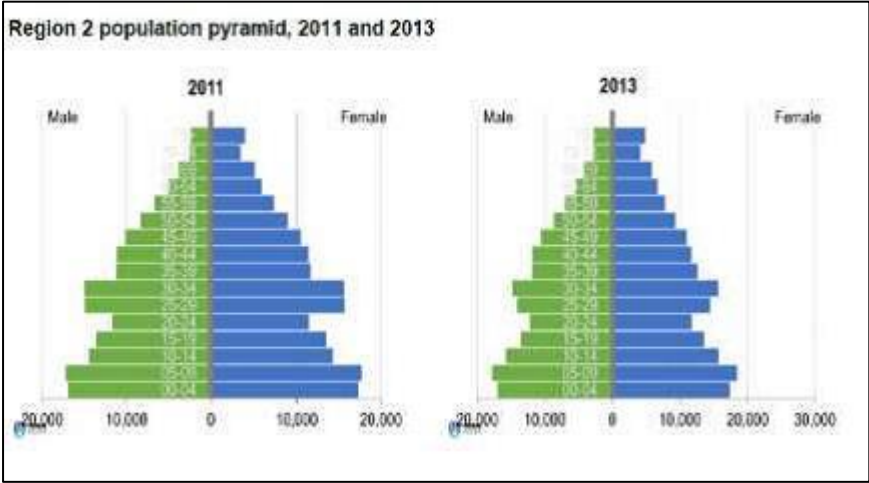


Figure 9-20: Total population and growth rate, 2011-2013

The above graph table indicates the total population and in Region 2 and the associated percentage growth rate since 2011 to 2013. As indicated in the figure, population in Region 2 has been steadily increasing in nominal terms; however, the percentage growth has been subjected to minor volatilities.

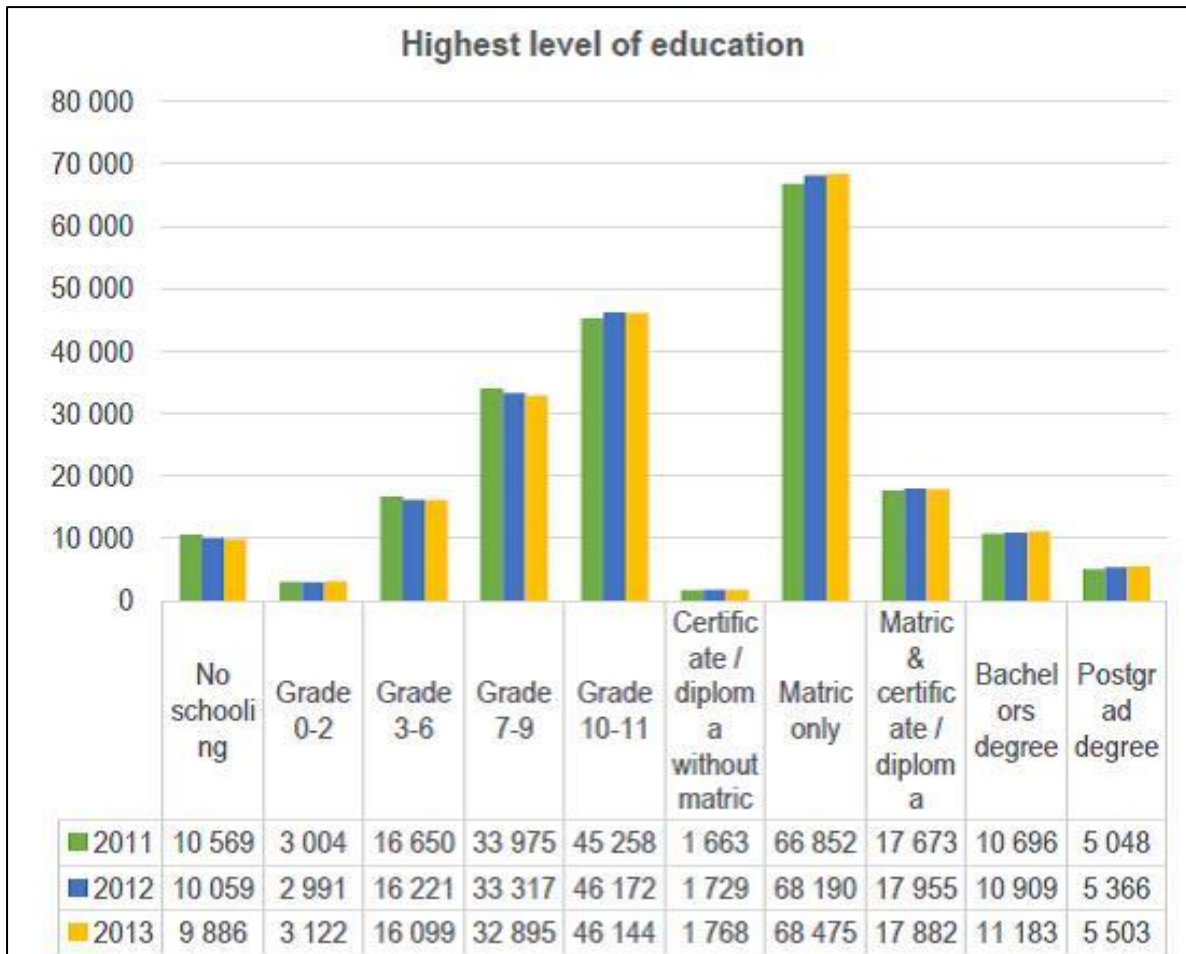
In 2011, the total population was approximately 339 209 and grew to 351 396 in 2013, representing 4 percent growth over the period. The population growth is growing at declining rate, in 2011 the

population growth rate was at 1,9 percent and this has declined to 1,7 percent in 2013.



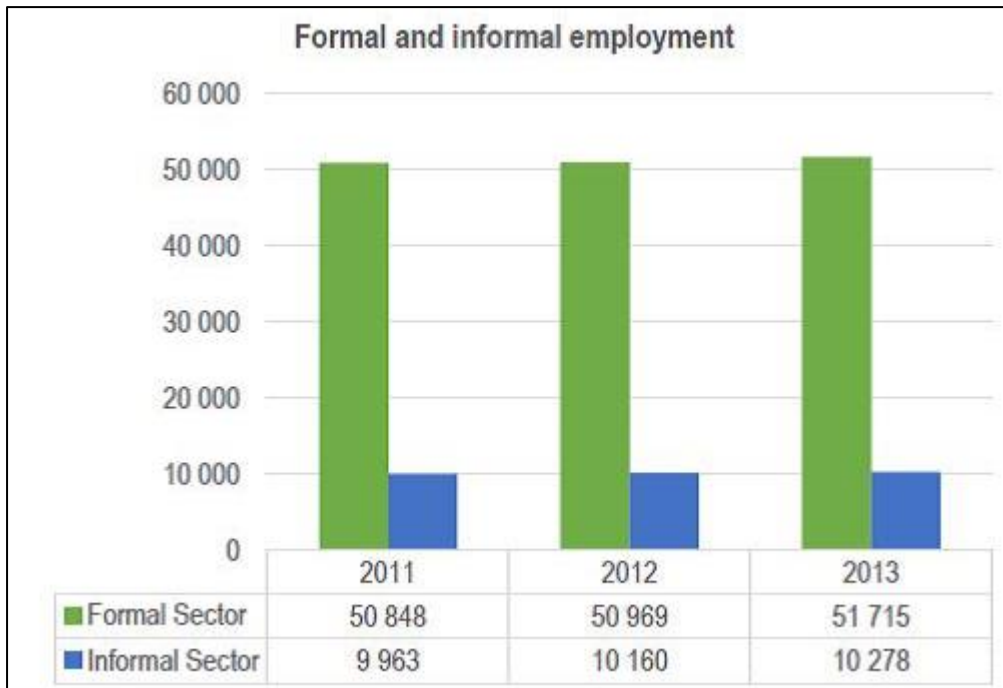
**Figure 9-21: Region 2 Population pyramid**

The figure above indicates the 2011 and 2013 population pyramid for Region 2, from the figure, it can be noted that there is a youth bulge in Region 2’s population i.e. it can be observed that a significant portion of Region’s population is younger than 35 (60.4 percent). This is likely due to the large presence of institutions of higher learning in the City, as a result, a large student population.



**Figure 9-22: Highest level of education attained for Region 2 population aged 20+ years**

The above graph indicates the highest levels of schooling for the population aged 20 years and older in Region 2. As indicated in the figure, Tshwane has over the years under review i.e. 2011 – 2013, increasingly performed well with respect to education, more so in the accumulation of both matric and post matric qualifications. In 2011, approximately 66 852 individuals aged 20 years or older, had at least a matric qualification, this has since increased to 68 475 individuals in 2013. The number of individuals aged 20 years or older with no schooling have since declined from 10 569 in 2001 to 9 886 in 2013, i.e. a 6 percent improvement.



**Figure 9-23: Formal and Informal employment**

## 9.2 Description of specific environmental features and infrastructure on the site

Please refer to Figure 9-6 for the map indicating the current state of the land (land uses) and existing structures. From the figure it may be confirmed that there is no existing structures on the Mining Permit application footprint.

## 9.3 Description of the current land uses

The current land use has been determined by the ecological specialist study and was discussed within Section 9.1.5 and Section 9.1.5.1 above.

*Additionally:* A current high resolution satellite image (Zoom Earth) was provided to record the most recent information regarding land uses currently occurring on Honingnestkrans in relation to the section proposed for the Mining Permit application (dated 1 November 2018).

From the image it may be seen that the proposed Mining Permit footprint falls on artificially kept/disturbed groundcover and is surrounded by mainly farms with grazing and pasture related developments. Agriculture is found towards the far south of Honingnestkrans and immediately south of the image, the current and historic sand mining activities. To the far north (not included on the figure below), other existing sand mining operations was also observed (border at northern edge of Honingnestkrans).

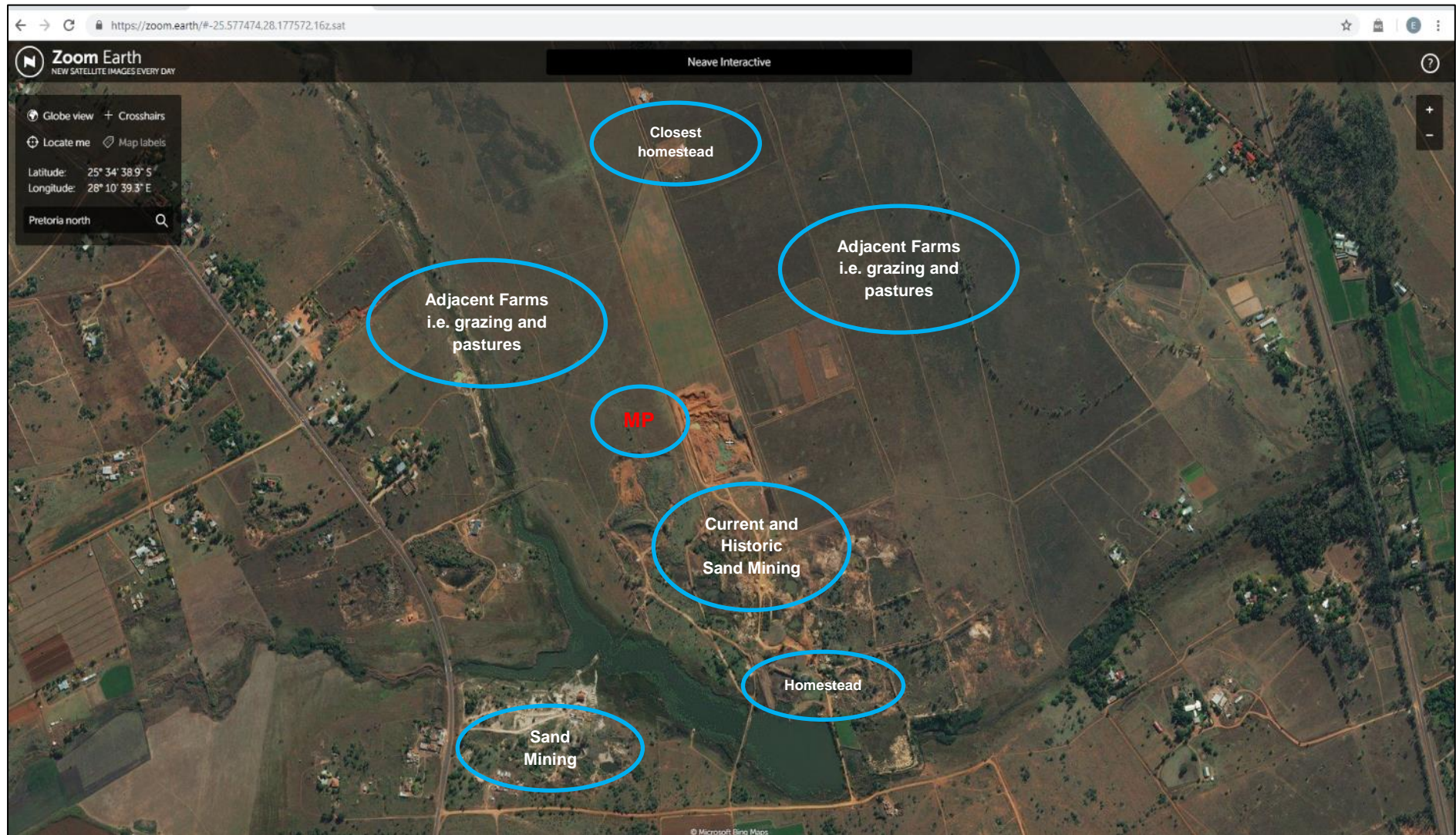


Figure 9-24: Satellite Image dated 1 November 2018 (MP: Mining Permit proposed)

### 9.3.1 Sensitive Landscapes

The occurrence of possible sensitive landscapes at the project site is outlined in Table 9-4.

**Table 9-4: Sensitive Landscapes within the area and nearby proximity**

Types of sensitive landscapes	Occurrence at the Mining Permit Application area
Nature conservation or ecologically sensitive areas indigenous plant communities (particularly rare communities and forests), wetlands, rivers, riverbanks, lakes, islands, lagoons, estuaries, reefs, inter-tidal zones, beaches and habitats of rare animal species.	These have been identified by the specialists and may be viewed in Figure 9-14. The Mining Permit footprint falls within a Low sensitive rating, with medium sensitivity towards the north and high sensitivity where the existing road crossing upgrade is proposed due to the occurrence of activities within a water resource buffer zone. These will be licensed in accordance the National Water Act, 1998 (Act No. 36 of 1998).
Sensitive physical environments - such as unstable soils and geo-technically unstable areas.	The topography differences across the site are relatively slight and it is noted that since the application is for sand mining, high erodibility of the soils are expected and as described in Section 9.1.1 (Geology) and Section 9.1.4 (Soils). A Geotech investigation for the area has been done and has informed this application.
Important natural resources - river systems, groundwater systems, high potential agricultural land.	The existing river crossing will be upgraded as part of this application and therefore activity will occur within the 100 m buffer for a river system. A WUL application will be made to accommodate this along with the two wetlands found within 500 m of the Mining Permit itself, which will also need to be licensed under Section 21 (c) and (i). The wetland assessment predicted low impacts associated with the proposed activities.
Sites of special scientific interest.	None known.
Sites of social significance - including sites of archaeological, historic, cultural, spiritual or religious importance and burial sites.	A specialist heritage assessment was conducted and information may be viewed in Section 9.1.13, which states that based on the inspection of the historical and topographical maps, two potentially sensitive areas have been identified. It should be noted, however, that the potentially sensitive areas might not be limited by these boundaries. Recommendations have been described within the EMPr.
Sites of outstanding natural beauty, panoramic views and scenic drives.	The area falls within Region 2 of the City of Tshwane Management zone and most area are rural based, agriculture and mixed land use and developments, however, Honingnestkrans has been subjected to various historic and ongoing sand mining operations and is already disturbed in nature.
Green belts or public open space in municipal areas.	Not applicable.
Servitudes	A Sasol gas line was identified occurring to the

<b>Types of sensitive landscapes</b>	<b>Occurrence at the Mining Permit Application area</b>
	North of the Mining Permit footprint and a 50 m buffer had been placed to ensure that the servitude/gas line remains unharmed and/or untouched.

## 10 IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS CAN BE MANAGED

*(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).*

The following list of potential impacts has been identified as informed by typical known impacts of such activities. The impact and related significances are rated specifically with the assumption that no mitigation measures are applied.

### 10.1 New Activities assessed as part of Mining Permit and Road Upgrade

The following activities will be assessed during the Impact Assessment Phase as described within this document.

**Table 10-1: Summary of potential impacts expected**

<b>Biophysical/ Socio-Economic Aspect</b>	<b>Potential Impact</b>	<b>Phase</b>
<b>Geology</b>	<b>Loss and sterilisation of mineral resources:</b> The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral resources through the sloping and rehabilitation of the slopes and area.	Construction, Operational.
<b>Topography</b>	<b>Hazardous excavations:</b> The project has the potential to alter the topography.	Construction, Operational, Closure
<b>Soils and land capability</b>	<b>Loss of soil and land capability:</b> The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of sand and stone aggregate will result in loss of soil structure and land capability. Loss of soil resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes.	Construction, Operational, Closure
<b>Biodiversity</b>	<b>Loss of biodiversity (terrestrial and aquatic):</b> The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction, Operational, Closure
<b>Surface water</b>	<b>Alteration of natural drainage patterns and pollution:</b> The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water courses.	Construction, Operational, Closure
<b>Groundwater</b>	<b>Groundwater contamination and lowering of</b>	Construction,

	<b>groundwater levels:</b> The project has the potential to contaminate groundwater resources.	Operational, Closure
<b>Air</b>	<b>Air quality:</b> The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Construction, Operational, Closure
<b>Noise</b>	<b>Disturbing noise levels:</b> The project has the potential to cause noise pollution through the mining activities.	Construction, Operational, Closure
<b>Visual</b>	<b>Negative visual views:</b> The mining activities have the potential to create visual impacts.	Construction, Operational, Closure
<b>Traffic</b>	<b>Road disturbance and traffic safety:</b> The project has the potential to result in an increase in traffic volumes along existing roads.	Construction, Operational, Closure
<b>Heritage/cultural and palaeontological resources</b>	<b>Loss of heritage/cultural and palaeontological resources:</b> The project has the potential to damage heritage/cultural and palaeontological resources.	Construction, Operational, Closure
<b>Socio-economic</b>	<b>Positive and negative socio-economic impact:</b> The project has the potential for positive and negative socio-economic impacts. Positive impacts include job creation and stimulation of local and regional economy as well as a parallel economy to mining. Negative impacts include the influx of job seekers and related issues of crime, disease and disruption to social structures	Construction, Operational, Closure
<b>Land use</b>	<b>Change in land use:</b> The proposed project has the potential to impact on surrounding land uses such as residential areas.	Construction, Operational, Closure

## 10.2 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 were determined in order to decide the extent to which the initial site layout needs revision).*

Alternative assessment, Environmental and other sensitivities has been incorporated from the onset of the application and therefore the proposed footprint is the best suited. The layout does not require revision and a 50m buffer has been allowed between the SASOL gas line and the proposed footprint.

The methodology used to rank the impacts is discussed in Section 11.1.

## 10.3 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)*

This is not applicable as the proposed footprint is already ideally placed to avoid adverse impacts in terms of sensitivities. This existing road crossing is only to be upgraded where needed to facilitate increased movement and weight on the bridge. Reasons as to why the existing site was decided upon are described in Section 6.1.1. Please also refer to Section 6.1.



## 10.4 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).*

Measures to reduce impacts during construction and operation will mainly be required and implemented accordingly. Closure impacts will be similar to construction impacts, which may mainly create noise and dust.

### 10.4.1 Motivation where no alternative sites were considered

Alternatives have been discussed within Section 6 above. Considerations have been included from the onset of the application and thereby the proposed site layout is cognisant of potential environmental sensitivities and the SASOL gas line (which required a suitable buffer zone).

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

As per Sections 10.4.1 and 10.4.2 above, no site alternatives are feasible as the layout has been revised during the process to match the most suitable location. The locations are also guided by the sand reserve and the footprint was moved to accommodate the SASOL gas line (as mentioned above).

## 11 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.)*

### 11.1 Methodology

The results of the desktop assessment were analysed and interpreted in order to assess the potential impacts, which the proposed development may inflict on bio-physical and social systems, devise potential alternatives with respect to selected activities and the development of necessary mitigation measures in order to minimise negative impacts and optimise positive impacts. The specialist recommendations were also incorporated into the Environmental Management Programme (**Part B of this report**). The activities described in the project description were assessed in terms of direct, indirect as well as cumulative impacts, where possible.

#### 11.1.1 Specialist Impact Identification and Assessment

Specialist studies in the following disciplines have been conducted to identify environmental attributes:

- Heritage Assessment;
- Biodiversity Scan – Fauna and Flora Scan

- Wetland Mapping;
- Geotechnical investigation
- Closure Plan – Cost Assessment

The specialists will visit the site to identify environmental attributes and potential impacts that the activity may have on the environment. The specialists' reports will contain a description of environmental attributes and impacts identified. The specialists will also assess each impact and propose mitigation measures to avoid, reduce or remediate impacts. The specialists will also make recommendations with regards to the proposed activities, which will be included in the EMPr.

During the assessment phase of the project all the potential impacts will be discussed in detail. Each specialist report as mentioned above will be used for the identification of the impacts and mitigation measures will be set up regarding those impacts. The assessment of the data was, where possible, based on accepted scientific techniques, failing which, the specialists made judgements based on their professional expertise and experience.

### 11.1.2 Assessment Criteria

The impact assessment methodology used to determine the significance of impacts prior and after mitigation is presented below.

#### Extent of the impact

The EXTENT of an impact is the physical extent/area of impact or influence.

Score	Extent	Description
1	Footprint	The impacted area extends only as far as the actual footprint of the activity.
2	Site	The impact will affect the entire or substantial portion of the site/property.
3	Local	The impact could affect the area including neighbouring properties and transport routes.
4	Region	Impact could be widespread with regional implication.
5	National	Impact could have a widespread national level implication.

#### Duration of the impact

The DURATION of an impact is the expected period of time the impact will have an effect.

Score	Duration	Description
1	Short term	The impact is quickly reversible within a period of less than 2 years limited to the construction phase, or immediate upon the commencement of floods.
2	Short to medium term	The impact will have a short term lifespan (2–5 years).
3	Medium term	The impact will have a medium term lifespan (6 – 10 years)
4	Long term	The impact will have a medium term lifespan (10 – 25 years)
5	Permanent	The impact will be permanent beyond the lifespan of the development.

#### Intensity of the impact

The INTENSITY of an impact is the expected amplitude of the impact.

Score	Intensity	Description
1	Minor	The activity will only have a minor impact on the affected environment such a way that the natural processes or functions are not affected.

2	Low	The activity will have a low impact on the affected environment.
3	Medium	The activity will have a medium impact on the affected environment, but function and process continue, albeit in a modified way.
4	High	The activity will have a high impact on the affected environment which may be disturbed to the extent where it temporarily or permanently ceases.
5	Very High	The activity will have a very high impact on the affected environment which may be disturbed to the extent where it temporarily or permanently ceases.

### Reversibility of the impact

The REVERSIBILITY of an impact is the severity of the impact on the ecosystem structure

Score	Reversibility	Description
1	Completely reversible	The impact is reversible without any mitigation measures management measures
2	Nearly completely reversible	The impact is reversible without any significant mitigation management measures. Some time and resources required.
3	Partly reversible	The impact is only reversible with the implantation of mitigation management measures. Substantial time and resources required.
4	Nearly irreversible	The impact is can only marginally be reversed with the implantation significant mitigation and management measures. Significant time resources required to ensure impact is on a controllable level.
5	Irreversible	The impact is irreversible.

### Probability of the impact

The PROBABILITY of an impact is the severity of the impact on the ecosystem structure

Score	Probability	Description
1	Improbable	The possibility of the impact occurring is highly improbable (less than 5% of impact occurring).
2	Low	The possibility of the impact occurring is very low, due either to circumstances, design or experience (5% to 30% of impact occurring).
3	Medium	There is a possibility that the impact will occur to the extent that prevention must be made therefore (30% to 60% of impact occurring).
4	High	There is a high possibility that the impact will occur to the extent that extensive provision must be made therefore (60% to 90% of impact occurring).
5	Definite	The impact will definitely take place regardless of any prevention and there can only be relied on migratory actions or contingency plans to contain the effect (90% to 100% of impact occurring).

### Calculation of Impacts – Significance Rating of Impact

Significance is determined through a synthesis of the various impact characteristics and represents the combined effect of the Irreplaceability (Magnitude, Extent, Duration, and Intensity) multiplied by the Probability of the impact. The significance of an impact is rated according to the scores as presented below:

Equation 1:

$$\text{Significance} = \text{Irreplaceability (Reversibility + Intensity + Duration + Extent)} \times \text{Probability}$$

### Significance Rating

Score	Significance	Colour Code
1 to 20	Very low	Very Low
21 to 40	Low	Low

41 to 60	Medium	
61 to 80	High	
81 to 100	Very high	

**Degree to which the impact can be mitigated:** *The effect of mitigation measures on the impact and its degree of effectiveness:*

*Equation 2:*

$$\text{Significance Rating (WM)} = \text{Significance Rating (WOM)} \times \text{Mitigation Efficiency}$$

Mitigation Efficiency (ME)	
High	0,2
Medium to High	0,4
Medium	0,6
Low to Medium	0,8
Low	1,0

**Confidence rating:** *Level of certainty of the impact occurring.*

- **Certain**
- **Sure**
- **Unsure**

**Cumulative impacts:** *The effect the combination of past, present and “reasonably foreseeable” future actions have on aspects.*

- Very Low cumulative impact
- Low cumulative impact
- Medium cumulative impact
- High cumulative impact

### 11.1.3 Description of environmental issues and risks without and with the implementation of mitigation measures

A summary of the key environmental aspects is provided in Table 11-1.

## 11.2 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).

**Table 11-1: Summary of the key environmental impacts SWOM: Significance without mitigation; SWM: Significance with mitigation)**

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

Activity	Aspects Affected	Potential Impact	Phase	Extend	Duration		Intensity		Reversibility		Irreplaceability (Extent + Duration + Intensity + Reversibility)		Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Geology	Loss and sterilisation of mineral resources: The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral resources through the sloping and rehabilitation of the slopes and area.	Construction ; Operational Phase	Site	2	Short term	2	Low	2	Nearly irreversible	4	10	High	4	Medium	40	Low	1	Medium	40	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Loss of soil and land capability: The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of sand and stone aggregate will result in loss of soil structure and land capability. Loss of soil	Construction ; Operational Phase	Site	2	Short term	2	Low	2	Nearly completely	2	8	Medium	3	Low	24	High	0.2	Very Low	4.8	Mining Permit maximum lifetime is 2 years. 5 ha footprint..

Activity	Aspects Affected	Potential Impact	Phase	Extend		Duration		Intensity		Reversibility		Irreplaceability (Extent + Duration + Intensity + Reversibility)		Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale
		resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes																				
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	Construction ; Operational Phase	Site	2	Short term	2	Low	2	Nearly completely	2	8	Medium	3	Low	24	High	0.2	Very Low	4.8	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil positioned for later rehabilitation.	Land Capability and Land Use	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	Construction ; Operational Phase	Local	3	Short term	2	Low	2	Nearly completely	2	9	Low	2	Low	18	High	0.2	Very Low	3.6	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Sand Mining; Opencast mining – Excavator employed	Topography	Hazardous excavations: The project has the	Construction ; Operational Phase	Local	3	Short term	2	Low	2	Nearly completely	2	9	Medium	3	Low	27	Medium	0.6	Very Low	16.2	Mining Permit maximum lifetime is 2	

Activity	Aspects Affected	Potential Impact	Phase	Extend	Duration	Intensity	Reversibility	Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale				
to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.		potential to alter the topography.																years. 5 ha footprint.			
All	Ecological Impacts - Plants/Vegetation	Loss of biodiversity (terrestrial and aquatic): The mining activity has the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction ; Operational Phase	Site	2	Short term	2	Medium	3	Nearly completely	2	9	Medium	3	Low	27	Medium	0.6	Very Low	16.2	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
All	Ecological Impacts - Animals/Fauna	Loss of biodiversity (terrestrial and aquatic): The mining activity has the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction ; Operational Phase	Site	2	Short term	2	Medium	3	Nearly completely	2	9	Medium	3	Low	27	Medium	0.6	Very Low	16.2	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Sand Mining; Vegetation Clearance, Changing the land-	Hydrological Aspects; Surface water and	Stormwater, erosion and siltation impacts due to a lack of	Construction ; Operational Phase	Local	3	Short term	2	Medium	3	Partly reversible	3	11	Medium	3	Low	33	Medium	0.6	Very Low	19.8	Mining Permit maximum lifetime is 2 years. 5 ha

Activity	Aspects Affected	Potential Impact	Phase	Extend	Duration	Intensity	Reversibility	Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability	Significance Without Mitigation	Mitigation Efficiently	Significance With Mitigation	Size And Scale								
use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Groundwater	implementing measures to manage stormwater run-off quantity and quality during the operational phase.											footprint.								
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water	Alteration of natural drainage patterns and pollution: The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water courses - Section 21(c) and (i) water uses	Construction ; Operational Phase	Regional	4	Short term	2	Medium	3	Partly reversible	3	12	Medium	3	Low	36	Medium	0.6	Low	21.6	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Water crossing upgrade	Hydrological Aspects; Surface water	Section 21(c) and (i) water uses: such as increasing sedimentation of the water resource during Construction, impacting on water quality	Construction ; Operational Phase	Regional	4	Short term	2	Medium	3	Nearly Irreversible	4	13	Medium	3	Low	39	Low	1	Low	39	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Sand Mining; Potential disturbance of water courses	Hydrological Aspects; Surface water and	Groundwater contamination and lowering of groundwater	Construction ; Operational Phase	Regional	4	Short term	2	Medium	3	Nearly Irreversible	4	13	Low	2	Low	26	Medium	0.6	Very Low	15.6	Mining Permit maximum lifetime is 2 years. 5 ha



Activity	Aspects Affected	Potential Impact	Phase	Extend	Duration	Intensity	Reversibility	Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability	Significance Without Mitigation	Mitigation Efficiently	Significance With Mitigation	Size And Scale								
	Groundwater	levels: The project has the potential to contaminate groundwater resources.											footprint.								
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Air Quality	Air quality: The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Construction ; Operational Phase	Local	3	Short term	2	Medium	3	Partly reversible	3	11	Medium	3	Low	33	Low to Medium	0.8	Low	26.4	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Noise, Vibration and Lighting	Disturbing noise levels: The project has the potential to cause noise pollution through the mining activities.	Construction ; Operational Phase	Site	2	Short term	2	Medium	3	Nearly completely	2	9	Medium	3	Low	27	Low to Medium	0.8	Low	21.6	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Sites of archaeological and cultural interests	Loss of heritage/cultural and palaeontological resources: The project has the potential to damage heritage/cultural and palaeontological	Construction ; Operational Phase	Site	2	Short term	2	Low	2	Nearly completely	2	8	Low	2	Very Low	16	Low	1	Low	16	Mining Permit maximum lifetime is 2 years. 5 ha footprint.

Activity	Aspects Affected	Potential Impact	Phase	Extend		Duration		Intensity		Reversibility		Irreplaceability (Extent + Duration + Intensity + Reversibility)		Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale
of 3m.		resources.																				
All	Visual aspects	Negative visual views: The mining activities have the potential to create visual impacts.	Construction ; Operational Phase	Regional	4	Short term	2	Low	2	Nearly Irreversible	4	12	Medium	3	Low	36	Low	1	Low	36	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Waste	Generation and disposal of general waste, litter and hazardous material during the operational phase	Construction ; Operational Phase	Local	2	Short term	2	Medium	3	Partly reversible	3	10	High	4	Medium	40	Medium	0.6	Low	24	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Construction ; Operational Phase	Regional	3	Short term	2	Low	2	Nearly completely	2	9	High	4	Low	36	Low	0.8	Low	28.8	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Water crossing upgrade	Traffic	Road disturbance and traffic safety:	Construction ; Operational	Regional	3	Short term	2	Low	2	Nearly completely	2	9	High	4	Low	36	Low	0.8	Low	28.8	River crossing footprint area	

Activity	Aspects Affected	Potential Impact	Phase	Extend	Duration	Intensity	Reversibility	Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability	Significance Without Mitigation		Mitigation Efficiently	Significance With Mitigation		Size And Scale						
		The project has the potential to result in an increase in traffic volumes along existing roads.	Phase																		
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil, Impacts on watercourses	Health and Safety	Increased risk to public health and safety: Dangerous areas	Construction ; Operational Phase	Site	2	Short term	2	Medium	3	Partly reversible	3	10	Medium	3	Low	30	Medium	0.6	Very Low	18	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
All	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Construction ; Operational Phase	Regional	4	Short term	2	Medium	3	Nearly irreversible	4	13	High	4	Medium	52	Medium	0.6	Low	31.2	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
All	Socio-Economic: Positive Impacts	Employment provision due to the implementation of new sand mining activities.	Construction ; Operational Phase	Regional	4	Short term	2	High	4	Nearly irreversible	4	14	Medium	3	Medium	42	N/A	1	Low	42	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
All	Socio-Economic: Positive Impacts	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Construction ; Operational Phase	Regional	4	Short term	2	High	4	Nearly irreversible	4	14	Medium	3	Medium	42	N/A	1	Medium	42	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
<b>Closure Phase</b>																					
Closure and Rehabilitation	Geology and Soils	Soil compaction by heavy duty vehicles.	Closure Phase	Site	2	Short term	1	Low	2	Nearly completely	2	7	Medium	3	Low	21	High	0.2	Very Low	4.2	Mining Permit maximum lifetime is 2

Activity	Aspects Affected	Potential Impact	Phase	Extend	Duration			Intensity			Reversibility			Irreplaceability (Extent + Duration + Intensity + Reversibility)		Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale
																							years. 5 ha footprint.	
Closure and Rehabilitation	Geology and Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Closure Phase	Site	2	Short term	1	Low	2	Nearly completely	2	7	Medium	3	Low	21	High	0.2	Very Low	4.2			Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Closure and Rehabilitation	Land Capability and Land Use	Land Capability impacts, impacting on the livelihood of surrounding land owners and users.	Closure Phase	Local	3	Short term	1	Low	2	Nearly completely	2	8	Low	2	Very Low	16	High	0.2	Very Low	3.2			Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Closure and Rehabilitation	Ecological Impacts	Spreading of alien invasive species and bush encroachment of indigenous species.	Closure Phase	Site	2	Short term	1	Low	2	Nearly completely	2	7	Medium	3	Low	21	Medium	0.6	Very Low	12.6			Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Closure and Rehabilitation	Ecological Impacts - Positive Impact	Rehabilitation of area with natural vegetation and re-establishment of local biodiversity	Closure Phase	Site	2	Short term	1	Low	2	Nearly completely	2	7	Medium	3	Low	21	Medium	0.6	Very Low	12.6			Mining Permit maximum lifetime is 2 years. 5 ha footprint.	
Closure and Rehabilitation	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Closure Phase	Regional	4	Short term	1	Medium	3	Partly reversible	3	11	Low	2	Low	22	Medium	0.6	Very Low	13.2			Mining Permit maximum lifetime is 2 years. 5 ha footprint.	

Activity	Aspects Affected	Potential Impact	Phase	Extend		Duration		Intensity		Reversibility		Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale
				Site	2	Short term	1	Low	2	Nearly completely	2		7	Medium	3	Low	21	Medium	0.6	Very Low	
Closure and Rehabilitation	Air Quality	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Closure Phase	Site	2	Short term	1	Low	2	Nearly completely	2	7	Medium	3	Low	21	Medium	0.6	Very Low	12.6	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Closure and Rehabilitation	Noise, Vibration and Lighting	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Closure Phase	Site	2	Short term	1	Medium	3	Nearly completely	2	8	Medium	3	Low	24	Low	0.8	Very Low	19.2	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Closure and Rehabilitation	Sites of archaeological and cultural interests	None expected at this stage as all off the resources have been removed and no further excavation work will be done	Closure Phase	N/A		N/A		N/A		N/A		N/A	N/A		N/A		N/A		N/A		Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Closure and Rehabilitation	Visual aspects	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Closure Phase	Local	3	Short term	1	Low	2	Nearly completely	2	8	High	4	Low	32	Low	0.8	Low	25.6	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
Closure and Rehabilitation	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust	Closure Phase	Regional	4	Short term	1	Low	2	Nearly irreversible	4	11	Medium	3	Low	33	Medium	0.6	Very Low	19.8	Mining Permit maximum lifetime is 2 years. 5 ha footprint.

Activity	Aspects Affected	Potential Impact	Phase	Extend		Duration		Intensity		Reversibility		Irreplaceability (Extent + Duration + Intensity + Reversibility)	Probability		Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation		Size And Scale
		pollution, noise pollution etc.																			
Closure and Rehabilitation	Socio-Economic	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Closure Phase	Regional	4	Short term	1	Medium	3	Nearly completely	2	10	Medium	3	Low	30	Medium	0.6	Very Low	18	Mining Permit maximum lifetime is 2 years. 5 ha footprint.
<b>NO-GO Option</b>																					
No-Go Option	Socio-Economic	Reduced period of development and upliftment of the surrounding communities and infrastructure.	N/A	Regional	4	Short term	1	High	4	Partly reversible	3	12	High	4	Medium	48	N/A	1	Medium	48	N/A
No-Go Option	Socio-Economic	Reduced period of development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	N/A	Regional	4	Short term	1	High	4	Partly reversible	3	12	High	4	Medium	48	N/A	1	Medium	48	N/A
No-Go Option	Socio-Economic	Positive: No additional negative impacts on the environment	N/A	Local	3	Short term	1	High	4	Partly reversible	3	11	High	4	Medium	44	N/A	1	Medium	44	N/A

### 11.3 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):-

**Table 11-2: Summary of Specialist reports**

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The Report <sup>1</sup>	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
Fauna and Flora	<p>Much of the site comprised modified or secondary vegetation that pose no constraints to the proposed activities. However, the grassland vegetation in the north of the site as well as the <i>Typha capensis</i> vegetation associated with watercourses was regarded as being of medium and high sensitivity to the proposed activity. Grassland vegetation may support some plant species of conservation concern. The species that may be present will occur sporadically or scattered within the grassland and not grouped in a specific area. If the footprint is kept to a minimum, the species could be avoided, particularly if the footprint is scanned for such species prior to commencement. The <i>Typha capensis</i> vegetation is associated with wetland conditions which increases the sensitivity of such vegetation.</p> <p>Mitigation measures can be implemented to limit the proposed impacts and if mitigation measures as listed are implemented as a minimum.</p> <p>The main conservation objectives for vertebrates are to try and protect as much of the natural habitat as possible and ensure the minimum impact in sensitive areas like the Kaalspruit and other wetlands on site. Prospecting is expected to have almost no significant impact on Red Data vertebrate species that might make at best only peripheral use of the study area. From a vertebrate perspective, there is no objection against the proposed activities if the mitigation measures are adhered to. However, a full survey of the whole area is necessary before any mining takes place.</p> <p>The following is recommended as a minimum:            General:</p> <ul style="list-style-type: none"> <li>• Keep the prospecting footprint as small as possible, utilising existing roads or tracks.</li> <li>• No equipment, samples etc. may be stored within the grassland and <i>Typha capensis</i> vegetation. Limit the use of heavy machinery or vehicles in these areas.</li> <li>• Prevent spillage of pollutants, contain and treat any spillages immediately, strictly prohibit any pollution/littering. Ensure there is a method statement in place to remedy any</li> </ul>	X	Please refer to Section 9.1.10 as well as all impact and management tables.

<sup>1</sup> (Mark With An X Where Applicable)

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The Report <sup>1</sup>	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	<p>accidental spillages immediately.</p> <ul style="list-style-type: none"> <li>• No open fires may be lit for cooking or any other purposes, unless in specifically designated and secured areas.</li> <li>• No vehicles / equipment may be washed on site, except in suitably designed and protected areas.</li> <li>• No vehicles may be serviced or repaired on the property, unless it is an emergency situation in which case adequate spillage containment must be implemented.</li> <li>• After activities have taken place, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to commencement.</li> <li>• Clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoils and landscape to surrounding level.</li> <li>• Ensure that the vegetation disturbed is rehabilitated. Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that indigenous vegetation cover is sufficient within one growing season. Due to the high degree of invasive species in the area, it is active rehabilitation e.g. hydroseeding is recommended, along with an alien invasive management plan.</li> <li>• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access until such time that rehabilitation was successful.</li> <li>• Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring should continue for at least two years.</li> </ul> <p><i>Protected or plant species of conservation concern:</i></p> <ul style="list-style-type: none"> <li>• Scan the footprint for plant species of conservation concern. Where threatened species are present, activities should be moved to avoid their localities. Declining or Near Threatened plant species may be relocated provided that a permit for removal and relocation has been granted by the GDARD.</li> <li>• Protected plants must be removed by a suitably qualified specialist and replanted in</li> </ul>		



List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The Report <sup>1</sup>	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	<p>suitable habitat such as the buffer areas of the moist grasslands. Their survival must be monitored for at least two growing seasons after relocation.</p> <ul style="list-style-type: none"> <li>Construction workers may not tamper or remove these plants, and neither may anyone collect seed from the plants without permission from the local authority.</li> </ul> <p><i>Typha capensis and grassland vegetation</i></p> <ul style="list-style-type: none"> <li>Adhere to national legislation pertaining to activities within or close to watercourses.</li> <li>Prevent unnecessary access into the grassland and <i>Typha capensis</i> vegetation.</li> </ul> <p><b>Vertebrates</b></p> <p>The Kaalspruit and its drainage lines, which are tributaries of the Apies River, and the wetlands, as well as their buffer zones, should be considered as ecologically sensitive.</p> <p>Ten mammal species with Red Data status (African marsh rat, swamp musk shrew, Southern African hedgehog, Blasius’s or peak-saddle horseshoe bat, Mauritian tomb bat, short-eared trident bat, brown hyena, Cape clawless otter, Spotted-necked otter, African striped weasel) may occur on or near the study site.</p> <p>Due to the limited extent and quality of the habitats, half the Red Data species are expected to be at best erratic visitors and the other half are only expected as infrequent vagrants. The possibility exists that at least some individuals of Southern African python, giant bullfrog, coppery grass lizard and striped harlequin snake occur on the study site.</p> <p>From a vertebrate perspective, there is no objection against prospecting for mining if the mitigation measures are adhered to. However, a full survey of the whole area is necessary before any mining takes place.</p> <p>The following mitigation measures are proposed by the specialist:</p> <ul style="list-style-type: none"> <li>Every effort should be made to retain the linear integrity, flow dynamics and water quality of the Kaalspruit and the wetlands.</li> </ul>		

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The Report <sup>1</sup>	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	<ul style="list-style-type: none"> <li>• If the Southern African Hedgehog or any other mammal species are encountered or exposed, they should be removed and relocated to natural areas in the vicinity.</li> <li>• If the African Rock Python, Striped Harlequin Snake, Giant Bullfrog or any herpetological species are encountered or exposed, they should be removed and relocated to natural areas in the vicinity. This remediation requires the employment of a herpetologist to oversee the removal of any herpetofauna during the initial ground-clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment). The contractor must ensure that no herpetofauna species are disturbed, trapped, hunted or killed. Conservation-orientated clauses should be built into contracts for personnel, complete with penalty clauses for non-compliance.</li> <li>• Education of the staff about the value of wildlife and environmental sensitivity.</li> <li>• Alien and invasive plants must be removed.</li> <li>• When a hole is drilled for prospecting, it must be cordoned off or completed quickly; otherwise the hole may act as a death trap for small mammals and herpetofauna.</li> <li>• Keep the footprint as small as possible, utilising existing roads or tracks.</li> </ul>		
Archaeology and Heritage	<p>The following recommendations are made in order to avoid the destruction of heritage remains on the areas demarcated:</p> <ul style="list-style-type: none"> <li>• Care should be exercised on the demarcated farm portions and if possible the areas demarcated as 'Potentially Sensitive' should be avoided.</li> <li>• It is advised that a qualified archaeologist be contacted whenever uncertainty regarding potential heritage remains is encountered.</li> <li>• Prospecting should not take place in the vicinity of stone cairns, stone-walling, building ruins or any other heritage material.</li> <li>• Should the prospecting outcome result in further development or construction, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered.</li> <li>• Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist.</li> </ul>	X	Please refer to Section 9.1.13 as well as all impact and management tables.

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The Report <sup>1</sup>	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	Also, should skeletal remains be exposed, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).		
Wetland Assessment and DWS Risk Report	<p>No wetlands are located on the proposed study site although a channelled valley bottom wetland and a seepage wetland are located within 330m and 260m of the site respectively. The proposed crossing and road upgrade is located over a dammed section of a channelled valley bottom wetland which drains into the Apies River approximately 4.2km to the east of the crossing. The current risk assessment is based on a site visit conducted in October 2018 and a delineation conducted by Galago Environmental Biodiversity Specialists in 2015.</p> <p>The risk assessment reflects a Low score during the construction and operation phase for sand mining activities. This should be verified by a hydrogeological study to confirm that altering soil/water processes won't negatively affect regional wetlands. These activities may be authorised under a General Authorization as discussed in GN 509 of 2016.</p> <p>The operational phase of the upgraded watercourse crossing falls in the Medium category. This is due to the fact that this phase will have a permanent effect on the hydrology of the watercourse. However, the risk assessment matrix allows for conditions where specific mitigation measures will ensure that the expected impact will be managed in order to have no nett negative effect on the watercourse. In such a case, the risk category may be lowered by a maximum of 25 points. Should the risk score then fall within a Low category, the activity may be authorised through a General Authorization. In the case of the operational phase of the proposed upgraded watercourse crossing, the risk score amounts to 47 which falls in the Low category and can therefore be authorized through a General Authorization. Mitigation measures relevant to this project that will ensure a no nett negative effect on the watercourse include:</p> <ul style="list-style-type: none"> <li>• During the detailed design phase, the footprint and design of structures should aim to have a positive impact on habitat quality and hydrology of the river</li> <li>• Control of alien invasive plants should form part of the maintenance plan</li> <li>• Maintenance activities should follow best practice</li> </ul>	X	Please refer to Section 9.1.7 regarding activities to be undertaken.

List Of Studies Undertaken	Recommendations Of Specialist Reports	Specialist Recommendations That Have Been Included In The Report <sup>1</sup>	Reference To Applicable Section Of Report Where Specialist Recommendations Have Been Included.
	<ul style="list-style-type: none"> <li>• Install and maintain litter and sediment traps</li> <li>• Monitoring for downstream degradation and effective rehabilitation where necessary</li> </ul>		
Geotechnical Investigation	<p>The property has been apportioned into two fairly general material horizons, Soil Zones “A” and “B”.</p> <p>Soil Zone “A” covers the major portion of the site (some 25 hectares) and a generalized description of the typical soil profile that may be encountered here, is as follows:  <b>0,0 - 0,4:</b> Abundant coarse, hard Nodular Ferricrete and scattered Quartz Gravels, clast supported in a subordinate matrix of moist, khaki brown becoming dark yellowish brown, clayey sand; ferruginised pebble marker. Overall consistency is loose. Covered in places by light brown, loose, silty sand of colluvial origin.  <b>0,4 - 0,7:</b> Abundant coarse, soft and hard, orange and yellow, Nodular Ferricrete, clast supported in a matrix of moist, dark yellow, silty sand; ferruginised residual granophyre. Overall consistency is loose.  <b>0,7 - 2,3:</b> Moist, dark reddish orange speckled yellow and white, dense, relict jointed, clayey gravelly coarse sand containing thin bands of dark yellow, ferruginised material; residual granite. Small to medium-sized, hard rock granophyre corestones (small boulders) are occasionally present within the profile.</p> <p>Soil Zone “B” covers portions of the central and southern portions of the study area (about 7 hectares in extent) and is characterized by outcrop and sub-outcrop of soft rock hardpan ferricrete. Isolated outcrops of hard rock granophyre boulders occur scattered across this area as well.</p>	X	Section 9.1.1 and Section 9.1.4. The Geotech investigation supported the application as to confirm the available resources and depths required to extract the resource.

Attach copies of Specialist Reports as appendices.

## **12 ENVIRONMENTAL IMPACT STATEMENT**

### **12.1 Summary of the key findings of the environmental impact assessment**

Please also refer to the table provided above, which is a summary of the impacts assessed for the proposed development by the EAP (Please refer to Table 11-1 above). From the table it can be concluded that the proposed sand mining activities will not have a significant impact on the environment. A shortened summary is also provided in Table 12-1.

### **12.2 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***

Please refer to Figure 4-1 as well as Appendix 4. At this stage the layout of the Mining Permit footprint is available, no surface infrastructure is proposed except the possibility of a temporary refuelling bay for the vehicles.

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

Other alternatives were assessed and none are feasible or preferable due to the position of the existing resource and in terms of environmental significance, please refer to the following sections: Section 6.1, Section 6.2.

**Table 12-1: Summary of Key findings of the impact assessment**

Activity	Aspects Affected	Potential Impact	Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation	
<b>Construction and Operational Phase</b>								
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Geology	Loss and sterilisation of mineral resources: The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral resources through the sloping and rehabilitation of the slopes and area.	Medium	40	Low	1	Medium	40
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Loss of soil and land capability: The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of sand and stone aggregate will result in loss of soil structure and land capability. Loss of soil resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes	Low	24	High	0.2	Very Low	4.8
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	Low	24	High	0.2	Very Low	4.8
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil positioned for	Land Capability and Land Use	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	Low	18	High	0.2	Very Low	3.6

Activity	Aspects Affected	Potential Impact	Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation	
later rehabilitation.								
Sand Mining; Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Topography	Hazardous excavations: The project has the potential to alter the topography.	Low	27	Medium	0.6	Very Low	16.2
All	Ecological Impacts - Plants/Vegetation	Loss of biodiversity (terrestrial and aquatic): The mining activity has the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Low	27	Medium	0.6	Very Low	16.2
All	Ecological Impacts - Animals/Fauna	Loss of biodiversity (terrestrial and aquatic): The mining activity has the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Low	27	Medium	0.6	Very Low	16.2
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Low	33	Medium	0.6	Very Low	19.8
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water	Alteration of natural drainage patterns and pollution: The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water courses - Section 21(c) and (i) water uses	Low	36	Medium	0.6	Low	21.6

Activity	Aspects Affected	Potential Impact	Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation	
			Low	39	Low	1	Low	39
Water crossing upgrade	Hydrological Aspects; Surface water	Section 21(c) and (i) water uses: such as increasing sedimentation of the water resource during Construction, impacting on water quality	Low	39	Low	1	Low	39
Sand Mining; Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Groundwater contamination and lowering of groundwater levels: The project has the potential to contaminate groundwater resources.	Low	26	Medium	0.6	Very Low	15.6
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Air Quality	Air quality: The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Low	33	Low to Medium	0.8	Low	26.4
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Noise, Vibration and Lighting	Disturbing noise levels: The project has the potential to cause noise pollution through the mining activities.	Low	27	Low to Medium	0.8	Low	21.6
Sand Mining; Vegetation Clearance, Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Sites of archaeological and cultural interests	Loss of heritage/cultural and palaeontological resources: The project has the potential to damage heritage/cultural and palaeontological resources.	Very Low	16	Low	1	Low	16
All	Visual aspects	Negative visual views: The mining activities have the potential to create visual impacts.	Low	36	Low	1	Low	36
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the	Waste	Generation and disposal of general waste, litter and hazardous material during the operational phase	Medium	40	Medium	0.6	Low	24



Activity	Aspects Affected	Potential Impact	Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation	
excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses								
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Low	36	Low	0.8	Low	28.8
Water crossing upgrade	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Low	36	Low	0.8	Low	28.8
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil , Impacts on watercourses	Health and Safety	Increased risk to public health and safety: Dangerous areas	Low	30	Medium	0.6	Very Low	18
All	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Medium	52	Medium	0.6	Low	31.2
All	Socio-Economic: <b>Positive Impacts</b>	Employment provision due to the implementation of new sand mining activities.	Medium	42	N/A	1	Low	42
All	Socio-Economic: <b>Positive Impacts</b>	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Medium	42	N/A	1	Medium	42
<b>Closure Phase</b>								
Closure and Rehabilitation	Geology and Soils	Soil compaction by heavy duty vehicles.	Low	21	High	0.2	Very Low	4.2
Closure and Rehabilitation	Geology and Soils	Contamination of soils through: - Indiscriminate disposal of waste; and	Low	21	High	0.2	Very Low	4.2

Activity	Aspects Affected	Potential Impact	Significance Without Mitigation		Mitigation Efficiently		Significance With Mitigation	
		- Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.						
Closure and Rehabilitation	Land Capability and Land Use	Land Capability impacts, impacting on the livelihood of surrounding land owners and users.	Very Low	16	High	0.2	Very Low	3.2
Closure and Rehabilitation	Ecological Impacts	Spreading of alien invasive species and bush encroachment of indigenous species.	Low	21	Medium	0.6	Very Low	12.6
Closure and Rehabilitation	Ecological Impacts - <b>Positive Impact</b>	Rehabilitation of area with natural vegetation and re-establishment of local biodiversity	Low	21	Medium	0.6	Very Low	12.6
Closure and Rehabilitation	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Low	22	Medium	0.6	Very Low	13.2
Closure and Rehabilitation	Air Quality	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Low	21	Medium	0.6	Very Low	12.6
Closure and Rehabilitation	Noise, Vibration and Lighting	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Low	24	Low	0.8	Very Low	19.2
Closure and Rehabilitation	Sites of archaeological and cultural interests	None expected at this stage as all off the resources have been removed and no further excavation work will be done	N/A		N/A		N/A	
Closure and Rehabilitation	Visual aspects	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Low	32	Low	0.8	Low	25.6
Closure and Rehabilitation	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Low	33	Medium	0.6	Very Low	19.8
Closure and Rehabilitation	Socio-Economic	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Low	30	Medium	0.6	Very Low	18
No-Go Option	Socio-Economic	Reduced period of development and upliftment of the surrounding communities and infrastructure.	Medium	48	N/A	1	Medium	48
No-Go Option	Socio-Economic	Reduced period of development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	Medium	48	N/A	1	Medium	48
No-Go Option	Socio-Economic	Positive: No additional negative impacts on the environment	Medium	44	N/A	1	Medium	44

### 13 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 Table 11-1 for mitigation measures prescribed to CIM International Banabatau (Pty) Ltd. A summary of the table is provided here for convenience.

**Table 13-1: Proposed impact management objectives and impact management outcomes for inclusion in the EMP**

Activity	Aspects Affected	Potential Impact	Mitigation Type	Management Outcome
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Geology	Loss and sterilisation of mineral resources: The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral resources through the sloping and rehabilitation of the slopes and area.	N/A	Utilising the resource completely sufficient
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Loss of soil and land capability: The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of sand and stone aggregate will result in loss of soil structure and land capability. Loss of soil resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes	Management, Rehabilitation	Storing of topsoil in berms that are covered with vegetation. Implementation and compliance with the soil conservation procedure. Prevention of erosion.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	Remedy through prevention, rehabilitation, proper removal and disposal if soils have become contaminated	Prevention of soil and water pollution.
Sand Mining; Vegetation Clearance, Changing the	Land Capability	Possibility of mining activities and workers causing veld	Remedy through rehabilitation and	Reducing footprint on which activities occur.

Activity	Aspects Affected	Potential Impact	Mitigation Type	Management Outcome
land-use Opencast mining, Stockpiling of topsoil positioned for later rehabilitation.	and Land Use	fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	management.	Prevention of erosion and conservation of soil resource.
Sand Mining; Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Topography	Hazardous excavations: The project has the potential to alter the topography.	Management; Rehabilitation	Fenced / bermed / notification of hazardous excavations. Continuous rehabilitation. Access control.
All	Ecological Impacts - Plants/Vegeta tion	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Surface disturbance will be kept to a minimum. Activities will be concentrated in already disturbed areas as far as is possible. Human and vehicular activity will be restricted to construction and operational sites.	N/A
All	Ecological Impacts - Animals/Faun a	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Surface disturbance will be kept to a minimum. Activities will be concentrated in already disturbed areas as far as is possible. Human and vehicular activity will be restricted to construction and operational sites.	N/A
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Stormwater Management, Monitoring, Infrastructure Design	Prevention water pollution and impacts on the natural environment and surrounding water users.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water	Alteration of natural drainage patterns and pollution: The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water courses - Section 21(c) and (i) water uses	Infrastructure designs; Management; Monitoring	Prevention water pollution and impacts on the natural environment and surrounding water users.

Activity	Aspects Affected	Potential Impact	Mitigation Type	Management Outcome
Water crossing upgrade	Hydrological Aspects; Surface water	Section 21(c) and (i) water uses: such as increasing sedimentation of the water resource during Construction, impacting on water quality	Infrastructure designs; Management; Monitoring	Prevention water pollution and impacts on the natural environment and surrounding water users.
Sand Mining; Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Groundwater contamination and lowering of groundwater levels: The project has the potential to contaminate groundwater resources.	Stormwater Management, Monitoring, Infrastructure Design	Prevention water pollution and impacts on the natural environment and surrounding water users.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Air Quality	Air quality: The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Monitor conditions workers are exposed to. Implement Dust Monitoring Programme	Ensure health and safety of mine workers as well as the surrounding environment
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Noise, Vibration and Lighting	Disturbing noise levels: The project has the potential to cause noise pollution through the mining activities.	Be mindful of additional noise sources. Monitoring of Noise levels	Reducing disturbing noise/light and vibration to outside boundaries.
Sand Mining; Vegetation Clearance, Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Sites of archaeological and cultural interests	Loss of heritage/cultural and palaeontological resources: The project has the potential to damage heritage/cultural and palaeontological resources.	Management; Conservation; Permitting	No sites will be impacted. Consult a specialist if any heritage aspect is uncovered during any stage of the development.
All	Visual aspects	Negative visual views: The mining activities have the potential to create visual impacts.	Monitoring and Rehabilitation if required	Early detection and prevention of possible impacts. Placements of Topsoil berms around quarry.
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Waste	Generation and disposal of general waste, litter and hazardous material during the operational phase	Environmental Awareness, Monitor waste	Responsible waste management and prevention of pollution.
Sand Mining; Vegetation Clearance, Changing the	Traffic	Road disturbance and traffic safety: The project has the	Infrastructure designs; Management;	Traffic Control and prevention of impacts

Activity	Aspects Affected	Potential Impact	Mitigation Type	Management Outcome
land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses		potential to result in an increase in traffic volumes along existing roads.	Monitoring	
Water crossing upgrade	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Infrastructure designs; Management; Monitoring	Traffic Control and prevention of impacts
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil , Impacts on watercourses	Health and Safety	Increased risk to public health and safety: Dangerous areas	Environmental Awareness, Infrastructure designs; Management; Monitoring	Ensure Health and Safety Compliance and Environmental Compliance
All	Socio- Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Management; Communication; Strategy implementation	Prevent impacts on farmers labourers and surrounding landowners at all stages of the development.
All	Socio- Economic: <b>Positive Impacts</b>	Employment provision due to the implementation of new sand mining activities.	Management; Communication; Strategy implementation	Increased Employment Opportunities in the Long term
All	Socio- Economic: <b>Positive Impacts</b>	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Management; Communication; Strategy implementation	Supporting, utilising and building local economy
<b>Closure Phase</b>				
Closure and Rehabilitation	Geology and Soils	Soil compaction by heavy duty vehicles.	Rehabilitation and Monitoring	Closure phase overlapping with the operational phase, adhere to management outcomes as described for Operational phase
Closure and Rehabilitation	Geology and Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Remedy through prevention, rehabilitation, proper removal and disposal if soils have become contaminated	Prevention of soil and water pollution. Closure phase overlapping with the operational phase, adhere to management outcomes/mitigation measures as described for Operational phase.
Closure and Rehabilitation	Land Capability and Land Use	Land Capability impacts, impacting on the livelihood of surrounding land owners and users.	Rehabilitation and Monitoring	Early detection and prevention of possible impacts. Restoration of Landscape function and Capability.
Closure and Rehabilitation	Ecological Impacts	Spreading of alien invasive species and bush encroachment of indigenous species.	Rehabilitation and Monitoring	Prevent and/or remediate ecological impacts. Closure phase overlapping with the

Activity	Aspects Affected	Potential Impact	Mitigation Type	Management Outcome
				operational phase; adhere to management outcomes/mitigation measures as described for Construction and Operational phase.
Closure and Rehabilitation	Ecological Impacts - <b>Positive Impact</b>	Rehabilitation of area with natural vegetation and re-establishment of local biodiversity	Rehabilitation and Monitoring	Restore the natural environment to approved Post-Closure Land form
Closure and Rehabilitation	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Infrastructure designs; Management; Monitoring	Prevention water pollution and impacts on the natural environment and surrounding water users.
Closure and Rehabilitation	Air Quality	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Adhere to Dust Management and Monitoring plan	Ensure health and safety of Environment including adjacent land users, prevent dust on crops and fields utilised by cattle grazing.
Closure and Rehabilitation	Noise, Vibration and Lighting	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Be mindful of additional noise sources. Monitoring of Noise levels.	Reducing disturbing noise/light and vibration to outside boundaries.
Closure and Rehabilitation	Sites of archaeological and cultural interests	None expected at this stage as all off the resources have been removed and no further excavation work will be done	Management; Conservation; Permitting	No sites will be impacted. Consult a specialist if any heritage aspect is uncovered during any stage of the development.
Closure and Rehabilitation	Visual aspects	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Monitoring and Rehabilitation if required	Early detection and prevention of possible impacts.
Closure and Rehabilitation	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Infrastructure designs; Management; Monitoring	Prevent impacts on farmers, labourers and surrounding landowners at all stages of the development.
Closure and Rehabilitation	Socio-Economic	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Management; Communication; Strategy implementation	Supporting, utilising and building local economy
<b>NO-GO Option</b>				
No-Go Option	Socio-Economic	Reduced period of development and upliftment of the surrounding communities and infrastructure.	N/A	No management possible
No-Go Option	Socio-Economic	Reduced period of development of the economic environment, by job provision and sourcing supplies for and	N/A	No management possible

Activity	Aspects Affected	Potential Impact	Mitigation Type	Management Outcome
		from local residents and businesses.		
No-Go Option	Socio-Economic	Positive: No additional negative impacts on the environment	N/A	No management possible

## 14 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

*Any aspects which must be made conditions of the Environmental Authorisation*

It is recommended that before the construction and operational phase begins,

- The proposed water crossing upgrade to be licensed in accordance with the National Water Act, 1998 (Act No. 36 of 1998) along with the other water uses identified:
  - Borehole abstraction (a);
  - Dust suppression (g);
  - 500 m within bufferzone of wetlands as identified (c & i); and
  - Water crossing upgrade (c & i).
- CIM International Banabatau (Pty) Ltd should ensure the emergency management features are in place and correct as to prevent any damage to the environment.
- If any heritage associated objects or archaeological items are uncovered during any phase of the development across the new route along the mountain, procedure as set out within the specialist study is to be taken and a specialist is to be contacted immediately before any activity continues.

## 15 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

*(Which relate to the assessment and mitigation measures proposed)*

Thorough investigations have been done and alternatives assessed. At this stage of the process no formal design is available for the upgrade of the water crossing and this will have to be done for the WUL licensing process along with possible stormwater design, such as placement of topsoil berms to avoid water ingress into the quarry.

## 16 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

### 16.1 Reasons why the activity should be authorized or not

All gaps identified will be addressed during the WUL process, such as designs for the water crossing, Water management features and rehabilitation plans required for Section 21© and (i) water uses. Thereby, this will ultimately be addressed before any construction may be started.

### 16.2 Conditions that must be included in the authorisation

Please refer to Table 11-1 above for prescribed mitigation measures to mitigate the impacts expected by the activities associated with the sand mine.



Other general conditions should include the following:

- All new activities as outlined in Table 3-1 that requires an authorisation under the NEMA 2017 listed notices are applied for within this application.
- No specific conditions other than those specified within Section 14 are thought to be conditional of the authorisation at this stage of the study; however, it is to the discretion of the Department to include additional conditions.
- The Applicant will have to adhere to all mitigation and management measures as specified in the Water Use License (when approved).

### 16.3 Period for which the Environmental Authorisation is required

Since the application is for a Mining Permit. The maximum allowed timeframe is 2 years.

## 17 FINANCIAL PROVISION

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

### 17.1 National Environmental Management Laws Amendment Act of 2014 (Act 25 of 2014)

The requirements in terms of financial provisioning which was originally part of the Minerals and Petroleum Resources Development Act of 2002 (Act No. 28 of 2002), however has been included in the National Environmental Management Laws Amendment Act of 2014 (Act No. 25 of 2014) which commenced on 2 September 2014.

The definition of “Financial Provision has been included within the National Environmental Management Laws Amendment Act of 2014 (Act No. 25 of 2014):

*“means the insurance, bank guarantee, trust fund or cash that applicants for an environmental authorisation must provide in terms of this Act guaranteeing the availability of sufficient funds to undertake the—*

- (a) rehabilitation of the adverse environmental impacts of the listed or specified activities;*
- (b) rehabilitation of the impacts of the prospecting, exploration, mining or production activities, including the pumping and treatment of polluted or extraneous water;*
- (c) decommissioning and closure of the operations;*
- (d) remediation of latent or residual environmental impacts which become known in the future;*
- (e) removal of building structures and other objects; or*
- (f) remediation of any other negative environmental impacts”*

Section 24P of the National Environmental Management Amendment Act of 2008 (Act No. 62 of 2008) published in Government Gazette No. 32151 of 21 April 2009 has also been amended by the National Environmental Management Laws Amendment Act of 2014 (Act 25 of 2014) resulting as follows:

*“(1) An applicant for an environmental authorisation relating to prospecting, exploration, mining or production, before the Minister responsible for mineral resources issues the environmental authorisation, comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.*

- (2) *If any holder or any holder of an old order right fails to rehabilitate or to manage any impact on the environment, or is unable to undertake such rehabilitation or to manage such impact, the Minister of Minerals and Energy may, upon written notice to such holder, use all or part of the financial provision contemplated in subsection (1) to rehabilitate or manage the environmental impact in question.*
- (3) *Every holder must annually*
  - (a) *assess his or her environmental liability in a prescribed manner and must increase his or her financial provision to the satisfaction of the Minister responsible for mineral resources; and*
  - (b) *submit an audit report to the Minister responsible for mineral resources on the adequacy of the financial provision from an independent auditor.*
- (4) (a) *If the Minister of Minerals and Energy is not satisfied with the assessment and financial provision contemplated in this section, the Minister of Minerals and Energy may appoint an independent assessor to conduct the assessment and determine the financial provision.*  
(b) *Any costs in respect of such assessment must be borne by the holder in question.*
- (5) *The requirement to maintain and retain the financial provision contemplated in this section remains in force notwithstanding the issuing of a closure certificate by the Minister responsible for mineral resources in terms of the Mineral and Petroleum Resources Development Act, 2002 to the holder or owner concerned and the Minister responsible for mineral resources may retain such portion of the financial provision as may be required to rehabilitate the closed mining or prospecting operation in respect of latent, residual or any other environmental impacts, including the pumping of polluted or extraneous water, for a prescribed period.*
- (6) *The Insolvency Act, 1936 (Act No. 24 of 1936), does not apply to any form of financial provision contemplated in subsection (1) and all amounts arising from that provision.*
- (7) *The Minister, or an MEC in concurrence with the Minister, may in writing make subsections (1) to (6) with the changes required by the context applicable to any other application in terms of this Act.”*

Section 24R of the National Environmental Management Amendment Act of 2008 (Act No. 62 of 2008) published in Government Gazette No. 32151 of 21 April 2009 has also been amended by the National Environmental Management Laws Amendment Act of 2014 (Act No. 25 of 2014) resulting as follows:

- “1) Every holder, holder of an old order right and owner of works remain responsible for any environmental liability, pollution or ecological degradation, the pumping and treatment of polluted or extraneous water, the management and sustainable closure thereof notwithstanding the issuing of a closure certificate by the Minister responsible for mineral resources in terms of the Mineral and Petroleum Resources Development Act, 2002, to the holder or owner concerned.*
- 2) When the Minister responsible for mineral resources issues a closure certificate, he or she must return such portion of the financial provision contemplated in section 24P as the Minister may deem appropriate to the holder concerned, but may retain a portion of such financial provision referred to in subsection (1) for any latent, residual or any other environmental impact, including the pumping of polluted or extraneous water, for a prescribed period after issuing a closure certificate.”*

## **17.2 Regulations Pertaining to the Financial Provision for the Prospecting, Exploration, Mining or Production Operations, GN 1147 Dated 20 November 2015**

The aim of these regulations is to regulate the determining and making of financial provision for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future.

Within the transitional arrangement as specified within the latest Financial Provisioning Regulations, November 2015, it is stated that any financial provision undertaken in terms of Section 53 and 54 of the Mineral and Petroleum Resources Development Regulations, 2004 must be regarded as having been undertaken in terms of the provision of these new regulations. It however a requirement that any holder of a right has to review and align such approved financial provision with the provisions of the new regulations within three months of its current financial year end or within 15 months after the coming into effect of these regulations (February 2017) and annually thereafter. On 26 October 2016 the transitional period for the review, assessment and adjustment of financial provision in terms of this new regulation has been extended to 20 February 2019. And again, on 21 September 2018, the amendment to financial provision regulations were published (GN991) assessment and adjustment of financial provision in for holders of a right or permit in terms of this new regulation has been extended again to 19 February 2020.

Important information about the regulation is:

- More certainty on how to calculate the 'financial provision' required of all mining and prospecting rights applicants or rights holders. Each activity listed in the plans must be itemised, and the cost of immediate implementation thereof must be calculated. The financial provision (either in the form of a single vehicle, or a combination of vehicles) must, at any given time, equal the sum of the actual costs of implementing the plans put in place by the rights applicant or holder for a period of at least 10 years going forward.
- Three plans must be included in the Environmental Management Programme: an Annual Rehabilitation Plan; an Environmental Risk Assessment Report; and a Final Rehabilitation, Decommissioning and Mine Closure Plan. The minimum contents for each plan are attached to the Financial Liability Regulations as Appendixes 3, 4 and 5.
- Provision must be made for annual rehabilitation (including a minimum requirement for the annual rehabilitation plan), which must take place on an on-going basis (as opposed to waiting until the closure of a mine).
- Provision made for latent or residual environmental impacts must specifically address the pumping and treatment of extraneous or polluted water. Previously a mining rights holder's liability ended upon the issuing of closure certificates; however NEMA now specifically provides that liability, including the responsibility for extraneous or polluted water, continues after closure. The inclusion of this provision in the regulations setting out how to calculate the financial provision is a clear indication that the quantum of the provision will annually increase.
- The adequacy of the financial provision must be reviewed and assessed annually. The result of this assessment must now also be audited by an independent auditor, and submitted to the Minister. Any excess must be deferred against subsequent assessments, and any shortfall must be remedied by increasing the financial provision, within 90 days from the date of signature of the auditor's report.

### **17.3 Departmental Guidelines for the Evaluation of the Quantum for Financial Provision**

The Department of Minerals and Energy published a guideline on how to determine the quantum for financial provision in January 2005. Although it is stated that the Master Rates in Section B of the document will be updated on an annual basis, based on CPIX or a similar approved method, no updates have occurred since the document has been published. In addition, new guidelines have not yet been provided by the Department to date in order to take the requirements of the latest Financial Provisioning Regulations, 2015 into account. The 2005 guidelines of the Department are still however available on their website (<http://www.dmr.gov.za/publications/viewcategory/21-mineral-policy.html>) and has therefore been utilised again to determine the quantum for this financial year.

During the past few years it has been requested by the Department that the quantum values be updated. In most instances the Department does not supply any information on how these values should be updated, and therefore the onus is on the client to determine the correct and most relevant value. Therefore, in relation to the guidelines provided, the CPIX values have been included within this assessment in order to obtain a more realistic value in relation to the financial quantum required until another method/guideline is provided by the relevant authorities.

**Table 17-1: Financial Provisioning calculated for CIM International Banabatau: Sand Mine Permit**

Closure Cost Assessment - Sand Mine						
Closure Component		Schedule Closure Cost (2019)				
		Applicable	Quantity	Unit	Unit Rate	Total
1	Infrastructure Area					
1.1	Dismantling of processing plant and related structures	No	0	N/A	R -	R -
	Sub-total for Infrastructure Area					R -
2	Mining Area					
2.1	Grading to profile area	Yes	5	ha	R 37,500.00	R 187,500.00
2.2	Topsoil placement from Stockpile	Yes	15000	m3	R 12.61	R 189,150.00
2.3	Rip and scarify	Yes	5	ha	R 8,934.00	R 44,670.00
2.4	Vegetation Establishment	Yes	5	ha	R 13,138.29	R 65,691.45
	Sub-total for Mining Area					R 487,011.45
3	Surface water reinstatement					
3.1	Rehabilitated Storm water and reinstate drainage lines	Yes	5	ha	R 5,685.14	R 28,425.70
	Sub-total for General Surface Rehabilitation					R 28,425.70
	Subtotal 1: Infrastructure and Rehabilitation					R 515,437.15
4	P&G's Contingencies and Additional Allowances					
4.1	Preliminaries and general	Yes	10	/sum	R 51,543.72	R 51,543.72
4.2	Contingencies	Yes	10	/sum	R 51,543.72	R 51,543.72
	Subtotal 2: P&G's Contingencies and Additional Allowances					R 103,087.43
5	Pre-site Relinquishment Monitoring and Aftercare					
5.1	Surface Water Monitoring	Yes	3	/yr	R 24,804.00	R 74,412.00
5.2	Rehabilitation Monitoring	Yes	3	/yr	R 26,587.00	R 79,761.00
5.3	Care and Maintenance of rehabilitated area	Yes	5	ha/3yr	R 15,784.00	R 78,920.00
	Subtotal 3: Pre-site Relinquishment Monitoring and Aftercare					R 233,093.00
	<b>Grand Total EXCLUDING VAT (subtotal 1+2+3)</b>					<b>R 851,617.58</b>

## 17.4 Explain how the aforesaid amount was derived

A Closure and Rehabilitation plan was done for the Mining Permit (Ltd, 2018). The costing methodology applied is summarized as follows:

- Undertook a site visit to key areas and facilities to confirm observations and assumptions;
- Developed an itemised plan indicating an inventory of closure aspects based on the proposed life of mine plan and discussions with mine personnel;
- Defined specific rehabilitation actions for each through reviewing specialist studies, impact assessment outcomes, industry guidelines, conceptual modelling and rehabilitation experience;
- Quantified the rehabilitation actions by a volumetric assessment.
- Obtained rates through consultation with rehabilitation and civil construction companies
- Calculated monitoring and maintenance costs through defining the required monitoring and maintenance, obtaining rates for laboratory analysis, specialists, travelling, accommodation and equipment rates; and
- Compiled a dedicated closure spreadsheet to determine the closure costs of the quantified actions through applicable rates.

## 17.5 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).*

CIM International Banabatau (Pty) Ltd will ensure that costs are provided for financial provisioning.

## 18 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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).

### 18.1 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, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix).*

**Please note that no specific socio-economic specialist investigation was conducted for the specific activities and baseline information for Region 2 within the City of Tshwane Municipality was used.**

The following general socio-economic impacts may be expected to a low degree:

#### **Health and Social Well-Being**

The health and social wellbeing impacts related to the project include.

- Annoyance, dust and noise during construction phase;
- Crime and security;
- Fire risk; and

- Reduced actual personal safety, increased hazard exposure.

### **Quality of the Living Environment Impacts**

- None expected except in the case of an accident or large spillage that was not mitigated or prevented.

### **Economic and Material Well-Being Impacts**

The economic and material well-being impacts include:

- Increase in employment opportunities;
- Increase in employment stability;
- Economic stimulation of the area; and
- Impact of water availability to the maintenance of current activities and income.

### **Institutional, Legal, Political and Equity Impacts**

The institutional, legal, political and equity impacts include:

- Increased demand on existing infrastructure facilities and social services;
- Attitude formation towards project; and
- Disaster management.

## **18.2 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).*

A specialist study was conducted for the Heritage aspects associated with the project. This is included in Section 9.1.13 as well as mitigation measures prescribed within the Impact Management Tables as contained within the document.

From a cultural heritage point of view the development should be allowed to continue taking cognizance of the above recommendations. Furthermore, the subterranean presence of archaeological or historical sites, features or objects must always be taken into consideration as well. If any are uncovered during any development actions a heritage specialist/archaeologist should be called in to investigate and recommend on the best way forward.

## **19 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).*

The best suited alternative was developed in terms of the environmental and the sensitivities identified. Since sand mining is a small operation and turnover is limited, financial implications and cost of different management aspects also play a role. Therefore, no other site alternative is feasible and the location proposed within this document is the best suited positioning for the activities. Refer to Section 6.1 above regarding Alternatives and Motivation.

## 20 UNDERTAKING

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

The signed undertaking is included in the EMP (Part B of this report).



## PART B ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

### Draft Environmental Management Programme

#### 21 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).*

The information can be found in Section 1.1.

##### 21.1.1 Details of the EAP

<b>Name of the Practitioner:</b>	DuToit Wilken	Corlien Lambrechts
<b>Tel No.:</b>	+27 (0) 84 588 2322	+27 (0) 64 618 2646
<b>Fax No.:</b>	+27 87 238 7092	
<b>Email address:</b>	<a href="mailto:dutoit@elemental-s.co.za">dutoit@elemental-s.co.za</a>	<a href="mailto:corlien@elemental-s.co.za">corlien@elemental-s.co.za</a>
<b>Company:</b>	Elemental Sustainability (Pty) Ltd	
<b>Physical address:</b>	323 Brooks Street, Menlo Park, Pretoria	
<b>Postal address:</b>	Postnet Suite 324, Private Bag X1, Melrose Arch, Johannesburg, 2076	

##### 21.1.2 Expertise of the EAP

###### 21.1.2.1 The qualifications of the EAP (with evidence)

Please refer to Table 1 for a summary of the qualification and experience of the EAP. Refer to Appendix 1 and 2 for more details (CV).

*Mr Du Toit Wilken (Pri.Sci.Nat):*

- University of Pretoria, MSc Geography – 2015
- University of Pretoria, BSc Hons Environmental Science – 2010
- University of Pretoria, BSc Environmental Science – 2009

*Ms Corlien Lambrechts:*

- University of Pretoria, BSc Hons Zoology – 2015
- University of South Africa / North West University, BSc Environmental Management and Zoology - 2009

###### 21.1.2.2 Summary of the EAP's past experience (In carrying out the Environmental Impact Assessment Procedure)

*(Attached the EAP's curriculum vitae as Appendix 2)*

Provided here is a summary of the qualification and experience of the EAP. Refer to Appendix 2 for

more details (experience).

**DuToit Wilken** is an Environmental Scientist with more than 8 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He is registered as a Pri.Sci.Nat. (SACNASP), Natural Scientist, Registration number 118911. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Mining within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation.

A significant element of public participation is required throughout the life cycle of an EIA process. DuToit has successfully liaised with interested and affected parties, ensuring that all communication procedures and dialogues are open and transparent, and that capacity building is conducted where necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

**Corlien Lambrechts** is an Environmental Scientist with 6 years of applicable experience in the relevant field of Environmental Management and has qualifications in Environmental Management and Zoology. She is registered as a Cand.Sci.Nat. (SACNASP), Candidate Natural Scientist, Registration number 100003/17. She fulfills the requirements for Pr.Sci.Nat and has applied for upgrade with the South African Council for Natural Scientific Professions.

In 2015 she enrolled for her Honors degree in Zoology at the University of Pretoria where she completed a project in the Cathedral Peak Drakensberg Mountain range studying differences in community structures of invertebrate species between natural grasslands and grasslands subjected to rehabilitation by South African Environmental Observation Network (SAEON) and in association with the University of Pretoria Centre of Invasion Biology (CIB). During her career within the Environmental management field, she has been involved in a wide variety of Ecological and Environmental applications and compilation of reports, which include as relevant to the compilation of this report: Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports and Environmental Management Plans, Environmental Audit Reports, Water-Use Application Reports and Mining Right Applications.

## 22 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).*

Please refer to Section 4.

## 23 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 4, Appendix 5 and Figure 4-1.

## 24 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

### 24.1 Determination of closure objectives

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

- To leave site in a safe state for humans and animals.
- To ensure that the water resource (surface and ground) is not affected by rehabilitation activities.
- To promote indigenous vegetation growth suitable for animals that graze over the disturbed areas on the site.
- Cleaning and upgrading of all access to fit the current land use.
- Vegetation of rehabilitated disturbed surfaces around the project area.
- Leave rehabilitated ground to ensure blending with the surrounding environment.

**Table 23-1: Closure Scenario as per Closure Plan**

Aspect	Description
Mining	<ul style="list-style-type: none"> <li>• Concurrent rehabilitation will be performed as mining progress on slopes.</li> <li>• Topsoil will be replaced from the topsoil berm onto the backfilled opencast</li> <li>• The topsoiled pit will be cross ripped, to alleviate compaction, scarified and revegetated;</li> <li>• Contaminated soils will have been identified and addressed as they arise during operations, leaving only limited potentially contaminated soils / areas requiring clean-up at cessation of operations; and</li> <li>• The haul roads will be deep ripped, profiled and vegetated.</li> </ul>
Water management	<ul style="list-style-type: none"> <li>• Operational storm water measures will be filled in, shaped as required and the footprint scarified and revegetated;</li> </ul>

### 24.2 Volumes and rate of water use required for the operation

Little water will be required for the construction of the proposed activities; the operation however will make use of water.

Water will be used for dust suppression of the affected areas. It is anticipated that approximately maximum of 25 m<sup>3</sup> of water will be used per day based on a 2 times per day watering depth of 5 mm if the complete 5 ha will require dust suppression, which is not foreseen (50 000m x 0.0005 m x 2). The actual amount will be more likely 50 percent of the site for dust suppression = 12.5 m<sup>3</sup>.

### 24.3 Has a water use licence been applied for?

- The application has been started on the Online E-WULAAS system and is awaiting feedback from DWS to initiate the WUL application process and Site visit.

Please refer to Section 24.2 above for a breakdown of the intended water uses.

## 25 IMPACT MANAGEMENT OUTCOMES

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

Please refer to Table 25-1.

**Table 25-1: Impact Management Outcomes**

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

<b>Activity</b> <i>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.)</i>	<b>Aspects Affected</b>	<b>Potential Impact</b> <i>e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.</i>	<b>Phase</b> <i>In which impact is anticipated (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)</i>	<b>Mitigation Type</b> <i>(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.) E.g. Modify through alternative method. Control through noise control, Control through management and monitoring through rehabilitation</i>	<b>Management Outcome</b>	<b>Standard To Be Achieved</b> <i>(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.</i>
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Geology	Loss and sterilisation of mineral resources: The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral resources through the sloping and rehabilitation of the slopes and area.	Construction; Operational Phase	N/A	Utilising the resource completely sufficient	Pre-mining conditions (Surface conditions)
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Soils	Loss of soil and land capability: The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of	Construction; Operational Phase	Management, Rehabilitation	Storing of topsoil in berms that are covered with vegetation. Implementation and compliance with the soil conservation procedure. Prevention of erosion.	N/A

Stockpiling of topsoil positioned for later rehabilitation.		sand and stone aggregate will result in loss of soil structure and land capability. Loss of soil resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes				
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	Construction; Operational Phase	Remedy through rehabilitation, proper removal and disposal if soils have become contaminated	Prevention of soil and water pollution.	Pre-mining conditions after Closure
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil positioned for later rehabilitation.	Land Capability and Land Use	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	Construction; Operational Phase	Remedy through rehabilitation and management.	Reducing footprint on which activities occur. Prevention of erosion and conservation of soil resource.	N/A
Sand Mining; Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Topography	Hazardous excavations: The project has the potential to alter the topography.	Construction; Operational Phase	Management; Rehabilitation	Fenced / bermed / notification of hazardous excavations. Continuous rehabilitation. Access control.	N/A

Stockpiling of topsoil positioned for later rehabilitation.						
All	Ecological Impacts - Plants/Vegetation	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction; Operational Phase	Surface disturbance will be kept to a minimum. Activities will be concentrated in already disturbed areas as far as is possible. Human and vehicular activity will be restricted to construction and operational sites.	N/A	NEMBA
All	Ecological Impacts - Animals/Fauna	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction; Operational Phase	Surface disturbance will be kept to a minimum. Activities will be concentrated in already disturbed areas as far as is possible. Human and vehicular activity will be restricted to construction and operational sites.	N/A	NEMBA
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Construction; Operational Phase	Stormwater Management, Monitoring, Infrastructure Design	Prevention water pollution and impacts on the natural environment and surrounding water users.	Water Quality: In line with the specific Integrated Unit of Analysis RQS (Resource Quality Standards) for Environmental water resources and Water Quality as specified in WUL
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water	Alteration of natural drainage patterns and pollution: The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water	Construction; Operational Phase	Infrastructure designs; Management; Monitoring	Prevention water pollution and impacts on the natural environment and surrounding water users.	Water Quality: In line with the specific Integrated Unit of Analysis RQS (Resource Quality Standards) for Environmental water resources

		courses - Section 21(c) and (i) water uses				and Water Quality as specified in WUL
Water crossing upgrade	Hydrological Aspects; Surface water	Section 21(c) and (i) water uses: such as increasing sedimentation of the water resource during Construction, impacting on water quality	Construction; Operational Phase	Infrastructure designs; Management; Monitoring	Prevention water pollution and impacts on the natural environment and surrounding water users.	Water Quality: In line with the specific Integrated Unit of Analysis RQS (Resource Quality Standards) for Environmental water resources and Water Quality as specified in WUL Application
Sand Mining; Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Groundwater contamination and lowering of groundwater levels: The project has the potential to contaminate groundwater resources.	Construction; Operational Phase	Stormwater Management, Monitoring, Infrastructure Design	Prevention water pollution and impacts on the natural environment and surrounding water users.	Water Quality: In line with the specific Integrated Unit of Analysis RQS (Resource Quality Standards) for Environmental water resources and Water Quality as specified in WUL Application
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Air Quality	Air quality: The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Construction; Operational Phase	Monitor conditions workers are exposed to. Implement Dust Monitoring Programme	Ensure health and safety of mine workers as well as the surrounding environment	Health and Safety Standards. A Safe and Low Risk Environment. Air Quality Standards
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Noise, Vibration and Lighting	Disturbing noise levels: The project has the potential to cause noise pollution through the mining activities.	Construction; Operational Phase	Be mindful of additional noise sources. Monitoring of Noise levels	Reducing disturbing noise/light and vibration to outside boundaries.	Health and Safety Standards. A Safe and Low Risk Environment. Noise Regulations

Sand Mining; Vegetation Clearance, Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Sites of archaeological and cultural interests	Loss of heritage/cultural and palaeontological resources: The project has the potential to damage heritage/cultural and palaeontological resources.	Construction; Operational Phase	Management; Conservation; Permitting	No sites will be impacted. Consult a specialist if any heritage aspect is uncovered during any stage of the development.	No impacts on Heritage Resources
All	Visual aspects	Negative visual views: The mining activities have the potential to create visual impacts.	Construction; Operational Phase	Monitoring and Rehabilitation if required	Early detection and prevention of possible impacts. Placements of Topsoil berms around quarry.	Sense of Place. Pre-mining conditions after Closure
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Waste	Generation and disposal of general waste, litter and hazardous material during the operational phase	Construction; Operational Phase	Environmental Awareness, Monitor waste	Responsible waste management and prevention of pollution.	Waste Regulations (NEM:WA); WUL, IWWMP
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Construction; Operational Phase	Infrastructure designs; Management; Monitoring	Traffic Control and prevention of impacts	As per Traffic Management Plan
Water crossing upgrade	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Construction; Operational Phase	Infrastructure designs; Management; Monitoring	Traffic Control and prevention of impacts	As per Traffic Management Plan
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining,	Health and Safety	Increased risk to public health and safety: Dangerous areas	Construction; Operational Phase	Environmental Awareness, Infrastructure designs; Management;	Ensure Health and Safety Compliance and Environmental	Health and Safety Regulations. A safe and low risk



Stockpiling of topsoil , Impacts on watercourses				Monitoring	Compliance	environment
All	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Construction; Operational Phase	Management; Communication; Strategy implementation	Prevent impacts on farmers, labourers and surrounding landowners at all stages of the development.	Prevent impacts on farmers, labourers and surrounding landowners at all stages of the development.
All	Socio-Economic: <b>Positive Impacts</b>	Employment provision due to the implementation of new sand mining activities.	Construction; Operational Phase	Management; Communication; Strategy implementation	Increased Employment Opportunities in the Long term	Increased Employment Opportunities in the Long term
All	Socio-Economic: <b>Positive Impacts</b>	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Construction; Operational Phase	Management; Communication; Strategy implementation	Supporting, utilising and building local economy	Supporting, utilising and building local economy
<b>Closure Phase</b>						
Closure and Rehabilitation	Geology and Soils	Soil compaction by heavy duty vehicles.	Closure Phase	Rehabilitation and Monitoring	Closure phase overlapping with the operational phase, adhere to management outcomes as described for Operational phase	Pre-mining conditions after Closure
Closure and Rehabilitation	Geology and Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Closure Phase	Remedy through rehabilitation, proper removal and disposal if soils have become contaminated	Prevention of soil and water pollution. Closure phase overlapping with the operational phase, adhere to management outcomes/mitigation measures as described for Operational phase.	Pre-mining conditions after Closure
Closure and Rehabilitation	Land Capability and Land Use	Land Capability impacts, impacting on the livelihood of surrounding land owners and users.	Closure Phase	Rehabilitation and Monitoring	Early detection and prevention of possible impacts. Restoration of Landscape function and Capability.	Pre-mining conditions after Closure

Closure and Rehabilitation	Ecological Impacts	Spreading of alien invasive species and bush encroachment of indigenous species.	Closure Phase	Rehabilitation and Monitoring	Prevent and/or remediate ecological impacts. Closure phase overlapping with the operational phase; adhere to management outcomes/mitigation measures as described for Construction and Operational phase.	Pre-mining conditions after Closure
Closure and Rehabilitation	Ecological Impacts - <b>Positive Impact</b>	Rehabilitation of area with natural vegetation and re-establishment of local biodiversity	Closure Phase	Rehabilitation and Monitoring	Restore the natural environment to approved Post-Closure Land form	Pre-mining conditions after Closure
Closure and Rehabilitation	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Closure Phase	Infrastructure designs; Management; Monitoring	Prevention water pollution and impacts on the natural environment and surrounding water users.	Water Quality: In line with the specific Integrated Unit of Analysis RQS (Resource Quality Standards) for Environmental water resources and Water Quality as specified in WUL
Closure and Rehabilitation	Air Quality	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Closure Phase	Adhere to Dust Management and Monitoring plan	Ensure health and safety of Environment including adjacent land users, prevent dust on crops and fields utilised by cattle grazing.	Health and Safety Standards. A Safe and Low Risk Environment. Air Quality Standards
Closure and Rehabilitation	Noise, Vibration and Lighting	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Closure Phase	Be mindful of additional noise sources. Monitoring of Noise levels.	Reducing disturbing noise/light and vibration to outside boundaries.	Health and Safety Standards. A Safe and Low Risk Environment. Noise Regulations
Closure and Rehabilitation	Sites of	None expected at this	Closure	Management;	No sites will be	No impacts on

	archaeological and cultural interests	stage as all off the resources have been removed and no further excavation work will be done	Phase	Conservation; Permitting	impacted. Consult a specialist if any heritage aspect is uncovered during any stage of the development.	Heritage Resources
Closure and Rehabilitation	Visual aspects	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Closure Phase	Monitoring and Rehabilitation if required	Early detection and prevention of possible impacts.	Sense of Place. Pre-mining conditions after Closure
Closure and Rehabilitation	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Closure Phase	Infrastructure designs; Management; Monitoring	Prevent impacts on farmers, labourers and surrounding landowners at all stages of the development.	Health and Safety Regulations. A safe and low risk environment
Closure and Rehabilitation	Socio-Economic	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Closure Phase	Management; Communication; Strategy implementation	Supporting, utilising and building local economy	Increased Employment Opportunities in the Long term
<b>NO-GO-Option</b>						
No-Go Option	Socio-Economic	Reduced period of development and upliftment of the surrounding communities and infrastructure.	N/A	N/A	No management possible	N/A
No-Go Option	Socio-Economic	Reduced period of development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	N/A	N/A	No management possible	N/A
No-Go Option	Socio-Economic	Positive: No additional negative impacts on the environment	N/A	N/A	No management possible	N/A

## 26 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).*

### 26.1 Impacts to be mitigated in their respective phases

**Table 26-1: Measures to rehabilitate the environment affected by the undertaking of any listed activity**

Activity	Aspects Affected	Potential Impact	Phase	Size And Scale	Management And Mitigation Measures	Compliance With Standards	Time Period For Implementation
<i>(as listed in 2.11.1)</i>	<i>Of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure</i>			<i>(volumes, tonnages and hectares or m<sup>2</sup>)</i>	<i>(describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)</i>	<i>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)</i>	<i>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.</i>
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator	Geology	Loss and sterilisation of mineral resources: The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	None possible, except removal of all sand resource within the Mining footprint to a depth of 3m as predicted by the Geotechnical survey.	N/A	Throughout the LoM

<p>employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.</p>		<p>resources through the sloping and rehabilitation of the slopes and area.</p>					
<p>Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.</p>	Soils	<p>Loss of soil and land capability: The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of sand and stone aggregate will result in loss of soil structure and land capability. Loss of soil resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes</p>	Construction; Operational Phase	<p>Mining Permit maximum lifetime is 2 years. 5 ha footprint.</p>	<ul style="list-style-type: none"> <li>• The soil that has been removed within the area needs to be replaced and rehabilitated to its previous natural state as far as possible.</li> <li>• Topsoil from the footprint areas need to be removed before construction and used in rehabilitation afterwards.</li> <li>• The sand mine will implement a soil conservation procedure which includes the protection of soil from compaction, protection of topsoil, prevention of erosion and loss, re-vegetation of disturbed areas and monitoring.</li> </ul>	N/A	Continuous
<p>Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining</p>	Soils	<p>Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as</p>	Construction; Operational Phase	<p>Mining Permit maximum lifetime is 2 years. 5 ha footprint.</p>	<ul style="list-style-type: none"> <li>• All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks;</li> <li>• All leaks will be cleaned up immediately using an absorbent material and spill kits, in</li> </ul>	N/A	Continuous

<p>– Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.</p>		<p>hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.</p>			<p>the prescribed manner; and</p> <ul style="list-style-type: none"> <li>• The approved Integrated Water and Waste Management Plan to be implemented.</li> <li>• Implement driptrays under stationary vehicles.</li> </ul> <p><b>Hydrocarbons and hazardous waste:</b></p> <ul style="list-style-type: none"> <li>• All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and</li> <li>• All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area.</li> </ul>		
<p>Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil positioned for later rehabilitation.</p>	<p>Land Capability and Land Use</p>	<p>Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.</p>	<p>Construction; Operational Phase</p>	<p>Mining Permit maximum lifetime is 2 years. 5 ha footprint.</p>	<ul style="list-style-type: none"> <li>• The Sand mine will conserve soil and control erosion (as discussed above).</li> <li>• Grazing and natural land along the adjacent areas will need to remain as the main land activity to ensure land capability is kept to that of grazing and agriculture for surrounding land uses.</li> </ul>	<p>N/A</p>	<p>Continuous</p>
<p>Sand Mining; Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later</p>	<p>Topography</p>	<p>Hazardous excavations: The project has the potential to alter the topography.</p>	<p>Construction; Operational Phase</p>	<p>Mining Permit maximum lifetime is 2 years. 5 ha footprint.</p>	<ul style="list-style-type: none"> <li>• Unsafe areas associated with the construction will be fenced.</li> <li>• Excavations will be backfilled and landscaped as soon as possible.</li> </ul>	<p>N/A</p>	<p>Continuous</p>

rehabilitation.							
All	Ecological Impacts - Plants/Vegetation	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<ul style="list-style-type: none"> <li>• Keep the footprint as small as possible, utilising existing roads or tracks.</li> <li>• No equipment, samples etc. may be stored within the grassland and <i>Typha capensis</i> vegetation. Limit the use of heavy machinery or vehicles in these areas.</li> <li>• Prevent spillage of pollutants, contain and treat any spillages immediately, strictly prohibit any pollution/littering. Ensure there is a method statement in place to remedy any accidental spillages immediately.</li> <li>• No open fires may be lit for cooking or any other purposes, unless in specifically designated and secured areas</li> <li>• No vehicles / equipment may be washed on site, except in suitably designed and protected areas</li> <li>• No vehicles may be serviced or repaired on the property, unless it is an emergency situation in which case adequate spillage containment must be implemented</li> <li>• After proposed activities have taken place, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land must be left in a condition as close as possible to that prior to activity.</li> <li>• Clear any temporarily impacted areas of all foreign materials, re-apply and/or loosen topsoils and landscape to surrounding level.</li> <li>• Ensure that the vegetation disturbed is rehabilitated. Colonisation of the disturbed areas by plants species from the surrounding natural vegetation must be monitored to ensure that indigenous vegetation cover is sufficient within one growing season. Due to the high degree of invasive species in the area, it is active rehabilitation e.g. hydroseeding is</li> </ul>	Continuous	From onset of development

					<p>recommended, along with an alien invasive management plan.</p> <ul style="list-style-type: none"> <li>• Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access until such time that rehabilitation was successful.</li> <li>• Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. Monitoring should continue for at least two years afterwards.</li> </ul> <p><b>Protected or plant species of conservation concern:</b></p> <ul style="list-style-type: none"> <li>• Scan the footprint for plant species of conservation concern. Where threatened species are present, activities should be moved to avoid their localities. Declining or Near Threatened plant species may be relocated provided that a permit for removal and relocation has been granted by the GDARD.</li> <li>• Protected plants must be removed by a suitably qualified specialist and replanted in suitable habitat such as the buffer areas of the moist grasslands. Their survival must be monitored for at least two growing seasons after relocation.</li> <li>• Construction workers may not tamper or remove these plants, and neither may anyone collect seed from the plants without permission from the local authority.</li> </ul> <p><i>Typha capensis</i> and grassland vegetation</p> <ul style="list-style-type: none"> <li>• Adhere to national legislation pertaining to activities within or close to watercourses.</li> <li>• Prevent unnecessary access into the grassland and <i>Typha capensis</i> vegetation.</li> </ul>		
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All	Ecological Impacts - Animals/Fauna	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<ul style="list-style-type: none"> <li>• If the African Rock Python, Striped Harlequin Snake, Giant Bullfrog or any herpetological species are encountered or exposed during any phase, they should be removed and relocated to natural areas in the vicinity. This remediation requires the employment of a herpetologist to oversee the removal of any herpetofauna during the initial ground-clearing phase of construction (i.e. initial ground-breaking by earthmoving equipment). The contractor must ensure that no herpetofauna species are disturbed, trapped, hunted or killed</li> <li>• Conservation-orientated clauses should be built into contracts for personnel, complete with penalty clauses for non-compliance.</li> <li>• Education of the staff about the value of wildlife and environmental sensitivity.</li> <li>• Alien and invasive plants must be removed.</li> <li>• When holes are drilled or excavations are made, it must be cordoned off or completed quickly; otherwise the hole may act as a death trap for small mammals and herpetofauna.</li> <li>• Keep the footprint as small as possible, utilising existing roads or tracks.</li> </ul>	Continuous	From onset of development
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<ul style="list-style-type: none"> <li>• The Site Manager (SM) should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system;</li> <li>• Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses should be taken;</li> <li>• No wastewater may run freely into any of the surrounding naturally vegetated areas;</li> <li>• The loss of topsoil must be minimised;</li> <li>• Erosion and subsequent siltation must be</li> </ul>	<ul style="list-style-type: none"> <li>• GNR 704</li> <li>• Water Use Licence</li> <li>• Groundwater monitoring program</li> </ul>	Continuous

<p>sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses</p>					<p>limited;  <ul style="list-style-type: none"> <li>Any drainage channels shall be suitably designed to ensure that erosion does not occur;</li> <li>All areas susceptible to erosion shall be protected and stabilisation measures implemented;</li> <li>Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies;</li> <li>Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and</li> <li>A stormwater management plan must be compiled; and should be approved by DWS and implemented.</li> </ul> </p>		
<p>Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses</p>	<p>Hydrological Aspects; Surface water</p>	<p>Alteration of natural drainage patterns and pollution: The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water courses - Section 21(c) and (i) water uses</p>	<p>Construction; Operational Phase</p>	<p>Mining Permit maximum lifetime is 2 years. 5 ha footprint.</p>	<ul style="list-style-type: none"> <li>Control of alien invasive plants should form part of the maintenance plan</li> <li>Maintenance activities should follow best practice</li> <li>Install and maintain litter and sediment traps</li> <li>Monitoring for downstream degradation and effective rehabilitation where necessary</li> </ul>	<ul style="list-style-type: none"> <li>GNR 704</li> <li>Water Use Licence</li> <li>Groundwater monitoring program</li> </ul>	<p>Continuous</p>
<p>Water crossing upgrade</p>	<p>Hydrological Aspects; Surface water</p>	<p>Section 21(c) and (i) water uses: such as increasing sedimentation of the water resource during Construction, impacting on water quality</p>	<p>Construction; Operational Phase</p>	<p>Mining Permit maximum lifetime is 2 years. 5 ha footprint.</p>	<p><b><u>Watercrossing:</u></b> During the detailed design phase, the footprint and design of structures should aim to have a positive impact on habitat quality and hydrology of the river  <ul style="list-style-type: none"> <li>Control of alien invasive plants should form part of the maintenance plan</li> </ul> </p>	<ul style="list-style-type: none"> <li>GNR 704</li> <li>Water Use Licence</li> <li>Groundwater monitoring</li> </ul>	<p>Continuous</p>

					<ul style="list-style-type: none"> <li>• Maintenance activities should follow best practice</li> <li>• Install and maintain litter and sediment traps</li> <li>• Monitoring for downstream degradation and effective rehabilitation where necessary</li> </ul>	program	
Sand Mining; Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Groundwater contamination and lowering of groundwater levels: The project has the potential to contaminate groundwater resources.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Adhere to all hydrological mitigation measures as prescribed above.	<ul style="list-style-type: none"> <li>• GNR 704</li> <li>• Water Use Licence</li> <li>• Groundwater monitoring program</li> </ul>	Continuous and As needed
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Air Quality	Air quality: The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<p>The monitoring should include air quality (dust exposure). Dust suppression shall be implemented during dry periods and windy conditions;</p> <ul style="list-style-type: none"> <li>• Minimise travel speed on roads;</li> <li>• Implement and actively monitor dust fallout generated in the 8 major wind directions on the borders of the site; and</li> <li>• Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed.</li> </ul>	<ul style="list-style-type: none"> <li>• South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution</li> <li>• Meet the requirements of the National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the</li> </ul>	Continuous

						National Environmental Management: Air Quality Act 39 of 2004 • Dust fall monitoring programme should be implemented	
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Noise, Vibration and Lighting	Disturbing noise levels: The project has the potential to cause noise pollution through the mining activities.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<ul style="list-style-type: none"> <li>• Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible;</li> <li>• Heavy vehicle traffic should be routed away from noise sensitive areas, where possible;</li> <li>• Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies;</li> <li>• The Site Manager (SM) should take measures to discourage labourers from loitering in the area and causing noise disturbance;</li> <li>• Regular monitoring of noise levels at various, pre-determined locations. This will serve as the core of noise mitigation as it will enable the determination of problem areas;</li> <li>• Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; and</li> </ul>	Noise Management and Monitoring Programme	Continuous

					<ul style="list-style-type: none"> <li>Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise.</li> </ul>		
<p>Sand Mining; Vegetation Clearance, Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.</p>	Sites of archaeological and cultural interests	Loss of heritage/cultural and palaeontological resources: The project has the potential to damage heritage/cultural and palaeontological resources.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<p>Care should be exercised on the demarcated farm portions and if possible the areas demarcated as 'Potentially Sensitive' should be avoided.</p> <ul style="list-style-type: none"> <li>It is advised that a qualified archaeologist be contacted whenever uncertainty regarding potential heritage remains is encountered.</li> <li>Activities should not take place in the vicinity of stone cairns, stone-walling, building ruins or any other heritage material.</li> <li>Should the prospecting outcome result in further development or construction, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered.</li> <li>Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).</li> </ul>	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Continuous
All	Visual aspects	Negative visual views: The mining activities have the potential to create visual impacts.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Ideal placement of Topsoil berms to shield activities from sensitive viewpoints.	Rehabilitation Plans as approved.	Continuous
Sand Mining; Vegetation	Waste	Generation and disposal of general waste, litter and	Construction; Operational	Mining Permit	Waste should be sorted, collected and disposed off in the correct manner and	Waste Regulations	Continuous

<p>Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses</p>		hazardous material during the operational phase	Phase	maximum lifetime is 2 years. 5 ha footprint.	removed from site.	(NEM:WA) National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended]	
<p>Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses</p>	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<ul style="list-style-type: none"> <li>• Where feasible heavy vehicles should not operate on public roads during peak hours; and</li> <li>• Heavy vehicles should adhere to the speed limit of the road</li> <li>• The existing water crossing will need to be upgraded to ensure safe and responsible transport to and from the site (to the market)</li> </ul>	Traffic Management Plan	Continuous
Water crossing upgrade	Traffic	Road disturbance and traffic safety: The project has the potential to result in an	Construction; Operational Phase	Mining Permit maximum	<ul style="list-style-type: none"> <li>• Implement Work Method Statement to avoid impacts to the watercourse</li> <li>• Adhere to Water use license specifications as (and</li> </ul>	Traffic Management Plan	Continuous

		increase in traffic volumes along existing roads.		lifetime is 2 years. 5 ha footprint.	when) approved • Ensure a detour is available for use during the upgrade of the bridge over the watercourse to prevent access problems for properties requiring this road.		
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil , Impacts on watercourses	Health and Safety	Increased risk to public health and safety: Dangerous areas	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	<ul style="list-style-type: none"> <li>• A health and safety control officer should monitor the implementation of the health and safety plan;</li> <li>• Any health and safety incidents should be reported to the Site Manager (SM) immediately;</li> <li>• First aid facilities should be available on site at all times;</li> <li>• Workers have the right to refuse work in unsafe conditions; and</li> <li>• Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers.</li> </ul>	Refer above	Continuous
All	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Refer to the above-mentioned mitigation measures for noise, dust and other environmental impacts.	N/A	Continuous
All	Socio-Economic: <b>Positive Impacts</b>	Employment provision due to the implementation of new sand mining activities.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	• Proceed with the proposed activity.	N/A	Continuous
All	Socio-Economic: <b>Positive Impacts</b>	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Construction; Operational Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Sourcing supplies and non-core activities from local residents and businesses boosting the local economy. Implement Social and Labour Plan.	N/A	Continuous
<b>Closure Phase</b>							
Closure and Rehabilitation	Geology and Soils	Soil compaction by heavy duty vehicles.	Closure Phase	Mining Permit	Monitor general condition of surface, rehabilitate if any surface impact	N/A	As needed

				maximum lifetime is 2 years. 5 ha footprint.	occurs. Adhere to soil compaction mitigation measures as prescribed within Operational phase.		
Closure and Rehabilitation	Geology and Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any surface impact occurs. Adhere to mitigation measures as prescribed within Operational phase.	N/A	Continuous
Closure and Rehabilitation	Land Capability and Land Use	Land Capability impacts, impacting on the livelihood of surrounding land owners and users.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any surface impact occurs. Adhere to mitigation measures as prescribed within Construction and Operational phase.	Final Land Use	Continuous
Closure and Rehabilitation	Ecological Impacts	Spreading of alien invasive species and bush encroachment of indigenous species.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any surface impact occurs. Adhere to mitigation measures as prescribed within Construction and Operational phase. Monitor whether rehabilitation practices have been successful	<ul style="list-style-type: none"> <li>• Alien and Invasive Species Management Plan</li> <li>• Rehabilitation Objectives and Standards</li> <li>• Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014)</li> <li>• Notice 2</li> <li>• Exempted Alien Species in terms of Section 66 (1) Notice 3 National Lists of</li> </ul>	Continuous



						Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11 • Notice 4 Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12	
Closure and Rehabilitation	Ecological Impacts - <b>Positive Impact</b>	Rehabilitation of area with natural vegetation and re-establishment of local biodiversity	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any surface impact occurs. Adhere to mitigation measures as prescribed within Operational phase. Monitor whether rehabilitation practices have been successful	• GNR 704 • Water Use Licence • Groundwater monitoring program	Continuous
Closure and Rehabilitation	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor as per WUL and rehabilitate/remediate if any impact occurs. Adhere to mitigation measures as prescribed within Construction and Operational phase. Create a free-draining surface to prevent ingress of water and erosion.	• GNR 704 • Water Use Licence • Groundwater monitoring program	Continuous
Closure and Rehabilitation	Air Quality	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor and adhere to mitigation measures as prescribed within Construction and Operational phase.	• South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution • Meet the requirements of the National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in	Continuous

						terms of the National Environmental Management: Air Quality Act 39 of 2004 • Dust fall monitoring programme should be implemented	
Closure and Rehabilitation	Noise, Vibration and Lighting	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor and adhere to mitigation measures as prescribed within Operational phase.	Noise Management and Monitoring Programme	Continuous
Closure and Rehabilitation	Sites of archaeological and cultural interests	None expected at this stage as all off the resources have been removed and no further excavation work will be done	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	To be prescribed by Specialist if any heritage sensitive aspects are discovered during any phase of the development.	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Continuous
Closure and Rehabilitation	Visual aspects	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any impact occurs. Adhere to mitigation measures as prescribed within Operational phase.	Final Land form and Mine Rehabilitation Plans as approved.	Continuous
Closure and Rehabilitation	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any impact occurs. Adhere to mitigation measures as prescribed within Operational phase.	Social and Labour Plan	Continuous
Closure and Rehabilitation	Socio-Economic	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Closure Phase	Mining Permit maximum lifetime is 2 years. 5 ha footprint.	Monitor general condition of surface, rehabilitate if any impact occurs. Adhere to mitigation measures as prescribed within Operational phase.	Social and Labour Plan	Continuous

NO-GO Option							
No-Go Option	Socio-Economic	Reduced period of development and upliftment of the surrounding communities and infrastructure.	N/A	N/A	N/A	N/A	N/A
No-Go Option	Socio-Economic	Reduced period of development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	N/A	N/A	N/A	N/A	N/A
No-Go Option	Socio-Economic	Positive: No additional negative impacts on the environment	N/A	N/A	N/A	N/A	N/A

## 27 FINANCIAL PROVISION

### 27.1 Determination of the amount of Financial Provision

Please refer to Section 17.

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

The closure objectives are outlined in Section 23.1 (Part B) and were determined to be the best environmental option taking into consideration the fact that the trenches are already existing.

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

Yes this will be done as part of the public participation process when this report is made available for comment. Comments from the public are incorporated within this report.

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

At this stage, rehabilitation will be of the following aspects:

<b>Vegetation clearance</b>	5 Ha
<b>Open quarry for sand mining</b>	5 Ha
<b>Road upgrade</b>	<i>To be determined</i>

Please refer to Figure 9-6 and Figure 9-24 for current land uses and local visual description of proposed activity from Google Earth.

A Closure Plan has been drafted and is available within the appendices.

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

The rehabilitation plan, once finalised will be compatible with the closure objectives as it is the applicant's responsibility to restore the site to its original condition as far as possible and to make sure that the environment is left in the desired state as before the infrastructure was installed/implemented.

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

Please refer to Section 27 for preliminary financial provisioning calculated for the applicant.

#### 27.1.6 Confirm that the financial provision will be provided as determined.

The financial provision will be provided by CIM International Banabatau (Pty) Ltd.

## 28 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON

Including:

g) *Monitoring of Impact Management Actions*

h) *Monitoring and reporting frequency*

i) *Responsible persons*

j) *Time period for implementing impact management action*

k) *Mechanism for monitoring compliance*

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

**Table 26-2: Mechanism for Monitoring Compliance and Reporting**

Activity	Aspects Affected	Potential Impact	Phase	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency	Time Period For Implementation Impact Management Options
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Geology	Loss and sterilisation of mineral resources: The project has the potential to access sand and stone aggregate resources but also result in the loss and sterilisation of mineral resources through the sloping and rehabilitation of the slopes and area.	Construction; Operational Phase	Monitor that resource extraction is optimal	SHEQ	Daily, Monthly recording of tonnages removed and rehabilitated	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth	Soils	Loss of soil and land capability: The project has the potential to compromise soil resources through physical disturbance (erosion and compaction). Removal of sand and stone aggregate will result in loss of soil structure and land capability.	Construction; Operational Phase	Confirm vegetation establishment, Confirm that soil is conserved and removed before construction to preserve topsoil.	SHEQ	Annually	Continuous

of 3m. Stockpiling of topsoil positioned for later rehabilitation.		Loss of soil resources has a direct impact on the natural capability of the land. However, rehabilitated land is anticipated to have uses for grazing and or agriculture purposes					
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	Construction; Operational Phase	Set up service plan and record services of vehicles. Monitor areas for spills that need to be cleaned. Monitor drip tray placement.	Site manager	As needed	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil positioned for later rehabilitation.	Land Capability and Land Use	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	Construction; Operational Phase	Demarcate areas and Design appropriately	ECO / Site Manager	As needed	Continuous
Sand Mining; Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation.	Topography	Hazardous excavations: The project has the potential to alter the topography.	Construction; Operational Phase	Confirm berms in place / fencing in place. Identify areas to be rehabilitated and rehabilitate.	SHEQ / Site Manager	Quarterly	Continuous
All	Ecological Impacts - Plants/Vegetation	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality,	Construction; Operational Phase	Demarcate area, General Condition, spread of Alien and Invasives	ECO / Contractor	Annually	Continuous

		including the disturbance of protected species.					
All	Ecological Impacts - Animals/Fauna	Loss of biodiversity (terrestrial and aquatic): The mining activities have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of protected species.	Construction; Operational Phase	Demarcate area, General Condition, spread of Alien and Invasives	ECO / Contractor	Annually	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Construction; Operational Phase	Implement IWWMP Monitoring prescribed	SHEQ, Contractor	Monthly for Surface water quality, Quarterly for Groundwater levels	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining Stockpiling of topsoil positioned for later rehabilitation. Potential disturbance of water courses	Hydrological Aspects; Surface water	Alteration of natural drainage patterns and pollution: The project has the potential to alter surface drainage patterns through the mining of sand and stone aggregate in close proximity to water courses - Section 21(c) and (i) water uses	Construction; Operational Phase	Implement IWWMP Monitoring prescribed	SHEQ, Contractor / specialist	Monthly for Surface water quality, and as per Rehabilitation/Monitoring plans for Section 21(c) and (i)	Continuous
Water crossing upgrade	Hydrological Aspects; Surface water	Section 21(c) and (i) water uses: such as increasing sedimentation of the water resource during Construction, impacting on water quality	Construction; Operational Phase	Implement IWWMP and Rehabilitation Programmes as required for Section 21 (c) and (i) water uses. Monitoring prescribed	SHEQ, Contractor / specialist	Monthly for Surface water quality, and as per Rehabilitation/Monitoring plans for Section 21(c) and (i)	Continuous
Sand Mining; Potential	Hydrological	Groundwater contamination and	Construction;	Implement IWWMP	SHEQ, Contractor /	Quarterly for	Continuous

disturbance of water courses	Aspects; Surface water and Groundwater	lowering of groundwater levels: The project has the potential to contaminate groundwater resources.	Operational Phase		specialist	Groundwater levels, since no Groundwater quality impact are foreseen	
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Air Quality	Air quality: The proposed project has the potential to emit pollution into the air which could have a negative impact on ambient air quality.	Construction; Operational Phase	Dust management programme	SHEQ, Contractor / specialist	Monthly Dust exposure	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Noise, Vibration and Lighting	Disturbing noise levels: The project has the potential to cause noise pollution through the mining activities.	Construction; Operational Phase	Conduct noise monitoring	SHEQ, Contractor	Quarterly Noise levels at Sensitive receptors	Continuous
Sand Mining; Vegetation Clearance, Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m.	Sites of archaeological and cultural interests	Loss of heritage/cultural and palaeontological resources: The project has the potential to damage heritage/cultural and palaeontological resources.	Construction; Operational Phase	Record occurrences of sites and artefacts if found, contact a specialist immediately.	SHEQ	As needed	Continuous
All	Visual aspects	Negative visual views: The mining activities have the potential to create visual impacts.	Construction; Operational Phase	Monitor general condition and Implement good housekeeping	SHEQ, Mine Manager	Quarterly	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use	Waste	Generation and disposal of general waste, litter and hazardous material during the	Construction; Operational Phase	Monitor volumes of waste disposed/ generated and volumes	SHEQ, Mine Manager	Monthly	Continuous



Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses		operational phase		removed by Contractors			
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining – Excavator employed to remove topsoil. Excavator to be used for the excavation of sand and stone aggregate to a maximum depth of 3m. Stockpiling of topsoil , Impacts on watercourses	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Construction; Operational Phase	As per Traffic Management Plan	SHEQ, Mine Manager	As per Traffic Management Plan	Continuous
Water crossing upgrade	Traffic	Road disturbance and traffic safety: The project has the potential to result in an increase in traffic volumes along existing roads.	Construction; Operational Phase	As per Traffic Management Plan	SHEQ, Mine Manager	As per Traffic Management Plan, specifically for the water crossing upgrade	Continuous
Sand Mining; Vegetation Clearance, Changing the land-use Opencast mining, Stockpiling of topsoil , Impacts on watercourses	Health and Safety	Increased risk to public health and safety: Dangerous areas	Construction; Operational Phase	Health and Safety Occupational Monitoring,	SHEQ, Mine Manager	As per Dust and Noise monitoring	Continuous
All	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Construction; Operational Phase	Complaints should be investigated (if any). Monitoring records to be kept on-site and complaints register to record complaints received	SHEQ	Annually	Continuous
All	Socio-Economic: <b>Positive</b>	Employment provision due to the implementation of new sand	Construction; Operational	Compliance with programme principles /	Human Resources	Annually	Continuous

	Impacts	mining activities.	Phase	vision			
All	Socio-Economic: <b>Positive Impacts</b>	Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Construction; Operational Phase	Keep records of service providers and where they are from	Human Resources/ Procurement	Annually. Record is to be kept of local workers and services utilised.	Continuous
<b>Closure Phase</b>							
Closure and Rehabilitation	Geology and Soils	Soil compaction by heavy duty vehicles.	Closure Phase	Monitoring of the condition of the surface areas - Visual inspection	SHEQ, Mine Manager	Monthly, Visual and confirm rehabilitation of affected areas.	Continuous
Closure and Rehabilitation	Geology and Soils	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	Closure Phase	Service plan and record services of vehicles. Monitor areas for spills that need to be cleaned. Monitor drip tray placement.	SHEQ, Mine Manager	As needed. Monitor is correct procedures were followed to clean up.	Continuous
Closure and Rehabilitation	Land Capability and Land Use	Land Capability impacts, impacting on the livelihood of surrounding land owners and users.	Closure Phase	Monitoring of the Land status and condition	SHEQ, Mine Manager	Monthly record of rehabilitated areas and if rehabilitation was successful.	Continuous
Closure and Rehabilitation	Ecological Impacts	Spreading of alien invasive species and bush encroachment of indigenous species.	Closure Phase	Ecological Monitoring, Alien and Invasive Management and Monitoring Programme	SHEQ, Mine Manager	Annually or as prescribed in accordance with WUL, including 3 years post closure impacts	Continuous
Closure and Rehabilitation	Ecological Impacts - <b>Positive Impact</b>	Rehabilitation of area with natural vegetation and re-establishment of local biodiversity	Closure Phase	Implement IWWMP Monitoring prescribed	SHEQ, Mine Manager	Annually or as prescribed in accordance with WUL, including 3 years post closure impacts.	
Closure and Rehabilitation	Hydrological Aspects; Surface water and Groundwater	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off	Closure Phase	Implement IWWMP Monitoring prescribed	SHEQ, Mine Manager	Bi-annually for Surface water quality (3 years post closure	Continuous

		quantity and quality during the closure phase.				monitoring)	
Closure and Rehabilitation	Air Quality	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Closure Phase	Conduct air quality monitoring/ Dust buckets.	SHEQ, Mine Manager	Monthly until all activities have stopped and revegetation has been successful.	Continuous
Closure and Rehabilitation	Noise, Vibration and Lighting	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Closure Phase	Conduct noise monitoring.	SHEQ, Contractor	Quarterly until all activities have stopped and revegetation has been successful.	Continuous
Closure and Rehabilitation	Sites of archaeological and cultural interests	None expected at this stage as all off the resources have been removed and no further excavation work will be done	Closure Phase	Record occurrences of sites and artefacts if found, contact a specialist immediately.	SHEQ	As needed	Continuous
Closure and Rehabilitation	Visual aspects	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Closure Phase	Monitor general condition and Implement good housekeeping	SHEQ, Mine Manager	Quarterly confirmation that rehabilitation has been successful / restored.	
Closure and Rehabilitation	Socio-Economic	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts such as dust pollution, noise pollution etc.	Closure Phase	Implement Dust and Noise monitoring,	SHEQ, Mine Manager	As prescribed.	Continuous
Closure and Rehabilitation	Socio-Economic	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Closure Phase	Compliance with programme principles / vision	Human Resources/ Procurement	Annually. Record is to be kept of local workers and services utilised.	Continuous
<b>NO-GO Option</b>							
No-Go Option	Socio-Economic	Reduced period of development and upliftment of the surrounding communities and infrastructure.	N/A	N/A	N/A	N/A	N/A
No-Go Option	Socio-Economic	Reduced period of development of the economic environment, by	N/A	N/A	N/A	N/A	N/A

		job provision and sourcing supplies for and from local residents and businesses.					
No-Go Option	Socio-Economic	Positive: No additional negative impacts on the environment	N/A	N/A	N/A	N/A	N/A

### 28.1.1 Functional requirements for monitoring programmes

Please refer to Table 26-1 and Table 26-2 for monitoring information prescribed to the operation.

#### 28.1.1.1 Surface water Monitoring

It is not anticipated that the operations will have a significant impact on surface water resources as long as the recommended mitigation measures are implemented.

Surface water quality should be monitored on a monthly basis at the water resource, both upstream and downstream of the development. If no impacts are evident, the monitoring programme may be reviewed to consider quarterly surface water monitoring.

**Table 26-3: Surface water sampling points**

Point	Coordinates (Latitude & Longitude)	
Upstream (If water is present)	25°34'16.12"S	28°10'3.45"E
Downstream (before Water crossing upgrade)	25°35'0.82"S	28°10'36.83"E
Below water crossing upgrade	25°35'2.92"S	28°10'43.80"E



**Figure 26-1: Surface water monitoring proposed**

#### 28.1.1.2 Groundwater Monitoring

A groundwater monitoring system has to adhere to the criteria mentioned below. As a result the system should be developed accordingly. The objectives of water quality monitoring are:

- To enable the Permit Holder to comply with the relevant Permit conditions and legislation.
- To indicate any escape of leachate into the water environment (*Not expected for this activity*).
- To serve as an early warning system, so that any pollution problems that arise can be identified and rectified.

- To quantify any effect that the quarry has on the water regime.

**Since the sand mining is a small impact activity (with no processing or other infrastructure), the footprint will be to a maximum depth of 3 m and according to the Geotech study, no water inception occurred during any of the samples/test pits, water quality monitoring in terms of groundwater is not recommended or economically viable. This will need to be verified with Department of Water and Sanitation as part of the WUL Application.**

#### 28.1.1.2.1 System Response Monitoring Network

Since the sand mining operation will abstract water from a borehole during the project life, groundwater level monitoring is recommended.

Groundwater levels: Static water levels are used to determine the flow direction and hydraulic gradient within an aquifer. Where possible, the borehole's water levels need to be recorded during each monitoring event.

#### 28.1.1.2.2 Monitoring Frequency

Quarterly monitoring of groundwater levels is recommended, after which bi-annual surface quality and groundwater levels are proposed after Closure (2-3 years post closure monitoring).

#### **28.1.1.3 Ecology Monitoring**

Monitoring of the flora should be done on a continual basis to assess whether there are any concerns regarding the flora and to assess whether the rehabilitation is successful. Monitoring of the flora should start as soon as the construction phase of the development commences. Monitoring should be undertaken annually.

The monitoring of biodiversity should include the following:

- Quarterly visual assessment of areas to determine if vegetation in undisturbed areas is being impacted.
- Alien invasive monitoring, eradication and control programme (Annual).
- Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase.
- Implement all Section 21 (c) and (i) monitoring requirements for the water crossing upgrade.

#### **28.1.1.4 Air quality Monitoring**

##### 28.1.1.4.1 Ambient Air Quality Monitoring

Ambient air quality monitoring can serve to meet various objectives, such as:

- compliance monitoring;
- validate dispersion model results;
- use as input for health risk assessment;
- assist in source apportionment;
- temporal trend analysis;
- spatial trend analysis;
- source quantification; and,
- tracking progress made by control measures.

It is recommended that, as a minimum continuous dust fallout sampling be conducted as part of the project's air quality management plan. The following methods for sampling are recommended:

- For dustfall, the NDCR specifies that the method to be used for measuring dustfall rates and the guideline for locating sampling points shall be ASTM D1739 (1970), or equivalent method approved by any internationally recognized body.

#### 28.1.1.4.2 *Dustfall Sampling*

The ASTM method covers the procedure of collection of dustfall and its measurement and employs a simple device consisting of a cylindrical container (not less than 150 mm in diameter) exposed for one calendar month ( $30 \pm 2$  days). Even though the method provides for a dry bucket, de-ionised (distilled) water can be added to ensure the dust remains trapped in the bucket. The bucket stand includes wind shield at the level of the rim of the bucket to provide an aerodynamic shield. The bucket holder is connected to a 2 m galvanized steel pole, which is either planted and cemented or directly attached to a fence post. This allows for a variety of placement options for the fallout samplers. Two buckets are usually provided for each dust bucket stand. Thus, after the first month, the buckets get exchanged with the second set.

Collected samples are sent to an accredited laboratory for gravimetric analysis. At the laboratory, each sample will be rinsed with clean water to remove residue from the sides, and the contents filtered through a coarse ( $>1$  mm) filter to remove insects and other coarse organic detritus. The sample is then filtered through a pre-weighed paper filter to remove the insoluble fraction. This residue and filter are dried, and gravimetrically analysed to determine total dustfall.

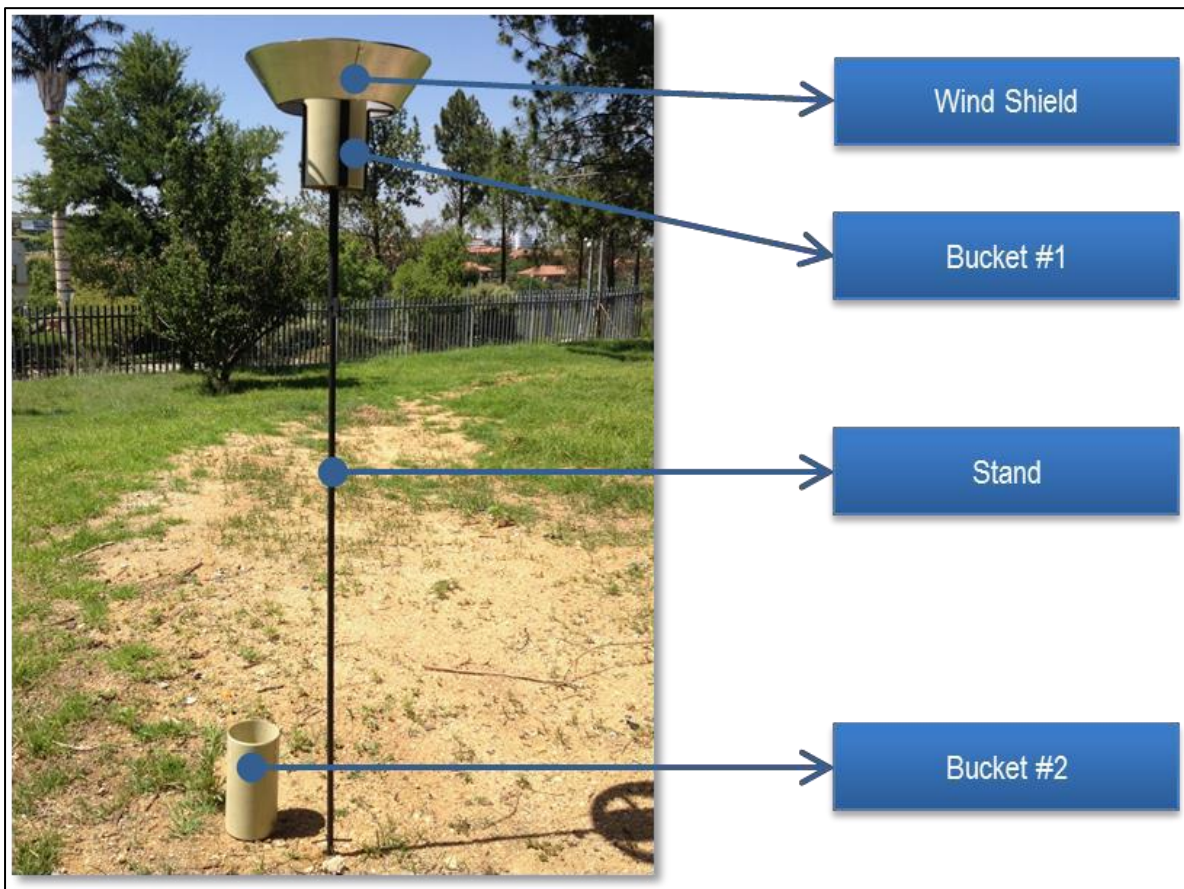


Figure 26-2: Dustfall collection unit example

## 28.1.2 Roles and responsibilities for the execution of monitoring programmes

*The contractor will be responsible to ensure that all rehabilitation takes place.*

Above the roles and responsibilities for every aspect as provided within Table 26-2, it remains the responsibility of the Mineral permit holder, which is CIM International Banabatau (Pty) Ltd) to hire a suitably qualified contractor, SHEQ or ECO to execute the EMP monitoring requirements as specified.

## 29 ENVIRONMENTAL AWARENESS PLAN

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

The applicant will inform his or her employees of any risk on a daily basis should any such a risk be identified. This will include Health and Safety as well as Environmental Risks.

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

Any activity that results in damage or pollution to the environment will be rated and signed a value to determine the risk. An environmental emergency is defined as an unplanned situation or event resulting in potential pollution of the environment. A pollution incident means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur.

### 29.3 Roles and responsibilities

All employees of CIM International Banabatau (Pty) Ltd and its contractors involved in the development section are responsible for reporting any accident/emergency to their supervisor immediately, and if required notifying the emergency response teams. Personnel must be nominated as response team members and must receive appropriate training to manage emergencies. All other personnel must be made aware of potential emergencies and trained in emergency response. Management must be aware of their responsibilities in case of emergency.

### 29.4 Responses to environmental emergencies

#### 29.4.1 Emergency Plan

An emergency plan must be developed for each potential environmental emergency situation. The emergency plan must give information on:

- Description of the emergency;
- Reference to relevant material safety data sheets;
- Responsibilities for management of emergencies;
- Contact telephone numbers (on-site & off-site);
- Equipment required (including locations); and
- Site plan where applicable.

#### 29.4.2 Classification of Emergencies

The following incidents will be classified as an emergency:



- Natural Disasters;
- Strikes, protest or unrest;
- Information Management System Failure (plc systems)
- Health and Disease Outbreaks;
- Serious Incident or Fatality;
- High Potential Risk Incidents (Fatality, serious environmental pollution); and
- Other emergencies.

### 29.4.3 Reporting emergencies

CIM International Banabatau (Pty) Ltd and its contractors involved in the development section will establish procedures to identify the potential for, and response to, incidents and emergency situations and for preventing and mitigating the illness, injury or environmental hazard that may be associated with them.

CIM International Banabatau (Pty) Ltd and its contractors involved will review its emergency preparedness and response plans and procedures, in particular, after the occurrence of incidents or emergency situations.

CIM International Banabatau (Pty) Ltd shall also periodically test such procedures where and when practicable.

In the event of a serious incident or fatality occurring it is of the utmost importance to not only ensure the Health and Safety of every person involved but also to ensure that certain evidence is protected and gathered for use, with the aim of the prevention of a similar incident/accident occurring in the future.

A “No Blame Fixing” approach to incident investigation will be implemented and it must be stressed that the gathering of information must be seen as preventative action and not as blame fixing.

In light of the above, and in addition to the emergency procedure that is relevant to the specific area where the incident/accident occurred, and in relation to the notifying of person and first aid treatment/safety of any person involved, the following steps must be taken immediately after an incident/accident classified above has occurred.

In the event of a reportable/major environmental incident that could lead to danger to the public or the environment (death or sustaining impact on the environment) the appointee of that specific section, in consultation with SHEQ Manager, is responsible for communicating with and drafting an external report (in terms of Section 30 of National Environmental Management Act, 1998 (Act No. 108 of 1998) and Sections 19 and 20 of the National Water Act, 1998 (Act No. 36 of 1998) to the national and provincial department and the municipality containing the:

- Nature of the incident;
- Substances and quantities and accurate effect on persons and environment;
- Initial measures to minimise impacts;
- Causes of the incident;
- Accordance measures;
- When an environmental incident occurs, the following should be adhered to:
  - Report incident as per Incident Reporting Flow Diagram;

- Measures to clean up any spillage/pollution must be taken as per Emergency Procedure. It is important to ensure that no secondary pollution is caused by incorrect handling of an environmental incident, e.g. incorrect disposal of absorbent material use to clean up a spill; and
- For high potential risk incident (HPRI) / reportable environmental incidents, the SHEQ Manager will conduct a closeout investigation prior to closure of the incident. This will be done one month after all actions has been completed to verify the effectiveness of the actions.

<b>Formalise policies</b>	
<b>OBJECTIVES</b>	
To formalise and sign off on company policies	
<b>ACTIONS</b>	<b>WHEN</b>
Compile Health and safety policy	Before construction and operation starts
Compile Environmental policy	Before construction and operation starts

The notification process has six main steps in managing an emergency, from the identification of the situation to final close off. These are as follows:

- Find and identify;
- Ensure human safety;
- Reporting;
- Containment and clean-up;
- Corrective action; and
- Monitoring.

## 29.5 Environmental Emergency Incidents

The SHEQ Manager must, within 14 days of the incident, report information on the incident to enable initial evaluation to the following

- Director-General of DEA;
- Provincial Head of Department; and
- Local Municipality.

The report must include:

- Nature of the incident;
- Substance involved and an estimation of quantity released and their possible acute effects on persons and the environment;
- Initial measures taken to minimise impacts;
- Cause of incident, whether direct or indirect; and
- Measures taken to avoid recurrence of such incident.

### 29.5.1 Water Pollution Emergency Incident

Water Pollution Emergency Incident is any accident /incident in which a substance pollutes or has the potential to pollute a water resource or a substance that has or is likely to have a detrimental effect on a water resource, such as a significant hydrocarbon spill and/or if the bridge or water crossing collapse during any phase of the development.

The responsible person who was in control of the substance involved in the incident at the time or responsible for the section the incident occurred will immediately inform the superior of the area

where the incident occurred.

The information with regard to the incident is communicated to the Business Manager, SHEQ Manager and Security Personnel immediately by the superior of the area.

The SHEQ Manager and the General Manager must, as soon as reasonably practicable after obtaining the knowledge of the incident, (i.e. within 14 days) report to:

- DWS (Regional Manager);
- South African Police Services or relevant fire department; and
- The Catchment Management Agency.

The SHEQ Manager and crisis management team must

- Take all reasonable measures to contain and minimise the effects of the incident;
- Undertake clean-up procedures;
- Remedy the effects of the incidents; and
- Sample the water together with the responsible person of the area.

#### **29.5.2 Air Pollution Emergency Incidents**

- Record of any non-compliance is kept and reported.

#### **29.5.3 Environmental Impact Register**

All non-conformances pertaining to safety, health, environmental, quality of project activities and employees shall be documented as identified by CIM International Banabatau (Pty) Ltd according to documented procedures.

CIM International Banabatau (Pty) Ltd will make provision for recording and reviewing the nature and extent of any non-conformance that may be encountered during the Project Execution phase.

The Project Steering Committee in conjunction with the identifier shall decide on the impact of poor performance and the actions that would be necessary to prevent further deterioration or occurrence.

#### **29.5.4 Records**

Records must be kept of all environmental emergencies and non-conformances.

### **30 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

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

- The financial provisioning will be revised on a yearly basis;
- The Closure Plan was provided within this application;
  - A WUL Application has been launched and water uses will be licensed accordingly.

**31 UNDERTAKINGS**

The EAP, .....Elemental Sustainability (Pty) Ltd ....., herewith confirms

- a) The correctness of the information provided in the reports;
- b) The inclusion of comments and inputs from stakeholders and I&AP's;
- c) The inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

Signed at.....on this..... day .....

Signature of applicant .....

Designation .....

**COMMITMENT/UNDERTAKING BY THE APPLICANT**

I, ....., the undersigned and duly authorised thereto by CIM International Banabatau (Pty) Ltd undertake to adhere to the requirements and to the conditions as set out in the EMPR submitted to the Director: Mineral Development and approved on ....

.....

Signed at.....on this..... day .....

Signature of applicant .....

Designation .....

END-

## 32 REFERENCES

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## 33 APPENDICES

**Appendix 1: Qualifications and Resume of EAP**

**Appendix 2: Resume of EAP**

**Appendix 3: Locality & Land Use Maps**

**Appendix 4: Site layout plan**

**Appendix 5: Specialist reports (2018)**

**Appendix 6: Public participation documents**