

**PROPOSED SAND MINE ON PORTION 0 (REMAINING  
EXTENT) OF THE FARM AKERMANS KRAAL 11 RD  
ALIWAL NORTH, EASTERN CAPE PROVINCE**

**DRAFT BASIC ASSESSMENT REPORT**



**NOVEMBER 2019**

***REFERENCE NUMBER: EC 30/5/1/3/2/10570 MP***

**PREPARED FOR:**

Yellowwood Trust  
P.O. Box 646  
Elliot  
5460

Tel: 083 321 1301

E-mail: [eastcapefarms@yahoo.co.za](mailto:eastcapefarms@yahoo.co.za)

**PREPARED BY:**

Greenmined Environmental  
Unit MO1, Office No 36  
AECI Site, Baker Square  
Paardevlei  
De Beers Avenue  
Somerset West  
7130

Tel: 021 851 2673

Cell: 082 811 8514

Fax: 086 546 0579

E -mail: [Christine.f@greenmined.co.za](mailto:Christine.f@greenmined.co.za)



## **EXECUTIVE SUMMARY**

Yellowwood Trust, applied for environmental authorisation (EA) and a mining permit to mine sand from the Orange River on a portion of Portion 0 (Remaining Extent) of the farm Akermans Kraal 11 RD, Aliwal North, Eastern Cape Province. The proposed mining area of the Applicant will be 2.8 ha and will be developed over an area where sand has previously been mined from the riverbed (Orange River). The proposed operation is representative of the small scale mining industry where the mineral (sand) is loaded with an excavator onto tractor-drawn tippers that hauls the sand from the river to the stockpile area (within the 2.8 ha mining area). At the stockpile area the sand will be screened (if required) and stockpiled until loaded by a front-end-loader (FEL) onto trucks that will transported the material to clients. No mining, from the riverbed, will take place during the high flow periods of the Orange River, and all machinery and equipment will be removed from the river. Due to the small scale of the operation no infrastructure, other than a chemical toilet and the sand screen, will be established within the mining footprint. Vehicle/equipment maintenance will be done at an existing off-site workshop of the Applicant, and the mining area will be reached via an existing farm road.

The proposed project triggers listed activities in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and the Environmental Impact Assessment Regulations 2014 (as amended 2017) and therefore requires an environmental impact assessment (basic assessment process) that assess project specific environmental impacts and alternatives, consider public input, and propose mitigation measures, to ultimately culminate in an environmental management programme that informs the competent authority (Department of Mineral Resources) when considering the environmental authorisation. This report, the Draft Basic Assessment Report, forms part of the departmental requirements, and presents the first report of the EIA process.

### **Site Alternative 1 (Preferred and Only Site Alternative):**

Site Alternative 1, which entails the mining of an area previously used for the winning of sand from the Orange River, was identified during the assessment phase of the environmental impact assessment, by the Applicant and project team, as the preferred site alternative.

### **No-go Alternative:**

The no-go alternative entails no change to the *status quo* and is therefore a real alternative that needs to be considered. The sand to be mined from the river will be sold to the building, road rehabilitation/maintenance and associated construction industry, if however, the no-go alternative is implemented the Applicant/landowner could not utilise the mineral resource on his property and the construction industry of Aliwal North will need to source sand from a more distant supplier; escalating product costs.

### **Public Participation Process:**

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents that were sent directly to the contact persons. An advertisement that was placed in The Reporter, and two on-site notices were placed at conspicuous places. A 30-days commenting period was allowed which expired on 27 September 2019. Thus far, only DEDEAT registered on the project; no other comments or objections have been received. In accordance with the timeframes stipulated in the EIA Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) the Draft Basic Assessment Report was compiled and will be distributed for comment and perusal to the I&AP's and stakeholders. A 30-day commenting period, ending 09 December 2019, will be allowed for perusal of the documentation and submission of comments. The comments received on the DBAR will be incorporated into the Final Basic Assessment Report (FBAR) to be submitted for decision making to DMR.

### **Basic Assessment Report:**

The basic assessment report identifies the potential positive and negative impacts that the proposed activity will have on the environment and the community as well as the aspects that may impact on the socio-economic conditions of directly affected persons, and proposes possible mitigation measure that could be applied to modify / remedy / control / stop the identified impacts.

The key finding of the environmental impact assessment entail the following:

#### **Topography:**

- ∞ The natural topography of both the stockpile area and the proposed excavated area, in the riverbed, can be described as flat. The earmarked sandbank is connected to the upper river bank (proposed stockpile area) with a road that was constructed many years ago to access the sand. The river bank is ±3 m high extending to a large level area (proposed stockpile area) that has previously been used for the screening and stockpiling of sand.

#### **Visual Characteristics:**

- ∞ The viewshed analysis showed that the visual impact of the proposed sand mining operation will be of low significance. The small scale of the proposed operation, and the continued reinstatement of the excavation area contributes to the low visual significance. Should the Applicant successfully rehabilitate the stockpile area (upon closure), no residual visual impact is expected upon closure of the mine

### **Air and Noise Quality:**

- ∞ The proposed activity will contribute the emissions of one excavator, one front-end-loader and two tippers to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operational at the property.

### **Geology and Soil:**

- ∞ The sand, to be excavated, is ready to be used and does not need further processing other than screening through a sieve to remove oversized particles. Sand is continuously washed down the river, forming a thick layer and sandbanks. In close proximity to the sandbank (western) an intrusive dolerite ridge creates eddies in the river that continuously replenish the western sandbank.

### **Hydrology:**

- ∞ The Applicant is in the process of applying for a water use authorisation from the DWS regarding the proposed operation in the river. The risk matrix concluded that the Risk Class of the proposed sand mining area is Low.

### **Mining, Biodiversity and Groundcover:**

- ∞ Ground-truthing showed that the proposed footprint of the stockpile area is highly disturbed with little to no indigenous vegetation intact. The risk matrix concluded that the risk class of the proposed excavation area (Orange River) is Low, and in light of this the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance. The Applicant will make use of the existing access point into the river, and a single haul road from the river to the stockpile area. It is proposed that should the Applicant implement the mitigation measures proposed in the EMPr the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.

### **Fauna:**

- ∞ No protected or red data species were identified to be resident within the proposed footprint area. The proposed sand mining operation is not expected to impact the aquatic fauna of the Orange River, as mining will only take place during the low flow periods of the river when the sandbank is

exposed. No pumping of sand will take place and no fishing or interference with any aquatic fauna will be allowed

### **Cultural and Heritage Environment:**

- ∞ No sites of archaeological or cultural importance were identified during the site inspection, and consultation with the interested and affected parties also did not identify any potential area of concern. The Applicant will implement a chance-find protocol on site for the duration of the site establishment-, operational- and decommissioning phase.

### **Site Specific Infrastructure:**

- ∞ The existing Eskom power line will supply power for the screening of the sand when needed. Two concrete silos were established in the north-western corner of the stockpile area, but apart from this, the only other infrastructure comprises of farm fences and the access road.

During the environmental impact assessment process the feasibility of the proposed site was assessed to identify fatal flaws that are deemed as severe as to prevent the activity continuing, or warrant a site or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing.

### **Environmental Management Programme (EMPR)**

The EMPR provides a description of the impact management outcomes and closure objectives. It presents the impacts to be mitigated in their respective phases as well as stipulates the mitigation measures to be applied on site.

The financial provision amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of R 200 068.98.

## LIST OF ABBREVIATIONS

BID	Background Information Document
BGIS	Biodiversity GIS
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DBAR	Draft Basic Assessment Report
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DMR	Department of Mineral and Resources
DoT	Department of Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECBP	Eastern Cape Biodiversity Plan
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIA Regulations	Environmental Impact Assessment Regulations, 2014 (as amended 2017)
EISC	Ecological Importance and Sensitivity Category
EMPR	Environmental Management Programme
FBAR	Final Basic Assessment Report
FEL	Front-end-loader
GDP	Gross Domestic Product
GNR	Government Notice
I&AP's	Interested and Affected Parties
MHSA	Mine Health and Safety Act, 1996 (Act No. 29 of 1996)
MP	Mining Permit
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Control Act, 2004 (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999 (Act No 25 of 1999)
NRTA	National Road Traffic Act, 1996 (Act No. 93 of 1996)

NWA	National Water Act, 1998 (Act No. 36 of 1998)
PCB's	Polychlorinated Biphenyl
PCO	Pest Control Officer
PES	Present Ecological State
PPE	Personal Protective Equipment
PSM	Palaeontological Sensitivity Map
RA	Risk Assessment
REC	Recommended Ecological Category
S1	Site Alternative 1
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAMBF	South African Mining and Biodiversity Forum
USBM	US Bureau of Mines
WMA	Water Management Area
WSLM	Walter Sisulu Local Municipality
WULA	Water Use Licence Application

## TABLE OF CONTENTS

PART A .....	16
SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT .....	16
1. CONTACT PERSON AND CORRESPONDENCE ADDRESS .....	16
a) Details of: Greenmined Environmental .....	16
i) Details of the EAP .....	16
ii) Expertise of the EAP.....	16
(1) The qualifications of the EAP.....	16
(2) Summary of the EAP's past experience. ....	16
b) Location of the overall Activity. ....	17
c) Locality map.....	17
d) Description of the scope of the proposed overall activity. ....	18
i) Listed and specified activities .....	18
ii) Description of the activities to be undertaken .....	19
e) Policy and Legislative Context.....	29
f) Need and desirability of the proposed activities. ....	31
g) Motivation for the overall preferred site, activities and technology alternative. ....	32
h) Full description of the process followed to reach the proposed preferred alternatives within the site.	33
i) Details of the development footprint alternatives considered.....	33
ii) Details of the Public Participation Process Followed.....	35
iii) Summary of issues raised by I&APs .....	37
iv) The Environmental attributes associated with the alternatives. ....	41
(1) Baseline Environment.....	41
(a) Type of environment affected by the proposed activity. ....	41
(b) Description of the current land uses .....	54
(c) Description of specific environmental features and infrastructure on the site. ....	55
(d) Environmental and current land use map.....	61
v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts.....	62
vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; .....	66
vii) 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. ....	71
viii) The possible mitigation measures that could be applied and the level of risk .....	73
ix) Motivation where no alternative sites were considered. ....	81
x) Statement motivating the alternative development location within the overall site. ....	81



i)	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.....	83
j)	Assessment of each identified potentially significant impact and risk .....	88
k)	Summary of specialist reports. ....	92
l)	Environmental impact statement .....	96
i)	Summary of the key findings of the environmental impact assessment;.....	96
ii)	Final Site Map .....	98
iii)	Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;.....	98
m)	Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;.....	99
n)	Aspects for inclusion as conditions of Authorisation. ....	107
o)	Description of any assumptions, uncertainties and gaps in knowledge. ....	107
p)	Reasoned opinion as to whether the proposed activity should or should not be authorised .....	107
i)	Reasons why the activity should be authorised or not. ....	107
ii)	Conditions that must be included in the authorisation .....	107
q)	Period for which the Environmental Authorisation is required.....	107
r)	Undertaking.....	107
s)	Financial Provision.....	108
i)	Explain how the aforesaid amount was derived .....	108
ii)	Confirm that this amount can be provided from operating expenditure.....	108
t)	Specific Information required by the competent Authority .....	108
i)	Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3)(a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the:- .	108
(1)	Impact on the socio-economic conditions of any directly affected person. ....	108
(2)	Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.     110	
u)	Other matters required in terms of section 24(4)(a) and (b) of the Act.....	110
	PART B.....	111
	ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT.....	111
1.	DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.....	111
a)	Details of the EAP,.....	111
b)	Description of the Aspects of the Activity .....	111
c)	Composite Map.....	111
d)	Description of impact management objectives including management statements.....	111
i)	Determination of closure objectives.....	111
ii)	Volume and rate of water use required for the operation .....	113
iii)	Has a water use licence has been applied for? .....	113
iv)	Impacts to be mitigated in their respective phases.....	114

e) Impact Management Outcomes.....	127
f) Impact Management Actions .....	132
i) Financial Provision.....	145
(1) Determination of the amount of Financial Provision.....	145
(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.....	145
(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.....	145
(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure. ....	145
(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.....	145
(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline. ....	146
(f) Confirm that the financial provision will be provided as determined.....	152
Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including .....	153
g) Monitoring of Impact Management Actions .....	153
h) Monitoring and reporting frequency.....	153
i) Responsible persons .....	153
j) Time period for implementing impact management actions.....	153
k) Mechanisms for monitoring compliance .....	153
l) Indicate the frequency of the submission of the performance assessment/environmental audit report.	165
m) Environmental Awareness Plan.....	165
i) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work. ....	165
ii) Manner in which risk will be dealt with in order to avoid pollution or the degradation of the environment. ....	165
n) Specific information required by the Competent Authority .....	167
2. UNDERTAKING.....	168

## LIST OF FIGURES

Figure 1: Satellite view of the proposed mining permit area (red polygon) of Yellowwood Trust (image obtained from Google Earth). ....	17
Figure 2: Satellite view showing the position of the proposed mining area (red polygon) in relation to the previous 1.2 ha mining permit area (blue polygon). (Image obtained from Google Earth). ....	20
Figure 3: Satellite view showing the access road (dark red line) to the proposed mining area (bright red polygon). ....	24
Figure 4: Photos showing the existing entrance into the river.....	25
Figure 5: Satellite view showing the position of Site Alternative 1 (red polygon) within the surrounding landscape. ....	34

Figure 6: Statistical representation of the average rainfall, midday temperatures and night-time temperatures for the Aliwal North region (Chart obtained from saexplorer).....	41
Figure 7: Annual wind direction distribution in % for the Aliwal North area, where the furthest point to the north-north-west is 15.1%/year, north is 12.5%, north-west is 11.4%/year, south-south-west equals 7.5%, and south is 7.3%. (Image obtained from www.windfinder.com/windstatistics/aliwalnorth).....	42
Figure 8: Elevation profile showing the topography between the proposed mining footprint (red polygon) and the town of Aliwal North. (Image obtained from Google Earth).....	43
Figure 9: Indication of the simplified geology of the study area, where green represents the Beaufort Group, grey the Molteno, Elliot and Clarens Formations, and pink the Drakensberg and Lebombo Groups. The proposed mining area is indicated by the red star. (Image obtained from the Council for Geoscience).....	44
Figure 10: Map showing the proposed mining footprint (red polygon) in the Orange River (blue). The dark green area represents a River FEPA while the lighter green represents an Upstream River FEPA. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA).....	45
Figure 11: The Mining and Biodiversity importance map with the proposed mining footprint indicated by the red polygon. Dark brown – highest biodiversity importance, highest risk for mining, light brown – high biodiversity Importance, high risk for mining (image obtained from the BGIS Map Viewer – Mining Guidelines). .....	46
Figure 12: Eastern Cape Biodiversity Conservation Plan showing the mining area (red polygon) in relation to the ECBP CBA: Terrestrial (green). (Image obtained from BGIS Map Viewer – Eastern Cape Conservation Plan).....	47
Figure 13: National vegetation cover map showing the mining area within the Upper Gariep Alluvial Vegetation (AZa4) (light blue). (Image obtained from BGIS Map Viewer – National Vegetation Map).....	48
Figure 14: The SAHRA palaeontological sensitivity map shows the proposed mining footprint (yellow star) falls in an area of moderate (green) to insignificant/zero (grey) concern. ....	50
Figure 15: Gender profile (image obtained from the Water Sisulu LM IDP 2017/18 – 2021/22). .....	51
Figure 16: Population profile of the Walter Sisulu municipal area (image obtained from the Water Sisulu LM IDP 2017/18 – 2021/22).....	52
Figure 17: Employment profile of the WSLM compared to the other municipalities within the district (source: HIS Markit Regional Explorer version 1156). .....	53
Figure 18: Elevation profile of the proposed mining footprint (Image obtained from Google Earth). .....	56
Figure 19: Viewshed of the proposed mining footprint where the green shaded areas shows the positions from where the mining area (red polygon) will be visible. (Image obtained from Google Earth).....	57
Figure 20: Satellite view showing the position of mining footprint in the Orange River and associated western bank. (Image obtained from Google Earth) .....	59
Figure 21: Photographs of the proposed stockpile area showing the lack of groundcover.....	60

## LIST OF TABLES

Table 1: Location of the proposed project. ....	17
Table 2: Listed and specified activities triggered by the associated mining activities.....	18
Table 3: GPS Coordinates of the proposed mining footprint.....	21
Table 4: Policy and Legislative Context.....	29
Table 5: GPS Coordinates of Site Alternative 1 (preferred and only site alternative) .....	33
Table 6: List of the I&AP's and stakeholders that were notified of the proposed sand mine project. ....	35
Table 7: Summary of issues raised by IAPs.....	37
Table 8: Aquatic characteristics of the greater study area .....	45
Table 9: Land uses and/or prominent features that occur within 500 m radius of S1 and S2.....	54
Table 10: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria. ....	68
Table 11: Criteria for the rating of duration.....	68
Table 12: Criteria for the rating of extent / spatial scale. ....	68
Table 13: Example of calculating overall consequence. ....	69
Table 14: Criteria for the rating of frequency.....	69

Table 15: Criteria for the rating of probability. ....	69
Table 16: Example of calculating overall likelihood. ....	70
Table 17: Determination of overall environmental significance. ....	70
Table 18: Description of environmental significance and related action required. ....	70
Table 19: Assessment of each identified potentially significant impact and risk. ....	88
Table 20: Summary of specialist reports. ....	92
Table 21: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR. ....	99
Table 22: Impact to be mitigated in their respective phases. ....	114
Table 23: Impact Management Outcomes. ....	127
Table 24: Impact Management Actions. ....	132
Table 25: Calculation of closure cost. ....	150
Table 26: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon. ....	153

## **LIST OF APPENDICES**

Appendix A	Regulation 2.2 Mine Plan
Appendix B	1:250 000 Locality Map
Appendix C	Site Activities Map
Appendix D	Surrounding Land Use Map
Appendix E	Rehabilitation Plan
Appendix F	Transfer of Liabilities
Appendix G1	Comments and Response Report
Appendix G2	Proof of Public Participation
Appendix H	Risk Assessment
Appendix I	Supporting Impact Assessment
Appendix J	Financial and Technical Ability
Appendix K	Invasive Plant Species Management Plan
Appendix L	Photographs of the site
Appendix M	Proof of water use application
Appendix N	CV and Experience Record of EAP



**mineral resources**

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

**BASIC ASSESSMENT REPORT**  
**And**  
**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATION IN TERMS OF THE NATIONAL ENVIRONMENTAL 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).

<b>NAME OF APPLICANT:</b>	Yellowwood Trust
<b>TEL NO:</b>	083 321 1301
<b>FAX NO:</b>	N/A
<b>POSTAL ADDRESS:</b>	P.O. Box 646, Elliot, 5460
<b>PHYSICAL ADDRESS:</b>	East Cape Farms (Pty) Ltd, Xuka Drift, Elliot
<b>FILE REFERENCE NUMBER SAMRAD:</b>	EC 30/5/1/3/2/10570 MP

## IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 29 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 can 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 basic assessment process is to, through a consultative process–

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives,
- (d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
  - (i) the nature, signification, consequence, extent, duration, and probability of the impacts occurring to; and
  - (ii) the degree to which these impacts –
    - (aa) can be reversed;
    - (bb) may cause irreplaceable loss of resources; and
    - (cc) can be managed, avoided or mitigated;
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to –
  - (i) identify and motivate a preferred site, activity and technology alternative;
  - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
  - (iii) identify residual risks that need to be managed and monitored.

## PART A

### SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

#### 1. CONTACT PERSON AND CORRESPONDENCE ADDRESS

##### a) Details of: Greenmined Environmental

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental impact assessment (EIA) of any activities regulated in terms of the aforementioned Act. Yellowwood Trust appointed Greenmined Environmental to undertake the study needed. Greenmined Environmental has no vested interest in Yellowwood Trust or the proposed project and declares its independence as required by the Environmental Impact Assessment Regulations, 2014 (as amended April 2017) (EIA Regulations).

##### i) Details of the EAP

Name of the Practitioner: Ms Christine Fouche (Senior Environmental Specialist)  
Tel No.: 021 851 2673  
Fax No.: 086 546 0579  
E-mail address: [christine.f@greenmined.co.za](mailto:christine.f@greenmined.co.za)

##### ii) Expertise of the EAP.

###### (1) The qualifications of the EAP

(with evidence).

Ms. Fouche has a Diploma in Nature Conservation and a B.Sc. in Botany and Zoology. Full curriculum vitae with evidence is attached as Appendix N.

###### (2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

Ms Fouche has fourteen years' experience in doing Environmental Impact Assessments and Mining Applications in South Africa. See Appendix N.



**b) Location of the overall Activity.**

*Table 1: Location of the proposed project.*

<b>Farm Name:</b>	Portion 0 (Remaining Extent) of the farm Akermans Kraal 11 RD
<b>Application area (Ha)</b>	2.8 ha
<b>Magisterial district:</b>	Aliwal North
<b>Distance and direction from the nearest town</b>	±12 km north-west of Aliwal North on the western bank of the Orange River.  Using R58 towards Burgersdorp, head west for approximately 4.7 km. Take a right turn onto a farm road that takes you to the farm house, from where the road continues to the mining area on the banks of the river.
<b>21 digit Surveyor General Code for each farm portion</b>	C00500000000001100000

**c) Locality map**

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

The requested map is attached as Appendix B.



*Figure 1: Satellite view of the proposed mining permit area (red polygon) of Yellowwood Trust (image obtained from Google Earth).*

**d) Description of the scope of the proposed overall activity.**

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

Yellowwood Trust (hereinafter referred to as “the Applicant”), applied for environmental authorisation (EA) and a mining permit to mine sand from the Orange River on a portion of Portion 0 (Remaining Extent) of the farm Akermans Kraal 11 RD, Aliwal North, Eastern Cape Province.

The proposed mining area of the Applicant will be 2.8 ha and will be developed over an area where sand has previously been mined from the riverbed. The proposed operation is representative of the small scale mining industry where the mineral (sand) is loaded with an excavator onto tractor-drawn tippers that hauls the sand from the river to the stockpile area (within the 2.8 ha mining area). At the stockpile area the sand will be screened (if required) and stockpiled until loaded by a front-end-loader (FEL) onto trucks that will transported the material to clients. No mining, from the riverbed, will take place during the high flow periods of the Orange River, and all machinery and equipment will be removed from the river.

Due to the small scale of the operation no infrastructure, other than a chemical toilet and the sand screen, will be established within the mining footprint. Vehicle/equipment maintenance will be done at an existing off-site workshop of the Applicant, and the mining area will be reached via an existing farm road.

See attached as Appendix C a copy of the site activities map for the proposed project.

**i) Listed and specified activities**

*Table 2: Listed and specified activities triggered by the associated mining activities*

<b>NAME OF ACTIVITY</b> (E.g. For prospecting – drill site, site camp, ablution facilities, accommodation, equipment storage, sample storage, site office, access route etc... etc... etc)  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.)	<b>Aerial extent of the activity</b> Ha or m <sup>2</sup>	<b>LISTED ACTIVITY</b> Mark with an X where applicable or affected	<b>APPLICABLE LISTING NOTICE</b> (GNR 324, GNR 325, GNR 326 OR GNR 327)
Demarcation of site with visible beacons.	2.8 ha	N/A	Not listed
Site establishment	±1 ha	X	GNR 324 LN 3 Activity 12

<b>NAME OF ACTIVITY</b> (E.g. For prospecting – drill site, site camp, ablution facilities, accommodation, equipment storage, sample storage, site office, access route etc... etc... etc  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.)	<b>Aerial extent of the activity</b> Ha or m <sup>2</sup>	<b>LISTED ACTIVITY</b> Mark with an X where applicable or affected	<b>APPLICABLE LISTING NOTICE</b> (GNR 324, GNR 325, GNR 326 OR GNR 327)
Winning of sand	±1.6 ha	X	GNR 327 LN 1 Activity 19, 21, 26.
Screening, stockpiling and transporting material from site.	±1 ha	X	GNR 327 LN 1 Activity 21, 26.
Sloping and landscaping upon closure of the mining area.	2.8 ha	X	GNR 327 LN 1 Activity 22.

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

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

**Background Information:**

Portion 0 (Remaining Extent) of the farm Akermans Kraal 11 RD in the Aliwal-North magisterial district is mainly used for agricultural purposes (crop cultivation & grazing). In 2014, the land use of the property was extended to include sand mining from the riverbed of the Orange River within a 1.2 ha area (Permit No: EC 1/2014 MP) held by Johannes Jacobus Snyman. Upon expiry of the said permit the landowner, Yellowwood Trust (hereinafter referred to as “the Applicant”), identified the need to mine the sand resource from the Orange River.

The Applicant entered into a transfer of liabilities agreement with the previous permit holder (Johannes Jacobus Snyman) to take over his rehabilitation liability. This enables the Applicant to rehabilitate both mining areas (EC 1/2014 MP & EC 30/5/1/3/2/10570 MP) at once, upon cessation of the proposed mining activities. To date the footprint of the previous sand mine has not been rehabilitated as it will be absorbed by the proposed mining area. See Appendix F for a copy of the Transfer of Liability Agreement as submitted with the mining permit application to the DMR.

**Project Proposal:**

In light of the above, the Applicant applied for environmental authorisation and a sand mining permit over a 2.8 ha area that extends over the previous sand mining footprint (see Figure 2). The proposed mining footprint was restricted to the already disturbed areas on the farm, so as to limit the removal of natural occurring vegetation.



Figure 2: Satellite view showing the position of the proposed mining area (red polygon) in relation to the previous 1.2 ha mining permit area (blue polygon). (Image obtained from Google Earth).

The table below lists the GPS coordinates of the proposed mining area as shown on the Regulation 2(2) Mine Plan attached as Appendix A.

Table 3: GPS Coordinates of the proposed mining footprint.

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	30°40'18.12"	26°38'03.23"	-30.671690°	26.634230°
B	30°40'17.58"	26°38'04.53"	-30.671544°	26.634593°
C	30°40'18.68"	26°38'06.69"	-30.671856°	26.635192°
D	30°40'19.96"	26°38'05.92"	-30.672211°	26.634977°
E	30°40'20.48"	26°38'06.85"	-30.672355°	26.635237°
F	30°40'19.09"	26°38'07.59"	-30.671967°	26.635443°
G	30°40'19.43"	26°38'10.22"	-30.672064°	26.636172°
H	30°40'25.73"	26°38'09.58"	-30.673813°	26.635994°
J	30°40'25.52"	26°38'06.31"	-30.673755°	26.635085°
K	30°40'20.94"	26°38'07.15"	-30.672482°	26.635319°
L	30°40'20.07"	26°38'05.88"	-30.672243°	26.634966°
M	30°40'25.01"	26°38'02.85"	-30.673615°	26.634126°
N	30°40'24.81"	26°38'01.47"	-30.673560°	26.633741°
P	30°40'21.17"	26°38'03.79"	-30.672547°	26.634385°

The proposed mining method will entail direct excavation of the sand from the permitted area, in order to win building and filling sand suitable for the construction and road building industry.

The proposed mining activities will include the following:

- ⌘ The existing access road to the mining area will be used as well as the existing entrance into the river.
- ⌘ The Applicant will remove the sand from the permitted mining area with an excavator that will load it onto tractor-drawn tippers that will haul the sand from the river to the stockpiled area.
- ⌘ At the stockpile area, the sand will be screened (if required) and stockpiled until loaded by a front-end-loader (FEL) onto trucks that will transport the material to clients.
- ⌘ All mining related activities will be contained within the approved mining permit boundaries.
- ⌘ No mining of sand from the riverbed will take place during high flow periods of the Orange River (±October – March). The permit holder will however continue with the sales of stockpiled material. All machinery will be removed from the riverbed during high flow periods.
- ⌘ The mining operations will be limited to daylight hours (07:00 – 17:00 Monday – Saturday).

Should the MP be issued and the mining of sand be allowed, the proposed project will comprise of activities that can be divided into three key phases (discussed in more detail below) namely the:

- (1) *Site establishment phase* which will involve the demarcation of the permitted mining area. Site establishment may necessitate the clearing of vegetation (that established through succession) from the stockpile area, the stripping and stockpiling of topsoil at the stockpile area (if applicable), and the introduction of the mining machinery and equipment.
- (2) *Operational phase* that will entail the removal of the sand with an excavator from the approved footprint area, screening (if needed) of the sand, stockpiling and hauling of the material to clients.
- (3) *Decommissioning phase* which entails the rehabilitation of the affected environment prior to the submission of a closure application to the Department of Mineral Resources (DMR). From previous experience it is known that the riverbed will annually replenish the sand resource and in doing so naturally rehabilitate any disturbance. The decommissioning phase will therefore mainly entail the reinstatement and seeding of the stockpile area. Once the mining area was rehabilitated, the mining permit holder will submit a closure application to the DMR in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

## **PHASES OF THE PROJECT**

### *1. Site Establishment Phase:*

Site establishment entails the demarcation of the mining boundaries, clearance of vegetation and stripping and stockpiling of topsoil (if needed) from the stockpile area, and the introduction of the mining equipment as detailed below:

#### **3 Demarcation of Mining Boundaries:**

Pursuant to receipt of an Environmental Authorisation (EA) and Mining Permit (MP), and prior to site establishment, the boundaries of the mining area will be demarcated with visible beacons.

### 3 Clearing of Vegetation (Stockpile Area):

According to Mucina and Rutherford (2012) the vegetation type of the natural areas is known as the Upper Gariep Alluvial Vegetation (AZa4). As mentioned earlier, the footprint of the proposed stockpile area was chosen to extend over an area that was previously used for the same purpose, and therefore little to no indigenous vegetation needs to be disturbed to allow the establishment of the site.

Although the proposed project will not necessitate the removal of natural Upper Gariep Alluvial Vegetation, the removal of some indigenous vegetation may be necessary where vegetation establish through succession. To mitigate this, the clearing of vegetation must be contained to the approved mining footprint, and no vegetation/bush clearance, outside the approved area, may be allowed.

### 3 Topsoil Stripping (Stockpile Area):

Should the permit holder need to use an area where topsoil has not previously been removed, the complete A-horizon will be stripped and stockpiled to be replaced during the rehabilitation of the area. If it is unclear where the topsoil layer ends the top 300 mm of soil will be stripped. It will be part of the obligations of site management to prevent the mixing of topsoil heaps with overburden/other soil heaps. The topsoil berm will measure a maximum of 1.5 m in height in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.

### 3 Access Road:

The Applicant will use the existing gravel farm road, ( $\pm 7$  km) to access the mining area and transport material from the mine. The farm road has a formal entrance onto the R58, and was also used by the previous permit holder to transport sand from the Orange River. No upgrading of the road is needed prior to commencement. The surface of the farm road will be maintained by the permit holder for the duration of the operational phase.



Figure 3: Satellite view showing the access road (dark red line) to the proposed mining area (bright red polygon).

### 3 Introduction of Mining Machinery:

No infrastructure, other than a chemical toilet and the sand screen, will be established within the proposed stockpile area. No infrastructure will be placed in the riverbed. Mining machinery that will operate within the footprint is expected to consist of the following:

- Excavator (1);
- Front-end-loader (1);



- Tractor-drawn Tippers (2).

The Applicant will not construct/establish any permanent infrastructure (such as a workshop or storage facilities) within the permitted mining area.

## 2. Operational Phase:

The operational phase will involve the recovery of the sand by an excavator that will load it onto the tractor-drawn tippers that will take the sand to the stockpile area. At the stockpile area the sand will be screened (if required) and stockpiled until loaded by a front-end-loader (FEL) onto trucks that will transported the material to clients. The Applicant will make use of a single access point (existing) into the river to limit damage to the riparian zone.



*Figure 4: Photos showing the existing entrance into the river.*

The layout of the mining area will be simple, consisting of a sand recovery zone (riverbed) and the adjacent stockpile area, connected by the river access point. As mentioned earlier, no mining, from the riverbed, will take place during the high flow periods of the Orange River, and all machinery and equipment will be removed from the river. The permit holder will however continue with the sales of stockpiled material.

The proposed sand mine will appoint  $\pm 4$  employees. No chemicals will be stored on site, and vehicle/equipment maintenance will be done at an existing off-site workshop ( $\pm 3$  km) of the Applicant. Sand mining will take place during normal working hours (no work on Sundays).

### 3 Water Use:

As no sand washing is proposed for this project, the Applicant will exclusively use water for dust suppression purposes on the access road when needed. Approximately 5 000 litre water/day will be needed during the dry months.

Dust generated on the access road will, as far as possible, be managed through alternative dust suppression methods to restrict water use to the absolute minimum.

These measures will include a combination of the following:

- The speed of all mining equipment/vehicles will be restricted to 40 km/h on the internal farm road to minimize dust generation;
- When the truck leaves the mining area it will be covered to minimise windblown dust from the loads;
- The Applicant will attempt to lessen denuded areas (dust source) to the absolute minimum.

Under very windy/dusty conditions the permit holder might have to substitute the above mentioned dust suppression methods with the spraying of water, in which case water will be bought and transported to the farm in a water truck that will moisten the problem area. The water truck driver will receive proper training to ensure effective use of the water on problem areas preventing water wastage.

### 3 Electricity:

The proposed project will make use of the existing power supply at the site that was used by the previous sand mine. No new connections or upgrade of the power infrastructure is required.

### 3 Waste Handling:

Due to the nature of the project, the small scale of the proposed operation, and the fact that no infrastructure will be established or maintenance work done within the earmarked footprint, very little to no general waste will be generated as a direct result of the mining activities. Any waste generated during the operational phase, will be contained in a sealable refuse bin that

will be removed from site and incorporated in the existing waste disposal system at the workshop of the Applicant.

Likewise, very little (if any) generation of hazardous waste is expected. Hazardous waste will mainly be the result of accidental spillages or breakdowns. Such contaminated areas will be cleaned up immediately (within two hours of the occurrence) and contaminated soil will be contained in designated hazardous waste containers to be removed daily to the hazardous waste storage area at the Applicant's workshop where it will be disposed of as part of the hazardous waste by a registered hazardous waste handling contractor.

The chemical toilet, to be placed on site, will be serviced by a registered contractor.

∞ Servicing and Maintenance:

No workshop or service area will be established within the boundaries of the permitted area. Any maintenance/services will be performed at the existing (off-site) workshop of the Applicant.

***Decommissioning Phase:***

The decommissioning phase will entail the reinstatement of the proposed mining footprint (2.8 ha), inclusive of the previous 1.2 ha mining permit area held by Johannes Jacobus Snyman, not yet rehabilitated, as agreed upon in terms of the Transfer of Liabilities Agreement (Appendix F).

The end objective is for the stockpile area to return to agricultural use and the Orange River to reinstate the riverbed. No buildings/infrastructure, other than the chemical toilet and screen, need to be demolished and the access road will remain intact to be used by the landowner.

The decommissioning activities will consist of the following:

- ∞ Removal of all mining machinery from the riverbed;
- ∞ Removal of the sand screen and chemical toilet from the stockpile area;
- ∞ Removal/levelling of all stockpiled material;
- ∞ Landscaping the stockpile area, and replacing the topsoil (if previously removed);
- ∞ Vegetating the reinstated area; and

3 Controlling the invasive plant species.

The Applicant will comply with the minimum closure objectives as prescribed DMR and detailed below:

3 Rehabilitation of the Excavated Area:

As mentioned earlier, the Orange River annually replenish the sand resource and rehabilitate disturbance to the riverbed. In light of this, upon closure of the mine the Applicant will remove the mining machinery from the river to be reinstated during the next high-flow period. The entrance into the river will remain, but should any signs of erosion occur, these will be reinstated and landscaped by the permit holder.

3 Rehabilitation of the Stockpile Area:

The sand screen, chemical toilet and stockpiled material will be removed from the stockpile area. Compacted areas will be ripped and landscaped and previously stockpiled topsoil will be reinstated. The reinstated area will be seeded with a locally adapted grassmix, and invasive plant species will be controlled for at least one growth seasons. The reinstated area will be monitored for signs of erosion until the cover crop established.

3 Final Rehabilitation:

Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species. All equipment, plant and other items used during the mining period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site. The management of invasive plant species will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site. Final rehabilitation shall be completed within a period specified by the Regional Manager.

Once the mining area was rehabilitated the permit holder is required to submit a closure application to the Department of Mineral Resources in accordance with section 43(4)

of the MPRDA, 2002 that states: “An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report”. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

## e) Policy and Legislative Context

Table 4: Policy and Legislative Context.

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>  (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)	<b>REFERENCE WHERE APPLIED</b>	<b>HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.</b>  (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity: <i>Physical Environment – Geology and Soil.</i>  Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of invader plant species.</i>	The mitigation measures proposed for the site includes specifications of the CARA, 1983.
Mine Health and Safety Act, 1996 (Act No 29 of 1996) read together with applicable amendments and regulations thereto including relevant OHSA regulations.	Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of Health and Safety Risks.</i>	The mitigation measures proposed for the site includes specifications of the MHSA, 1996
Mineral and Petroleum Resources Development Act, 2002, (Act No. 28 of 2002) read together with applicable amendments and regulations thereto.  ↻ Section 27	Part A(1)(d) Description of the scope of the proposed overall activity	Application for a mining permit submitted to DMR-WC.  Ref No: EC 30/5/1/3/2/10570 MP
National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended by GNR 326 effective 7 April 2017) ↻ GNR 324 Listing Notice 3 Activity 12 ↻ GNR 327 Listing Notice 1 Activity 19 ↻ GNR 327 Listing Notice 1 Activity 21 ↻ GNR 327 Listing Notice 1 Activity 22	Part A(1)(d)(i) Listed and specified activities.	Application for environmental authorisation submitted to DMR-WC.  Ref No: WC 30/5/1/3/2/10570 MP

<b>APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT</b>  (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)	<b>REFERENCE WHERE APPLIED</b>	<b>HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.</b>  (E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
3 GNR 327 Listing Notice 1 Activity 26		
National Environmental Management: Air Quality Control Act, 2004 (Act No 39 of 2004) read together with applicable amendments and regulations thereto specifically the National Dust Control Regulations, GN No R827.	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Air and Noise Quality</i> .  Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Dust Handling</i> .	The mitigation measures proposed for the site take into account the NEM:AQA, 2004 and the National Dust Control Regulations.
National Environmental Management Act: Biodiversity Act, 2004 (Act No. 10 of 2004) read together with applicable amendments and regulations thereto.	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity - <i>Biological Environment</i>  Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk – <i>Management of invader plant species</i> .	The mitigation measures proposed for the site includes specifications of the NEM:BA, 2004.
National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) read together with applicable amendments and regulations thereto.  NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)	Part A(1)(d)(ii) Description of the activities to be undertaken	The mitigation measures proposed for the site take into account the NEM:WA.
National Heritage Resources Act. 1999 (Act No 25 of 1999).	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Human Environment</i>	The mitigation measures proposed for the site includes specifications of the NHRA, 1999.
National Water Act, 1998 (Act No 36 of 1998) read together with applicable amendments and regulations thereto.	Part A(1)(h)(iv)(1)(a) Type of environment affected by the proposed activity – <i>Hydrology</i> .  Part A(1)(h)(viii) The possible mitigation measures that could be applied on the level of risk.	The proposed mining area falls within 100 m of a watercourse and requires Water Use Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in section 21(c) and section 21 (i).

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.
(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)		(E.g. in terms of the National Water Act a Water Use License has/has not been applied for)
		The mitigation measures proposed for the site includes specifications of the NWA, 1998.
Public Participation Guideline in terms of the NEMA EIA Regulations	Part A(1)(h)(ii) Details of the Public Participation Process Followed	Public participation was conducted in accordance with the guidelines published in terms of the NEMA EIA Regulations

**f) Need and desirability of the proposed activities.**

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

The increase in building, construction and road maintenance projects in the vicinity of the property triggered the need of the Applicant/landowner to trade with the available sand from a permitted area. Sand, although plentiful along the Orange River, is not always easily accessible due to high river banks and dense riparian vegetation. The proposed sand mining operation will entail the removal of sand, from the Orange River, from an area that was previously used for the same purpose with an easy and existing access to the mineral. As the Orange River replenishes the sand deposit annually the mining of the mineral was identified as a feasible business opportunity that will also bring about the diversification of activities on the property, extending it from agriculture to include small scale mining.

Approximately four labourers will be employed for the duration of the operational phase. The project will contribute to the local economy, both directly and through the multiplier effect that its presence will create, as equipment and supplies are purchased locally, and wages are spent at local businesses, generating both jobs and income in the area.

The risk matrix prepared by Mr G Botha (2019) concluded that the Risk Class of the proposed sand mine (regarding the Orange River) is Low (see the Risk Assessment attached as Appendix H) and is therefore allowable provided that the proposed management and mitigation measures be implemented.

**g) Motivation for the overall preferred site, activities and technology alternative.**

The proposed site (Site Alternative 1) was identified as the preferred and only viable site alternative based on the following:

- ∞ Due to the nature of the application and the presence of sand along the entire Orange River riverbed, the sand mining area can be moved to various alternative sites. However, the proposed mining area entails the winning of sand from an area previously used for sand mining purposes.
- ∞ The footprint of the proposed stockpile area was previously disturbed by sand mining activities, and no natural occurring Upper Gariiep Alluvial Vegetation needs to be disturbed. In light of this, the proposed project will not impact the Eastern Cape CBA that was registered over the area.
- ∞ The Applicant can make use of the existing access point into the river and no change to the riverbank or removal of riparian vegetation is needed.
- ∞ The Orange River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ∞ Access to the proposed mining area is possible via the existing farm road with a formal (existing) entrance onto the R58.
- ∞ The quality of the sand, in the earmarked area, complies with the requirements of the Applicant's clients and/or contracts.
- ∞ The risk matrix (Appendix H) supports the proposed site alternative.
- ∞ Upon closure, the mining footprint of the previous sand permit (EC 1/2014) will be rehabilitated as part of the decommissioning activities.

The environmental impact assessment process assessed the feasibility of the proposed site alternative to identify fatal flaws that are deemed as severe as to prevent the activity continuing, or warrant another site or project alternative. The outcome of the assessment showed that should the mitigation measures and monitoring programmes proposed in this document be implemented, no fatal flaws could be identified that prevents the activity continuing. In light of the above, the mining proposal was updated to incorporate the project related mitigation measures and monitoring programmes identified during the assessment process. The preferred development footprint was subsequently finalized and is depicted on the attached site activities plan (Appendix C).



**h) 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.

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

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

- (a) the property on which or location where it is proposed to undertake the activity;
- (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.

Due to the nature of the application and the presence of sand along the entire Orange River riverbed, the sand mining area can be moved to various alternative sites. However, the proposed mining area, as indicated on the Regulation 2.2 Mine Plan (Appendix A), was identified as the preferred and only viable site alternative as it entails the mining of an area previously used for sand mining purposes.

**Site Alternative 1 (S1) (Preferred and Only Site Alternative):** Site Alternative 1 entails the mining of an area previously used for the winning of sand within the GPS coordinates as listed in the table below.

*Table 5: GPS Coordinates of Site Alternative 1 (preferred and only site alternative)*

NUMBER	DEGREES, MINUTES, SECONDS		DECIMAL DEGREES	
	LAT (S)	LONG (E)	LAT (S)	LONG (E)
A	30°40'18.12"	26°38'03.23"	-30.671690°	26.634230°
B	30°40'17.58"	26°38'04.53"	-30.671544°	26.634593°
C	30°40'18.68"	26°38'06.69"	-30.671856°	26.635192°
D	30°40'19.96"	26°38'05.92"	-30.672211°	26.634977°
E	30°40'20.48"	26°38'06.85"	-30.672355°	26.635237°
F	30°40'19.09"	26°38'07.59"	-30.671967°	26.635443°
G	30°40'19.43"	26°38'10.22"	-30.672064°	26.636172°
H	30°40'25.73"	26°38'09.58"	-30.673813°	26.635994°
J	30°40'25.52"	26°38'06.31"	-30.673755°	26.635085°
K	30°40'20.94"	26°38'07.15"	-30.672482°	26.635319°
L	30°40'20.07"	26°38'05.88"	-30.672243°	26.634966°
M	30°40'25.01"	26°38'02.85"	-30.673615°	26.634126°
N	30°40'24.81"	26°38'01.47"	-30.673560°	26.633741°
P	30°40'21.17"	26°38'03.79"	-30.672547°	26.634385°



Figure 5: Satellite view showing the position of Site Alternative 1 (red polygon) within the surrounding landscape.

Site Alternative 1 was identified during the assessment phase of the environmental impact assessment, by the Applicant and project team, as the **preferred and only site alternative** due to the following:

- ∞ The footprint of the proposed stockpile area was previously disturbed by sand mining activities, and no natural occurring Upper Gariep Alluvial Vegetation needs to be disturbed. In light of this, the proposed project will not impact the Eastern Cape CBA that was registered over the area.
- ∞ The Applicant can make use of the existing access point into the river and no change to the riverbank or removal of riparian vegetation is needed.
- ∞ The Orange River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ∞ Access to the proposed mining area is possible via the existing farm road with a formal (existing) entrance onto the R58.
- ∞ The quality of the sand, in the earmarked area, complies with the requirements of the Applicant's clients and/or contracts.

- ∩ The risk matrix (Appendix H) supports the proposed site alternative.
- ∩ Upon closure, the mining footprint of the previous sand permit (EC 1/2014) will be rehabilitated as part of the decommissioning activities.

**No-go Alternative:** The no-go alternative entails no change to the *status quo* and is therefore a real alternative that must be considered. The sand to be mined from the river will be sold to the building, road rehabilitation/maintenance and associated construction industry. If however, the no-go alternative is implemented:

- ∩ the Applicant/landowner cannot utilise the mineral resource on his property;
- ∩ the proposed employment opportunities will be lost;
- ∩ the Aliwal North people/businesses, in need of sand will have to transport it from further sources that will escalate product pricing.

In light of this, the no-go alternative was not deemed to be the preferred alternative.

## ii) Details of the Public Participation Process Followed

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

During the initial public participation process the stakeholders and I&AP's were informed of the project by means of background information documents that were sent or hand delivered directly to the contact persons. A 30-days commenting period was allowed which expired on 27 September 2019. The following I&AP's and stakeholders were informed of the project:

Table 6: List of the I&AP's and stakeholders that were notified of the proposed sand mine project.

SURROUNDING LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
<p><b><u>Surrounding landowners &amp; lawful occupiers:</u></b></p> <ul style="list-style-type: none"> <li>∩ Thabang Trust (Portion 2 of Akermans Kraal 11)</li> <li>∩ Mr WJ Herselman (Portion 5 of Orange Fontein 63)</li> <li>∩ Mr &amp; Mrs V Bredenkamp (Me A Bekker) (Portion 2 (RE) of Orange Fontein 63)</li> <li>∩ Mr GF Roelofse (Portion 1 (RE) of Akermans Kraal 11)</li> <li>∩ Melkspruit Communal Property Association (Portion 0 (RE) of Melk Spruit 12)</li> <li>∩ Mr JJ Watkins (Portion 0 (RE) of Rotondo 1046)</li> <li>∩ Strydom Prime Genetics (Pty) Ltd (Portion 0 (RE) of Mooiplaas 1087)</li> </ul>	<ul style="list-style-type: none"> <li>∩ Department of Economic Development, Environmental Affairs and Tourism;</li> <li>∩ Department of Labour;</li> <li>∩ Department of Public Works;</li> <li>∩ Department of Rural Development and Agrarian Reform;</li> <li>∩ Department of Rural Development and Land Reform;</li> <li>∩ Department of Transport;</li> <li>∩ Department of Water and Sanitation;</li> <li>∩ Eskom;</li> <li>∩ Joe Gqabi District Municipality;</li> <li>∩ South African Heritage Resources Agency;</li> <li>∩ Walter Sisulu Local Municipality – Ward Councillor (Ward 10); and</li> </ul>

SURROUNDING LANDOWNERS & INTERESTED AND AFFECTED PARTIES	STAKEHOLDERS
	<ul style="list-style-type: none"> <li>3 Walter Sisulu Local Municipality.</li> </ul>
I&AP'S AND STAKEHOLDERS THAT REGISTERED/COMMENTED DURING THE INITIAL NOTIFICATION PERIOD	
<ul style="list-style-type: none"> <li>3 Department of Economic Development, Environmental Affairs and Tourism.</li> </ul>	

An advertisement was placed in The Reporter on 16 August 2019 and on-site notices were placed on 26 August 2019 at the Aliwal North Post Office and the entrance to the farm. The advertisement, background information document (BID) and on-site notices invited the recipients to register/comment on the project before 27 September 2019.

In accordance with the timeframes stipulated in the EIA Regulations of December 2014 (amended by GNR 326 effective 7 April 2017) the Draft Basic Assessment Report (DBAR) was compiled and will be distributed for comment and perusal to the I&AP's and stakeholders listed above. A 30-day commenting period, ending 09 December 2019, will be allowed for perusal of the documentation and submission of comments. The comments received on the DBAR will be incorporated into the Final Basic Assessment Report (FBAR) to be submitted for decision making to DMR.

### iii) Summary of issues raised by I&APs

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

Table 7: Summary of issues raised by IAPs

Interested and Affected Parties List the name of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
<b>AFFECTED PARTIES</b>	<b>X</b>			
<b>Landowner/s</b>				
Yellowwood Trust	X	The Applicant for the mining permit is also the landowner.		N/A
<b>Lawful occupier/s of the land</b>				
N/A		N/A	N/A	
<b>Landowners or lawful occupiers on adjacent properties</b>	<b>X</b>	-	-	-
Thabang Trust adjacent landowner of: 3 Portion 2 of Akermans Kraal 11	X	No comments received	N/A	N/A
Mr WJ Herselman adjacent landowner of: 3 Portion 5 of Orange Fontein 63	X	No comments received	N/A	N/A
Mr & Mrs V Bredenkamp adjacent landowner of: 3 Portion 2 (RE) of Orange Fontein 63	X	No comments received	N/A	N/A
Mr GF Roelofse adjacent landowner of: 3 Portion 1 (RE) of Akermans Kraal 11	X	No comments received	N/A	N/A
Melkspruit Communal Property Association adjacent landowner of: 3 Portion 0 (RE) of Melk Spruit 12	X	No comments received	N/A	N/A
Mr JJ Watkins adjacent landowner of:	X		N/A	N/A

<b>Interested and Affected Parties</b>		<b>Date Comments Received</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>
<b>List the name of persons consulted in this column, and</b>  <b>Mark with an X where those who must be consulted were in fact consulted</b>					
3 Rotondo 1046		No comments received			
Strydom Prime Genetics (Pty) Ltd adjacent landowner of: 3 Portion 0 (RE) of Mooiplaas 1087.	X	No comments received	N/A	N/A	N/A
<b>Municipal councillor</b>					
Cllr. W Mokhoabane (Ward 10)	X	No comments received	N/A	N/A	N/A
<b>Municipality</b>					
Walter Sisulu Local Municipality (WSLM)	X	No comments received	N/A	N/A	N/A
<b>Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e</b>					
Department of Transport (DoT)	X	No comments received	N/A	N/A	N/A
Eskom	X	No comments received.	N/A	N/A	N/A
<b>Communities</b>	No community were identified within the study area.				

<b>Interested and Affected Parties</b>		<b>Date Comments Received</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 name of persons consulted in this column, and					
Mark with an X where those who must be consulted were in fact consulted					
<b>Dept. Land Affairs</b>					
Department of Rural Development and Land Reform	X	No comments received	N/A	N/A	N/A
<b>Traditional Leaders</b>	N/A				
<b>Dept. Environmental Affairs</b>					
Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)	X	15 August 2019	Cira Ngetu confirmed receipt of the BID and responded that the relevant manager will revert back promptly. Thozamile Babane responded on 16 August 2019 that the site falls under Joe Gqabi Region and further communication must be addressed to the DEDEAT Regional Manager: Joe Gqabi Region for attention Ms Andiswa Qinisile.	Greenmined acknowledged receipt of the correspondence from DEDEAT on 19 August 2019 and confirmed that Ms A Qinisile was registered on behalf of the DEDEAT-Joe Gqabi Region and will be kept informed during the EIA process.	Appendix G2: Proof of public participation process.
<b>Other Competent Authorities affected</b>					
Department of Labour	X	No comments received	N/A	N/A	N/A
Department of Public Works	X	No comments received	N/A	N/A	N/A
Department of Rural Development and Agrarian Reform	X	No comments received	N/A	N/A	N/A
Department of Water and Sanitation	X	No comments received	N/A	N/A	N/A

<b>Interested and Affected Parties</b>		<b>Date Comments Received</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>
<b>List the name of persons consulted in this column, and</b>  <b>Mark with an X where those who must be consulted were in fact consulted</b>					
Joe Gqabi District Municipality	X	No comments received	N/A	N/A	N/A
South African Heritage Resources Agency	X	No comments received	N/A	N/A	N/A
<b><u>OTHER AFFECTED PARTIES</u></b>					
N/A					
<b><u>INTERESTED PARTIES</u></b>					
N/A					



#### iv) The Environmental attributes associated with the alternatives.

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

##### (1) Baseline Environment

###### (a) Type of environment affected by the proposed activity.

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

This section describes the biophysical, cultural and socio-economic environment that may be affected and the baseline conditions, which are likely to be affected by the proposed mining activity.

### PHYSICAL ENVIRONMENT

#### CLIMATE

According to the saexplorer website, Aliwal North normally receives about 418 mm of rain per year, with most rainfall occurring mainly during summer. The chart below (lower left) shows the average rainfall values for Aliwal North per month. It receives the lowest rainfall (5 mm) in July and the highest (71 mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Aliwal North range from 15.6°C in June to 29.7°C in January. The region is the coldest during July when the mercury drops to -0.1°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.

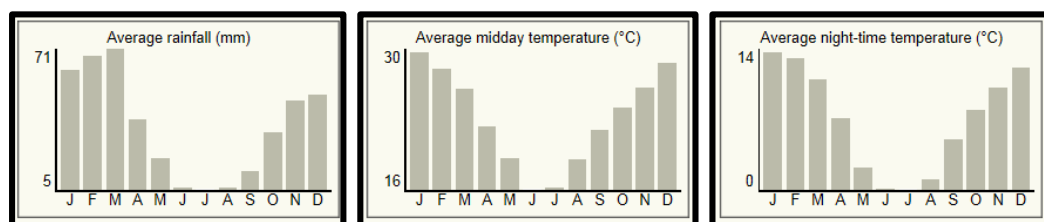


Figure 6: Statistical representation of the average rainfall, midday temperatures and night-time temperatures for the Aliwal North region (Chart obtained from saexplorer).

The dominant wind direction of Aliwal North is fairly constant ranging from north-west to north for most of the year. The figures below presents the wind direction distribution in % for the greater Aliwal North area.

Wind direction distribution in %  
Year

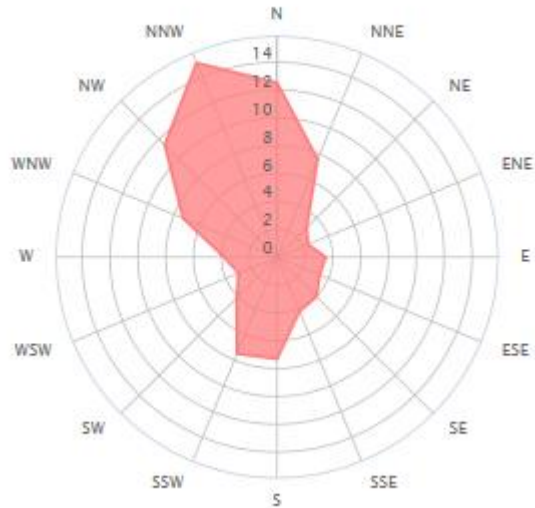


Figure 7: Annual wind direction distribution in % for the Aliwal North area, where the furthest point to the north-north-west is 15.1%/year, north is 12.5%, north-west is 11.4%/year, south-south-west equals 7.5%, and south is 7.3%. (Image obtained from [www.windfinder.com/windstatistics/aliwalnorth](http://www.windfinder.com/windstatistics/aliwalnorth))

## TOPOGRAPHY

The natural topography of the area surrounding the proposed sand mine is best described as an undulating landscape covered with grassveld intersected by the Orange River. The riverbed has the lowest surface elevation at 1 292 masl, with the altitude rising steadily towards the west (Eastern Cape Province) and east (Free State Province) respectively. The landscaped is characterised by small hills (koppies) that occur between the more even grassveld areas. The figure below shows the elevation gain from the proposed mining footprint to the town of Aliwal North to be 118 m over 6.69 km.

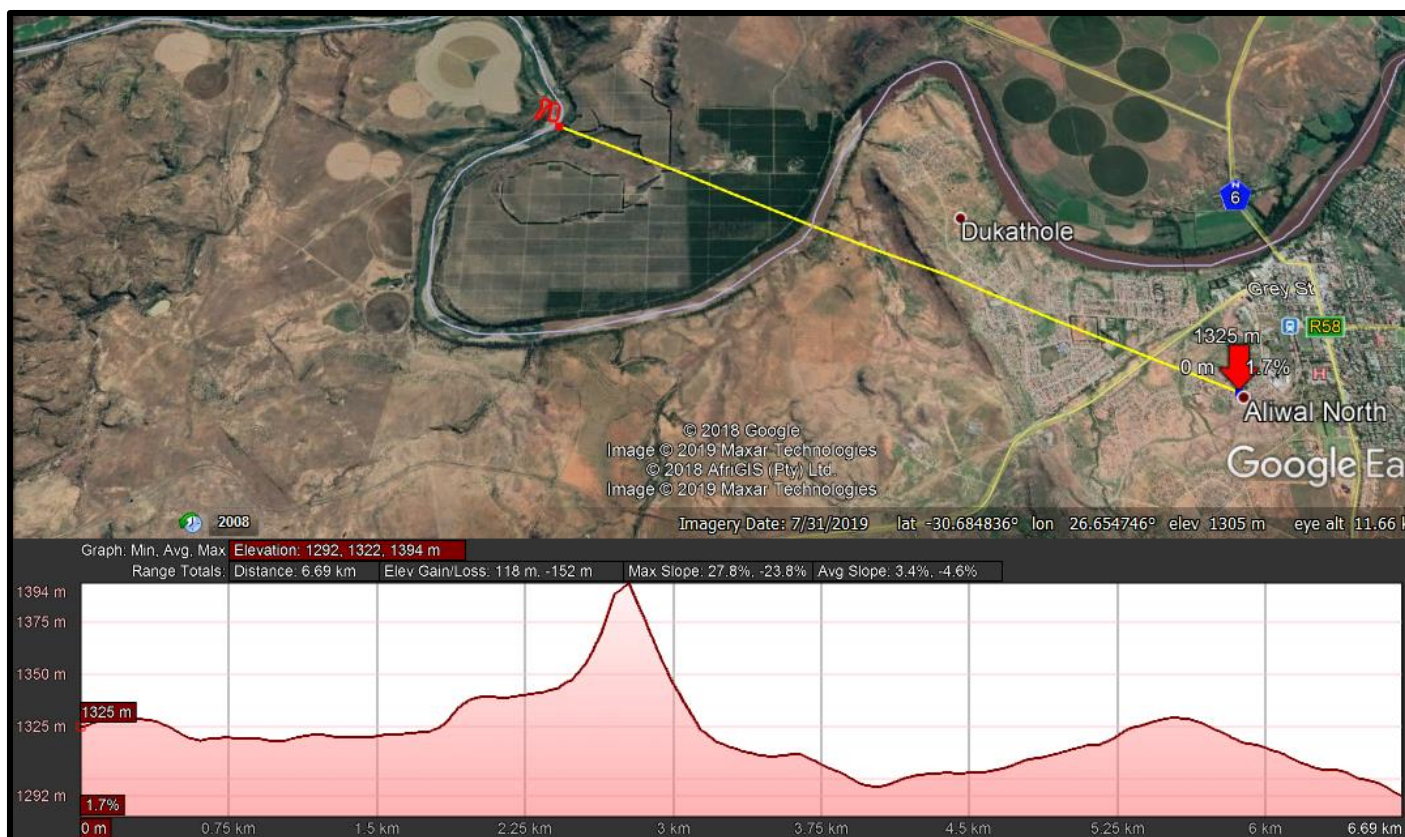


Figure 8: Elevation profile showing the topography between the proposed mining footprint (red polygon) and the town of Aliwal North. (Image obtained from Google Earth).

## VISUAL CHARACTERISTICS

The visual character of the surrounding areas mainly comprises of an agricultural setting, intersected by pivots for crop cultivation, orchards, the Orange River, and previously mined areas (sand & gravel). The aesthetic ambiance of the area is that of a rural area with highly natural landscapes.

## AIR AND NOISE QUALITY

The air quality of the study area is generally very good given the area's predominant agricultural use and rural character. Likewise, the noise ambiance is very low (classified as ambient rural / pastoral) with noise levels mainly affected by traffic along the R58, and the farming equipment operational in the area.

## GEOLOGY AND SOIL

Sand transported from Lesotho and the larger upstream catchment is deposited during periods of high flow into the Orange River. The upper part of the catchment consists of Basalt from the Drakensberg, which overlies various layers of sandstone from the Clarens, Elliot and Molteno formations. Below these, the Karoo sediments from the Beaufort Group occur and the river flows through these for the last couple of

kilometres, before reaching the study area. The geological map for the Council of Geoscience (figure below) confirms this and shows the geology of the study area to be representative of the Beaufort Group (green shaded area).

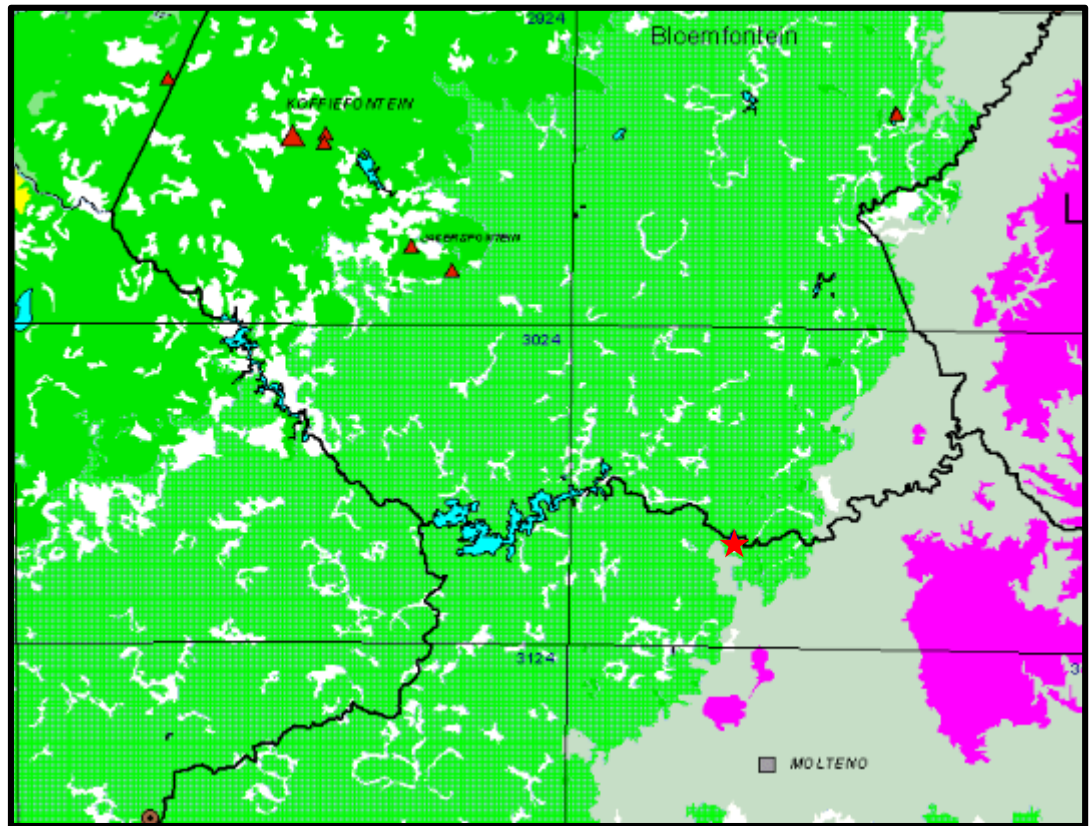


Figure 9: Indication of the simplified geology of the study area, where green represents the Beaufort Group, grey the Molteno, Elliot and Clarens Formations, and pink the Drakensberg and Lebombo Groups. The proposed mining area is indicated by the red star. (Image obtained from the Council for Geoscience)

## HYDROLOGY

(Information extracted from the DWAF Internal Strategic Perspective: Orange River System Overarching, 2004 & Orange River: Assessment of Water Quality Data Requirements for Planning Purposes, 2009)

The proposed mining area will be within the riverbed of the Orange River (along the western bank) that is located within the Kraai Sub-Water Management Area which is managed as part of the Upper Orange Water Management Area by the Department of Water and Sanitation (DWS). The Orange River rises in the Drakensberg mountains in Lesotho, where it is known as the Senqu River, and extensively extends into South Africa, Namibia and Botswana.

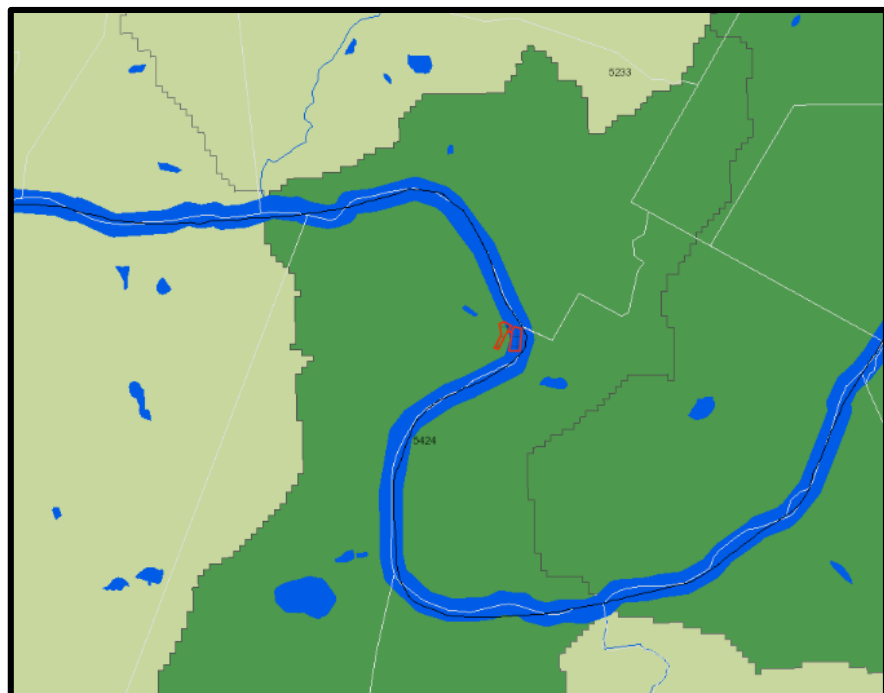
The whole Upper Orange River is fairly natural and homogenous in terms of water chemistry. The proposed sand mining operation falls within the river reach from Orangedraai (Lesotho border) to the Gariep Dam (DWAF, 2009). Fifty seven percent of the natural runoff is generated in Lesotho and 33% in the Upper Orange WMA. The

bulk of the surface water in the Lower Orange WMA is found in the main stem of the Orange River, with virtually all coming from the Upper Orange WMA. The water quality of the surface water in the Upper Orange is generally good except for the high sediment load in the Caledon and the salinity problems in the Lower Riet (DWAF, 2004).

*Table 8: Aquatic characteristics of the greater study area*

<b>Water Management Area</b>	Upper Orange WMA 13
<b>Sub Water Management Area</b>	Kraai Sub-WMA
<b>Catchment Area</b>	Lesotho
<b>Quaternary Catchment</b>	D14A
<b>FEPA Status</b>	River NFEPA

According to the National Freshwater Ecosystem Priority Areas (NFEPA) map as presented by SANBI, a River NFEPA of conservation importance extends over the proposed footprint (see figure below).



*Figure 10: Map showing the proposed mining footprint (red polygon) in the Orange River (blue). The dark green area represents a River FEPA while the lighter green represents an Upstream River FEPA. (Image obtained from the BGIS Map Viewer – National Wetlands and NFEPA)*

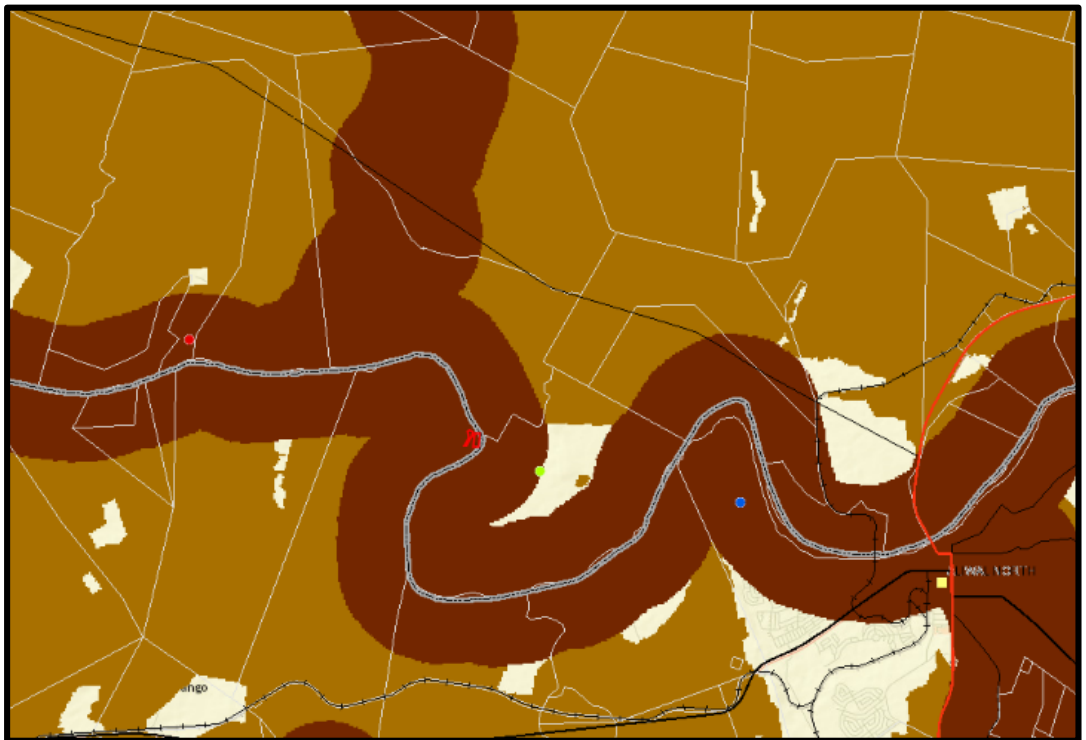
## **BIOLOGICAL ENVIRONMENT**

### **MINING AND BIODIVERSITY**

*(Information extracted from the Mining and Biodiversity Guideline: Mainstreaming Biodiversity into the Mining Sector, Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, 2013)*

The Mining and Biodiversity Guideline, compiled by the South African Mining and Biodiversity Forum (SAMBF) provides the mining sector with a practical, user-friendly manual for integrating biodiversity considerations into planning processes and managing biodiversity during the developmental and operational phases of a mine, from exploration through to closure.

When the mining footprint is layered over the Mining and Biodiversity Map, as shown in the figure below, it falls over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The Mining and Biodiversity Guideline's describes areas of highest biodiversity importance as: *"these areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being."* The guideline notes that environmental screening, the EIA and specialists should focus on confirming the presence and significance of biodiversity features, and provide a site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making.



*Figure 11: The Mining and Biodiversity importance map with the proposed mining footprint indicated by the red polygon. Dark brown – highest biodiversity importance, highest risk for mining, light brown – high biodiversity Importance, high risk for mining (image obtained from the BGIS Map Viewer – Mining Guidelines).*

## BIODIVERSITY CONSERVATION AREAS

The Eastern Cape Biodiversity Plan (ECBP) shows that the proposed mining footprint falls within an Eastern Cape Critical Biodiversity Area: Terrestrial (CBA):

The Lexicon of Biodiversity Planning in South Africa provides the following definitions:

- 3 Critical Biodiversity Area (CBA): *“an area that must be maintained in a good ecological condition in order to meet biodiversity targets. CBA’s collectively meet biodiversity targets for all ecosystem types as well as for species and ecological processes that depend on natural or near-natural habitat, that have not already been met in the protected area network.”*

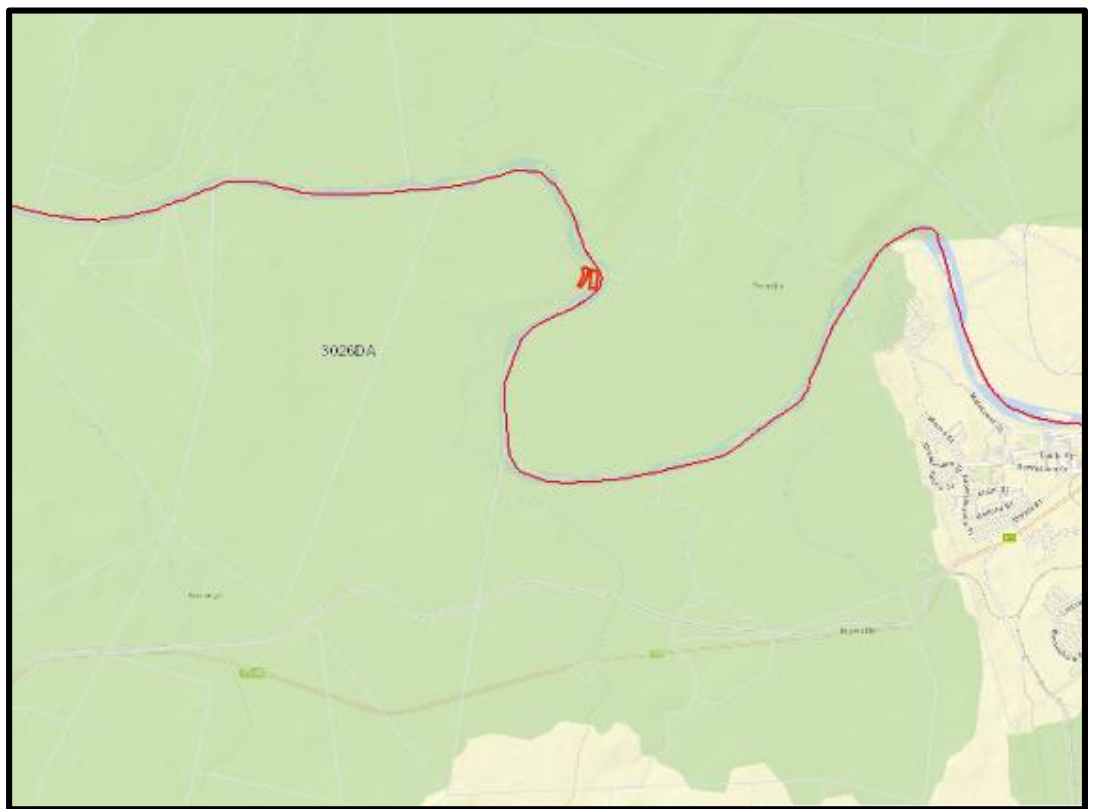


Figure 12: Eastern Cape Biodiversity Conservation Plan showing the mining area (red polygon) in relation to the ECBP CBA: Terrestrial (green). (Image obtained from BGIS Map Viewer – Eastern Cape Conservation Plan).

## GROUND COVER

According to Mucina and Rutherford (2012) the vegetation type of the natural areas is classified as Upper Gariep Alluvial Vegetation (AZa4). The vegetation and landscape features of this vegetation type is characterised by flat alluvial terraces supporting complex of riparian thickets dominated by native *Acacia karroo* and *Diospyros lycioides*, flooded grasslands, reed beds and ephemeral herblands populating mainly sand banks within the river and on its banks.

Some of the important taxa found in this vegetation type include *Acacia karroo*, *Celtis africana*, *Salix mucronata* subsp. *mucronata*, *Diospyros lycioides*, *Melianthus comosus*, *Searsia pyroides*, *Asparagus setaceus*, *A. suaveolens*, and *Lycium arenicola*, *L. hirsutum*.

The vegetation type is classified as Vulnerable and according to Mucina and Rutherford (2012) only 3% of the unit is conserved in statutory or private conservation areas. More than 20% of the vegetation type has already undergone transformation for cultivation and building of dams. A conservation target of 31% was set for the vegetation type.



Figure 13: National vegetation cover map showing the mining area within the Upper Gariep Alluvial Vegetation (AZa4) (light blue). (Image obtained from BGIS Map Viewer – National Vegetation Map).

## FAUNA

(Information extracted from the Environmental Management Programme Report for the Development of a Sand Mine Operation on the farm Zuiderzee the Remainder of farm Ackermanskraal No 11, 2013)

The majority of the farm is used for stock grazing. Apart from the domestic animals, the faunal action is mainly contained to the natural vegetated areas and riparian areas along the riverbanks. The EMPR of the previous mining permit reported the presence of the following small mammals within the study area:

- ≈ Porcupine (*Hystrix africaeaustralis*)
- ≈ Red Rock Hare (*Pronolagus* spp.)



- ↯ Cape Hare (*Lepus capensis*)
- ↯ Spring Hare (*Pedetes capensis*)
- ↯ Cape Fox (*Vulpes chama*)
- ↯ Bat Eared Fox (*Otocyon megalotis*)
- ↯ Cape Clawless Otter (*Aonyx capensis*)
- ↯ Rock Dassies (Hyrax) (*Procavia capensis*)
- ↯ Large Spotted Genet (*Genetta tigrina*)
- ↯ Black Backed Jackal (*Canis mesomelas*)
- ↯ Aardvark (*Orycteropus afer*)
- ↯ Yellow Mongoose (*Cynictis penicillata*)
- ↯ Water Mongoose (*Atilax paludinosus*)
- ↯ Steenbok (*Raphicerus campestris*)
- ↯ Mountain Reedbuck (*Redunca fulvorufula*)

The most important fish species in the river is the smallmouth yellowfish (*Barbus holubi*) as well as the largemouth yellowfish (*Barbus kimberleyensis*).

### **HUMAN ENVIRONMENT:**

#### **CULTURAL AND HERITAGE ENVIRONMENT**

*(Information extracted from the Environmental Management Programme Report for the Development of a Sand Mine Operation on the farm Zuiderzee the Remainder of farm Ackermanskraal No 11, 2013)*

The proposed mining footprint was selected over an area that has previously been used for sand mining and therefore no sites of archaeological or cultural importance is expected within the footprint. The approved EMPR of the previous mining permit states that: “*Although the surrounding area is rich in fossils they do not occur in the vicinity of the mining area*”.

The South African Heritage Resources Agency (SAHRA) compiled the Palaeontological (fossil) Sensitivity Map (PSM) to guide developers, heritage officers and practitioners in screening palaeontologically sensitive areas at the onset of a project. When the footprint of the earmarked mining area is placed on the PSM, it shows the study area to extend over an area of moderate (green) to insignificant/zero (grey) concern as presented in the figure below.

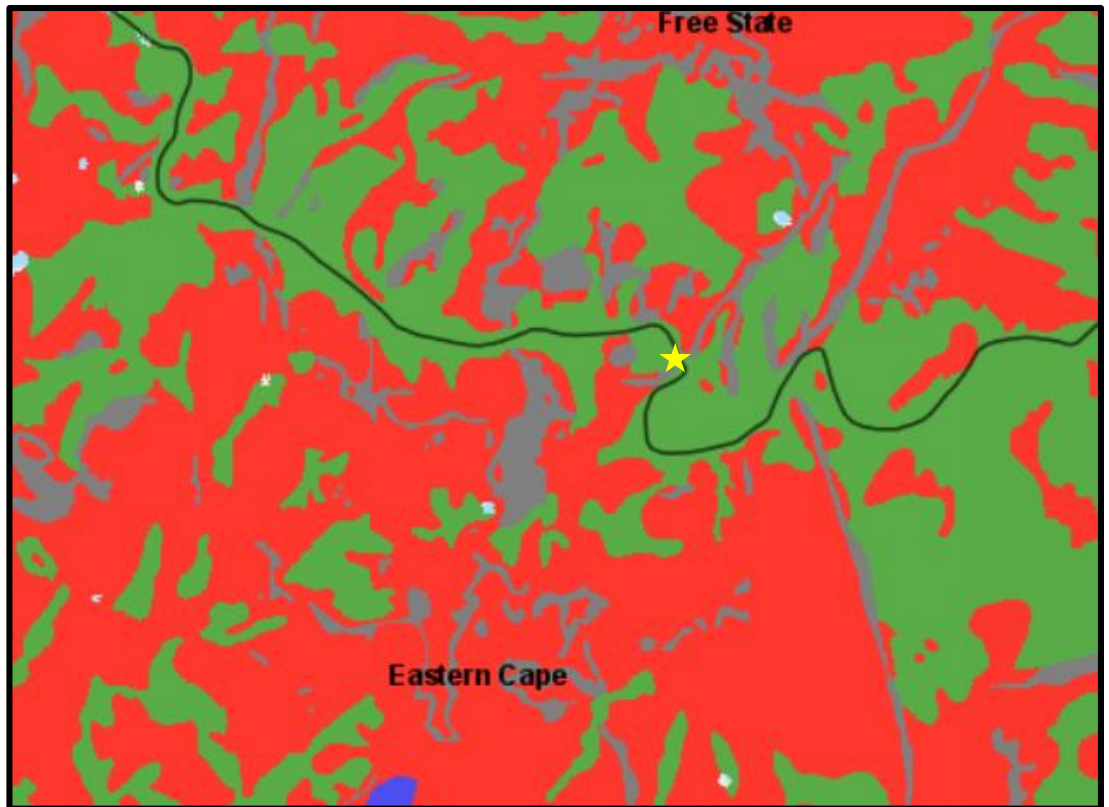


Figure 14: The SAHRA palaeontological sensitivity map shows the proposed mining footprint (yellow star) falls in an area of moderate (green) to insignificant/zero (grey) concern.

## **SOCIO-ECONOMIC ENVIRONMENT**

*(Information extracted from the Walter Sisulu Local Municipality Integrated Development Plan 2017/18 – 2021/22 Financial Years Reviewed 2018/2019)*

The proposed mining area is located within ward 10 of the Walter Sisulu Local Municipality (WSLM). The WSLM is a Category B municipality located in the west of the Joe Gqabi District in the Eastern Cape Province, south of the Orange River and Gariep Dam. The municipality is the largest in the district, making up half of its geographical area. It was established by the amalgamation of the Gariep and Maletswai Local Municipalities in August 2016. The WSLM is well known for its stock farming, of which sheep production is one of the dominating sectors. A thermal springs resort, named Aliwal Spa, is located within the municipal area and produces salty water, rich in minerals, from underground. The WSLM consist of 6 towns: Aliwal North, Burgersdorp, Jamestown, Oviston, Steynsburg, Venterstad.

The seat of the WSLM is in Burgersdorp with administrative units in all five towns which are managed by unit managers. According to the revised population estimates based on the 2011 (Statistics South Africa, 2011), the WSLM has a population of approximately 77 477 (compared to the 2001 Census estimate of 68 621). However, the current survey of 2016 (Source StatsSA) shows an increase from 82 000 to 87 263. This population accounts for 22% of the total population residing in the Joe Gqabi

District, making it the least populous local municipality in the district. The WSLM has the highest level of population growth, with an average annual growth rate of 1.4%.

The Eastern Cape Province is estimated to have an average growth rate of 1.0% which is lower than the Joe Gqabi District Municipality. South Africa as a whole is estimated to have an average annual growth rate of 1.4% which is higher than that of Joe Gqabi's growth rate.

### Gender Profile

The Pie Chart below indicates that gender ratio in WSLM is comprised of 47.3% males and 52.7% females (StatsSA). In all the wards the females are dominating and this suggests a future population growth and more demand services from the municipality.

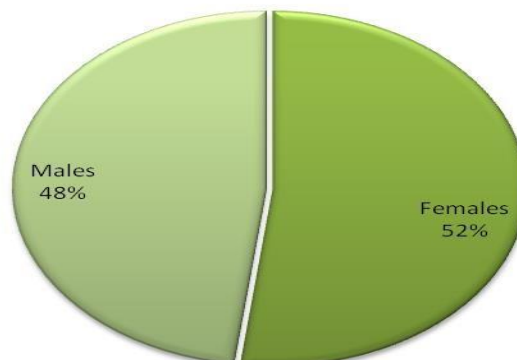


Figure 15: Gender profile (image obtained from the Water Sisulu LM IDP 2017/18 – 2021/22).

### Population Profile

Below is a pie chart which indicates the total black African population of WSLM at sixty-one thousand eight hundred and ninety-nine (61 899), Coloured at nine thousand two hundred and forty-four (9244), Asian/Indian at two hundred (200) and white population at five thousand eight hundred and forty (5 840). The Indian/Asian and others form the lowest proportions of the population with the former accounting for 0.3% and the latter 0.4%. The black African population makes about 80% of the total population followed by coloured population at 12% and white at 8%.

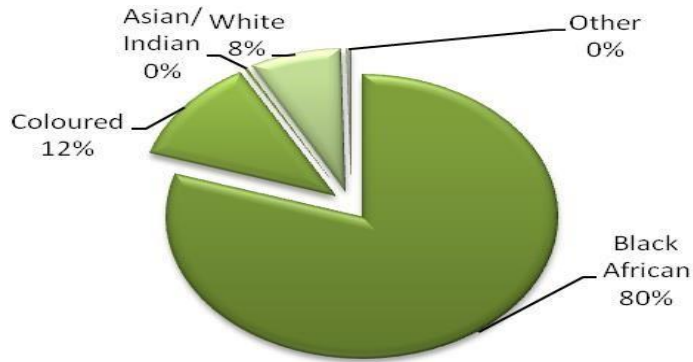


Figure 16: Population profile of the Walter Sisulu municipal area (image obtained from the Water Sisulu LM IDP 2017/18 – 2021/22).

### Economic Profile

The WSLM had the highest average annual economic growth, averaging 3.55% between 2006 and 2016, when compared to the rest of the municipalities within the Joe Gqabi District Municipality. The greatest contributor to the Joe Gqabi District Municipality economy is the Walter Sisulu local municipality with a share of 50.48% or R 5.27 billion, increasing from R 1.84 billion in 2006.

### Education Levels

7.4% of the population above the age of 20 has no schooling, 24.8% has obtained matric and 7.9% obtained higher education. The matric rate increased from 19.2% in 2011 to 24.8% in 2016, the no schooling rate decreased from 12.5% to 7.4% and the Higher Education decreased slightly from 8.5% to 7.9%.

### Employment Profile

The working age population in Walter Sisulu in 2016 was 54 200, increasing at an average annual rate of 1.48% since 2006. Walter Sisulu's EAP was 33 700 in 2016, which is 39.16% of its total population of 86 000, and roughly 32.58% of the total EAP of the Joe Gqabi District. From 2006 to 2016, the average annual increase in the EAP in the Walter Sisulu was 1.92%, which is 0.165 percentage points higher than the growth in the EAP of Joe Gqabi District for the same period.

In 2006, 37.2% of the total population in Walter Sisulu were classified as economically active which increased to 39.2% in 2016. Compared to the other areas in Joe Gqabi District, Walter Sisulu had the highest EAP as a percentage of the total population within its own area relative to the other areas.

In 2016, Walter Sisulu employed 28 500 people which is 37.63% of the total employment in the Joe Gqabi District (75 700), 1.95% of total employment in Eastern

Cape Province (1.46 million), and 0.18% of the total employment of 15.7 million in South Africa. Employment within Walter Sisulu increased annually at an average rate of 2.09% from 2006 to 2016. Walter Sisulu's average annual employment growth rate of 2.09% exceeds the average annual labour force growth rate of 1.92% resulting in unemployment decreasing from 19.79% in 2006 to 18.32% in 2016 in the municipal area.

	Walter Sisulu	Elundini	Senqu	Total of Joe Gqabi
<b>Agriculture</b>	3 120	2 120	2 720	7 963
<b>Mining</b>	24	23	27	75
<b>Manufacturing</b>	1 500	1 050	1 060	3 622
<b>Electricity</b>	100	92	45	237
<b>Construction</b>	3 020	4 140	3 190	10 358
<b>Trade</b>	5 420	4 860	5 520	15 802
<b>Transport</b>	973	1 040	808	2 823
<b>Finance</b>	2 410	1 680	1 480	5 566
<b>Community Services</b>	8 050	6 150	6 680	20 874
<b>Households</b>	3 860	1 680	2 830	8 366
<b>TOTAL:</b>	<b>28 500</b>	<b>22 900</b>	<b>24 400</b>	<b>75 686</b>

Figure 17: Employment profile of the WSLM compared to the other municipalities within the district (source: HIS Markit Regional Explorer version 1156).

### Income Profile

In 2016, it is estimated that 13.89% of all the households in the Walter Sisulu municipal area were living on R30, 000 or less per annum. In comparison with 2006's 45.77%, the number is more than half. The R54, 000 to R72, 000 income category has the highest number of households with a total number of 2 870, followed by the R72, 000 to R96, 000 income category with 2 690 households. Only 2.6 households fall within the R0 to R2, 400 income category.

For the period 2006 to 2016 the number of households earning was more than R30, 000 per annum has increased from 54.23% to 86.11% and the number of households with income equal to or lower than R6, 000 per year has decreased by a significant amount.

Walter Sisulu municipal area recorded an average annual growth rate of 11.77% (from R 1.54 billion to R 4.68 billion) from 2006 to 2016, which is more than both Joe Gqabi's (10.69%) as well as Eastern Cape Province's (9.52%) average annual growth rates.

The total personal income of Walter Sisulu amounted to approximately R 4.68 billion in 2016. The African population group earned R 2.83 billion, or 60.33% of total personal income, while the White population group earned R 1.4 billion, or 29.81% of the total

personal income. The Coloured and the Asian population groups only had a share of 9.44% and 0.42% of total personal income respectively.

The per capita income in Walter Sisulu in 2016 is R 54,400 which is higher than both the Eastern Cape (R 37,800) and of the Joe Gqabi District (R 34,100) per capita income. The per capita income for Walter Sisulu (R 54,400) is higher than that of the South Africa as a whole which is R 53,800.

**(b) Description of the current land uses**

Portion 0 (Remaining Extent) of the farm Akermans Kraal 11 RD is situated in a rural setting. The Orange River forms the northern boundary of the farm, while the Aliwal North – Burgersdorp railway line is found along the southern boundary. The land use of the property mainly comprises of crop cultivation through centre pivot irrigation, and grazing of the uncultivated areas. The land use was also extended to include small scale mining.

Likewise, the main land use of the surrounding properties is agricultural. The Orange River valley is a major economic corridor mainly based on intensive irrigation farming, and tourism. The following table provides a description of the land uses and/or prominent features that currently occur within a 500 m radius of the proposed site:

*Table 9: Land uses and/or prominent features that occur within 500 m radius of S1 and S2.*

LAND USE CHARACTER	YES	NO	DESCRIPTION
Natural area	YES	-	The study area is surrounded by natural areas used for agricultural purposes.
Low density residential	-	NO	
Medium density residential	-	NO	
High density residential	-	NO	
Informal residential	-	NO	
Retail commercial & warehousing	-	NO	
Light industrial	-	NO	
Medium industrial	-	NO	
Heavy industrial	-	NO	
Power station	-	NO	
High voltage power line	-	NO	
Office/consulting room	-	NO	
Military or police base / station / compound	-	NO	
Spoil heap or slimes dam	-	NO	
Quarry, sand or borrow pit	YES	-	The footprint of the proposed mining area extends over an area previously used for sand mining purposes.
Dam or reservoir	YES	-	A farm dam lays ±100 m north-west of the proposed mining area. The mining activities will not impact on the dam of the farm.
Hospital/medical centre	-	NO	
School/ crèche	-	NO	
Tertiary education facility	-	NO	
Church	-	NO	
Old age home	-	NO	

LAND USE CHARACTER	YES	NO	DESCRIPTION
Sewage treatment plant	-	NO	
Train station or shunting yard	-	NO	
Railway line	-	NO	The Aliwal North – Burgersdorp railway line is ±3.6 km (as the crow flies) from the earmarked area.
Major road (4 lanes or more)	-	NO	
Airport	-	NO	
Harbour	-	NO	
Sport facilities	-	NO	
Golf course	-	NO	
Polo fields	-	NO	
Filling station	-	NO	
Landfill or waste treatment site	-	NO	
Plantation	-	NO	
Agriculture	YES	-	The proposed footprint forms part of an agricultural active farm.
River, stream or wetland	YES	-	The proposed mining footprint extends into the Orange River.
Nature conservation area	-	NO	
Mountain, hill or ridge	YES	-	The north-western corner of the stockpile area is ±30 m from a low hill (koppie).
Museum	-	NO	
Historical building	-	NO	
Protected Area	-	NO	
Graveyard	-	NO	
Archaeological site	-	NO	
Other land uses (describe)	-	NO	

**(c) Description of specific environmental features and infrastructure on the site.**

**SPECIFIC ENVIRONMENTAL FEATURES**

**SITE SPECIFIC TOPOGRAPHY**

The natural topography of both the stockpile area and the proposed excavated area, in the riverbed, can be described as flat. The elevation of the stockpile area slightly increases from the north towards the south, while it visibly decreases from the west to the east as one nears the river. Therefore, drainage from the stockpile area will be in an eastern direction. The figure below shows an average slope of 1% from the north-western corner of the stockpile area (1301 masl) to the south-eastern corner (1291 masl) of the excavated area.

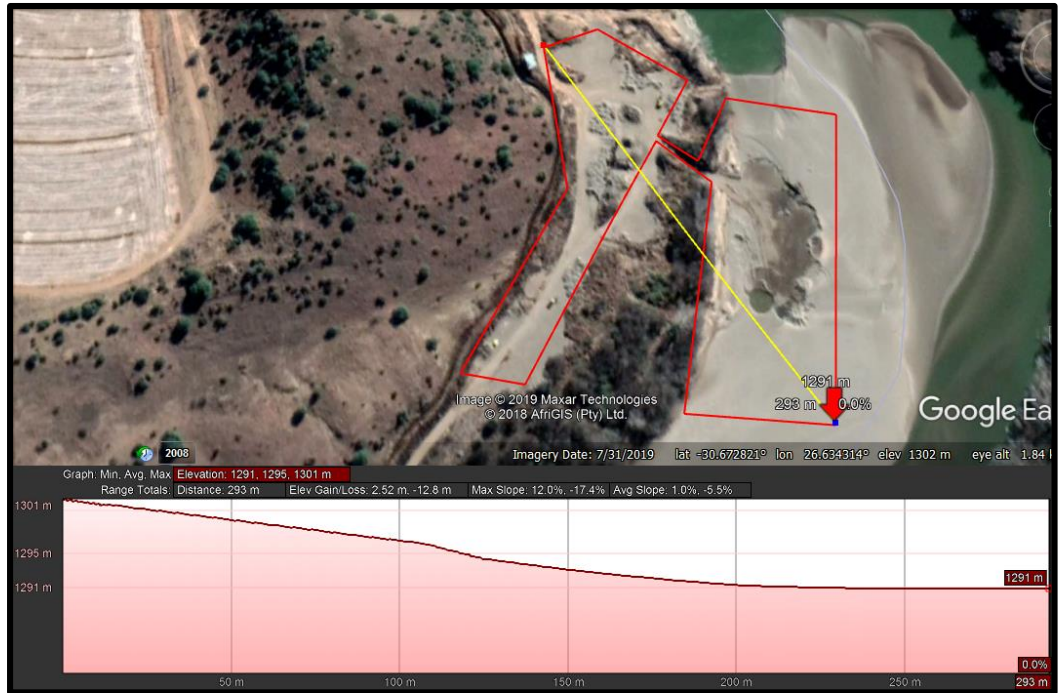


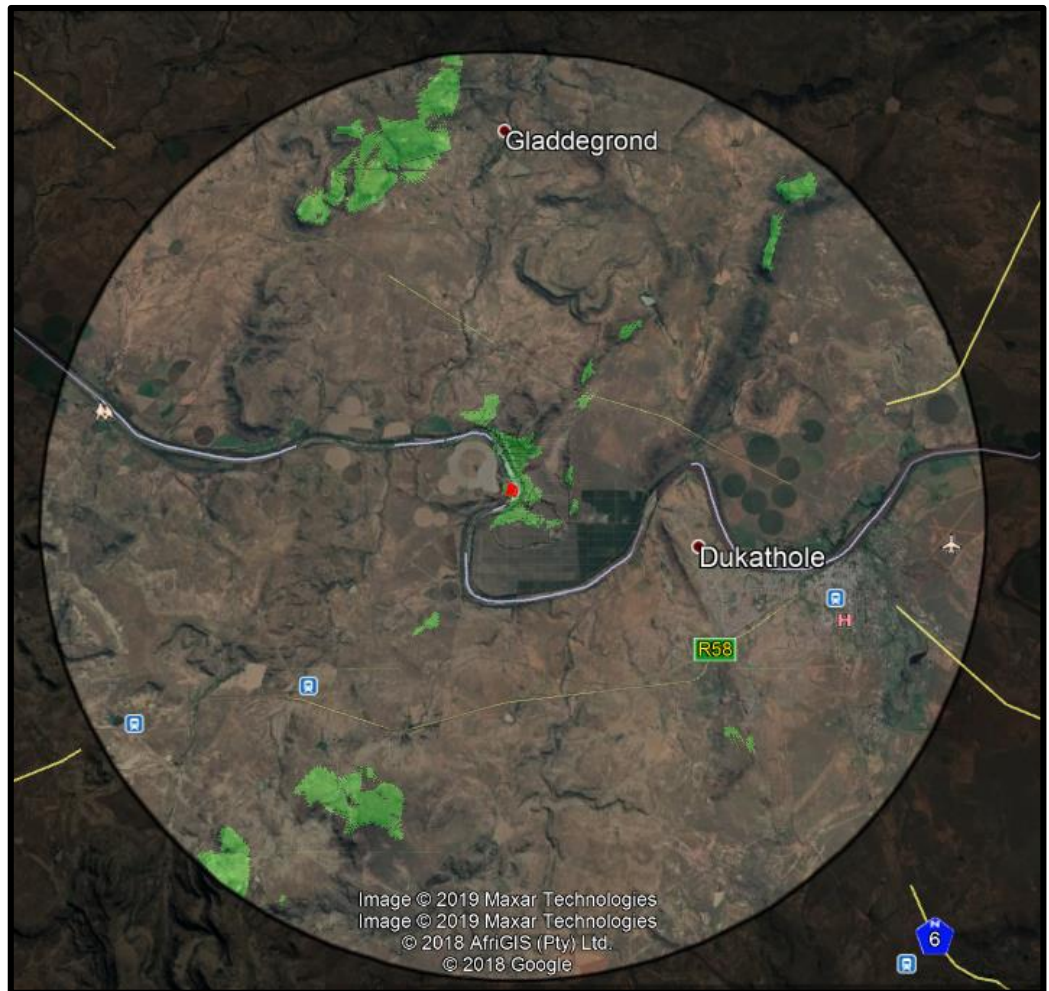
Figure 18: Elevation profile of the proposed mining footprint (Image obtained from Google Earth).

The earmarked sandbank is situated at a bend in the river along the western bank. The sandbank is connected to the upper river bank (proposed stockpile area) with a road that was constructed many years ago to access the sand for use on the farm, this access was also used by the previous sand permit holder. The river bank is  $\pm 3$  m high extending to a large level area (proposed stockpile area) that has previously been used for the screening and stockpiling of sand.

### SITE SPECIFIC VISUAL CHARACTERISTICS

The proposed mining activities will be visible within close proximity ( $\pm 1$  km radius) of the footprint. Visibility will mainly be from the eastern/Free State Province side of the river. However, as one moves away the visibility of the area greatly lessens. The figure below shows the viewshed analysis for the footprint within a  $\pm 10$  km radius. The green shaded areas shows the positions from where the mining area will be visible. From this analysis it is proposed that the visual impact of the proposed sand mining operation will be of low significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated areas. The small scale of the proposed operation, and the continued reinstatement of the excavation area contributes to the low visual significance. Should the Applicant successfully rehabilitate the stockpile area (upon closure), no residual visual impact is expected upon closure of the mine.





*Figure 19: Viewshed of the proposed mining footprint where the green shaded areas shows the positions from where the mining area (red polygon) will be visible. (Image obtained from Google Earth).*

## **SITE SPECIFIC AIR AND NOISE QUALITY**

The residential dwelling nearest to the proposed footprint is opposite the river (Free State Province) approximately 1.6 km away (south-east). The residence of the landowner is  $\pm 2$  km to the south-west. Further to this, the access road to the mining area passes only the residence of the landowner. Currently the air quality of the study area is mainly impacted on by the surrounding farming operations.

Emission into the atmosphere is controlled by the National Environmental Management: Air Quality Act, 2004. The proposed mining activity does not trigger an application in terms of the said act. The proposed activity will contribute the emissions of one excavator, one front-end-loader and two tippers to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use.

The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operational at the property. The distance of the proposed mining area from residential infrastructure further lessens the potential noise impact.

### **SITE SPECIFIC GEOLOGY AND SOIL**

*(Information extracted from the Environmental Management Programme Report for the Development of a Sand Mine Operation on the farm Zuiderzee the Remainder of farm Ackermanskraal No 11, 2013)*

The site specific geology is representative of the regional geology and soil as described earlier in this report. The silica sand of the study area is a coarse sand and highly suitable for construction purposes as well as cement block making. The sand, to be excavated, is ready to be used and does not need further processing other than screening through a sieve to remove oversized particles.

Sand is continuously washed down the river, forming a thick layer and sandbanks. In close proximity to the sandbank (western), to be mined, an intrusive dolerite ridge extends into the river from the eastern bank. During high flow, this ridge creates eddies in the river that continuously replenish the western sandbank.

According to the EMPR of the previous mining permit (Landplan & Associates, 2013) the river has over millions of years moved east and in doing so created the platform on which the stockpile area is proposed. The area has deep alluvial soils that was deposited because of the turn of the river as well as from sand deposited from the higher lying surrounding area.

### **SITE SPECIFIC HYDROLOGY**

The proposed project entails the mining of sand from the Orange River. The PES (Present Ecological State) in the Upper Orange River range between B and E, with the majority of the sites in the D category. The reach of the Orange River concerned with this application carries a DWS site code of OS2 (Orange River at Aliwal North). DWS determined a PES of C (moderately modified), REC (Recommended Ecological Category) of B (largely natural) and EISC (Ecological Importance and Sensitivity Category) of Moderate for the OS2 area in 2009.



*Figure 20: Satellite view showing the position of mining footprint in the Orange River and associated western bank. (Image obtained from Google Earth)*

In addition to the EA and mining permit required to allow the mining of sand from the Orange River, the proposed activity also requires a Water Use Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No 36 of 1998) for water uses as defined in section 21 (c) and section 21 (i). The Applicant appointed Greenmined Environmental (Pty) Ltd to handle the WULA application, which was submitted to the DWS on 30 October 2019 (see proof attached as Appendix M). DWS indicated that a Risk Assessment must be conducted by an appropriately qualified specialist to determine the risk category of the earmarked area. The risk matrix prepared by Mr G Botha concluded that the Risk Class of the proposed sand mining area is Low (see the Risk Assessment attached as Appendix H). In light of this, a general authorisation may be considered by the DWS.

#### **SITE SPECIFIC MINING AND BIODIVERSITY CONSERVATION AREAS**

As mentioned earlier, when the mining footprint is layered over the Mining and Biodiversity Map, it falls over an area of highest biodiversity importance with a corresponding rating of highest risk for mining. The High Biodiversity Importance area (in terms of the Mining and Biodiversity Guideline) is supported by the boundaries of

classified River NFEPA and the CBA identified in terms of the Eastern Cape Biodiversity Plan.

Ground-truthing however, showed that the proposed footprint of the stockpile area is highly disturbed with little to no indigenous vegetation intact. The risk matrix (Appendix H) concluded that the risk class of the proposed excavation area (Orange River) is Low, and in light of this the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance.

### **SITE SPECIFIC GROUNDCOVER**

Although the earmarked mining area lays within the Upper Gariep Alluvial Vegetation type, the site specific groundcover of the stockpile area was highly altered due to the previous mining operations, and no natural vegetation remains. Indigenous vegetation established through succession in small isolated pockets.



*Figure 21: Photographs of the proposed stockpile area showing the lack of groundcover*

Healthy riparian zones maintain the form of the river channel and serve as filters for sediment, nutrients and light. Plant material from the riparian zone is an important source of food for aquatic fauna. The structure and function of riparian vegetation is altered when vegetation removal, cultivation, construction, inundation, erosion, sedimentation and alien vegetation occur within or close to the riparian zone. The Applicant will make use of the existing access point into the river, and a single haul road from the river to the stockpile area, to limit damage to the riparian zone. It is proposed that should the Applicant implement the mitigation measures proposed in the EMP the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.

At the time of the inspection, invasive plant species such as Russian Tumbleweed (*Salsola kali*) and Spiny Cocklebur (*Xanthium spinosum*) were noted within the proposed footprint area (stockpile area and riparian area) that established due to the disturbance

of the natural groundcover. The Applicant will implement an invasive plant species management plan and constantly monitor the mining area for problem species.

#### **SITE SPECIFIC FAUNA**

The terrestrial site specific fauna of the study area represents the fauna of the surrounding environment, and no protected or red data species were identified to be resident within the proposed footprint area. The fauna at the site will not be impacted on by the proposed mining activity as they will be able to move away or through the site, without being harmed. Workers must be educated and managed to ensure that no fauna at the site is harmed.

The proposed sand mining operation is not expected to impact the aquatic fauna of the Orange River, as mining will only take place during the low flow periods of the river when the sandbank is exposed. No pumping of sand will take place and no fishing or interference with any aquatic fauna will be allowed.

#### **SITE SPECIFIC CULTURAL AND HERITAGE ENVIRONMENT**

No sites of archaeological or cultural importance were identified during the site inspection, and consultation with the interested and affected parties also did not identify any potential area of concern. The potential impact of the proposed mining activities on the cultural and/or heritage environment is therefore deemed to be insignificant, however the Applicant will implement a chance-find protocol on site for the duration of the site establishment-, operational- and decommissioning phase.

#### **SITE SPECIFIC INFRASTRUCTURE**

An Eskom power line, supplying electricity to the landowner's water pump at the river, runs along the western boundary of the proposed footprint area. This power line is also the one from where the Applicant will obtain power for the screening of the sand when needed. Two concrete silos were established in the north-western corner of the stockpile area, but apart from this, the only other infrastructure comprises of farm fences and the access road.

**(d) Environmental and current land use map.**

(Show all environmental and current land use features)

The environmental and current land use map is attached as Appendix D.

**v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts**

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

The following potential impacts were identified of each main activity in each phase of the proposed project. The significance rating was determined using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact rating listed below was determined for each impact **prior** to bringing the proposed mitigation measures into consideration. The degree of mitigation indicates the possibility of partial, full or no mitigation of the identified impact.

**SITE ESTABLISHMENT**

Visual intrusion as a result of site establishment

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Partial</b>				
1	4	1	2	1	5	3	<b>6</b>

Potential negative impact on the CBA

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
<b>Rating: Low</b>			<b>Degree of Mitigation: Full</b>				
5	4	5	4.7	1	1	1	<b>4.7</b>

Loss of topsoil and fertility during mining and stockpiling (stockpile area)

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Full</b>				
3	5	1	3	4	2	3	<b>9</b>

Infestation of the topsoil heaps and mining area with invader plant species

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Full</b>				
3	4	2	3	4	2	3	<b>9</b>

Potential impact on fauna (aquatic & terrestrial) within the footprint area

			Consequence			Likelihood	Significance
Severity	Duration	Extent		Probability	Frequency		
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Full</b>				
2	4	1	2.3	3	2	3.5	<b>8</b>

Dust nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
2	4	2	2.7	3	3	3	<b>8.1</b>

Noise nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Partial</b>	
2	4	2	2.7	1	5	3	<b>8.1</b>

Work opportunities to 4 local residents (**Positive Impact**)

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Medium-High</b>						<b>Degree of Mitigation: N/A</b>	
1	4	5	3.3	5	5	5	<b>16.5</b>

**WINNING OF SAND**

Soil contamination from hydrocarbon spills

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Medium</b>						<b>Degree of Mitigation: Full</b>	
5	5	5	5	3	1	2	<b>10</b>

Disturbance to aquatic fauna within the footprint area

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
3	4	5	4	2	1	1.5	<b>6</b>

Impact on the flow regime of the river

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
4	4	5	4.3	2	2	2	<b>8.6</b>

Impact on downstream water users

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
4	4	5	4.3	2	2	2	<b>8.6</b>

Noise nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Partial</b>	
2	4	2	2.7	2	5	3.5	9.5

Potential impact on areas/infrastructure of heritage or cultural concern

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
4	4	5	4.3	1	1	1	4.3

Loss of mining equipment due to unexpected flooding

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
3	4	1	2.6	3	2	2.5	6.5

**SCREENING, STOCKPILING AND TRANSPORTING MATERIAL FROM SITE:**

Loss of stockpiled material due to ineffective storm water control

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
3	4	1	2.6	3	2	2.5	6.5

Dust nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Medium</b>						<b>Degree of Mitigation: Full</b>	
3	4	2	3	4	5	4.5	13.5

Noise nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Partial</b>	
2	4	2	2.7	2	5	3.5	9.5

Potential impact associated with littering and hydrocarbon spills

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Medium</b>						<b>Degree of Mitigation: Full</b>	
3	4	2	3	4	4	4	12



Infestation of denuded areas with invader plant species

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Medium</b>			<b>Degree of Mitigation: Full</b>			
3	4	2	3	5	2	10.5

Deterioration of the access road to the mining area

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Full</b>			
2	4	2	2.6	3	2	9.1

Overloading of trucks having an impact on the public roads

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Medium-High</b>			<b>Degree of Mitigation: Full</b>			
4	4	5	4.3	4	5	19.4

**SLOPING AND LANDSCAPING UPON CLOSURE OF THE MINING AREA**

Erosion of returned topsoil after rehabilitation (stockpile area)

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Full</b>			
3	5	2	3.3	4	2	9.9

Residual impact on the flow regime of the Orange River

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low-Medium</b>			<b>Degree of Mitigation: Full</b>			
4	5	5	4.6	3	1	9.2

Infestation of the reinstated area with invader plant species

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Medium</b>			<b>Degree of Mitigation: Full</b>			
3	4	2	3	5	2	10.5

Noise nuisance as a result of the decommissioning activities

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Partial</b>			
1	1	2	1.3	1	5	3.9

Potential impact associated with litter/hydrocarbon spills left at the mining area

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Medium</b>						<b>Degree of Mitigation: Full</b>	
3	5	2	3.3	4	4	4	<b>13.2</b>

Return of the stockpile area to agricultural use by the landowner (**Positive Impact**)

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Medium-High</b>						<b>Degree of Mitigation: N/A</b>	
1	5	5	3.7	5	5	5	<b>18.5</b>

**vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;**

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision.)

**Methodology for the assessment of the potential environmental, social and cultural impacts**

**DEFINITIONS AND CONCEPTS:**

**Environmental significance:**

The concept of significance is at the core of impact identification, evaluation and decision-making. The concept remains largely undefined and there is no international consensus on a single definition. The following common elements are recognised from the various interpretations:

- ∞ Environmental significance is a value judgement
- ∞ The degree of environmental significance depends on the nature of the impact
- ∞ The importance is rated in terms of both biophysical and socio-economic values
- ∞ Determining significance involves the amount of change to the environment perceived to be acceptable to affected communities.

Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of acceptability) (DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5).

The concept of risk has two dimensions, namely the consequence of an event or set of circumstances, and the likelihood of particular consequences being realised (Environment Australia (1999) Environmental Risk Management).

## **Impact**

The positive or negative effects on human well-being and / or the environment.

## **Consequence**

The intermediate or final outcome of an event or situation OR it is the result, on the environment, of an event.

## **Likelihood**

A qualitative term covering both probability and frequency.

## **Frequency**

The number of occurrences of a defined event in a given time or rate.

## **Probability**

The likelihood of a specific outcome measured by the ratio of a specific outcome to the total number of possible outcomes.

## **Environment**

Surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation (ISO 14004, 1996).

## **Methodology that will be used**

The environmental significance assessment methodology is based on the following determination:

$$\text{Environmental Significance} = \text{Overall Consequence} \times \text{Overall Likelihood}$$

### **Determination of Overall Consequence**

Consequence analysis is a mixture of quantitative and qualitative information and the outcome can be positive or negative. Several factors can be used to determine consequence. For the purpose of determining the environmental significance in terms of consequence, the following factors were chosen: ***Severity/Intensity, Duration and Extent/Spatial Scale***. Each factor is assigned a rating of 1 to 5, as described in the tables below.

#### ***Determination of Severity / Intensity***

**Severity** relates to the nature of the event, aspect or impact to the environment and describes how severe the aspects impact on the biophysical and socio-economic environment.

The table below will be used to obtain an overall rating for severity, taking into consideration the various criteria.

Table 10: Table to be used to obtain an overall rating of severity, taking into consideration the various criteria.

Type of criteria	Rating				
	1	2	3	4	5
Quantitative	0-20%	21-40%	41-60%	61-80%	81-100%
Qualitative	Insignificant / Non-harmful	Small / Potentially harmful	Significant/ Harmful	Great/ Very harmful	Disastrous Extremely harmful
Social/ Community response	Acceptable / I&AP satisfied	Slightly tolerable / Possible objections	Intolerable/ Sporadic complaints	Unacceptable / Widespread complaints	Totally unacceptable / Possible legal action
Irreversibility	Very low cost to mitigate/ High potential to mitigate impacts to level of insignificance/ Easily reversible	Low cost to mitigate	Substantial cost to mitigate/ Potential to mitigate impacts/ Potential to reverse impact	High cost to mitigate	Prohibitive cost to mitigate/ Little or no mechanism to mitigate impact Irreversible
Biophysical (Air quality, water quantity and quality, waste production, fauna and flora)	Insignificant change / deterioration or disturbance	Moderate change / deterioration or disturbance	Significant change / deterioration or disturbance	Very significant change / deterioration or disturbance	Disastrous change / deterioration or disturbance

### **Determination of Duration**

Duration refers to the amount of time that the environment will be affected by the event, risk or impact, if no intervention e.g. remedial action takes place.

Table 11: Criteria for the rating of duration.

Rating	Description
1	Up to ONE MONTH
2	ONE MONTH to THREE MONTHS (QUARTER)
3	THREE MONTHS to ONE YEAR
4	ONE to TEN YEARS
5	Beyond TEN YEARS

### **Determination of Extent/Spatial Scale**

Extent or spatial scale is the area affected by the event, aspect or impact.

Table 12: Criteria for the rating of extent / spatial scale.

Rating	Description
1	Immediate, fully contained area
2	Surrounding area
3	Within Business Unit area of responsibility
4	Within the farm/neighbouring farm area
5	Regional, National, International

### **Determination of Overall Consequence**

Overall consequence is determined by adding the factors determined above and summarized below, and then dividing the sum by 3.

Table 13: Example of calculating overall consequence.

Consequence	Rating
Severity	Example 4
Duration	Example 2
Extent	Example 4
<b>SUBTOTAL</b>	<b>10</b>
<b>TOTAL CONSEQUENCE:</b> (Subtotal divided by 3)	<b>3.3</b>

### **Determination of Likelihood:**

The determination of likelihood is a combination of Frequency and Probability. Each factor is assigned a rating of 1 to 5, as described below and in tables 6 and 7.

### ***Determination of Frequency***

Frequency refers to how often the specific activity, related to the event, aspect or impact, is undertaken.

Table 14: Criteria for the rating of frequency.

Rating	Description
1	Once a year or once/more during operation
2	Once/more in 6 Months
3	Once/more a Month
4	Once/more a Week
5	Daily

### ***Determination of Probability***

Probability refers to how often the activity or aspect has an impact on the environment.

Table 15: Criteria for the rating of probability.

Rating	Description
1	Almost never / almost impossible
2	Very seldom / highly unlikely
3	Infrequent / unlikely / seldom
4	Often / regularly / likely / possible
5	Daily / highly likely / definitely

### ***Overall Likelihood***

Overall likelihood is calculated by adding the factors determined above and summarised below, and then dividing the sum by 2.

Table 16: Example of calculating overall likelihood.

Consequence	Rating
Frequency	Example 4
Probability	Example 2
<b>SUBTOTAL</b>	<b>6</b>
<b>TOTAL LIKELIHOOD</b> (Subtotal divided by 2)	<b>3</b>

### Determination of Overall Environmental Significance:

The multiplication of overall consequence with overall likelihood will provide the environmental significance, which is a number that will then fall into a range of **LOW**, **LOW-MEDIUM**, **MEDIUM**, **MEDIUM-HIGH** or **HIGH**, as shown in the table below.

Table 17: Determination of overall environmental significance.

Significance or Risk	Low	Low-Medium	Medium	Medium-High	High
Overall Consequence X Overall Likelihood	1 – 4.9	5 – 9.9	10 – 14.9	15 – 19.9	20 – 25

### **Qualitative description or magnitude of Environmental Significance**

This description is qualitative and is an indication of the nature or magnitude of the Environmental Significance. It also guides the prioritisations and decision making process associated with this event, aspect or impact.

Table 18: Description of environmental significance and related action required.

Significance	Low	Low-Medium	Medium	Medium-High	High
Impact Magnitude	Impact is of very low order and therefore likely to have very little real effect. Acceptable.	Impact is of low order and therefore likely to have little real effect. Acceptable.	Impact is real, and potentially substantial in relation to other impacts. Can pose a risk to company	Impact is real and substantial in relation to other impacts. Pose a risk to the company. Unacceptable	Impact is of the highest order possible. Unacceptable. Fatal flaw.
Action Required	Maintain current management measures. Where possible improve.	Maintain current management measures. Implement monitoring and evaluate to determine potential increase in risk. Where possible improve	Implement monitoring. Investigate mitigation measures and improve management measures to reduce risk, where possible.	Improve management measures to reduce risk.	Implement significant mitigation measures or implement alternatives.

Based on the above, the significance rating scale has been determined as follows:

High                      Of the highest order possible within the bounds of impacts which could occur. In the case of negative impacts, there would be no possible mitigation

and / or remedial activity to offset the impact at the spatial or time scale for which it was predicted. In the case of positive impacts, there is no real alternative to achieving the benefit.

Medium-High	Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
Medium	Impact would be real but not substantial within the bounds of those, which could occur. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible, In case of positive impacts; other means of achieving these benefits would be about equal in time, cost and effort.
Low-Medium	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.
Low	Impact would be negligible. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit
Insignificant	There would be a no impact at all – not even a very low impact on the system or any of its parts.

**vii) 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)

As explained earlier, the sand mining area can be moved to various alternative sites. However, the proposed mining area was identified as the preferred and only viable site alternative as it entails the mining of an area previously used for sand mining purposes. In light of this, S1 was identified during the assessment phase of the environmental impact assessment, by the Applicant and project team due to the following:

- 3 The footprint of the proposed stockpile area was previously disturbed by sand mining activities, and no natural occurring Upper Gariep Alluvial Vegetation needs to be disturbed.

In light of this, the proposed project will not impact the Eastern Cape CBA that was registered over the area.

- ∞ The Applicant can make use of the existing access point into the river and no change to the riverbank or removal of riparian vegetation is needed.
- ∞ The Orange River annually replenishes the sand deposit and reinstates the riverbed, thereby eliminating any residual impact that the sand mining activity may have on the flow of the river, or visual characteristics of the receiving and/or surrounding environment.
- ∞ Access to the proposed mining area is possible via the existing farm road with a formal (existing) entrance onto the R58.
- ∞ The quality of the sand, in the earmarked area, complies with the requirements of the Applicant's clients and/or contracts.
- ∞ The risk matrix (Appendix H) supports the proposed site alternative.
- ∞ Upon closure, the mining footprint of the previous sand permit (EC 1/2014) will be rehabilitated as part of the decommissioning activities

#### **PROJECT ASSOCIATED POSITIVE IMPACTS:**

- ∞ Work opportunities to 4 local residents;
- ∞ Return of the stockpile area to agricultural use upon closure of the project; and
- ∞ Diversification of the land use of the property.

#### **POTENTIAL NEGATIVE IMPACTS:**

##### ***SITE ESTABLISHMENT***

- ∞ Visual intrusion as a result of site establishment,
- ∞ Potential negative impact on the CBA;
- ∞ Loss of topsoil and fertility during mining and stockpiling (stockpile area);
- ∞ Infestation of the topsoil heaps and mining area with invader plant species;
- ∞ Potential impact on fauna (terrestrial & aquatic) within the footprint area;
- ∞ Dust nuisance as a result of the mining activities;
- ∞ Noise nuisance as a result of the mining activities; and

##### ***WINNING OF SAND***

- ∞ Soil contamination from hydrocarbon spills;
- ∞ Disturbance to aquatic fauna within the footprint area;



- ∩ Impact on the flow regime of the river;
- ∩ Impact on downstream water users;
- ∩ Noise nuisance as a result of the mining activities;
- ∩ Potential impact on area/infrastructure of heritage or cultural concern; and
- ∩ Loss of mining equipment due to unexpected flooding.

#### ***SCREENING, STOCKPILING AND TRANSPORTING MATERIAL FROM SITE***

- ∩ Loss of stockpiled material due to ineffective storm water control;
- ∩ Dust nuisance as a result of the mining activities;
- ∩ Noise nuisance as a result of the mining activities;
- ∩ Potential impact associated with littering and hydrocarbon spills;
- ∩ Infestation of denuded areas with invader plant species;
- ∩ Deterioration of the access road to the mining area; and
- ∩ Overloading of trucks having an impact on the public roads.

#### ***SLOPING AND LANDSCAPING UPON CLOSURE OF THE MINING AREA***

- ∩ Erosion of returned topsoil after rehabilitation (stockpile area);
- ∩ Residual impact on the flow regime of the Orange River;
- ∩ Infestation of the reinstated area with invader plant species;
- ∩ Noise nuisance as a result of the decommissioning activities; and
- ∩ Potential impact associated with litter/hydrocarbon spills left at the mining area.

#### **viii)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 mitigation 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)

The following mitigation measures are proposed to address/minimize the impact of the proposed activity on the surrounding environment:

#### **VISUAL CHARACTERISTICS**

##### **Visual Mitigation:**

The risk of the proposed mining activities having a negative impact on the aesthetic quality of the surrounding environment can be reduced to a low-medium risk through the implementation of the mitigation measures listed below.

- ∩ Mining must be contained to the boundaries of the permitted area.
- ∩ The site must have a neat appearance and be kept in good condition at all times.

- ⌘ The permit holder must limit vegetation removal (if applicable), and stripping of topsoil may only be done immediately prior to the use of a specific area.
- ⌘ Upon closure the stockpile area must be rehabilitated and levelled to remove the visual impact on the aesthetic value of the area.

## **AIR AND NOISE QUALITY**

### **Fugitive Dust Emission Mitigation:**

The risk of dust, generated from the proposed mining activities, having a negative impact on the surrounding environment can be reduced to being low through the implementation of the following mitigation measures:

- ⌘ The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).
- ⌘ The site manager must ensure continuous assessment of the dust suppression equipment to confirm its effectiveness in addressing dust suppression.
- ⌘ Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust.
- ⌘ Areas devoid of vegetation, which could act as a dust source, must be minimized.
- ⌘ Loads must be flattened and covered to prevent spillage of material during transportation, also preventing windblown dust.
- ⌘ Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.
- ⌘ All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).
- ⌘ Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from site to minimize potential dust impacts.

### **Noise Handling:**

The risk of noise, generated as a result of the proposed mining activity, having a negative impact on the surrounding environment can be reduced to being low through the implementation of the mitigation measures listed below:

- ⌘ The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site.
- ⌘ No loud music may be permitted at the mining area.

- ⌘ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).
- ⌘ Best practice measures shall be implemented in order to minimize potential noise impacts.
- ⌘ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.

## **GEOLOGY AND SOIL**

### **Topsoil Management:**

The following topsoil management mitigation measures are proposed (stockpile area):

- ⌘ The upper 300 mm of the soil must be stripped and stockpiled.
- ⌘ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.
- ⌘ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time.
- ⌘ The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.
- ⌘ Topsoil stockpiles must be protected against losses by water and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion.
- ⌘ Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.
- ⌘ The temporary topsoil stockpiles must be kept free of invasive plant species.
- ⌘ Storm- and runoff water must be diverted around the stockpile area to prevent erosion.
- ⌘ The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site.
- ⌘ The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.
- ⌘ A cover crop must be planted, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized

for optimum biomass production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.

- ⌘ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.

## **HYDROLOGY**

### **Mitigating the potential impact on the Orange River and downstream users:**

The risk that the proposed mining activity may have a negative impact on the flow regime of the Orange River and/or downstream users, can be reduced to have a low significance through the implementation of the mitigation measures listed below:

- ⌘ The flow of the river may at no point be changed, dammed or diverted without prior authorisation from the Department of Water and Sanitation (DWS).
- ⌘ No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.
- ⌘ Mining may only take place when the excavation area is exposed. Site management must monitor flooding levels of the river, and all activities within the excavation area must be halted and the area cleared at least a week before the entire flooding of the area.
- ⌘ A buffer of at least 20 m must be placed around any water body (flowing or standing) associated with the Orange River, and no activities may be allowed within these buffer areas. The buffer areas must be regarded as a dynamic zone and must be adjusted with the rising and falling of the water level.
- ⌘ The existing access into the river must be used. No changes may be made to the banks of the river without prior authorisation from the DWS.
- ⌘ A buffer of 10 m must be placed around the intact riparian fringe (apart from the access road through the riparian fringe) and must be regarded as a no-go zone. Natural vegetation must be encouraged within the 10 m buffer.
- ⌘ The permit holder must at all times adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities.
- ⌘ No equipment of any kind may be stored within the excavation area (operational phase).
- ⌘ All material stockpiles must be located outside of the riparian fringe and no stockpiled material shall remain within the sandbank overnight. The existing stockpiling areas within the processing area shall be used.
- ⌘ Upon closure, the permit holder must remove all mining related equipment/machinery from the riverbed.

### **Storm Water Mitigation:**

The following mitigation measures are proposed with regard to storm water handling (stockpile area):

- ⌘ Drainage must be controlled to ensure that runoff from the stockpile area does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points.
- ⌘ Storm water must be diverted around the topsoil heaps and stockpile area to prevent erosion.
- ⌘ Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.
- ⌘ Earthen berms/sediment traps must be constructed within the downslope area of the stockpiles and the screening plant.
- ⌘ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
  - Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.
  - Dirty water must be collected and contained in a system separate from the clean water system.
  - Dirty water must be prevented from spilling or seeping into clean water systems.
  - A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).
  - The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.

### **MINING AND BIODIVERSITY & GROUND COVER**

#### **Impact on Critical Biodiversity Area:**

The risk of the proposed mining activities having a negative impact on the identified CBA can be reduced to being Low through the implementation of the mitigation measures listed below:

- ⌘ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.
- ⌘ The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly.

- 3 The invasive plant species management plan attached as Appendix K must be implemented on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.

### **Management of Invasive Plant Species:**

The risk of weeds or invader plants invading the disturbed area can be reduced to being Low through the implementation of the mitigation measures listed below:

- 3 An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.
- 3 All stockpiles (topsoil) must be kept free of invasive plant species.
- 3 Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:
  - The plants can be uprooted, felled or cut off and can be destroyed completely.
  - The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.

## **FAUNA**

### **Protection of Fauna:**

The risk resulting from the proposed mining activity on aquatic and/or terrestrial fauna of the footprint area as well as the surrounding environment, can be reduced to Low through the implementation of the mitigation measures listed below:

- 3 The site manager must ensure no fauna is caught, killed, harmed, sold or played with.
- 3 Workers must be instructed to report any animals that may be trapped in the working area.
- 3 No snares may be set or nests raided for eggs or young.
- 3 Mining may only take place during the low flow period of the river when the sandbank is exposed. No pumping of sand may take place and no fishing or interference with any aquatic fauna is allowed.

## **CULTURAL AND HERITAGE ENVIRONMENT**

### **Archaeological, Heritage and Palaeontological Aspects:**

The impact on archaeological, heritage and palaeontological aspects, as a result of the proposed mining activities, can be reduced to being negligible through the implementation of the mitigation measures listed below:

- ⌘ All mining must be confined to the development footprint area.
- ⌘ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- ⌘ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- ⌘ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA.
- ⌘ Work may only continue once the go-ahead was issued by SAHRA.

## **EXISTING INFRASTRUCTURE**

### **Access Road Mitigation:**

The impact on the access road, as a result of the proposed mining activities, can be reduced to being Low through the implementation of the mitigation measures listed below:

- ⌘ Storm water must be diverted around the access road to prevent erosion.
- ⌘ Vehicular movement must be restricted to the existing access road and crisscrossing of tracks through undisturbed areas must be prohibited.
- ⌘ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder.
- ⌘ Overloading of the trucks must be prevented, and proof of load weights must be filed for auditing purposes.

## **GENERAL**

### **Waste Management:**

The risk of uncontrolled waste generation having a negative impact on the surrounding environment can be reduced to being Low through the implementation of the mitigation measures listed below:

- ⌘ Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area of the permit holder, and none of the above may be allowed in the riverbed. When a breakdown occurs in the riverbed, the permit holder must arrange for the removal of the machine, within 6 hours, to a recognised workshop where it can be mended.
- ⌘ Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be placed outside the 1:100 year floodline of the river, and must be serviced at least once every two weeks for the duration of the mining activities.
- ⌘ The use of any temporary, chemical toilet facilities may not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder.
- ⌘ If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.
- ⌘ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.
- ⌘ A spill kit must be available on-site which can be operated by trained employees for the *ad hoc* remediation of minor chemical and hydrocarbon spillages.
- ⌘ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.
- ⌘ Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.
- ⌘ A waste management plan must be compiled by site management and implemented on site. The plan must focus on the waste hierarchy of the NEM:WA.
- ⌘ General waste must be contained in marked, sealable, refuse bins placed at a designated area, to be removed when filled to capacity to a recognised general waste landfill site.
- ⌘ No waste may be buried or burned on the site.
- ⌘ No chemicals or hazardous materials may be stored at the mining area.
- ⌘ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.
- ⌘ To prevent the loss of machinery during unpredicted flooding, and lower the risk of accidental hydrocarbon spillages, no machinery may overnight in the riverbed. All



machinery must be parked at the stockpile area with drip trays placed underneath stationary vehicles.

### **Management of Health and Safety Risks:**

The following mitigation measures are proposed to minimise the potential health and safety impacts:

- ∞ Adequate ablution facilities and water for human consumption must daily be available on site.
- ∞ Workers must have access to the correct personal protection equipment (PPE) as required by law.
- ∞ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).

#### **ix) Motivation where no alternative sites were considered.**

As mentioned previously, due to the nature of the application and the presence of sand along the entire Orange River, the sand mining area can be moved to various alternative sites. However, the proposed mining area, as indicated on the Regulation 2.2 Mine Plan (attached as Appendix A), was identified as the preferred and only viable site alternative as it entails the mining of an area previously used for sand mining purposes, and the use of the existing access road and entrance point into the river. In addition, it is known that the Orange River annually replenishes the sand deposit and re-instates the riverbed, thereby eliminating any residual impact that sand mining may have on the river or visual characteristics of the receiving and/or surrounding environment. In light of this, no alternative sites were considered during this assessment

#### **x) Statement motivating the alternative development location within the overall site.**

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

Site Alternative 1 was identified during the assessment phase of the environmental impact assessment as the preferred and only site alternative. The following matters contributed to the identification of the preferred development footprint:

1. **Topography** – The natural topography of both the stockpile area and the proposed excavated area, in the riverbed, can be described as flat. The earmarked sandbank is connected to the upper river bank (proposed stockpile area) with a road that was constructed many years ago to access the sand. The river bank is ±3 m high extending to a large level area (proposed stockpile area) that has previously been used for the screening and stockpiling of sand.

2. **Visual Characteristics** – The viewshed analysis showed that the visual impact of the proposed sand mining operation will be of low significance. The small scale of the proposed operation, and the continued reinstatement of the excavation area contributes to the low visual significance. Should the Applicant successfully rehabilitate the stockpile area (upon closure), no residual visual impact is expected upon closure of the mine.
3. **Air and Noise Quality** – The proposed activity will contribute the emissions of one excavator, one front-end-loader and two tippers to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use. The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operational at the property.
4. **Geology and Soil** – The sand, to be excavated, is ready to be used and does not need further processing other than screening through a sieve to remove oversized particles. Sand is continuously washed down the river, forming a thick layer and sandbanks. In close proximity to the sandbank (western) an intrusive dolerite ridge creates eddies in the river that continuously replenish the western sandbank.
5. **Hydrology** – The Applicant is in the process of applying for a water use authorisation from the DWS regarding the proposed operation in the river. The risk matrix concluded that the Risk Class of the proposed sand mining area is Low.
6. **Mining, Biodiversity and Groundcover** – Ground-truthing showed that the proposed footprint of the stockpile area is highly disturbed with little to no indigenous vegetation intact. The risk matrix concluded that the risk class of the proposed excavation area (Orange River) is Low, and in light of this the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance. The Applicant will make use of the existing access point into the river, and a single haul road from the river to the stockpile area. It is proposed that should the Applicant implement the mitigation measures proposed in the EMPr the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.
7. **Fauna** - No protected or red data species were identified to be resident within the proposed footprint area. The proposed sand mining operation is not expected to impact the aquatic fauna of the Orange River, as mining will only take place during the low flow periods of the river when the sandbank is exposed. No pumping of sand will take place and no fishing or interference with any aquatic fauna will be allowed.

8. **Cultural and Heritage Environment** - No sites of archaeological or cultural importance were identified during the site inspection, and consultation with the interested and affected parties also did not identify any potential area of concern. The Applicant will implement a chance-find protocol on site for the duration of the site establishment-, operational- and decommissioning phase.

9. **Site Specific Infrastructure** – The existing Eskom power line will supply power for the screening of the sand when needed. Two concrete silos were established in the north-western corner of the stockpile area, but apart from this, the only other infrastructure comprises of farm fences and the access road.

**i) 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)

During the impact assessment process the following potential impacts were identified of each main activity in each phase. An initial significance rating (listed under *v) Impacts and Risks Identified*) was determined for each potential impact should the mitigation measures proposed in this document not be implemented on-site. The impact assessment process then continued in identifying mitigation measures to address the impact that the proposed mining activity may have on the surrounding environment.

The significance rating was again determined for each impact using the methodology as explained under *vi) Methodology Used in Determining and Ranking the Significance*. The impact ratings listed below was determined for each impact **after** bringing the proposed mitigation measures into consideration and therefore represents the final layout/activity proposal.

**SITE ESTABLISHMENT**

Visual intrusion as a result of site establishment

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Partial</b>	
1	2	2	1.7	3	3	3	<b>5.1</b>

Potential negative impact on the CBA

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
5	4	5	4.7	1	1	1	<b>4.7</b>

Loss of topsoil and fertility during mining and stockpiling (stockpile area)

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Full</b>			
3	1	1	1.6	2	2	3.2

Infestation of the topsoil heaps and mining area with invader plant species

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Full</b>			
3	1	2	2	2	2	4

Potential impact on fauna (aquatic & terrestrial) within the footprint area

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Full</b>			
2	4	1	2.3	2	1	3.5

Dust nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Full</b>			
2	1	2	1.7	2	3	4.3

Noise nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Partial</b>			
2	4	2	2.7	1	2	4

Work opportunities to 4 local residents (**Positive Impact**)

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Medium-High</b>			<b>Degree of Mitigation: N/A</b>			
1	4	5	3.3	5	5	16.5

**WINNING OF SAND**

Soil contamination from hydrocarbon spills

Severity	Duration	Extent	Consequence	Likelihood		Significance
				Probability	Frequency	
<b>Rating: Low</b>			<b>Degree of Mitigation: Full</b>			
5	1	1	2.3	2	1	3.5

Disturbance to aquatic fauna within the footprint area

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	2	2	2	1	1.5	<b>3</b>

Impact on the flow regime of the river

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	2	2	1	2	1.5	<b>3</b>

Impact on downstream water users

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	2	2	2	1	1.5	<b>3</b>

Noise nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Partial</b>	
2	2	2	2	1	2	1.5	<b>3</b>

Potential impact on areas/infrastructure of heritage or cultural concern

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
4	4	5	4.3	1	1	1	<b>4.3</b>

Loss of mining equipment due to unexpected flooding

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	1	1.6	2	1	1.5	<b>2.4</b>

**SCREENING, STOCKPILING AND TRANSPORTING MATERIAL FROM SITE:**

Loss of stockpiled material due to ineffective storm water control

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	1	1.7	2	1	1.5	<b>2.6</b>

Dust nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	2	2	2	2	2	4

Noise nuisance as a result of the mining activities

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Partial</b>	
2	2	2	2	1	2	1.5	3

Potential impact associated with littering and hydrocarbon spills

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	1	1.7	2	2	2	3.4

Infestation of denuded areas with invader plant species

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	2	1	2	2	2	2	4

Deterioration of the access road to the mining area

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
2	2	2	2	2	2	2	4

Overloading of trucks having an impact on the public roads

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low-Medium</b>						<b>Degree of Mitigation: Full</b>	
4	2	5	3.6	2	1	1.5	5.4

**SLOPING AND LANDSCAPING UPON CLOSURE OF THE MINING AREA**

Erosion of returned topsoil after rehabilitation (stockpile area)

Severity	Duration	Extent	Consequence			Likelihood	Significance
				Probability	Frequency		
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	1	2	2	2	1	1.5	3

Residual impact on the flow regime of the Orange River

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
4	1	2	2.3	2	1	1.5	3.5

Infestation of the reinstated area with invader plant species

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Full</b>	
3	2	1	2	2	2	2	4

Noise nuisance as a result of the decommissioning activities

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Low</b>						<b>Degree of Mitigation: Partial</b>	
1	1	2	1.3	1	5	3	3.9

Potential impact associated with litter/hydrocarbon spills left at the mining area

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Medium</b>						<b>Degree of Mitigation: Full</b>	
3	1	1	1.7	2	1	1.5	2.6

Return of the stockpile area to agricultural use by the landowner (**Positive Impact**)

Severity	Duration	Extent	Consequence	Probability	Frequency	Likelihood	Significance
<b>Rating: Medium-High</b>						<b>Degree of Mitigation: N/A</b>	
1	5	5	3.7	5	5	5	18.5

**j) 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 19: Assessment of each identified potentially significant impact and risk*

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
Whether listed or not listed. (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, air pollution, etc...etc...etc.)		In which impact is anticipated. (E.g. Construction, commissioning, operational Decommissioning closure, post closure.)	If not mitigated.	(modify, remedy, control, or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc etc)  E.g. Modify through alternative method Control through noise control Control through management and monitoring through rehabilitation.	If not mitigated.
⌚ Demarcation of site with visible beacons.	⌚ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	N/A	Control through management and monitoring.	N/A
⌚ Site establishment	⌚ Visual intrusion as a result of site establishment.	The visual impact may affect the aesthetics of the landscape.	Site Establishment & Operational Phase	⌚ Low-Medium	<u>Control:</u> Implementing proper housekeeping.	⌚ Low-Medium
⌚ Site establishment	⌚ Potential negative impact on the CBA	This will impact on the biodiversity of the receiving environment.	Site Establishment phase	⌚ Low	<u>Control:</u> Keeping mining operations to the approved boundaries.	⌚ Low



ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
<ul style="list-style-type: none"> <li>⌘ Site establishment</li> <li>⌘ Screening, stockpiling and transporting material from site.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Loss of topsoil and fertility during mining and stockpiling (stockpile area)</li> <li>⌘ Loss of stockpiled material due to ineffective storm water control.</li> <li>⌘ Erosion of returned topsoil after rehabilitation (stockpile area)</li> </ul>	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment- and Decommissioning phase	<ul style="list-style-type: none"> <li>⌘ Low</li> <li>⌘ Low-Medium</li> <li>⌘ Low-Medium</li> </ul>	<u>Control &amp; Remedy:</u> Proper housekeeping and storm water management.	<ul style="list-style-type: none"> <li>⌘ Low</li> <li>⌘ Low</li> <li>⌘ Low</li> </ul>
<ul style="list-style-type: none"> <li>⌘ Site establishment</li> <li>⌘ Screening, stockpile, and transporting material from site.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Infestation of the topsoil heaps and mining area with invader plant species.</li> <li>⌘ Infestation of denuded areas with invader plant species</li> <li>⌘ Infestation of the reinstated area with invader plant species.</li> </ul>	This will impact on the biodiversity of the receiving environment.	Site Establishment-, Operational- and Decommissioning phase	<ul style="list-style-type: none"> <li>⌘ Low-Medium</li> <li>⌘ Medium</li> <li>⌘ Medium</li> </ul>	<u>Control:</u> Implementing soil- and storm water management.	<ul style="list-style-type: none"> <li>⌘ Low</li> <li>⌘ Low</li> <li>⌘ Low</li> </ul>
<ul style="list-style-type: none"> <li>⌘ Site establishment.</li> <li>⌘ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Potential impact on fauna (aquatic &amp; terrestrial) within the footprint area.</li> <li>⌘ Disturbance to aquatic fauna within the footprint area</li> </ul>	This will impact on the biodiversity of the receiving environment.	Site Establishment- and Operational phase	<ul style="list-style-type: none"> <li>⌘ Low-Medium</li> <li>⌘ Low-Medium</li> </ul>	<u>Control &amp; Stop:</u> Implementing good management practices.	<ul style="list-style-type: none"> <li>⌘ Low</li> <li>⌘ Low</li> </ul>
<ul style="list-style-type: none"> <li>⌘ Site establishment</li> <li>⌘ Screening, stockpile, and transporting material from site.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Dust nuisance as a result of the mining activities.</li> <li>⌘ Dust nuisance as a result of the mining activities.</li> </ul>	Increased dust generation will impact on the air quality of the receiving environment.	Site Establishment- and Operational Phase	<ul style="list-style-type: none"> <li>⌘ Low-Medium</li> <li>⌘ Medium</li> </ul>	<u>Control:</u> Dust suppression methods and proper housekeeping.	<ul style="list-style-type: none"> <li>⌘ Low</li> <li>⌘ Low</li> </ul>

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
<ul style="list-style-type: none"> <li>☞ Site establishment</li> <li>☞ Winning of sand</li> <li>☞ Screening, stockpile, and transporting material from site.</li> <li>☞ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Noise nuisance as a result of the mining activities.</li> <li>☞ Noise nuisance as a result of the decommissioning activities.</li> </ul>	Should noise levels become excessive it may have an impact on the noise ambience of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	<ul style="list-style-type: none"> <li>☞ Low-Medium</li> <li>☞ Low</li> </ul>	<u>Control:</u> Noise suppression methods and proper housekeeping.	<ul style="list-style-type: none"> <li>☞ Low</li> <li>☞ Low</li> </ul>
<ul style="list-style-type: none"> <li>☞ Winning of sand.</li> <li>☞ Screening, stockpile, and transporting material from site.</li> <li>☞ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Soil contamination from hydrocarbon spills.</li> <li>☞ Potential impact associated with littering and hydrocarbon spills.</li> <li>☞ Potential impact associated with litter left at the mining area.</li> </ul>	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the permit holder.	Site Establishment-, Operational-, and Decommissioning Phase	<ul style="list-style-type: none"> <li>☞ Medium</li> <li>☞ Medium</li> <li>☞ Medium</li> </ul>	<u>Control &amp; Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	<ul style="list-style-type: none"> <li>☞ Low</li> <li>☞ Low</li> <li>☞ Low</li> </ul>
<ul style="list-style-type: none"> <li>☞ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Impact on the flow regime of the river.</li> </ul>	A negative impact on the flow regime of the river may lead to erosion of banks, and impact on the downstream users.	Operational Phase	<ul style="list-style-type: none"> <li>☞ Low-Medium</li> </ul>	<u>Control &amp; Remedy:</u> Implementing proper housekeeping and site management.	<ul style="list-style-type: none"> <li>☞ Low</li> </ul>
<ul style="list-style-type: none"> <li>☞ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Impact on downstream water users.</li> </ul>	This impact may lead to complaints from	Operational Phase	<ul style="list-style-type: none"> <li>☞ Low-Medium</li> </ul>	<u>Control &amp; Remedy:</u> Implementing proper housekeeping and site management.	<ul style="list-style-type: none"> <li>☞ Low</li> </ul>

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE	MITIGATION TYPE	SIGNIFICANCE
		surrounding landowners.				
⌚ Winning of sand.	⌚ Potential impact on area/infrastructure of heritage or cultural concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	⌚ Low	<u>Control &amp; Stop:</u> Implementing good management practices, as well as the chance-find protocol.	⌚ Low
⌚ Winning of sand.	⌚ Loss of mining equipment due to unexpected flooding.	This could impact may have financial implications to the permit holder.	Operational Phase	⌚ Low-Medium	<u>Control:</u> Implementing good management practices.	⌚ Low
⌚ Screening, stockpile, and transporting material from site.	⌚ Deterioration of the access road to the mining area.	Collapse of the road infrastructure will affect the landowner.	Operational Phase	⌚ Low-Medium	<u>Control &amp; Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	⌚ Low
⌚ Screening, stockpile, and transporting material from site.	⌚ Overloading of trucks having an impact on the public roads.	Overloading will negatively affect the roads in the vicinity of the mining area.	Operational Phase	⌚ Medium-High	<u>Control:</u> Proper site management.	⌚ Low-Medium
⌚ Sloping and landscaping upon closure of the mining area.	⌚ Residual impact on the flow regime of the Orange River.	A negative impact on the flow regime of the river may lead to erosion of banks, and impact on the downstream users.	Decommissioning Phase	⌚ Low-Medium	<u>Control:</u> Proper site management.	⌚ Low

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

**k) 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 20: Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT  (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
<p><b>Risk Assessment</b></p> <p>Proposed sand mine on Portion 0 (Remaining) Extent) of the farm Akermans kraal 11 near Aliwal North, Eastern Cape Province.</p> <p><i>(See Appendix H for a full copy of the document)</i></p>	<p><b>Recommendations:</b></p> <ol style="list-style-type: none"> <li>1. Where possible undertake construction activities in the dry season.</li> <li>2. Existing access roads to be used.</li> <li>3. No activities or movement of any construction vehicles shall be allowed outside of the mining footprint.</li> <li>4. No equipment of any kind may be stored within the sandbar.</li> <li>5. Any new infrastructure may only be erected within the existing and already disturbed plant and stockpiling area.</li> <li>6. All material stockpiles should be located outside of the riparian fringe and no stockpiled material shall remain within the sandbar overnight.</li> <li>7. The existing stockpiling areas within the processing area shall be used.</li> <li>8. No vegetation clearing/disturbance shall be allowed outside of this development footprint.</li> <li>9. The “intact” riparian fringe is regarded as a no-go zone and no activities within or disturbances of this area shall be allowed. Access to the sandbar only via the existing access road through the riparian fringe.</li> <li>10. A buffer of 10m should be placed around the intact riparian fringe (apart from the access road through the riparian fringe) and should also be regarded as a NO-GO Zone. Natural vegetation should be encouraged within this 10m buffer.</li> <li>11. The management and eradication of IAPs should be addressed in the Management Plan.</li> </ol>	<p>This report supports all the recommendations proposed by the specialist.</p>	<p>Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Mitigating the potential impact on the Orange River and downstream users.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Storm Water Mitigation.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Protection of Fauna.</p> <p>Part A(1)(h)(viii) The possible mitigation measures that could be applied and the level of risk – Waste Management.</p>

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT  (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	<p>12. Regular monitoring and eradication of IAPs within the mining footprint should occur on a regular basis (every second month during the dry season and on a monthly basis during the wet season).</p> <p>13. Ensure that IAP material is disposed of in an appropriate manner (as specified with a Management Plan).</p> <p>14. Monitor flooding levels of river, especially around the sandbar.</p> <p>15. All activities within the sandbar should be halted and the area cleared at least a week before the entire flooding of the sandbar.</p> <p>16. A buffer of at least 20m should be placed around any waterbody (flowing or standing) associated with Orange river and no activities may be allowed within these buffer areas. This 20m buffer is regarded as a dynamic zone and should adjust with the rising and falling water level.</p> <p>17. Avoid pumping of water from the pit back into the river as far as possible.</p> <p>18. If pumping of water back into the river is regarded as the only solution, this water should be tested and the results should indicate that the water is of an acceptable quality to be pumped back into the river.</p> <p>19. Regular monitoring for erosion.</p> <p>20. Any erosion problems observed, to be associated with the relating activity, should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.</p> <p>21. Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.</p> <p>22. It is recommended that earthen berms / sediment traps are constructed within the downslope areas of stockpiles and screening plant areas.</p> <p>23. Operate using best practices by storing hazardous substances in an adequately sized bunded area outside of the riparian fringe and active flooding area,</p>		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT  (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	<p>24. Ensure that appropriate safety equipment is at all times present on site;</p> <p>25. Place spill kits on site which are operated by trained staff members for the adhoc remediation of minor chemical and hydrocarbon spillages.</p> <p>26. No refueling or servicing of vehicles and machinery may be allowed within the mining area.</p> <p>27. Regular monitoring of mining site for potential oil spillages and prompt action (clean-up) if a spillage has been identified.</p> <p>28. Ensure that contaminated soil is stored adequately within a bunded area along with the other hazardous substances and regularly removed by a licensed hazardous waste removal company.</p> <p>29. Culprit vehicles and machinery responsible for such an oil spillage should be promptly removed of site to an acceptable servicing area where the vehicle/machine can be made safe.</p> <p>30. Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction etc.).</p> <p>31. Waste should be stored on site in clearly marked containers in a demarcated area.</p> <p>32. All waste material should be removed at the end of every working day to designated waste facilities at a suitable waste disposal facility.</p> <p>33. All waste must be disposed of offsite.</p> <p>34. Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.</p> <p>35. Operate using best practices in separating waste streams and disposing of the waste correctly.</p> <p>36. Develop and implement controls to clean up oil/diesel leaks and spillages of any designated hazardous waste.</p> <p>37. This management plan should focus on the waste hierarchy of the NEM:WA;</p>		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT  (Mark with X if applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
	<p>38. No waste may be disposed of to land without the necessary legal permits;</p> <p>39. Waste will be removed from site by an accredited waste removal company and legally disposed of.</p> <p>40. Disposal certificates will be kept on site for audit purposes.</p>		

## **I) Environmental impact statement**

### **i) Summary of the key findings of the environmental impact assessment;**

The key findings of the environmental impact assessment entail the following:

#### **Project Proposal**

Yellowwood Trust applied for authorisation to mine sand from a 2.8 ha area that extends over the previous sand mining footprint. The proposed mining footprint was restricted to the already disturbed areas on the farm, so as to limit the removal of natural occurring vegetation. The operational phase will involve the recovery of the sand by an excavator that will load it onto the tractor-drawn tippers that will take the sand to the stockpile area. At the stockpile area the sand will be screened (if required) and stockpiled until loaded by a FEL onto trucks that will transported the material to clients. The Applicant will make use of a single access point (existing) into the river to limit damage to the riparian zone.

#### **Topography**

The natural topography of both the stockpile area and the proposed excavated area, in the riverbed, can be described as flat. The earmarked sandbank is connected to the upper river bank (proposed stockpile area) with a road that was constructed many years ago to access the sand. The river bank is  $\pm 3$  m high extending to a large level area (proposed stockpile area) that has previously been used for the screening and stockpiling of sand.

#### **Visual Characteristics**

The viewshed analysis showed that the visual impact of the proposed sand mining operation will be of low significance. The small scale of the proposed operation, and the continued reinstatement of the excavation area contributes to the low visual significance. Should the Applicant successfully rehabilitate the stockpile area (upon closure), no residual visual impact is expected upon closure of the mine

#### **Air and Noise Quality**

The proposed activity will contribute the emissions of one excavator, one front-end-loader and two tippers to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this



document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use. The potential impact on the noise ambience of the receiving environment is expected to be of low significance and representative of the machinery already operational at the property.

### **Geology and Soil**

The sand, to be excavated, is ready to be used and does not need further processing other than screening through a sieve to remove oversized particles. Sand is continuously washed down the river, forming a thick layer and sandbanks. In close proximity to the sandbank (western) an intrusive dolerite ridge creates eddies in the river that continuously replenish the western sandbank.

### **Hydrology**

The Applicant is in the process of applying for a water use authorisation from the DWS regarding the proposed operation in the river. The risk matrix concluded that the Risk Class of the proposed sand mining area is Low.

### **Mining, Biodiversity and Groundcover**

Ground-truthing showed that the proposed footprint of the stockpile area is highly disturbed with little to no indigenous vegetation intact. The risk matrix concluded that the risk class of the proposed excavation area (Orange River) is Low, and in light of this the impact of the proposed sand mining operation on the identified CBA is deemed to be of Low significance. The Applicant will make use of the existing access point into the river, and a single haul road from the river to the stockpile area. It is proposed that should the Applicant implement the mitigation measures proposed in the EMPr the impact of the proposed activity on the riparian vegetation and groundcover in general is deemed to be of low significance.

### **Fauna**

No protected or red data species were identified to be resident within the proposed footprint area. The proposed sand mining operation is not expected to impact the aquatic fauna of the Orange River, as mining will only take place during the low flow periods of the river when the sandbank is exposed. No pumping of sand will take place and no fishing or interference with any aquatic fauna will be allowed.

## **Cultural and Heritage Environment**

No sites of archaeological or cultural importance were identified during the site inspection, and consultation with the interested and affected parties also did not identify any potential area of concern. The Applicant will implement a chance-find protocol on site for the duration of the site establishment-, operational- and decommissioning phase.

## **Site Specific Infrastructure**

The existing Eskom power line will supply power for the screening of the sand when needed. Two concrete silos were established in the north-western corner of the stockpile area, but apart from this, the only other infrastructure comprises of farm fences and the access road.

### **ii) Final Site Map**

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

See the map indicating site activities attached as Appendix C.

### **iii) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;**

The positive impacts associated with the project include:

- ∞ Work opportunities to four local residents;
- ∞ Return of the stockpile area to agricultural use upon closure of the project; and
- ∞ Diversification of the land use of the property.

The negative impacts associated with the project that was deemed to have a Low-Medium or higher significance includes:

- ∞ Visual intrusion as a result of site establishment **Low-Medium**
- ∞ Overloading of trucks having an impact on the public roads **Low-Medium**

**m) 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 condition of authorisation.

*Table 21: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR*

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
<p><b>VISUAL CHARACTERISTICS</b></p> <p>Mitigating the visual impact.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Contain mining to the boundaries of the permitted area.</li> <li>∩ Ensure that the site have a neat appearance and is kept in good condition at all times.</li> <li>∩ Limit vegetation removal, and only strip topsoil immediately prior to the use of a specific area.</li> <li>∩ Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Minimise the impact of the proposed project on the visual characteristics of the receiving environment during the operational phase, and ensure no residual impact remains after closure.</li> </ul>
<p><b>AIR QUALITY</b></p> <p>Dust management</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Control the liberation of dust into the surrounding environment by the use of; inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).</li> <li>∩ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.</li> <li>∩ Limit speed on the haul roads to 40 km/h to prevent the generation of excess dust.</li> <li>∩ Minimise areas devoid of vegetation.</li> <li>∩ Flatten and cover loads to prevent spillage and windblown dust during transportation.</li> <li>∩ Take weather conditions into consideration upon commencement of daily operations. Limit operations during very windy periods to reduce airborne dust and resulting impacts.</li> <li>∩ Ensure dust generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in</li> </ul>	<ul style="list-style-type: none"> <li>∩ Dust prevention measures are applied to minimise the generation of dust.</li> </ul>

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		<p>terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012).</p> <ul style="list-style-type: none"> <li>⌚ Implement best practice measures during the stripping of topsoil, loading, and transporting of material from site to minimize potential dust impacts.</li> </ul>	
<p><b>NOISE AMBIANCE</b></p> <p>Noise mitigation.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>⌚ Ensure that employees and staff conduct themselves in an acceptable manner while on site.</li> <li>⌚ No loud music may be permitted at the mining area.</li> <li>⌚ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996.</li> <li>⌚ Implement best practice measures to minimise potential noise impacts.</li> <li>⌚ Contract a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be in accordance with SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA 2004, SANS 10103:2008.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.</li> </ul>
<p><b>GEOLOGY AND SOIL</b></p> <p>Topsoil management mitigation measures</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>⌚ Strip and stockpile the upper 300 mm of the soil.</li> <li>⌚ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process.</li> <li>⌚ Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time.</li> <li>⌚ Place topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas.</li> <li>⌚ Protect topsoil stockpiles against losses by water and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establishment of plants on the stockpiles will help prevent erosion.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Adequate fertile topsoil is available to rehabilitate the mined area upon closure.</li> </ul>

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		<ul style="list-style-type: none"> <li>⌘ Ensure that topsoil heaps do not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.</li> <li>⌘ Keep temporary stockpiles free of invasive plant species.</li> <li>⌘ Divert storm- and runoff water around the stockpile area to prevent erosion.</li> <li>⌘ Spread the topsoil evenly over the rehabilitated area, to a depth of 300 mm, upon closure of the site.</li> <li>⌘ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season.</li> <li>⌘ Plant and irrigate a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum biomass production. Rehabilitation extends until the first cover crop is well established.</li> <li>⌘ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.</li> </ul>	
<p><b>HYDROLOGY</b></p> <p>Mitigating the potential impact on the Orange River and downstream users.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>⌘ Do not change, the flow of the river, or dam or divert it without prior authorisation from the DWS.</li> <li>⌘ Ensure no activities take place without the necessary DWS approval, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.</li> <li>⌘ Restrict mining to the exposed excavation area. Monitor flooding levels of the river, and halt all activities within the exaction area and the site cleared at least a week before the entire flooding of the area.</li> <li>⌘ Place a buffer of at least 20 m around any water body (flowing or standing) associated with the Orange River, prevent any activities within these buffer areas. Treat the</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Mining does not affect soil drainage of the mined area.</li> </ul>

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		<p>buffer areas as a dynamic zone to be adjusted with the rising and falling of the water level.</p> <ul style="list-style-type: none"> <li>∩ Use the existing access into the river. Do not make changes to the banks of the river without prior authorisation from the DWS.</li> <li>∩ Place a buffer of 10 m around the intact riparian fringe (apart from the access road through the riparian fringe) and treat it as a no-go zone. Natural vegetation must be encouraged within the 10 m buffer.</li> <li>∩ Adhere at all times to the requirements of the water use authorisation to be obtained prior to the commencement of the mining activities.</li> <li>∩ Do not store equipment of any kind within the excavation area (operational phase).</li> <li>∩ Place all material stockpiles outside of the riparian fringe and ensure no stockpiled material remains within the sandbank overnight. Use the stockpiling area.</li> <li>∩ Remove all mining related equipment/machinery from the riverbed upon closure.</li> </ul>	
<p><b>HYDROLOGY</b></p> <p>Storm water management.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Control drainage to ensure that runoff from the stockpile area does not culminate in off-site pollution, flooding or result in damage to properties downstream or storm water discharge points.</li> <li>∩ Divert storm water around the topsoil heaps to prevent erosion.</li> <li>∩ Use silt traps where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.</li> <li>∩ Construct earthen berms/sediment traps within the downslope area of the stockpiles and the screening plant.</li> <li>∩ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Impact to the environment caused by storm water discharge is avoided.</li> </ul>

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
<p><b>MINING AND BIODIVERSITY GROUNDCOVER</b></p> <p>Impact on CBA.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Clearly demarcate the mining boundaries and contain all operations to the approved mining area.</li> <li>∩ Declared the area outside the mining boundaries a no-go area, and educate all employees accordingly.</li> <li>∩ Implement the invasive plant species management plan on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Vegetation clearing is restricted to the authorised development footprint of the mine.</li> </ul>
<p><b>GROUNDCOVER</b></p> <p>Mitigating invader plants.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983.</li> <li>∩ Keep all stockpiles (topsoil) free of invasive plant species.</li> <li>∩ Control declared invader or exotic species on the rehabilitated areas.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Mining area is kept free of invasive plant species.</li> </ul>
<p><b>FAUNA</b></p> <p>Mitigating the fauna component.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Ensure no fauna is caught, killed, harmed, sold or played with.</li> <li>∩ Instruct workers to report any animals that may be trapped in the working area.</li> <li>∩ Ensure no snares are set or nests raided for eggs or young.</li> <li>∩ Only mine the area during the low flow period of the river when the sandbank is exposed. Do not pump sand, allow fishing or interference with any aquatic fauna.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Disturbance to fauna is minimised.</li> </ul>
<p><b>CULTURE/HERITAGE</b></p> <p>Mitigating cultural/heritage aspects.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Confine all mining to the development footprint area.</li> <li>∩ Implement the following change find procedure when discoveries are made on site: <ul style="list-style-type: none"> <li>▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>∩ Impact to cultural/heritage resources is avoided or at least minimised.</li> </ul>

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		<p>this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</p> <ul style="list-style-type: none"> <li>▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.</li> <li>▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify SAHRA.</li> <li>▪ Work may only continue once the go-ahead was issued by SAHRA.</li> </ul>	
<p><b>EXISTING INFRASTRUCTURE</b></p> <p>Control of access road.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Divert storm water around the access road to prevent erosion.</li> <li>∩ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas.</li> <li>∩ Repair rutting and erosion of the access road caused as a direct result of the mining activities.</li> <li>∩ Prevent the overloading of the trucks, and file proof of load weights for auditing purposes.</li> </ul>	<ul style="list-style-type: none"> <li>∩ The access road remains accessible to the road users during the operational phase, and upon closure the road is returned in a better, or at least the same state as received by the permit holder.</li> </ul>
<p><b>GENERAL</b></p> <p>Waste management</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p> <p>Compliance to be monitored by the Environmental Control Officer.</p>	<ul style="list-style-type: none"> <li>∩ Ensure regular vehicle maintenance, repairs and services takes place at the off-site workshop and service area of the permit holder, and that none of the above is allowed in the riverbed. When a breakdown occurs in the riverbed, arrange for the removal of the machine within 6 hours to a recognised workshop where it can be mended.</li> <li>∩ Provide ablution facilities in the form of a chemical toilet that is placed outside the 1:100 year floodline of the river. Ensure the toilet is serviced at least once every two weeks for the duration of the mining activities.</li> <li>∩ Ensure that the use of any temporary, chemical toilet facilities does not cause any pollution to water sources or pose a health hazard. In addition, ensure that no form of secondary pollution arise from the disposal of refuse or</li> </ul>	<ul style="list-style-type: none"> <li>∩ Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility.</li> </ul>



MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
		<p>sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately.</p> <ul style="list-style-type: none"> <li>⌚ Equip the diesel bowser with a drip tray if used on site. The nozzle of the bowser must rest in a sleeve to prevent dripping after refuelling.</li> <li>⌚ Clean drip trays after use. Do not use dirty drip trays.</li> <li>⌚ Keep a spill kit on site.</li> <li>⌚ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.</li> <li>⌚ Collect the contaminated soil from spillage that occurred, such as oil or diesel leaking from a burst pipe, within the first hour of occurrence, in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. File proof.</li> <li>⌚ Compile a waste management plan and implement it on site. The plan must focus on the waste hierarchy of the NEM:WA.</li> <li>⌚ Contain general waste in marked, sealable, refuse bins placed at a designated area and remove waste from the mining area to a recognised general waste landfill site.</li> <li>⌚ Prevent the burning or burying of waste on site.</li> <li>⌚ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the Department of Water and Sanitation and other relevant authorities.</li> <li>⌚ Do not allow machinery to overnight in the riverbed. Park the machinery at the stockpile area with drip trays placed underneath stationary vehicles.</li> </ul>	
<p><b>GENERAL</b> Health and safety aspects.</p>	<p>Site Manager to ensure compliance with the guidelines as stipulated in the EMPR.</p>	<ul style="list-style-type: none"> <li>⌚ Ensure adequate ablution facilities and water for human consumption is daily available on site.</li> <li>⌚ Ensure that workers have access to the correct PPE as required by law.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Employees work in a healthy and safe environment.</li> </ul>

MANAGEMENT OBJECTIVES	ROLE	MANAGEMENT ACTION	MANAGEMENT OUTCOME
	Compliance to be monitored by the Environmental Control Officer.	3 Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).	

**n) Aspects for inclusion as conditions of Authorisation.**

Any aspects which must be made conditions of the Environmental Authorisation

The management objectives listed in this report under *Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* above should be considered for inclusion in the environmental authorisation.

**o) Description of any assumptions, uncertainties and gaps in knowledge.**

(Which relate to the assessment and mitigation measures proposed)

The assumptions made in this document which relate to the assessment and mitigation measures proposed, stem from site specific information gathered from site inspections, desktop studies as well as the specialist study. No uncertainty regarding the proposed project or the receiving environment could be identified.

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

**i) Reasons why the activity should be authorised or not.**

Should the mitigation measures and monitoring programmes proposed in this document be implemented on site, no fatal flaws could be identified that were deemed as severe as to prevent the activity continuing.

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

The management objectives listed in this report under *Part A(1)(m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR* should be considered for inclusion in the environmental authorisation.

**q) Period for which the Environmental Authorisation is required.**

The Applicant requests the Environmental Authorisation to be valid for a five-year period to correspond with the validity of the mining permit.

**r) Undertaking**

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

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

**s) Financial Provision**

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

**i) Explain how the aforesaid amount was derived**

The annual amount required to manage and rehabilitate the environment was estimated to be R 187 000. Please see the explanation as to how this amount was derived at attached as Appendix J – Financial and Technical Competence Report.

**ii) Confirm that this amount can be provided 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).

Yellowwood Trust will be responsible for the financial and technical aspects of the proposed mining project. The operating expenditure is provided for as such in the Financial and Technical Competence Report attached as Appendix J to this report.

**t) Specific Information required by the competent Authority**

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

**(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)

The following potential impacts were identified that may impact on socio-economic conditions of directly affected persons:

3 **Visual intrusion associated with the proposed mining activities:**

The viewshed analysis showed that the visual impact of the proposed sand mining operation will be of low significance, especially as no permanent structures will be constructed and the river will annually reinstate the excavated areas. The small scale of the proposed operation, and the continued reinstatement of the excavation area contributes to the low visual significance. Should the Applicant successfully rehabilitate the stockpile area (upon closure), no residual visual impact is expected upon closure of the mine.

3 **Dust nuisance caused as a result of the proposed mining activities:**

The proposed activity will contribute the emissions of one excavator, one front-end-loader and two tippers to the receiving environment for the duration of the operational phase. Should the permit holder implement the mitigation measures proposed in this document and the EMPR the impact on the air quality of the surrounding environment is deemed to be of low significance and compatible with the current land use.

3 **Noise nuisance as a result of mining activities:**

The potential impact on the noise ambiance of the receiving environment is expected to be of low significance and representative of the machinery already operational at the property. The distance of the proposed mining area from residential infrastructure further lessens the potential noise impact.

3 **Impact of downstream water users:**

The Applicant propose to mine sand from the Orange River during low flow spells when access to the sand deposit is available. The proposed project does not entail any alterations/changes to the banks of the river, or riverbed and no deviation in the flow of the river is proposed.

Mining within the riverbed trigger the National Water Act, 1998 in terms of Section 39, and the Applicant has to obtain approval from the Department of Water and Sanitation prior to commencement with the activity. It is proposed that should the Applicant follow the mitigation measures as proposed in this document and the conditions of the water use authorisation the impact of the proposed activity on the aquatic features of the study area and the rights of downstream users is of low significance, with no residual impact.

3 **Employment opportunities and socio-economic impact:**

The proposed labour component of the activity will be four employees. The operation will contribute to the local economy in the area, both directly and through the multiplier effect that its continued presence will create.

Equipment and supplies will be purchased locally, and wages are spent at local businesses, generating both jobs and income in the area. Although the

employees are not resident on the site, they will be from the surrounding community.

**(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 the 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).

No sites or artefacts classified as national estate as referred to in section 3(2) of the NHRA, 1999 were identified within the footprint of the proposed mining area.

The excavation area is situated inside the Orange River and was previously used for sand mining. The existing access road and entrance point into the river will be used, and no areas of cultural or heritage importance could be identified that will be affected by the proposed activity.

**u) Other matters required in terms of section 24(4)(a) and (b) of the Act.**

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

Site Alternative 1, as discussed earlier, was identified during the assessment phase of the environmental impact assessment by the Applicant and project team, as the preferred and only viable site alternative. The Applicant will recover the sand by means of mechanical excavation with earthmoving equipment, screen, and store it at the proposed stockpile area.

The no-go alternative entails no change to the status quo and is therefore a real alternative that must be considered. The sand to be mined at the site will be used in the building and construction industries, if however, the no-go alternative is implemented the Applicant will not be able to utilise the mineral present in the area.

## PART B

### ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

#### 1. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME.

##### a) Details of the EAP,

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

The details and expertise of Christine Fouché of Greenmined Environmental that acts as EAP on this project has been included in Part A Section 1(a) as well as Appendix N as required.

##### b) Description of the Aspects of the Activity

(Confirm that the requirements to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

The aspects of the activity that are covered by the draft environmental management programme has been described and included in Part A, section (1)(h).

##### c) 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)

As mentioned under Part A, section (1)(l)(ii) this map has been compiled and is attached as Appendix C to this document.

##### d) Description of impact management objectives including management statements

###### i) Determination of closure objectives.

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

The end objective is for the stockpile area to return to agricultural use and the Orange River to reinstate the riverbed. No buildings/infrastructure, other than the chemical toilet and screen, need to be demolished and the access road will remain intact to be used by the landowner.

The decommissioning activities will consist of the following:

- ∞ Removal of all mining machinery from the riverbed;
- ∞ Removal of the sand screen and chemical toilet from the stockpile area;
- ∞ Removal/levelling of all stockpiled material;
- ∞ Landscaping the stockpile area, and replacing the topsoil (if previously removed);

- ∞ Vegetating the reinstated area; and
- ∞ Controlling the invasive plant species.

The Applicant will comply with the minimum closure objectives as prescribed DMR and detailed below:

- ∞ Rehabilitation of the Excavated Area:

As mentioned earlier, the Orange River annually replenish the sand resource and rehabilitate disturbance to the riverbed. In light of this, upon closure of the mine the Applicant will remove the mining machinery from the river to be reinstated during the next high-flow period. The entrance into the river will remain, but should any signs of erosion occur, these will be reinstated and landscaped by the permit holder.

- ∞ Rehabilitation of the Stockpile Area:

The sand screen, chemical toilet and stockpiled material will be removed from the stockpile area. Compacted areas will be ripped and landscaped and previously stockpiled topsoil will be reinstated. The reinstated area will be seeded with a locally adapted grassmix, and invasive plant species will be controlled for at least one growth seasons. The reinstated area will be monitored for signs of erosion until the cover crop established.

- ∞ Final Rehabilitation:

Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species. All equipment, plant and other items used during the mining period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site. The management of invasive plant species will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site. Final rehabilitation shall be completed within a period specified by the Regional Manager.



**ii) Volume and rate of water use required for the operation**

Due to the nature of the sand to be mined (heavy), very little to no water is needed as dust levels are typically low. Dust generated on the access road will as far as possible be managed through alternative dust suppression methods to restrict water use to the absolute minimum. Under very windy/dusty conditions the permit holder might have to substitute the above mentioned dust suppression methods with the spraying of water, in which case water will be bought and transported to the farm in a water truck that will moisten the problem area. A maximum of 10 000 l/month is expected to be needed during the dry months.

As no sand washing is proposed for this project, the Applicant will exclusively use water for dust suppression purposes on the access road when needed. Approximately 5 000 litre water/day will be needed during the dry months. The water will be bought and transported to the farm in a water truck that will moisten the problem area.

**iii) Has a water use licence has been applied for?**

The Applicant applied for a water use authorisation in terms of the NWA, 1998 on 30 October 2019. See proof attached as Appendix M.

**iv) Impacts to be mitigated in their respective phases**

*Table 22: Impact to be mitigated in their respective phases*

ACTIVITIES  (as listed in 2.11.1)	PHASE  of operation in which activity will take place.  State; Planning and design, Pre-Construction, Operational, Rehabilitation, Closure, Post closure	SIZE AND SCALE OF DISTURBANCE  (volumes, tonnages and hectares or m <sup>2</sup> )	MITIGATION MEASURES  (describe how each of the recommendations herein will remedy the cause of pollution or degradation and migration of pollutants)	COMPLIANCE WITH STANDARDS  (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	TIME PERIOD FOR IMPLEMENTATION  Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. With regard to Rehabilitation, therefore state either – Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Demarcation of site with visible beacons.	Site Establishment phase	2.8 ha	Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area.	Mining of sand is only allowed within the boundaries of the approved area. ∩ MPRDA, 2008 ∩ NEMA, 1998	Beacons need to be in place throughout the life of the activity.
∩ Site establishment	Site Establishment & Operational Phase	2.8 ha	<b><u>Visual Mitigation</u></b> ∩ Mining must be contained to the boundaries of the permitted area. ∩ The site must have a neat appearance and be kept in good condition at all times. ∩ The permit holder must limit vegetation removal (if applicable), and stripping of topsoil	Management of the mining area must be in accordance with the: ∩ MPRDA, 2008 ∩ NEMA, 1998	Throughout the site establishment-, and operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>may only be done immediately prior to the use of a specific area.</p> <ul style="list-style-type: none"> <li>⌚ Upon closure the stockpile area must be rehabilitated and levelled to remove the visual impact on the aesthetic value of the area.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Site establishment</li> </ul>	<p>Site Establishment phase</p>	<p>±1 ha</p>	<p><b><u>Impact on Critical Biodiversity Area:</u></b></p> <ul style="list-style-type: none"> <li>⌚ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.</li> <li>⌚ The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly.</li> <li>⌚ The invasive plant species management plan attached as Appendix K must be implement on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.</li> </ul>	<p>Natural vegetated areas must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ NEM:BA 2004</li> <li>⌚ Eastern Cape Biodiversity Plan</li> </ul>	<p>Throughout the site establishment phase.</p>
<ul style="list-style-type: none"> <li>⌚ Site establishment.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	<p>Site Establishment- and Decommissioning phase</p>	<p>±1 ha</p>	<p><b><u>Topsoil Management:</u></b></p> <ul style="list-style-type: none"> <li>⌚ The upper 300 mm of the soil must be stripped and stockpiled.</li> <li>⌚ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.</li> <li>⌚ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that topsoil is stockpiled for the minimum possible time.</li> <li>⌚ The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.</li> </ul>	<p>Topsoil must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ CARA, 1983</li> <li>⌚ NEM:BA, 2004</li> <li>⌚ MPRDA, 2008</li> </ul>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> <li>∩ Topsoil stockpiles must be protected against losses by water and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion.</li> <li>∩ Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.</li> <li>∩ The temporary topsoil stockpiles must be kept free of invasive plant species.</li> <li>∩ Storm- and runoff water must be diverted around the stockpile area to prevent erosion.</li> <li>∩ The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site.</li> <li>∩ The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.</li> <li>∩ A cover crop must be planted, irrigated and established immediately after spreading of topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot</li> </ul>		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>be considered complete until the first cover crop is well established.</p> <ul style="list-style-type: none"> <li>⌚ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Site establishment.</li> <li>⌚ Screening, stockpiling and transporting material from site.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	<p>Site Establishment-, Operational- and Decommissioning phase</p>	<p>±1 ha</p>	<p><b><u>Management of Invader Plant Species:</u></b></p> <ul style="list-style-type: none"> <li>⌚ An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.</li> <li>⌚ All stockpiles (topsoil) must be kept free of invasive plant species.</li> <li>⌚ Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used: <ul style="list-style-type: none"> <li>▪ The plants can be uprooted, felled or cut off and can be destroyed completely.</li> <li>▪ The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in accordance with the directions for the use of such an herbicide.</li> </ul> </li> </ul>	<p>Invader plants must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ CARA, 1983</li> <li>⌚ NEM:BA 2004</li> <li>⌚ Invasive Plant Species Management Plan (Appendix K)</li> </ul>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
<ul style="list-style-type: none"> <li>∩ Site establishment.</li> <li>∩ Winning of sand.</li> </ul>	Site Establishment- and Operational phase	2.8 ha	<p><b><u>Protection of Fauna:</u></b></p> <ul style="list-style-type: none"> <li>∩ The site manager must ensure no fauna is caught, killed, harmed, sold or played with.</li> <li>∩ Workers must be instructed to report any animals that may be trapped in the working area.</li> <li>∩ No snares may be set or nests raided for eggs or young.</li> <li>∩ Mining may only take place during the low flow period of the river when the sandbank is exposed. No pumping of sand may take place and no fishing or interference with any aquatic fauna is allowed.</li> </ul>	<p>Fauna must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>∩ NEM:BA 2004</li> </ul>	Throughout the site establishment-, and operational phase.
<ul style="list-style-type: none"> <li>∩ Site establishment.</li> <li>∩ Screening, stockpiling and transporting material from site.</li> </ul>	Site Establishment-, Operational Phase	±1 ha	<p><b><u>Fugitive Dust Emission Mitigation:</u></b></p> <ul style="list-style-type: none"> <li>∩ The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).</li> <li>∩ The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.</li> <li>∩ Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust.</li> <li>∩ Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.</li> <li>∩ Loads must be flattened and covered to ensure that minimal spillage of material takes place</li> </ul>	<p>Dust generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>∩ NEM:AQA. 2004 Regulation 6(1)</li> <li>∩ National Dust Control Regulations, GN No R827</li> <li>∩ ASTM D1739 (SANS 1137:2012)</li> </ul>	Throughout the site establishment-, operational, and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>during transportation, also preventing windblown dust.</p> <ul style="list-style-type: none"> <li>⌚ Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.</li> <li>⌚ All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).</li> <li>⌚ Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from site to minimize potential dust impacts.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Site establishment.</li> <li>⌚ Winning of sand.</li> <li>⌚ Screening, stockpiling and transporting material from site.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	<p>Site Establishment-, Operational-, and Decommissioning Phase</p>	<p>2.8 ha</p>	<p><b>Noise Handling:</b></p> <ul style="list-style-type: none"> <li>⌚ The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site.</li> <li>⌚ No loud music may be permitted at the mining area.</li> <li>⌚ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).</li> <li>⌚ Best practice measures shall be implemented in order to minimize potential noise impacts.</li> <li>⌚ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The monitoring must be done in accordance with the SANS</li> </ul>	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ NEM:AQA. 2004 Regulation 6(1)</li> <li>⌚ NRTA, 1996</li> </ul>	<p>Throughout the site establishment-, operational-, and decommissioning phase.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.		
<ul style="list-style-type: none"> <li>∩ Winning of sand.</li> <li>∩ Screening, stockpiling and transporting material from site.</li> <li>∩ Sloping and landscaping upon closure of the mining area.</li> </ul>	Site Establishment-, Operational-, and Decommissioning Phase	2.8 ha	<p><b>Waste Management:</b></p> <ul style="list-style-type: none"> <li>∩ Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area of the permit holder, and none of the above may be allowed in the riverbed. When a breakdown occurs in the riverbed, the permit holder must arrange for the removal of the machine, within 6 hours, to a recognised workshop where it can be mended.</li> <li>∩ Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be placed outside the 1:100 year floodline of the river, and must be serviced at least once every two weeks for the duration of the mining activities.</li> <li>∩ The use of any temporary, chemical toilet facilities may not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder.</li> <li>∩ If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.</li> </ul>	<p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>∩ NWA, 1998</li> <li>∩ NEM:WA, 2008</li> <li>∩ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)</li> <li>∩ NEMA, 1998 (Section 30)</li> </ul>	Throughout the site establishment-, operational-, and decommissioning phase.



ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> <li>∩ Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.</li> <li>∩ A spill kit must be available on-site which can be operated by trained employees for the adhoc remediation of minor chemical and hydrocarbon spillages.</li> <li>∩ Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.</li> <li>∩ Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.</li> <li>∩ A waste management plan must be compiled by site management and implemented on site. The plan must focus on the waste hierarchy of the NEM:WA.</li> <li>∩ General waste must be contained in marked, sealable, refuse bins placed at a designated area, to be removed when filled to capacity to a recognised general waste landfill site.</li> <li>∩ No waste may be buried or burned on the site.</li> <li>∩ No chemicals or hazardous materials may be stored at the mining area.</li> <li>∩ It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.</li> </ul>		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> <li>⌚ To prevent the loss of machinery during unpredicted flooding, and lower the risk of accidental hydrocarbon spillages, no machinery may overnight in the riverbed. All machinery must be parked at the stockpile area with drip trays placed underneath stationary vehicles.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Winning of sand.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	Operational- and Decommissioning Phase	±1.6 ha	<p><b><u>Potential impact on the Orange River and downstream users:</u></b></p> <ul style="list-style-type: none"> <li>⌚ The flow of the river may at no point be changed, dammed or diverted without prior authorisation from the Department of Water and Sanitation (DWS).</li> <li>⌚ No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.</li> <li>⌚ Mining may only take place when the excavation area is exposed. Site management must monitor flooding levels of the river, and all activities within the exaction area must be halted and the area cleared at least a week before the entire flooding of the area.</li> <li>⌚ A buffer of at least 20 m must be placed around any water body (flowing or standing) associated with the Orange River, and no activities may be allowed within these buffer areas. The buffer areas must be regarded as a dynamic zone and must be adjusted with the rising and falling of the water level.</li> <li>⌚ The existing access into the river must be used. No changes may be made to the banks</li> </ul>	<p>The aquatic aspects at the site and rights of downstream users must be managed in terms of:</p> <ul style="list-style-type: none"> <li>⌚ NWA, 1998</li> </ul>	Throughout the operational- and decommissioning phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>of the river without prior authorisation from the DWS.</p> <ul style="list-style-type: none"> <li>⌚ A buffer of 10 m must be placed around the intact riparian fringe (apart from the access road through the riparian fringe) and must be regarded as a no-go zone. Natural vegetation must be encouraged within the 10 m buffer.</li> <li>⌚ The permit holder must at all times adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities.</li> <li>⌚ No equipment of any kind may be stored within the excavation area (operational phase).</li> <li>⌚ All material stockpiles must be located outside of the riparian fringe and no stockpiled material shall remain within the sandbank overnight. The existing stockpiling areas within the processing area shall be used.</li> <li>⌚ Upon closure, the permit holder must remove all mining related equipment/machinery from the riverbed.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Winning of sand.</li> </ul>	Operational Phase	±1.6 ha	<p><b><u>Archaeological, Heritage and Palaeontological Aspects:</u></b></p> <ul style="list-style-type: none"> <li>⌚ All mining must be confined to the development footprint area.</li> <li>⌚ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate</li> </ul>	<p>Cultural/heritage aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ NHRA, 1999</li> </ul>	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>supervisor, and through their supervisor to the senior on-site manager.</p> <ul style="list-style-type: none"> <li>∩ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.</li> <li>∩ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA.</li> <li>∩ Work may only continue once the go-ahead was issued by SAHRA.</li> </ul>		
<ul style="list-style-type: none"> <li>∩ Winning of sand.</li> <li>∩ Screening, stockpiling and transporting material from site.</li> </ul>	Operational Phase	2.8 ha	<p><b><u>Storm Water Mitigation:</u></b></p> <ul style="list-style-type: none"> <li>∩ Drainage must be controlled to ensure that runoff from the stockpile area does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points.</li> <li>∩ Storm water must be diverted around the topsoil heaps and stockpile area to prevent erosion.</li> <li>∩ Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.</li> <li>∩ Earthen berms/sediment traps must be constructed within the downslope area of the stockpiles and the screening plant.</li> <li>∩ Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the</li> </ul>	<p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>∩ CARA, 1983</li> <li>∩ NEMA, 1998</li> <li>∩ NWA, 1998</li> </ul>	Throughout the operational phase.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<p>Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:</p> <ul style="list-style-type: none"> <li>▪ Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.</li> <li>▪ Dirty water must be collected and contained in a system separate from the clean water system.</li> <li>▪ Dirty water must be prevented from spilling or seeping into clean water systems.</li> <li>▪ A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).</li> <li>▪ The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.</li> </ul>		
<p>⌚ Screening, stockpiling and transporting material from site.</p>	<p>Operational Phase</p>	<p>±1 ha</p>	<p><b><u>Access Road Mitigation:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Storm water must be diverted around the access road to prevent erosion.</li> <li>⌚ Vehicular movement must be restricted to the existing access road to prevent crisscrossing of tracks through undisturbed areas.</li> <li>⌚ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder.</li> </ul>	<p>The access road must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ NRTA, 1996</li> </ul>	<p>Throughout the operational phase.</p>

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			<ul style="list-style-type: none"> <li>⌚ Overloading of the truck must be prevented, and proof of load weights must be filed for auditing purposes.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Site establishment.</li> <li>⌚ Winning of sand.</li> <li>⌚ Screening, stockpiling and transporting material from site.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	Site Establishment-, Operational-, and Decommissioning phase	2.8 ha	<p><b><u>Management of Health and Safety Risks:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Adequate ablution facilities and water for human consumption must daily be available on site.</li> <li>⌚ Workers must have access to the correct personal protection equipment (PPE) as required by law.</li> <li>⌚ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).</li> </ul>	<p>Health and safety aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ MHSA, 1996</li> <li>⌚ OHSA, 1993</li> <li>⌚ OHSAS, 18001</li> </ul>	Throughout the site establishment-, operational and decommissioning phase.

## e) Impact Management Outcomes

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

Table 23: Impact Management Outcomes

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)	(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)		In which impact is anticipated  (e.g. Construction, commissioning, operational Decommissioning, closure, post-closure))	(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc...etc..) E.g. <ul style="list-style-type: none"> <li>• Modify through alternative method.</li> <li>• Control through noise control</li> <li>• Control through management and monitoring</li> </ul> Remedy through rehabilitation.	(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.
⌚ Demarcation of site with visible beacons.	⌚ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.	N/A	Site Establishment phase	Control through management and monitoring.	Mining of sand is only allowed within the boundaries of the approved area. ⌚ MPRDA, 2008 ⌚ NEMA, 1998
⌚ Site establishment	⌚ Visual intrusion as a result of site establishment.	The visual impact may affect the aesthetics of the landscape.	Site Establishment & Operational Phase	<u>Control:</u> Implementing proper housekeeping.	Management of the mining area must be in accordance with the: ⌚ MPRDA, 2008 ⌚ NEMA, 1998
⌚ Site establishment	⌚ Potential negative impact on the CBA	This will impact on the biodiversity of the	Site Establishment phase	<u>Control:</u> Keeping mining operations to the approved boundaries.	Natural vegetated areas must be managed in accordance with the: ⌚ NEM:BA 2004 ⌚ Eastern Cape Biodiversity Plan

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
		receiving environment.			
<ul style="list-style-type: none"> <li>⌚ Site establishment</li> <li>⌚ Screening, stockpiling and transporting material from site.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Loss of topsoil and fertility during mining and stockpiling (stockpile area)</li> <li>⌚ Loss of stockpiled material due to ineffective storm water control.</li> <li>⌚ Erosion of returned topsoil after rehabilitation (stockpile area)</li> </ul>	Loss of topsoil will affect the rehabilitation success upon closure of the mine.	Site Establishment- and Decommissioning phase	<u>Control &amp; Remedy:</u> Proper housekeeping and storm water management.	Topsoil must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌚ CARA, 1983</li> <li>⌚ NEM:BA, 2004</li> <li>⌚ MPRDA, 2008</li> </ul>
<ul style="list-style-type: none"> <li>⌚ Site establishment</li> <li>⌚ Screening, stockpile, and transporting material from site.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Infestation of the topsoil heaps and mining area with invader plant species.</li> <li>⌚ Infestation of denuded areas with invader plant species</li> <li>⌚ Infestation of the reinstated area with invader plant species.</li> </ul>	This will impact on the biodiversity of the receiving environment.	Site Establishment-, Operational- and Decommissioning phase	<u>Control:</u> Implementing soil- and storm water management.	Invader plants must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌚ CARA, 1983</li> <li>⌚ NEM:BA 2004</li> <li>⌚ Invasive Plant Species Management Plan (Appendix K)</li> </ul>
<ul style="list-style-type: none"> <li>⌚ Site establishment.</li> <li>⌚ Winning of sand.</li> </ul>	⌚ Potential impact on fauna (aquatic & terrestrial) within the footprint area.	This will impact on the biodiversity of the	Site Establishment- and Operational phase	<u>Control &amp; Stop:</u> Implementing good management practices.	Fauna must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌚ NEM:BA 2004</li> </ul>



ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	<ul style="list-style-type: none"> <li>⌘ Disturbance to aquatic fauna within the footprint area</li> </ul>	receiving environment.			
<ul style="list-style-type: none"> <li>⌘ Site establishment</li> <li>⌘ Screening, stockpile, and transporting material from site.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Dust nuisance as a result of the mining activities.</li> <li>⌘ Dust nuisance as a result of the mining activities.</li> </ul>	Increased dust generation will impact on the air quality of the receiving environment.	Site Establishment- and Operational Phase	<u>Control:</u> Dust suppression methods and proper housekeeping.	Dust generation must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌘ NEM:AQA. 2004 Regulation 6(1)</li> <li>⌘ National Dust Control Regulations, GN No R827</li> <li>⌘ ASTM D1739 (SANS 1137:2012)</li> </ul>
<ul style="list-style-type: none"> <li>⌘ Site establishment</li> <li>⌘ Winning of sand</li> <li>⌘ Screening, stockpile, and transporting material from site.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Noise nuisance as a result of the mining activities.</li> <li>⌘ Noise nuisance as a result of the decommissioning activities.</li> </ul>	Should noise levels become excessive it may have an impact on the noise ambiance of the receiving environment.	Site Establishment-, Operational-, and Decommissioning Phase	<u>Control:</u> Noise suppression methods and proper housekeeping.	Noise generation must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌘ NEM:AQA. 2004 Regulation 6(1)</li> <li>⌘ NRTA, 1996</li> </ul>
<ul style="list-style-type: none"> <li>⌘ Winning of sand.</li> <li>⌘ Screening, stockpile, and transporting material from site.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Soil contamination from hydrocarbon spills.</li> <li>⌘ Potential impact associated with littering and hydrocarbon spills.</li> <li>⌘ Potential impact associated with litter left at the mining area.</li> </ul>	Contamination of the footprint area will negatively impact the soil, surface runoff and potentially the groundwater. It will also incur additional costs to the permit holder.	Site Establishment-, Operational-, and Decommissioning Phase	<u>Control &amp; Remedy:</u> Proper housekeeping and implementation of an emergency response plan and waste management plan.	Mining related waste must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌘ NWA, 1998</li> <li>⌘ NEM:WA, 2008</li> <li>⌘ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)</li> <li>⌘ NEMA, 1998 (Section 30)</li> </ul>

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
⌚ Winning of sand.	⌚ Impact on the flow regime of the river.	A negative impact on the flow regime of the river may lead to erosion of banks, and impact on the downstream users.	Operational Phase	<u>Control &amp; Remedy:</u> Implementing proper housekeeping and site management.	The aquatic aspects at the site and rights of downstream users must be managed in terms of: ⌚ NWA, 1998
⌚ Winning of sand.	⌚ Impact on downstream water users.	This impact may lead to complaints from surrounding landowners.	Operational Phase	<u>Control &amp; Remedy:</u> Implementing proper housekeeping and site management.	The aquatic aspects at the site and rights of downstream users must be managed in terms of: ⌚ NWA, 1998
⌚ Winning of sand.	⌚ Potential impact on area/infrastructure of heritage or cultural concern.	This could impact on the cultural and heritage legacy of the receiving environment.	Operational Phase	<u>Control &amp; Stop:</u> Implementing good management practices, as well as the chance-find protocol.	Cultural/heritage aspects must be managed in accordance with the: ⌚ NHRA, 1999
⌚ Winning of sand.	⌚ Loss of mining equipment due to unexpected flooding.	This could impact may have financial implications to the permit holder.	Operational Phase	<u>Control:</u> Implementing good management practices.	The mining area must be managed in accordance with the: ⌚ MPRDA, 2002 ⌚ NEMA, 1998 ⌚ NWA, 1998
⌚ Screening, stockpile, and transporting material from site.	⌚ Deterioration of the access road to the mining area.	Collapse of the road infrastructure will affect the landowner.	Operational Phase	<u>Control &amp; Remedy:</u> Maintaining the access road for the duration of the operational phase, as well as leaving it in a representative or better condition than prior to mining.	The access road must be managed in accordance with the: ⌚ NRTA, 1996
⌚ Screening, stockpile, and transporting material from site.	⌚ Overloading of trucks having an impact on the public roads.	Overloading will negatively affect the	Operational Phase	<u>Control:</u> Proper site management.	Load weights must be managed in accordance with the: ⌚ NRTA, 1996

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	MITIGATION TYPE	STANDARD TO BE ACHIEVED
		roads in the vicinity of the mining area.			
<p>3 Sloping and landscaping upon closure of the mining area.</p>	<p>3 Residual impact on the flow regime of the Orange River.</p>	<p>A negative impact on the flow regime of the river may lead to erosion of banks, and impact on the downstream users.</p>	<p>Decommissioning Phase</p>	<p><u>Control:</u> Proper site management.</p>	<p>The aquatic aspects at the site and rights of downstream users must be managed in terms of:  3 NWA, 1993</p>

## f) Impact Management Actions

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

Table 24: Impact Management Actions

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
<p>whether listed or not listed (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc..etc.)</p>	<p>(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc...etc..)</p>	<p>(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc... etc.)</p> <p>E.g.</p> <ul style="list-style-type: none"> <li>• Modify through alternative method.</li> <li>• Control through noise control</li> <li>• Control through management and monitoring</li> </ul> <p>Remedy through rehabilitation.</p>	<p>Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required.</p> <p>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.</p>	<p>(A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)</p>
<p>∩ Demarcation of site with visible beacons.</p>	<p>∩ No impact could be identified other than the beacons being outside the boundaries of the approved mining area.</p>	<p>Demarcation of the site will ensure that all employees are aware of the boundaries of the mining area, and that work stay within the approved area.</p>	<p>Beacons need to be in place throughout the life of the activity.</p>	<p>Mining of sand is only allowed within the boundaries of the approved area. ∩ MPRDA, 2008 ∩ NEMA, 1998</p>
<p>∩ Site establishment</p>	<p>∩ Visual intrusion as a result of site establishment.</p>	<p><b>Visual Mitigation</b> ∩ Mining must be contained to the boundaries of the permitted area.</p>	<p>Throughout the site establishment-, site and operational phase.</p>	<p>Management of the mining area must be in accordance with the: ∩ MPRDA, 2008</p>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<ul style="list-style-type: none"> <li>⌄ The site must have a neat appearance and be kept in good condition at all times.</li> <li>⌄ The permit holder must limit vegetation removal (if applicable), and stripping of topsoil may only be done immediately prior to the use of a specific area.</li> <li>⌄ Upon closure the stockpile area must be rehabilitated and levelled to remove the visual impact on the aesthetic value of the area.</li> </ul>		<ul style="list-style-type: none"> <li>⌄ NEMA, 1998</li> </ul>
<ul style="list-style-type: none"> <li>⌄ Site establishment</li> </ul>	<ul style="list-style-type: none"> <li>⌄ Potential negative impact on the CBA</li> </ul>	<p><b><u>Impact on Critical Biodiversity Area:</u></b></p> <ul style="list-style-type: none"> <li>⌄ The mining boundaries must be clearly demarcated and all operations must be contained to the approved mining area.</li> <li>⌄ The area outside the mining boundaries must be declared a no-go area, and all employees must be educated accordingly.</li> <li>⌄ The invasive plant species management plan attached as Appendix K must be implemented on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.</li> </ul>	<p>Throughout the site establishment phase.</p>	<p>Natural vegetated areas must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌄ NEM:BA 2004</li> <li>⌄ Eastern Cape Biodiversity Plan</li> </ul>
<ul style="list-style-type: none"> <li>⌄ Site establishment</li> <li>⌄ Screening, stockpiling and transporting material from site.</li> <li>⌄ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌄ Loss of topsoil and fertility during mining and stockpiling (stockpile area)</li> <li>⌄ Loss of stockpiled material due to ineffective storm water control.</li> <li>⌄ Erosion of returned topsoil after rehabilitation (stockpile area)</li> </ul>	<p><b><u>Topsoil Management:</u></b></p> <ul style="list-style-type: none"> <li>⌄ The upper 300 mm of the soil must be stripped and stockpiled.</li> <li>⌄ Topsoil is a valuable and essential resource for rehabilitation and it must therefore be managed carefully to conserve and maintain it throughout the stockpiling and rehabilitation processes.</li> <li>⌄ Topsoil stripping, stockpiling and re-spreading must be done in a systematic way. The mining plan have to be such that</li> </ul>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>	<p>Topsoil must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌄ CARA, 1983</li> <li>⌄ NEM:BA, 2004</li> <li>⌄ MPRDA, 2008</li> </ul>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>topsoil is stockpiled for the minimum possible time.</p> <ul style="list-style-type: none"> <li>3 The topsoil must be placed on a levelled area, within the mining footprint. No topsoil may be stockpiled in undisturbed areas.</li> <li>3 Topsoil stockpiles must be protected against losses by water and wind erosion. Stockpiles must be positioned so as not to be vulnerable to erosion by wind and water. The establishment of plants (weeds or a cover crop) on the stockpiles will help to prevent erosion.</li> <li>3 Topsoil heaps may not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.</li> <li>3 The temporary topsoil stockpiles must be kept free of invasive plant species.</li> <li>3 Storm- and runoff water must be diverted around the stockpile area to prevent erosion.</li> <li>3 The stockpiled topsoil must be evenly spread, to a depth of 300 mm, over the rehabilitated area upon closure of the site.</li> <li>3 The permit holder must strive to re-instate topsoil at a time of year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, before vegetation is established, is minimized. The best time of year is at the end of the rainy season, when there is moisture in the soil for vegetation establishment and the risk of heavy rainfall events is minimal.</li> <li>3 A cover crop must be planted, irrigated and established immediately after spreading of</li> </ul>		

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>topsoil, to stabilize the soil and protect it from erosion. The cover crop must be fertilized for optimum biomass production. It is important that rehabilitation be taken up to the point of cover crop stabilization. Rehabilitation cannot be considered complete until the first cover crop is well established.</p> <p>∩ The rehabilitated area must be monitored for erosion, and appropriately stabilized if any erosion occurs for at least 12 months after reinstatement.</p>		
<p>∩ Site establishment</p> <p>∩ Screening, stockpile, and transporting material from site.</p> <p>∩ Sloping and landscaping upon closure of the mining area.</p>	<p>∩ Infestation of the topsoil heaps and mining area with invader plant species.</p> <p>∩ Infestation of denuded areas with invader plant species</p> <p>∩ Infestation of the reinstated area with invader plant species.</p>	<p><b><u>Management of Invader Plant Species:</u></b></p> <p>∩ An invasive plant species management plan (Appendix K) must be implemented at the site to ensure the management and control of all species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto). Weed/alien clearing must be done on an ongoing basis throughout the life of the mining activities.</p> <p>∩ All stockpiles (topsoil) must be kept free of invasive plant species.</p> <p>∩ Management must take responsibility to control declared invader or exotic species on the rehabilitated areas. The following control methods can be used:</p> <ul style="list-style-type: none"> <li>▪ The plants can be uprooted, felled or cut off and can be destroyed completely.</li> <li>▪ The plants can be treated chemically by a registered pest control officer (PCO) through the use of an herbicide recommended for use by the PCO in</li> </ul>	<p>Throughout the site establishment-, operational, and decommissioning phase.</p>	<p>Invader plants must be managed in accordance with the:</p> <p>∩ CARA, 1983</p> <p>∩ NEM:BA 2004</p> <p>∩ Invasive Plant Species Management Plan (Appendix K)</p>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		accordance with the directions for the use of such an herbicide.		
<ul style="list-style-type: none"> <li>⌄ Site establishment.</li> <li>⌄ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>⌄ Potential impact on fauna (aquatic &amp; terrestrial) within the footprint area.</li> <li>⌄ Disturbance to aquatic fauna within the footprint area</li> </ul>	<p><b><u>Protection of Fauna:</u></b></p> <ul style="list-style-type: none"> <li>⌄ The site manager must ensure no fauna is caught, killed, harmed, sold or played with.</li> <li>⌄ Workers must be instructed to report any animals that may be trapped in the working area.</li> <li>⌄ No snares may be set or nests raided for eggs or young.</li> <li>⌄ Mining may only take place during the low flow period of the river when the sandbank is exposed. No pumping of sand may take place and no fishing or interference with any aquatic fauna is allowed.</li> </ul>	Throughout the site establishment-, site and operational phase.	Fauna must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌄ NEM:BA 2004</li> </ul>
<ul style="list-style-type: none"> <li>⌄ Site establishment</li> <li>⌄ Screening, stockpile, and transporting material from site.</li> </ul>	<ul style="list-style-type: none"> <li>⌄ Dust nuisance as a result of the mining activities.</li> <li>⌄ Dust nuisance as a result of the mining activities.</li> </ul>	<p><b><u>Fugitive Dust Emission Mitigation:</u></b></p> <ul style="list-style-type: none"> <li>⌄ The liberation of dust into the surrounding environment must be effectively controlled by the use of, inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).</li> <li>⌄ The site manager must ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.</li> <li>⌄ Speed on the access road must be limited to 40 km/h to prevent the generation of excess dust.</li> <li>⌄ Areas devoid of vegetation, which could act as a dust source, must be minimized and vegetation removal may only be done immediately prior to mining.</li> </ul>	Throughout the site establishment-, operational, and decommissioning phase.	Dust generation must be managed in accordance with the: <ul style="list-style-type: none"> <li>⌄ NEM:AQA. 2004 Regulation 6(1)</li> <li>⌄ National Dust Control Regulations, GN No R827</li> <li>⌄ ASTM D1739 (SANS 1137:2012)</li> </ul>



ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<ul style="list-style-type: none"> <li>⌘ Loads must be flattened and covered to ensure that minimal spillage of material takes place during transportation, also preventing windblown dust.</li> <li>⌘ Weather conditions must be taken into consideration upon commencement of daily operations. Limiting operations during very windy periods would reduce airborne dust and resulting impacts.</li> <li>⌘ All dust generating activities shall comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA (Act 39 of 2004) and ASTM D1739 (SANS 1137:2012).</li> <li>⌘ Best practice measures shall be implemented during the stripping of topsoil, loading, and transporting of the sand from site to minimize potential dust impacts.</li> </ul>		
<ul style="list-style-type: none"> <li>⌘ Site establishment</li> <li>⌘ Winning of sand</li> <li>⌘ Screening, stockpile, and transporting material from site.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Noise nuisance as a result of the mining activities.</li> <li>⌘ Noise nuisance as a result of the decommissioning activities.</li> </ul>	<p><b><u>Noise Handling:</u></b></p> <ul style="list-style-type: none"> <li>⌘ The permit holder must ensure that employees and staff conduct themselves in an acceptable manner while on site.</li> <li>⌘ No loud music may be permitted at the mining area.</li> <li>⌘ All mining vehicles must be equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996 (Act No 93 of 1996).</li> <li>⌘ Best practice measures shall be implemented in order to minimize potential noise impacts.</li> <li>⌘ A qualified occupational hygienist must be contracted to quarterly monitor and report on the personal noise exposure of the employees working at the mine. The</li> </ul>	<p>Throughout the site establishment-, operational-, and decommissioning phase.</p>	<p>Noise generation must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌘ NEM:AQA. 2004 Regulation 6(1)</li> <li>⌘ NRTA, 1996</li> </ul>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>monitoring must be done in accordance with the SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA, 2004, SANS 10103:2008.</p>		
<ul style="list-style-type: none"> <li>∩ Winning of sand.</li> <li>∩ Screening, stockpile, and transporting material from site.</li> <li>∩ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Soil contamination from hydrocarbon spills.</li> <li>∩ Potential impact associated with littering and hydrocarbon spills.</li> <li>∩ Potential impact associated with litter left at the mining area.</li> </ul>	<p><b><u>Waste Management:</u></b></p> <ul style="list-style-type: none"> <li>∩ Regular vehicle maintenance, repairs and services may only take place at the off-site workshop and service area of the permit holder, and none of the above may be allowed in the riverbed. When a breakdown occurs in the riverbed, the permit holder must arrange for the removal of the machine, within 6 hours, to a recognised workshop where it can be mended.</li> <li>∩ Ablution facilities must be provided in the form of a chemical toilet. The chemical toilet must be placed outside the 1:100 year floodline of the river, and must be serviced at least once every two weeks for the duration of the mining activities.</li> <li>∩ The use of any temporary, chemical toilet facilities may not cause any pollution to water sources or pose a health hazard. In addition, no form of secondary pollution should arise from the disposal of refuse or sewage from the temporary, chemical toilets. Any pollution problems arising from the above are to be addressed immediately by the permit holder.</li> <li>∩ If a diesel bowser is used on site, it must be equipped with a drip tray at all times. Drip trays must be used during each and every refuelling event. The nozzle of the bowser needs to rest in a sleeve to prevent dripping after refuelling.</li> </ul>	<p>Throughout the site establishment-, operational-, and decommissioning phase.</p>	<p>Mining related waste must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>∩ NWA, 1998</li> <li>∩ NEM:WA, 2008</li> <li>∩ NEM:WA, 2008: National norms and standards for the storage of waste (GN 926)</li> <li>∩ NEMA, 1998 (Section 30)</li> </ul>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<ul style="list-style-type: none"> <li>3 Site management must ensure drip trays are cleaned after each use. No dirty drip trays may be used on site.</li> <li>3 A spill kit must be available on-site which can be operated by trained employees for the adhoc remediation of minor chemical and hydrocarbon spillages.</li> <li>3 Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.</li> <li>3 Should spillage occur, such as oil or diesel leaking from a burst pipe, the contaminated soil must, within the first hour of occurrence, be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility. Proof must be filed.</li> <li>3 A waste management plan must be compiled by site management and implemented on site. The plan must focus on the waste hierarchy of the NEM:WA.</li> <li>3 General waste must be contained in marked, sealable, refuse bins placed at a designated area, to be removed when filled to capacity to a recognised general waste landfill site.</li> <li>3 No waste may be buried or burned on the site.</li> <li>3 No chemicals or hazardous materials may be stored at the mining area.</li> <li>3 It is important that any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities is reported to the Department of Water and Sanitation and other relevant authorities.</li> </ul>		

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<ul style="list-style-type: none"> <li>⌘ To prevent the loss of machinery during unpredicted flooding, and lower the risk of accidental hydrocarbon spillages, no machinery may overnight in the riverbed. All machinery must be parked at the stockpile area with drip trays placed underneath stationary vehicles.</li> </ul>		
<ul style="list-style-type: none"> <li>⌘ Winning of sand.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Impact on the flow regime of the river.</li> <li>⌘ Impact on downstream water users.</li> <li>⌘ Residual impact on the flow regime of the Orange River.</li> </ul>	<p><b><u>Potential impact on the Orange River and downstream users:</u></b></p> <ul style="list-style-type: none"> <li>⌘ The flow of the river may at no point be changed, dammed or diverted without prior authorisation from the Department of Water and Sanitation (DWS).</li> <li>⌘ No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.</li> <li>⌘ Mining may only take place when the excavation area is exposed. Site management must monitor flooding levels of the river, and all activities within the exaction area must be halted and the area cleared at least a week before the entire flooding of the area.</li> <li>⌘ A buffer of at least 20 m must be placed around any water body (flowing or standing) associated with the Orange River, and no activities may be allowed within these buffer areas. The buffer areas must be regarded as a dynamic zone and must be adjusted with the rising and falling of the water level.</li> <li>⌘ The existing access into the river must be used. No changes may be made to the</li> </ul>	<p>Throughout the operational- and decommissioning phase.</p>	<p>The aquatic aspects at the site and rights of downstream users must be managed in terms of:</p> <ul style="list-style-type: none"> <li>⌘ NWA, 1998</li> </ul>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>banks of the river without prior authorisation from the DWS.</p> <ul style="list-style-type: none"> <li>⌚ A buffer of 10 m must be placed around the intact riparian fringe (apart from the access road through the riparian fringe) and must be regarded as a no-go zone. Natural vegetation must be encouraged within the 10 m buffer.</li> <li>⌚ The permit holder must at all times adhere to the requirements of the water use authorisations to be obtained prior to the commencement of the mining activities.</li> <li>⌚ No equipment of any kind may be stored within the excavation area (operational phase).</li> <li>⌚ All material stockpiles must be located outside of the riparian fringe and no stockpiled material shall remain within the sandbank overnight. The existing stockpiling areas within the processing area shall be used.</li> <li>⌚ Upon closure, the permit holder must remove all mining related equipment/machinery from the riverbed.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Potential impact on area/infrastructure of heritage or cultural concern.</li> </ul>	<p><b><u>Archaeological, Heritage and Palaeontological Aspects:</u></b></p> <ul style="list-style-type: none"> <li>⌚ All mining must be confined to the development footprint area.</li> <li>⌚ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person</li> </ul>	<p>Throughout the operational phase.</p>	<p>Cultural/heritage aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ NHRA, 1999</li> </ul>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</p> <ul style="list-style-type: none"> <li>⌚ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.</li> <li>⌚ The senior on-site Manager must inform the ECO of the chance find and its immediate impact on operations. The ECO must then contact a professional archaeologist for an assessment of the finds who must notify SAHRA.</li> <li>⌚ Work may only continue once the go-ahead was issued by SAHRA.</li> </ul>		
<ul style="list-style-type: none"> <li>⌚ Screening, stockpiling and transporting material from site.</li> <li>⌚ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Loss of stockpiled material due to ineffective storm water control.</li> <li>⌚ Loss mining equipment due to unexpected flooding.</li> </ul>	<p><b><u>Storm Water Mitigation:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Drainage must be controlled to ensure that runoff from the stockpile area does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points.</li> <li>⌚ Storm water must be diverted around the topsoil heaps and stockpile area to prevent erosion.</li> <li>⌚ Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.</li> <li>⌚ Earthen berms/sediment traps must be constructed within the downslope area of the stockpiles and the screening plant.</li> <li>⌚ Mining must be conducted only in accordance with the Best Practice Guideline</li> </ul>	<p>Throughout the operational phase.</p>	<p>Storm water must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌚ CARA, 1983</li> <li>⌚ NEMA, 1998</li> <li>⌚ NWA, 1998</li> </ul>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:</p> <ul style="list-style-type: none"> <li>▪ Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. You must prevent clean water from running or spilling into dirty water systems.</li> <li>▪ Dirty water must be collected and contained in a system separate from the clean water system.</li> <li>▪ Dirty water must be prevented from spilling or seeping into clean water systems.</li> <li>▪ A storm water management plan must apply for the entire life cycle of the mining activity and over different hydrological cycles (rainfall patterns).</li> <li>▪ The statutory requirements of various regulatory agencies and the interests of stakeholders must be considered and incorporated into a storm water management plan.</li> </ul>		
<p>⌚ Screening, stockpile, and transporting material from site.</p>	<p>⌚ Deterioration of the access road to the mining area.</p> <p>⌚ Overloading of trucks having an impact on the public roads.</p>	<p><b><u>Access Road Mitigation:</u></b></p> <p>⌚ Storm water must be diverted around the access road to prevent erosion.</p> <p>⌚ Vehicular movement must be restricted to the existing access road to prevent crisscrossing of tracks through undisturbed areas.</p>	<p>Throughout the operational phase.</p>	<p>The access road must be managed in accordance with the:</p> <p>⌚ NRTA, 1996</p>

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<ul style="list-style-type: none"> <li>⌘ Rutting and erosion of the access road caused as a direct result of the mining activities must be repaired by the permit holder.</li> <li>⌘ Overloading of the truck must be prevented, and proof of load weights must be filed for auditing purposes.</li> </ul>		
<ul style="list-style-type: none"> <li>⌘ Site establishment.</li> <li>⌘ Winning of sand.</li> <li>⌘ Screening, stockpiling and transporting material from site.</li> <li>⌘ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>⌘ Potential health and safety risk to employees.</li> </ul>	<p><b><u>Management of Health and Safety Risks:</u></b></p> <ul style="list-style-type: none"> <li>⌘ Adequate ablution facilities and water for human consumption must daily be available on site.</li> <li>⌘ Workers must have access to the correct personal protection equipment (PPE) as required by law.</li> <li>⌘ All operations must comply with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).</li> </ul>	<p>Throughout the site establishment-, operational and decommissioning phase.</p>	<p>Health and safety aspects must be managed in accordance with the:</p> <ul style="list-style-type: none"> <li>⌘ MHSA, 1996</li> <li>⌘ OHSA, 1993</li> <li>⌘ OHSAS, 18001</li> </ul>



**i) Financial Provision**

**(1) Determination of the amount of Financial Provision.**

- (a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.**

The closure objectives entail removing the mining machinery from the river. Removal of the sand screen and chemical toilet from the stockpile area, removal/levelling of all stockpiled material and the landscaping of the stockpile area to allow the replacement of stockpiled topsoil. The reinstated area will be vegetated and invasive plant species will be controlled during a 12 months' aftercare period to address germination of problem plants in the area. The Applicant will comply with the minimum closure objectives as prescribed by DMR.

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

This report, the Draft Basic Assessment Report, includes all the environmental objectives in relation to closure and will be made available for perusal by the landowner, registered I&AP's and stakeholders over a 30-days commenting period.

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

The requested rehabilitation plan is attached as Appendix E.

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

The decommissioning phase will entail the final rehabilitation of the mining site. Final landscaping, levelling and top dressing will be done. The rehabilitation of the mining area as indicated on the rehabilitation plan attached as Appendix E will comply with the minimum closure objectives as prescribed by DMR and detailed below, and therefore is deemed to be compatible:

3 Rehabilitation of the Excavated Area:

As mentioned earlier, the Orange River annually replenish the sand resource and rehabilitate disturbance to the riverbed. In light of this, upon closure of the mine the Applicant will remove the mining machinery from the river to be reinstated during the next high-flow period. The entrance into the river will remain, but should any signs of erosion occur, these will be reinstated and landscaped by the permit holder.

3 Rehabilitation of the Stockpile Area:

The sand screen, chemical toilet and stockpiled material will be removed from the stockpile area. Compacted areas will be ripped and landscaped and previously stockpiled topsoil will be reinstated. The reinstated area will be seeded with a locally adapted grassmix, and invasive plant species will be controlled for at least one growth seasons. The reinstated area will be monitored for signs of erosion until the cover crop established.

3 Final Rehabilitation:

Final rehabilitation of the surface area shall entail landscaping, levelling, maintenance, and clearing of invasive plant species. All equipment, plant and other items used during the mining period will be removed from site (section 44 of the MPRDA, 2002). Waste material of any description will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site. The management of invasive plant species will be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) will be eradicated from the site. Final rehabilitation shall be completed within a period specified by the Regional Manager.

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

The calculation of the quantum for financial provision was according to Section B of the working manual.

### **Mine type and saleable mineral by-product**

According to Tables B.12, B.13 and B.14

Mine type	Sand
Saleable mineral by-product	None

### **Risk ranking**

According to Tables B.12, B.13 and B.14

Primary risk ranking (either Table B.12 or B.13)	C (Low risk).
Revised risk ranking (B.14)	N/A

### **Environmental sensitivity of the mine area**

According to Table B.4

Environmental sensitivity of the mine area	Low
--	-----

### **Level of information**

According to Step 4.2:

Level of information available	Limited
--------------------------------	---------

### **Identify closure components**

According to Table B.5 and site-specific conditions

Component No.	Main description	Applicability of closure components (Circle Yes or No)	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	NO
2(A)	Demolition of steel buildings and structures	-	NO
2(B)	Demolition of reinforced concrete buildings and structures	-	NO
3	Rehabilitation of access roads	-	NO
4(A)	Demolition and rehabilitation of electrified railway lines	-	NO
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	NO
5	Demolition of housing and facilities	-	NO
6	Opencast rehabilitation including final voids and ramps	-	NO
7	Sealing of shafts, adits and inclines	-	NO

Component No.	Main description	Applicability of closure components (Circle Yes or No)	
8(A)	Rehabilitation of overburden and spoils	-	NO
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	NO
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	NO
9	Rehabilitation of subsided areas	-	NO
10	General surface rehabilitation, including grassing of all denuded areas	YES	-
11	River diversions	-	NO
12	Fencing	-	NO
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	NO
14	2 to 3 years of maintenance and aftercare	-	NO

### Unit rates for closure components

According to Table B.6 master rates and multiplication factors for applicable closure components.

Component No.	Main description	Master rate	Multiplication factor
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	-	-
2(A)	Demolition of steel buildings and structures	-	-
2(B)	Demolition of reinforced concrete buildings and structures	-	-
3	Rehabilitation of access roads	-	-
4(A)	Demolition and rehabilitation of electrified railway lines	-	-
4(B)	Demolition and rehabilitation of non-electrified railway lines	-	-
5	Demolition of housing and facilities	-	-
6	Opencast rehabilitation including final voids and ramps	-	-
7	Sealing of shafts, adits and inclines	-	-
8(A)	Rehabilitation of overburden and spoils	-	-
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing)	-	-
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich)	-	-
9	Rehabilitation of subsided areas	-	-
10	General surface rehabilitation, including grassing of all denuded areas	126 059	1.00
11	River diversions	-	-
12	Fencing	-	-
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater)	-	-
14	2 to 3 years of maintenance and aftercare	16 776	1.00

**Determine weighting factors**

According to Tables B.7 and B.8

Weighting factor 1: Nature of terrain/accessibility	1.00 (Flat)
Weighting factor 2: Proximity to urban area where goods and services are to be supplied	1.05

### Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision

Table 25: Calculation of closure cost

CALCULATION OF THE QUANTUM							
<b>Mine:</b>	Yellowwood Trust			<b>Location:</b>	Aliwal North		
<b>Evaluators:</b>	C Fouché			<b>Date:</b>	01 November 2019		
No	Description	Unit	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A *B*C*D Amount (Rand)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m <sup>2</sup>	0	16	1.00	1.00	R 0.00
2(A)	Demolition of steel buildings and structures	m <sup>2</sup>	0	228	1.00	1.00	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m <sup>2</sup>	0	336	1.00	1.00	R 0.00
3	Rehabilitation of access roads	m <sup>2</sup>	0	41	1.00	1.00	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	395	1.00	1.00	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	216	1.00	1.00	R 0.00
5	Demolition of housing and/or administration facilities	m <sup>2</sup>	0	455	1.00	1.00	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	0	238 697	0.04	1.00	R 0.00
7	Sealing of shaft, audits and inclines	m <sup>3</sup>	0	122	1.00	1.00	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0	159 131	1.00	1.00	R 0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	198 195	1.00	1.00	R 0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	575 653	0.51	1.00	R 0.00
9	Rehabilitation of subsided areas	ha	0	133 249	1.00	1.00	R 0.00
10	General surface rehabilitation	ha	1	126 059	1.00	1.00	R 126 059.00
11	River diversions	ha	0	126 059	1.00	1.00	R 0.00

12	Fencing	m	0	144	1.00	1.00	R 0.00
13	Water Management	ha	0	47 931	0.17	1.00	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	1	16 776	1.00	1.00	R 16 776.00
15(A)	Specialists study	Sum	0				R 0.00
15(B)	Specialists study	Sum	0				R 0.00
Sum of items 1 to 15 above							R 142 835.00
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R 142 835.00		<b>Sub Total 1</b>	R 149 976.75

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00					R 8 998.61
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00					-
2	Contingency	10.0% of Subtotal 1					R 14 997.68
<b>Sub Total 2</b>							
(Subtotal 1 plus management and contingency)						R 173 973.03	
Vat (15%)						R 26 095.95	
GRAND TOTAL							
(Subtotal 3 plus VAT)						<b>R 200 068.98</b>	

The amount that will be necessary for the rehabilitation of damages caused by the operation, both sudden closures during the normal operation of the project and at final, planned closure gives a sum total of **R 200 068.98**.

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

Herewith I, the person, whose name is stated below confirm that I am the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application. I herewith confirm that the company will provide the amount that will be determined by the Regional Manager in accordance with the prescribed guidelines.



**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 actions**
- k) Mechanisms for monitoring compliance**

*Table 26: Mechanisms for monitoring compliance with and performance assessment against the EMPR and reporting thereon.*

<b>SOURCE ACTIVITY</b>	<b>IMPACTS REQUIRING MONITORING PROGRAMMES</b>	<b>FUNCTIONAL REQUIREMENTS FOR MONITORING</b>	<b>ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)</b>	<b>MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS</b>
<ul style="list-style-type: none"> <li>∩ Demarcation of site with visible beacons</li> </ul>	Maintenance of beacons	<ul style="list-style-type: none"> <li>∩ Visible beacons need to be placed at the corners of the mining area.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>∩ Ensure beacons are in place throughout the life of the mine.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>∩ Daily compliance monitoring by site management.</li> <li>∩ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>
<ul style="list-style-type: none"> <li>∩ Site establishment</li> </ul>	<p><b><u>Visual Characteristics:</u></b></p> <ul style="list-style-type: none"> <li>∩ Visual intrusion as a result of site establishment.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Minimize the visual impact of the activity on the surrounding environment through proper site management and implementing good housekeeping practices.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>∩ Contain mining to the boundaries of the permitted area.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>∩ Daily compliance monitoring by site management.</li> <li>∩ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<ul style="list-style-type: none"> <li>☞ Ensure that the site have a neat appearance and is kept in good condition at all times.</li> <li>☞ Limit vegetation removal, and only strip topsoil immediately prior to the use of a specific area.</li> <li>☞ Rehabilitate and level the site upon closure to ensure that the visual impact on the aesthetic value of the area is kept to a minimum.</li> </ul>	
<ul style="list-style-type: none"> <li>☞ Site establishment</li> </ul>	<p><b><u>Mining and Biodiversity, Groundcover</u></b></p> <ul style="list-style-type: none"> <li>☞ Potential negative impact on the CBA.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Visible beacons indicating the boundary of the mining area.</li> <li>☞ Cover crop to seed reinstated areas.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>☞ Clearly demarcate the mining boundaries and contain all operations to the approved mining area.</li> <li>☞ Declared the area outside the mining boundaries a no-go area, and educate all employees accordingly.</li> <li>☞ Implement the invasive plant species management plan on site to control weeds and invasive plants on denuded areas, topsoil heaps and reinstated areas.</li> </ul>	<p>Applicable throughout site establishment-, and operational phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>
<ul style="list-style-type: none"> <li>☞ Site establishment</li> <li>☞ Screening, stockpiling and transporting material from site.</li> <li>☞ Sloping and landscaping upon</li> </ul>	<p><b><u>Geology and Soil:</u></b></p> <ul style="list-style-type: none"> <li>☞ Loss of topsoil and fertility during mining and stockpiling (stockpile area)</li> <li>☞ Loss of stockpiled material due to</li> </ul>	<ul style="list-style-type: none"> <li>☞ Earthmoving equipment to reinstate mined-out areas.</li> <li>☞ Cover crop to be established on reinstated areas.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>☞ Strip and stockpile the upper 300 mm of the soil.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
closure of the mining area.	<p>ineffective storm water control.</p> <p>∩ Erosion of returned topsoil after rehabilitation (stockpile area).</p>	<p>∩ Erosion infrastructure necessary) control (if</p>	<p>∩ Carefully manage and conserve the topsoil throughout the stockpiling and rehabilitation process.</p> <p>∩ Ensure topsoil stripping, stockpiling and re-spreading is done in a systematic way. Plan mining in such a way that topsoil is stockpiled for the minimum possible time.</p> <p>∩ Place topsoil heaps on a levelled area within the mining footprint area. Do not stockpile topsoil in undisturbed areas.</p> <p>∩ Protect topsoil stockpiles against losses by water and wind erosion. Position stockpiles so as not to be vulnerable to erosion by wind and water. Establishment of plants on the stockpiles will help prevent erosion.</p> <p>∩ Ensure that topsoil heaps do not exceed 1.5 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.</p> <p>∩ Keep temporary stockpiles free of invasive plant species.</p> <p>∩ Divert storm- and runoff water around the stockpile area to prevent erosion.</p> <p>∩ Spread the topsoil evenly over the rehabilitated area, to a depth of 300 mm, upon closure of the site.</p> <p>∩ Strive to re-instate topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, to that erosion of returned topsoil is minimized. The best time of year is at the end of the rainy season.</p> <p>∩ Plant and irrigate a cover crop immediately after spreading topsoil to stabilise the soil and protect it from erosion. Fertilise the cover crop for optimum biomass production. Rehabilitation extends until the first cover crop is well established.</p>	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<ul style="list-style-type: none"> <li>☞ Monitor the rehabilitated area for erosion, and appropriately stabilize if erosion do occur, for at least 12 months after reinstatement.</li> </ul>	
<ul style="list-style-type: none"> <li>☞ Site establishment</li> <li>☞ Screening, stockpile, and transporting material from site.</li> <li>☞ Sloping and landscaping upon closure of the mining area.</li> </ul>	<p><b><u>Groundcover:</u></b></p> <ul style="list-style-type: none"> <li>☞ Infestation of the topsoil heaps and mining area with invader plant species.</li> <li>☞ Infestateion of denuded areas with invader plant species.</li> <li>☞ Infestation of the reinstated area with invader plant species.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Designated team to cut or pull out invasive plant species that germinated on site.</li> <li>☞ Herbicide application equipment.</li> </ul>	<p><b><u>Role:</u></b></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><b><u>Responsibility:</u></b></p> <ul style="list-style-type: none"> <li>☞ Implement an invasive plant species management plan to control all invasive plant species on site in terms of NEM:BA, 2004 and CARA, 1983.</li> <li>☞ Keep all stockpiles (topsoil) free of invasive plant species.</li> <li>☞ Control declared invader or exotic species on the rehabilitated areas.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>
<ul style="list-style-type: none"> <li>☞ Site establishment.</li> <li>☞ Winning of sand.</li> </ul>	<p><b><u>Fauna:</u></b></p> <ul style="list-style-type: none"> <li>☞ Potential impact on fauna (aquatic &amp; terrestrial) within the footprint area.</li> <li>☞ Disturbance to aquatic fauna within the footprint area.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Toolbox talks to educate employees how to handle fauna that enter the work areas.</li> </ul>	<p><b><u>Role:</u></b></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><b><u>Responsibility:</u></b></p> <ul style="list-style-type: none"> <li>☞ Ensure no fauna is caught, killed, harmed, sold or played with.</li> <li>☞ Instruct workers to report any animals that may be trapped in the working area.</li> <li>☞ Ensure no snares are set or nests raided for eggs or young.</li> </ul>	<p>Applicable throughout site establishment-, and operational phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<ul style="list-style-type: none"> <li>⌚ Only mine the area during the low flow period of the river when the sandbank is exposed. Do not pump sand, allow fishing or interference with any aquatic fauna.</li> </ul>	
<ul style="list-style-type: none"> <li>⌚ Site establishment</li> <li>⌚ Screening, stockpile, and transporting material from site.</li> </ul>	<p><b><u>Air Quality:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Dust nuisance as a result of the mining activities.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Dust suppression equipment such as a water car.</li> <li>⌚ Signage that clearly reduce the speed on the access roads.</li> </ul>	<p><b><u>Role:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><b><u>Responsibility:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Control the liberation of dust into the surrounding environment by the use of; inter alia, straw, water spraying and/or environmentally friendly dust-allaying agents that contains no PCB's (e.g. DAS products).</li> <li>⌚ Ensure continuous assessment of all dust suppression equipment to confirm its effectiveness in addressing dust suppression.</li> <li>⌚ Limit speed on the haul roads to 40 km/h to prevent the generation of excess dust.</li> <li>⌚ Minimise areas devoid of vegetation.</li> <li>⌚ Flatten and cover loads to prevent spillage and windblown dust during transportation.</li> <li>⌚ Take weather conditions into consideration upon commencement of daily operations. Limit operations during very windy periods to reduce airborne dust and resulting impacts.</li> <li>⌚ Ensure dust generating activities comply with the National Dust Control Regulations, GN No R827 promulgated in terms of NEM:AQA, 2004 and ASTM D1739 (SANS 1137:2012).</li> <li>⌚ Implement best practice measures during the stripping of topsoil, loading, and transporting of</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>⌚ Daily compliance monitoring by site management.</li> <li>⌚ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			material from site to minimize potential dust impacts.	
<ul style="list-style-type: none"> <li>☞ Site establishment</li> <li>☞ Winning of sand</li> <li>☞ Screening, stockpile, and transporting material from site.</li> <li>☞ Sloping and landscaping upon closure of the mining area.</li> </ul>	<p><b><u>Noise Ambiance:</u></b></p> <ul style="list-style-type: none"> <li>☞ Noise nuisance as a result of the mining activities.</li> <li>☞ Noise nuisance as a result of the decommissioning activities.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Silencers fitted to all project related vehicles, and the use of vehicles that are in road worthy condition in terms of the National Road Traffic Act, 1996.</li> </ul>	<p><b><u>Role:</u></b></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><b><u>Responsibility:</u></b></p> <ul style="list-style-type: none"> <li>☞ Ensure that employees and staff conduct themselves in an acceptable manner while on site.</li> <li>☞ No loud music may be permitted at the mining area.</li> <li>☞ Ensure that all project related vehicles are equipped with silencers and maintained in a road worthy condition in terms of the National Road Traffic Act, 1996.</li> <li>☞ Implement best practice measures to minimise potential noise impacts.</li> <li>☞ Contract a qualified occupational hygienist to quarterly monitor and report on the personal noise exposure of the employees working at the mine. Monitoring must be in accordance with SANS 10083:2004 (Edition 5) sampling method as well as NEM:AQA 2004, SANS 10103:2008.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>
<ul style="list-style-type: none"> <li>☞ Winning of sand.</li> <li>☞ Screening, stockpile, and transporting material from site.</li> <li>☞ Sloping and landscaping upon</li> </ul>	<p><b><u>Waste Management:</u></b></p> <ul style="list-style-type: none"> <li>☞ Soil contamination from hydrocarbon spills.</li> <li>☞ Potential impact associated with littering and hydrocarbon spills.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Oil spill kit.</li> <li>☞ Sealed drip trays.</li> <li>☞ Formal waste disposal system with waste registers.</li> </ul>	<p><b><u>Role:</u></b></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
closure of the mining area.	<ul style="list-style-type: none"> <li>∩ Potential impact associated with litter left at the mining area.</li> </ul>		<p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>∩ Ensure regular vehicle maintenance, repairs and services takes place at the off-site workshop and service area of the permit holder, and that none of the above is allowed in the riverbed. When a breakdown occurs in the riverbed, arrange for the removal of the machine within 6 hours to a recognised workshop where it can be mended.</li> <li>∩ Provide ablution facilities in the form of a chemical toilet that is placed outside the 1:100 year floodline of the river. Ensure the toilet is serviced at least once every two weeks for the duration of the mining activities.</li> <li>∩ Ensure that the use of any temporary, chemical toilet facilities does not cause any pollution to water sources or pose a health hazard. In addition, ensure that no form of secondary pollution arise from the disposal of refuse or sewage from the temporary, chemical toilets. Address any pollution problems arising from the above immediately.</li> <li>∩ Equip the diesel bowser with a drip tray if used on site. The nozzle of the bowser must rest in a sleeve to prevent dripping after refuelling.</li> <li>∩ Clean drip trays after use. Do not use dirty drip trays.</li> <li>∩ Keep a spill kit on site.</li> <li>∩ Collect any effluents containing oil, grease or other industrial substances in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.</li> <li>∩ Collect the contaminated soil from spillage that occurred, such as oil or diesel leaking from a burst pipe, within the first hour of occurrence, in a suitable receptacle and removed from the site,</li> </ul>	

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<p>either for resale or for appropriate disposal at a recognized facility. File proof.</p> <ul style="list-style-type: none"> <li>⌚ Compile a waste management plan and implement it on site. The plan must focus on the waste hierarchy of the NEM:WA.</li> <li>⌚ Contain general waste in marked, sealable, refuse bins placed at a designated area and remove waste from the mining area to a recognised general waste landfill site.</li> <li>⌚ Prevent the burning or burying of waste on site.</li> <li>⌚ Report any significant spillage of chemicals, fuels etc. during the lifespan of the mining activities to the Department of Water and Sanitation and other relevant authorities.</li> <li>⌚ Do not allow machinery to overnight in the riverbed. Park the machinery at the stockpile area with drip trays placed underneath stationary vehicles.</li> </ul>	
<ul style="list-style-type: none"> <li>⌚ Winning of sand.</li> <li>⌚ Sloping and landscaping upon closure of the mining area.</li> </ul>	<p><b><u>Hydrology:</u></b></p> <ul style="list-style-type: none"> <li>⌚ Impact on the flow regime of the river.</li> <li>⌚ Impact on downstream water users.</li> <li>⌚ Residual impact on the flow regime of the Orange River.</li> </ul>	<ul style="list-style-type: none"> <li>⌚ Visible beacons indicating the boundary of the mining area.</li> <li>⌚ Water use authorisation as issued by the DWS.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>⌚ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>⌚ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>⌚ Do not change, the flow of the river, or dam or divert it without prior authorisation from the DWS.</li> <li>⌚ Ensure no activities take place without the necessary DWS approval, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan.</li> <li>⌚ Restrict mining to the exposed excavation area. Monitor flooding levels of the river, and halt all activities within the exaction area and the site</li> </ul>	<p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> <li>⌚ Daily compliance monitoring by site management.</li> <li>⌚ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>



SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<p>cleared at least a week before the entire flooding of the area.</p> <ul style="list-style-type: none"> <li>∩ Place a buffer of at least 20 m around any water body (flowing or standing) associated with the Orange River, prevent any activities within these buffer areas. Treat the buffer areas as a dynamic zone to be adjusted with the rising and falling of the water level.</li> <li>∩ Use the existing access into the river. Do not make changes to the banks of the river without prior authorisation from the DWS.</li> <li>∩ Place a buffer of 10 m around the intact riparian fringe (apart from the access road through the riparian fringe) and treat it as a no-go zone. Natural vegetation must be encouraged within the 10 m buffer.</li> <li>∩ Adhere at all times to the requirements of the water use authorisation to be obtained prior to the commencement of the mining activities.</li> <li>∩ Do not store equipment of any kind within the excavation area (operational phase).</li> <li>∩ Place all material stockpiles outside of the riparian fringe and ensure no stockpiled material remains within the sandbar overnight. Use the stockpiling area.</li> <li>∩ Remove all mining related equipment/machinery from the riverbed upon closure.</li> </ul>	
<ul style="list-style-type: none"> <li>∩ Winning of sand.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Potential impact on areas/infrastructure of heritage or cultural concern.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Contact number of an archaeologist that can be contacted when a discovery is made on site.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>∩ Daily compliance monitoring by site management.</li> <li>∩ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>∩ Confine all mining to the development footprint area.</li> <li>∩ Implement the following change find procedure when discoveries are made on site: <ul style="list-style-type: none"> <li>▪ If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.</li> <li>▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.</li> <li>▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify SAHRA.</li> <li>▪ Work may only continue once the go-ahead was issued by SAHRA.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>∩ Screening, stockpiling and transporting material from site.</li> <li>∩ Winning of sand.</li> </ul>	<p><b><u>Hydrology:</u></b></p> <ul style="list-style-type: none"> <li>∩ Storm water management</li> </ul>	<ul style="list-style-type: none"> <li>∩ Storm water management structures such as berms to direct storm- and runoff water around the stockpiled topsoil area (when needed).</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>∩ Control drainage to ensure that runoff from the stockpile area does not culminate in off-site</li> </ul>	<p>Applicable throughout site establishment-, operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>∩ Daily compliance monitoring by site management.</li> <li>∩ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
			<p>pollution, flooding or result in damage to properties downstream or storm water discharge points.</p> <ul style="list-style-type: none"> <li>∩ Divert storm water around the topsoil heaps to prevent erosion.</li> <li>∩ Use silt traps where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.</li> <li>∩ Construct earthen berms/sediment traps within the downslope area of the stockpiles and the screening plant.</li> <li>∩ Conduct activity in terms of the Best Practice Guidelines for small-scale mining as developed by DWS.</li> </ul>	
<ul style="list-style-type: none"> <li>∩ Screening, stockpile, and transporting material from site.</li> </ul>	<p><b><u>Existing Infrastructure:</u></b></p> <ul style="list-style-type: none"> <li>∩ Deterioration of the access road to the mining area.</li> <li>∩ Overloading of trucks having an impact on the public roads.</li> </ul>	<ul style="list-style-type: none"> <li>∩ Grader to restore the road surface when needed.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>∩ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>∩ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>∩ Divert storm water around the access road to prevent erosion.</li> <li>∩ Restrict vehicular movement to the existing access road to prevent crisscrossing of tracks through undisturbed areas.</li> <li>∩ Repair rutting and erosion of the access road caused as a direct result of the mining activities.</li> <li>∩ Prevent the overloading of the truck, and file proof of load weights for auditing purposes.</li> </ul>	<p>Applicable throughout operational phases.</p> <ul style="list-style-type: none"> <li>∩ Daily compliance monitoring by site management.</li> <li>∩ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY AND TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
<ul style="list-style-type: none"> <li>☞ Site establishment.</li> <li>☞ Winning of sand.</li> <li>☞ Screening, stockpiling and transporting material from site.</li> <li>☞ Sloping and landscaping upon closure of the mining area.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Potential health and safety risks to employees.</li> </ul>	<ul style="list-style-type: none"> <li>☞ Stocked first aid box.</li> <li>☞ Level 1 certified first aider.</li> <li>☞ All appointments in terms of the Mine Health and Safety Act, 1996.</li> </ul>	<p><u>Role:</u></p> <ul style="list-style-type: none"> <li>☞ Site Manager to ensure day-to-day compliance with the guidelines as stipulated in the EMPR.</li> <li>☞ Compliance to be monitored by the independent Environmental Control Officer during the annual environmental audit.</li> </ul> <p><u>Responsibility:</u></p> <ul style="list-style-type: none"> <li>☞ Ensure adequate ablution facilities and water for human consumption is daily available on site.</li> <li>☞ Ensure that workers have access to the correct PPE as required by law.</li> <li>☞ Manage all operations in compliance with the Mine Health and Safety Act, 1996 (Act No 29 of 1996).</li> </ul>	<p>Applicable throughout operational-, and decommissioning phases.</p> <ul style="list-style-type: none"> <li>☞ Daily compliance monitoring by site management.</li> <li>☞ Annual compliance monitoring of site by an Environmental Control Officer.</li> </ul>

**l) Indicate the frequency of the submission of the performance assessment/environmental audit report.**

The Environmental Audit Report in accordance with Appendix 7 as prescribed in Regulation 34 of the EIA Regulations, 2014 (as amended) will annually be submitted to DMR for compliance monitoring purposes or in accordance with the time period stipulated by the Environmental Authorisation.

**m) Environmental Awareness Plan**

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

Once the Applicant received the mining permit and may commence with the proposed activity, a copy of the Environmental Management Programme will be handed to the site manager for his perusal. Issues such as the mining boundaries, fire principals and waste handling will be discussed.

An induction meeting will be held with all the site workers to inform them of the Basic Rules of Conduct with regard to the environment.

**ii) Manner in which risk will be dealt with in order to avoid pollution or the degradation of the environment.**

The operations manager must ensure that he/she understands the EMPR document and its requirement and commitments before any mining takes place. An Environmental Control Officer needs to check compliance of the mining activity to the management programmes described in the EMPR.

The following list represents the basic steps towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks.

3 **Site Management:**

- Stay within boundaries of site – do not enter adjacent properties.
- Keep tools and material properly stored.
- Smoke only in designated areas.
- Use toilets provided – report full or leaking toilets.

3 **Water Management and Erosion:**

- Check that rainwater flows around work areas and are not contaminated.
- Report any erosion.
- Check that dirty water is kept from clean water.

3 **Waste Management:**

- Take care of your own waste
- Keep waste separate into labelled containers – report full bins.
- Place waste in containers and always close lid.
- Don't burn waste.
- Pick-up any litter laying around.

3 **Hazardous Waste Management (Petrol, Oil, Diesel, Grease)**

- Never mix general waste with hazardous waste.
- Use only sealed, non-leaking containers.
- Keep all containers closed and store only in approved areas.
- Always put drip trays under vehicles and machinery.
- Empty drip trays after rain.
- Stop leaks and spills, if safe:
  - ✓ Keep spilled liquids moving away.
  - ✓ Immediately report the spill to the site manager/supervision.
  - ✓ Locate spill kit/supplies and use to clean-up, if safe.
  - ✓ Place spill clean-up wastes in proper containers.
  - ✓ Label containers and move to approved storage area.

3 **Discoveries:**

- Stop work immediately.
- Notify site manager/supervisor.
- Includes – archaeological finds, cultural artefacts, contaminated water, pipes, containers, tanks and drums, any buried structures.

3 **Air Quality:**

- Wear protection when working in very dusty areas.
- Implement dust control measures:
  - ✓ Water all roads and work areas.

- ✓ Minimize handling of material.
- ✓ Obey speed limit and cover trucks.

3 **Driving and Noise:**

- Use only approved access roads.
- Respect speed limits.
- Only use turn-around areas – no crisscrossing through undisturbed areas.
- Avoid unnecessary loud noises.
- Report or repair noisy vehicles.

3 **Vegetation and Animal life:**

- Do not remove any plants or trees without approval of the site manager.
- Do not collect fire wood.
- Do not catch, kill, harm, sell or play with any animal, reptile, bird or amphibian on site.
- Report any animal trapped in the work area.
- Do not set snares or raid nests for eggs or young.

3 **Fire Management:**

- Do not light any fires on site, unless contained in a drum at demarcated area.
- Put cigarette butts in a rubbish bin.
- Do not smoke near gas, paints or petrol.
- Know the position of firefighting equipment.
- Report all fires.
- Don't burn waste or vegetation.

**n) Specific information required by the Competent Authority**

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

The Applicant undertakes to annually review and update the financial provision calculation, upon which it will be submitted to DMR for review and approved as being sufficient to cover the environmental liability at the time and for closure of the mine at that time.

## 2. UNDERTAKING

The EAP herewith confirms

- a) the correctness of the information provided in the reports
- b) the inclusion of comments and inputs from stakeholders and I&AP's
- c) the inclusion of inputs and recommendations from the specialist reports where relevant,   
and
- d) that the information provided by the EAP to interested and affected parties and any response by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein



---

Signature of the environmental assessment practitioner:

Greenmined Environmental (Pty) Ltd

---

Name of Company:

09 November 2019

---

Date:

**-END-**



**APPENDIX A**  
**REGULATION 2(2) MINE MAP**



# APPENDIX B

## LOCALITY MAP



# APPENDIX C

## SITE ACTIVITIES PLAN



# APPENDIX D

## LAND USE MAP



# APPENDIX E

## REHABILITATION MAP



# APPENDIX F

## TRANSFER OF LIABILITIES



**APPENDIX G1 & G2**  
**COMMENTS AND RESPONSE REPORT**  
**&**  
**PROOF OF PUBLIC PARTICIPATION**



# APPENDIX H

## RISK MATRIX ASSESSMENT





**APPENDIX I**  
**SUPPORTING IMPACT ASSESSMENT**



## ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, herewith please receive an environmental impact statement that summarises the impact that the proposed activity may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

<b><u>ENVIRONMENTAL IMPACT STATEMENT</u></b>			
<b>SITE ALTERNATIVE 1</b>			
<b><u>TYPE OF IMPACT</u></b>	<b><u>DURATION</u></b>	<b><u>LIKELIHOOD</u></b>	<b><u>SIGNIFICANCE</u></b>
<p><u>Site Establishment:</u></p> <ul style="list-style-type: none"> <li>⌘ Visual intrusion as a result of site establishment.</li> <li>⌘ Potential impact on the CBA.</li> <li>⌘ Loss of topsoil and fertility during mining and stockpiling (stockpile area)</li> <li>⌘ Infestation of the topsoil heaps and mining area with invader plant species.</li> <li>⌘ Potential impact on fauna (aquatic &amp; terrestrial) within the footprint area.</li> <li>⌘ Dust nuisance as a result of the mining activities.</li> <li>⌘ Noise nuisance as a result of the mining activities.</li> <li>⌘ Work opportunities to 4 local residents <b>(Positive Impact)</b></li> </ul>	<p><b>Duration of site establishment phase (&lt;1 month)</b></p>	<p><b>Possible</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Definite</b></p>	<p><b>Low-Medium Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Medium-High (+)</b></p>
<p><u>Winning of sand:</u></p> <ul style="list-style-type: none"> <li>⌘ Soil contamination from hydrocarbon spills.</li> <li>⌘ Disturbance to aquatic fauna within the footprint area.</li> <li>⌘ Impact on the flow regime of the river.</li> <li>⌘ Impact on downstream water users.</li> <li>⌘ Noise nuisance as a result of the mining activities.</li> <li>⌘ Potential impact on areas/infrastructure of heritage or cultural concern.</li> <li>⌘ Loss of mining equipment due to unexpected flooding.</li> </ul>	<p><b>Duration of operational phase (5 years maximum)</b></p>	<p><b><u>LIKELIHOOD</u></b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p> <p><b>Low Possibility</b></p>	<p><b><u>SIGNIFICANCE</u></b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p> <p><b>Low Concern</b></p>

<p><u>Screening, stockpiling and transporting material from site:</u></p> <ul style="list-style-type: none"> <li>∩ Loss of stockpiled material due to ineffective storm water control</li> <li>∩ Dust nuisance as a result of the mining activities.</li> <li>∩ Noise nuisance as a result of the mining activities.</li> <li>∩ Potential impact associated with littering and hydrocarbon spills.</li> <li>∩ Infestation of denuded areas with invader plant species.</li> <li>∩ Deterioration of the access road to the mining area.</li> <li>∩ Overloading of trucks having an impact on the public roads.</li> </ul>	<p style="text-align: center;"><b>Duration of operational phase (5 years maximum)</b></p>	<p style="text-align: center;"><b><u>LIKELIHOOD</u></b></p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Possible</p>	<p style="text-align: center;"><b><u>SIGNIFICANCE</u></b></p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low-Medium Concern</p>
<p><u>Sloping and landscaping upon closure of the mining area:</u></p> <ul style="list-style-type: none"> <li>∩ Erosion of returned topsoil after rehabilitation (stockpile area).</li> <li>∩ Residual impact on the flow regime of the Orange River.</li> <li>∩ Infestation of the reinstated area with invader plant species.</li> <li>∩ Noise nuisance as a result of the decommissioning activities</li> <li>∩ Potential impact associated with litter/hydrocarbon spills left at the mining area.</li> <li>∩ Return of the stockpile area to agricultural use by the landowner (<b>Positive Impact</b>).</li> </ul>	<p style="text-align: center;"><b>Duration of decommissioning phase (±2 months)</b></p>	<p style="text-align: center;"><b><u>LIKELIHOOD</u></b></p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Low Possibility</p> <p style="text-align: center;">Definite</p>	<p style="text-align: center;"><b><u>SIGNIFICANCE</u></b></p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Low Concern</p> <p style="text-align: center;">Medium-High (+)</p>

# APPENDIX J

## FINANCIAL AND TECHNICAL ABILITY



**APPENDIX K**  
**INVASIVE PLANT SPECIES**  
**MANAGEMENT PLAN**



**APPENDIX L**  
**PHOTOGRAPHS OF THE PROPOSED**  
**SITE**



**PHOTOGRAPHS OF THE EXCAVATION AREA IN THE ORANGE RIVER**



**PHOTOGRAPHS SHOWING THE EXISTING ACCESS ROAD INTO THE RIVER**



**PHOTOGRAPHS SHOWING THE EXISTING STOCKPILE AREA TO BE USED**





**VIEW OF THE EXISTING ACCESS ROAD**



**APPENDIX M**  
**PROOF OF WATER AUTHORISATION**  
**APPLICATION**



# APPENDIX N

## CV AND PROOF OF EXPERIENCE OF THE EAP

