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Proposed Sand Mining Project, Situated in the Magisterial District of Sasolburg, Free State Province

DRAFT REPORT FOR PUBLIC REVIEW

Basic Assessment Report

Prepared for:

Copper Sunset Sand (Pty) Ltd

Project Number:

COP6147



July 2020



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This document has been prepared by Digby Wells Environmental.

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IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

- 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;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives,
- undertake 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:
 - the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - the degree to which these impacts—
 - can be reversed;
 - may cause irreplaceable loss of resources; and
 - can be managed, avoided or mitigated;
- 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—
 - identify and motivate a preferred site, activity and technology alternative;
 - identify suitable measures to manage, avoid or mitigate identified impacts; and
 - identify residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Introduction

Digby Wells Environmental (Digby Wells) has been appointed by Copper Sunset Sand (Pty) Ltd (Copper Sunset) to assist in applying for a Mining Permit for Listed Activities triggered under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). Copper Sunset intends to mine sand on a 5 Hectare (ha) area that occurs within the existing Seriti New Vaal mining area (New Vaal Life Extension Project) in the Free State Province. Copper Sunset intends to obtain a Mining Permit through completing a Mining Permit Application (MPA) in terms of Section 27 of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

Project Applicant

The particulars for Copper Sunset are detailed in the table below.

Company name:	Copper Sunset Sand (Pty) Ltd
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Project Overview

Copper Sunset seeks to undertake sand mining in the Free State Province. The proposed project falls within an existing Mining Right Area (MRA) of the New Vaal Colliery. Seriti Resources (Seriti) is the holder of the Mining Right that permits the mining and extraction of coal. The proposed Copper Sunset sand mining area is situated immediately south of Vereeniging on the banks of the Vaal River about 70 km south of Johannesburg.

Copper Sunset entered into an agreement with Seriti to mine sand within 5 ha of the MRA. The proposed sand mining project is anticipated to continue for approximately five months. Subsequently, Seriti will proceed to mine coal from the area earmarked for the sand mining. Should the Mining Permit be approved, Copper Sunset will apply for a Mining Right to mine an additional 9.2 ha of sand within the same MRA. This will, however, be applied for in a separate application under a separate environmental authorisation process.

Strip mining will be utilised to mine the sand. The sand will be mined in strips of 30 – 35 m in width and 3 m in depth. The length of the strips is dependent on the area to be mined but approximate lengths are in the region of 180 – 600 m. The mining activities to be applied includes:

- Clearing of vegetation;
- Stripping and stockpiling of topsoil;
- Construction of a temporary haul road;
- Mining of the sand resources including screening;
- Backfilling of the mined excavations with overburden and the stockpiled topsoil; and
- All-natural re-vegetation of the rehabilitated area.

There will be no change to the existing New Vaal Colliery infrastructure and minimal infrastructure will be constructed on site for the sand mining operation. All machinery, including offices will be mobile and brought in by Copper Sunset. A haul road will be constructed to gain access to the sand mine so as not to disturb the coal mining operation.

The proposed mining activity triggers Listing Notice 1, Activity 21 and Activity 24 and therefore a Basic Assessment Application process is required to obtain the necessary Environmental Authorisation (EA). This Basic Assessment Report (BAR) has thus been compiled in support of the EA application.

Purpose of this Report

The overarching objectives of this BAR are to:

- Describe the status quo of the biophysical and social environment of the project area;
- Identify and assess potential environmental impacts associated with the proposed project; and
- Recommend mitigation and management measures to ensure that the mining operation is undertaken in such a way as to minimise negative impacts and enhance positive impacts. These are included in an Environmental Management Programme Report (EMPr) in terms of the NEMA.

This draft BAR will be made available to the public for input and comments over a legislative 30-day comment period, which will then be addressed and incorporated into a Final BAR to be submitted to the Department of Mineral Resources (DMR) for consideration.

Environmental Consultants

Contact details for the independent EAP are provided in the table below.

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EAPASA Registration No.	2019/1013

Approach and Methodology for the Public Participation Process

A Public Participation Process (PPP) as per the EIA Regulations, 2014 (GN R 982 of 4 December 2014 as amended by GN R 326 of 7 April 2017 (EIA Regulations, 2014), as amended, promulgated under the NEMA, has been initiated. The PPP is designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate the proposed project. The aim is to maximise the project benefits while minimising its adverse effects.

The PPP for the proposed project has and will follow the steps provided below:

- Stakeholder database was developed to ensure I&APs details are correct and to identify any I&APs surrounding the larger area;
- A letter and Background Information Document (BID) detailing the proposed project and availability of the Draft BAR was sent to all registered I&APs on 08 July 2020 via email;
- An advertisement was placed in one local newspaper in English notifying I&APs of the proposed project and availability of the Draft BAR as well as inviting registration of I&APs and comments;
- Site notices were placed at prominent public areas around the project area to notify stakeholders of the project;
- Due to COVID-19 Regulations the Draft BAR has been released electronically;
- The Draft BAR was placed on the Digby Wells website and can be accessed via our data-free service for the prescribed 30-day comment period;
- All comments received during the project will be captured in a Comments and Responses Report (CRR);
- The Draft BAR will be updated to a final version and submitted to the DMR for review and consideration;

- Once the competent authority provides a decision about the proposed project, a letter will be distributed to registered I&APs. The letter will contain the competent authority's decision and relevant details of the appeal procedure.

Summary of the Potential Environmental Impacts

A large extent of the proposed project area has been transformed in terms of the soil profile and vegetation, mostly as a result of the historical disturbance created by the established oak plantation, roads and a mine stockpile. The main potential environmental impacts identified from the proposed sand mine have been discussed below.

Soils Compaction and Soil Erosion

Mining activities on site will result in exposed soil, which could result in soil erosion. Erosion can lead to the destruction of natural habitats. Additionally, movement of machinery on site may result in soil compaction. It is however noted that the area has already been heavily disturbed and therefore the impact will be of low significance with the implementation of the proposed mitigation measures.

Loss of Habitat

Vegetation or habitat loss is unavoidable during the construction phase of the project. This will, however, be limited to the footprint of the infrastructure (haul road and mining area). Care must be taken to manage any species of special concern.

Establishment and Spread of Alien Plant Species

Alien plant invasion is expected to occur in disturbed areas, however, with the implementation of the proposed mitigation measures this impact can be reduced from moderate to low. This should be mitigated through the establishment of an alien invasive management plan to ensure the establishment of indigenous vegetation.

Water Resources

The significance of the impacts of the mine on this aspect has been assessed as 'very low' (negligible) with the implementation of mitigation measures as no water courses are located within the mining footprint.

Noise Generation

Noise generation as a result of machinery and vehicles operated on site is likely to impact on the surrounding receptors in close proximity to the site. However, due to the small-scale nature of the proposed mining activity, and therefore basic machinery and equipment, this impact is expected to be of very low significance. Also, the project area is located near Seriti Colliery and therefore in comparison the impact is insignificant.

Air Quality

Site preparation activities, excavation, loading and offloading of the sand material and decommissioning activities will result in the generation of fugitive dust. Air quality emissions will be of low significance. The recommended mitigation measures in this report should reduce the impact for these activities on the ambient air quality to a low significance.

Socio-economic

Mining is important for economic development, employment creation and revenue collection. The proposed project will create short term employment opportunities directly associated with the construction and operational phase of the development, while additional economic benefits in the construction industry are highly likely.

Conclusions and Recommendations

Based on the environmental assessment presented in this report and the specialists' reports, it is the conclusion of this Basic Assessment that the main impacts of concern are the establishment of alien invasive species, loss of soil, soil compaction, soil contamination and soil erosion.

Further, assuming all phases of the project adhere to the conditions stated in the Environmental Management Programme (EMPr) (Part B Section 5 of this report), it is believed that all impacts associated with the proposed sand mining project will have no significant, adverse environmental impacts on the surrounding environment. No environmentally sensitive features were identified on the preferred site which need to be considered during construction and operational phases.

Key findings of the environmental impact assessment include:

- All the identified impacts will be localised, short term and will have a moderate and minor significance. The significance of potential environmental impacts can be reduced with the implementation of mitigation measures and monitoring; and
- Cumulative fauna and flora, noise, and air quality (dust) impacts are deemed to not be significant (low) when proper mitigation measures are implemented.

Therefore, there are no fatal flaws associated with the proposed project and is further considered to be a suitable activity for the location it is being proposed in. The significance of impacts identified can be greatly reduced with the correct management practises. It is recommended that the proposed project can be granted Environmental Authorisation, with the implementation of the following key recommendations:

- Only clear vegetation and remove topsoil when and where necessary;
- Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high;
- Ensure that machinery is regularly serviced in accordance with manufacturing specifications;

- Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with the South African National Standards;
- Sewage will be collected in portable chemical toilets to reduce the risk of contamination. The portable toilets must be available in the area where mining is taking place as well as at the mine offices and supplied and serviced by a legally compliant and reputable supplier;
- Any dirty water generated from the mining operation or office area must be collected and are not permitted to be discharged to the environment;
- Visual assessments of the site will be conducted on a regular basis to monitor potential soil erosion;
- Ensure that waste is disposed of correctly according to different waste streams;
- Appropriate dust abatement measures must be implemented in areas where required;
- Enclose the screening circuit to contain associated airborne dust (if screening process is used);
- Conduct activities judiciously on windy days (wind speed ≥ 5.4 m/s);
- Vehicles will obey speed limits (30 km/hr);
- Minimise drop heights when loading onto trucks and at conveyor tipping points;
- Monitoring of dustfall rates and PM10 on a monthly basis around the mining area to ensure compliance with the National Dust Control Regulation 2013 (GG36974 GN 827) (NDCR);
- Switch off equipment when not in use;
- Berms must be constructed around the periphery of the mining site to separate clean and dirty water. Water within the mining site must be diverted to the water sump;
- Site clearing and mining activities to take place during daylight hours only;
- Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided;
- Promote labour -intensive construction methods;
- Walk through of the area to ensure that no Species of Conservation Concern (SCC) are impacted upon as a result of sand mining activities;
- Invasive or exotic plant species should not be allowed to establish during and after the operational phase (undertake an alien invasive monitoring programme);
- Concurrent rehabilitation should take place;
- Chance Finds Procedures (CFPs) and Fossil Finds Procedure (FFP) must be developed and clearly describe the reporting process and appropriate management of the exposure of previously unidentified heritage resources;



- The backfilled area must be sloped so as to avoid ponding of water. Should ponding occur the area must be re-sloped, and water must be drained from the area;
- Limited movement of vehicles on newly rehabilitated areas;
- Ensure no contaminated soil is used for rehabilitation purposes;
- A waste management system must be implemented to ensure that domestic and hazardous waste, including sewage, generated during decommissioning and closure are disposed of in a manner that will not affect the soil environment;
- All infrastructure must be completed removed from site after mining is completed;
- Monitoring of the rehabilitated area for vegetation regrowth and removal of alien invasive plant species; and
- Where vegetation establishment is not successfully implemented additional measures to encourage vegetation growth must be undertaken.

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LIST OF ACRONYMS

Abbreviation	Explanation
BAR	Basic Assessment Report
BID	Background Information Document
Copper Sunset	Copper Sunset Sand (Pty) Ltd
CRR	Comments and Response Report
DMR	Department of Mineral Resources
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
ESA	Early Stone Age
FDDM	Fezile Dabi District Municipality
FFP	Fossil Finds Procedure
FSPSDF	Free State Province Spatial Development Framework
GDP	Gross Domestic Product
ha	Hectare
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
VTAPA	Vaal Triangle Airshed Priority Area
km	kilometer
km ²	square kilometer
LSA	Late Stone Age
m	meter
mm	millimetres
MAE	Mean Annual Evaporation
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MLM	Metsimaholo Local Municipality
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
MRA	Mining Right Area

Abbreviation	Explanation
mya	Million years ago
MSA	Middle Stone Age
NEM: AQA	National Environmental Management: Air Quality 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)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
PPP	Public Participation Process
RE	Remaining Extent
SAHRA	South African Heritage Resources Agency
WMA	Water Management Area

Part A – Scope of Assessment and Basic Assessment Report

1 Introduction

Copper Sunset Sand (Pty) Ltd (Copper Sunset) seeks to undertake sand mining in the Free State Province. The proposed project area falls within an existing Mining Right Area (MRA) of the Seriti New Vaal Colliery. Copper Sunset intends to obtain a Mining Permit through completing a Mining Permit Application (MPA) in terms of Section 27 of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

Seriti Resources (Seriti) is the holder of a Mining Right for New Vaal Colliery which permits the mining and extraction of coal. The New Vaal Colliery is situated immediately south of Vereeniging on the bank of the Vaal River about 70 km south of Johannesburg, in the Free State Province.

Copper Sunset entered into an agreement with Seriti to mine sand within the MRA by means of strip mining due to the shallow depth of the sand deposit. The areas proposed for sand mining (approximately 14.2 Hectare (ha)) falls within the extension area. To minimise potential delays to Seriti's mining plan, Copper Sunset has divided the sand mining area into two parts: an area of 5 ha, which will be mined first and a second area of 9.2 ha which will be mined at a later stage. The Environmental Authorisation application and this Basic Assessment Report (BAR) will therefore focus on the 5 ha area only for this phase of the project.

The following infrastructure and equipment will be utilised for the mining activities:

- Haul roads;
- Solar power batteries;
- Portable toilets;
- Water bowser;
- Portable diesel storage tank
- Offices including security check point;
- Tipper trucks;
- Front end loader;
- Screening machinery (if required);
- Excavator;
- Grader;
- Water bowser; and
- Bulldozer.

The proposed project is anticipated to continue for approximately five months. Once mining activities are completed, Seriti will then mine the area for coal.

The proposed project triggers Listed Activities in terms of the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 4 December 2014 as amended by GN R 326 of 7 April 2017) promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The proposed project triggers Listing Notice 1 (GN R 983 of 4 December 2014 amended by GNR 327 of 7 April 2017), Activity 21 and Activity 24, as follows:

- “Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).”
- “The development of a road— (ii) with a reserve wider than 13 5 meters, or where no reserve exists where the road is wider than 8 metres.”

2 Project Applicant

The section below provides the Applicant and Environmental Assessment Practitioner (EAP) details.

2.1 Details of Applicant

The particulars for Copper Sunset are detailed in the table below.

Table 2-1: Contact Details of the Applicant

Name of Applicant:	Copper Sunset (Pty) Ltd
Registration number (if any):	2006/036057/07
Contact person:	Trudie Vosloo
Physical address:	P.O. Box 413712; Craighall, 2024
Postal code:	P.O. Box 914, Bedfordview, 2008
Telephone:	+27 11 622 1785
Email:	trudie@tvosloo.com

2.2 Details of the EAP

Digby Wells Environmental (Digby Wells) has been appointed by Copper Sunset as the independent EAP to conduct a Basic Assessment process according to the NEMA, as well as the required Public Participation Process (PPP). The particulars of the EAP are provided in the Table 2-2 and the Curriculum Vitae and EAP qualifications are attached in Appendix A.

Table 2-2: Contact Details of the EAP

Company Name:	Digby Wells Environmental
Name of Practitioner:	Claire Wannenburg
Telephone:	011 789 9495
Fax:	011 069 6801
Email:	claire.wannenburg@digbywells.com
Physical Address:	Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191, South Africa
Postal Address:	Private Bag X10046, Randburg, 2125
EAPASA Registration No.	2019/1013

2.2.1 The Qualifications of the EAP

Ms Wannenburg holds the following degrees:

- Bachelor of Science (BSc) Honours – University of Pretoria (2013); and
- Bachelor of Science (BSc) – University of Pretoria (2012).

2.2.2 Summary of the EAP's Past Experience

Claire Wannenburg is an Environmental Consultant at Digby Wells. She holds a Bachelor of Science (BSc) in Environmental Science (2010-2012) and has completed her BSc (Honours) in Environmental Management and Analysis (2013-2013) from the University of Pretoria where she majored in Environmental Impact Assessment, Auditing and Environmental Law. Claire is a hard-working individual, a good team player and always strives to perform to the best of her abilities. She has seven years' experience and has managed various Performance Assessments and Water Use License Audits and has worked as an Environmental Control Officer. She has also managed high profile Environmental Impact Assessments; Basic Assessments; Water Use License and Permitting Applications; Environmental Management Programme Amendments; Green Star Environmental Management Programmes and Auditing. She was awarded Golden Key International Membership which recognises the top 15% of students per field of study in any undergraduate and post-graduate degree. Claire is also ISO14001 certified as an internal lead auditor and is registered as an Environmental Assessment Practitioner (EAPASA Ref No. 2019/1013).

3 Locality Map

Figure 3-1 illustrates the regional setting of the project area (Refer to Plan 1 in Appendix B). The project area is located 2.8 km south of Vereeniging and approximately 18 km northeast of Sasolburg. It falls under the Fezile Dabi District Municipality (FDDM) and the Metsimaholo Local Municipality (MLM) of the Free State Province (refer to Figure 3-2 for the locality map and Plan 2 in Appendix B).

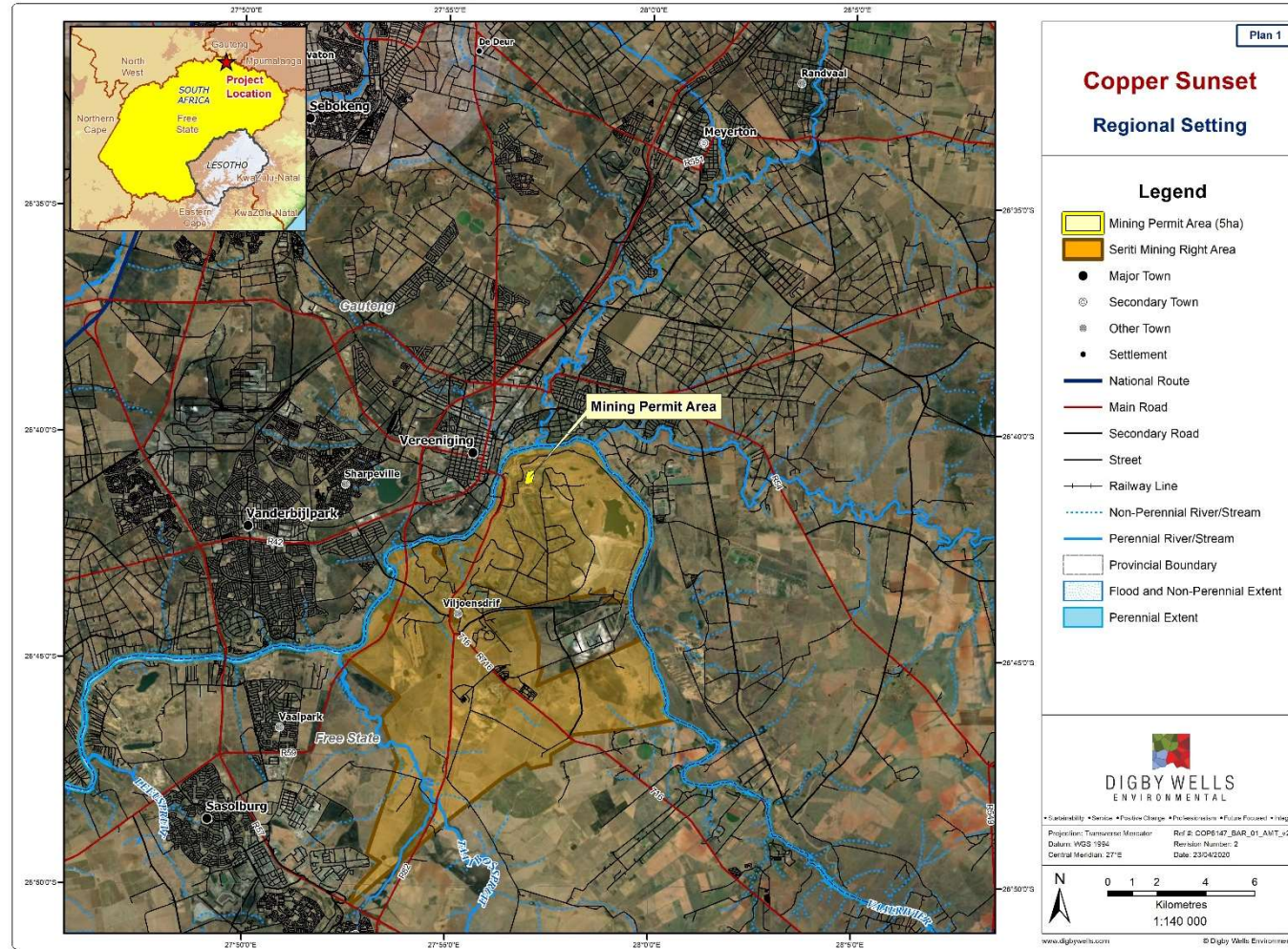


Figure 3-1: Regional Setting

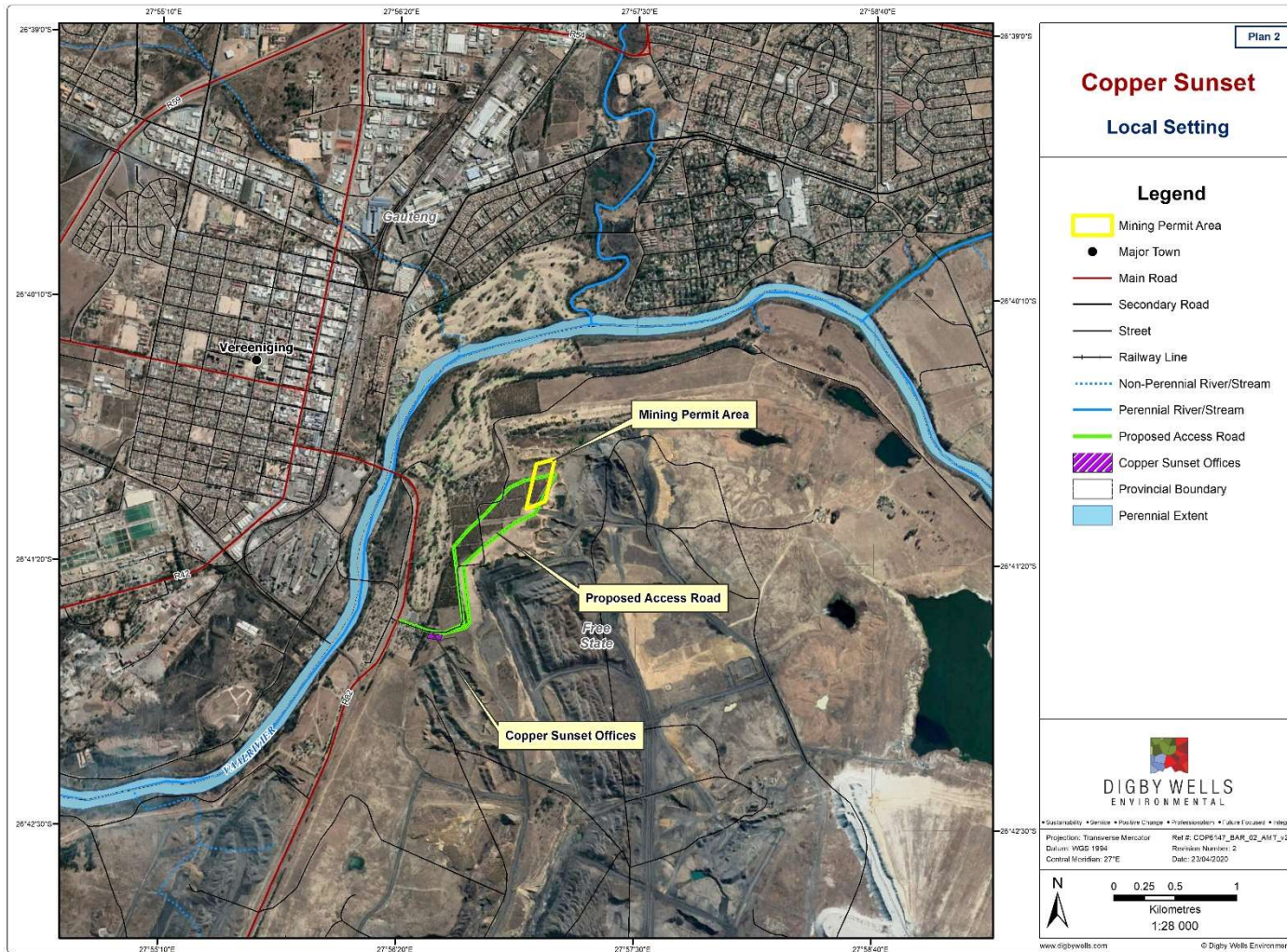


Figure 3-2: Locality Map

4 Location of the Overall Activity

Table 4-1 below provides the property details associated with the activities under application. The proposed project is located on the farm Maccaw Vlei located in the Free State Province. Refer to Figure 4-1 for the Land Tenure Map (Refer to Plan 3 in Appendix B).

Table 4-1: Property Details

Farm name:	The proposed project is located on the remaining extent of the farm Maccaw Vlei No. 121.		
Application area (Ha):	5 ha		
Magisterial district:	The proposed project is located in the northern part of the Free State Province and falls under the Fezile Dabi District Municipality in the Sasolburg Magisterial District.		
Distance and direction from nearest town:	The proposed project is located approximately 2.8 km south of the town of Vereeniging.		
21digit Surveyor General Code for each farm portion:	Farm	Portion	21 Digit Code
	Maccaw Vlei No. 121	RE	F01600000000012100000

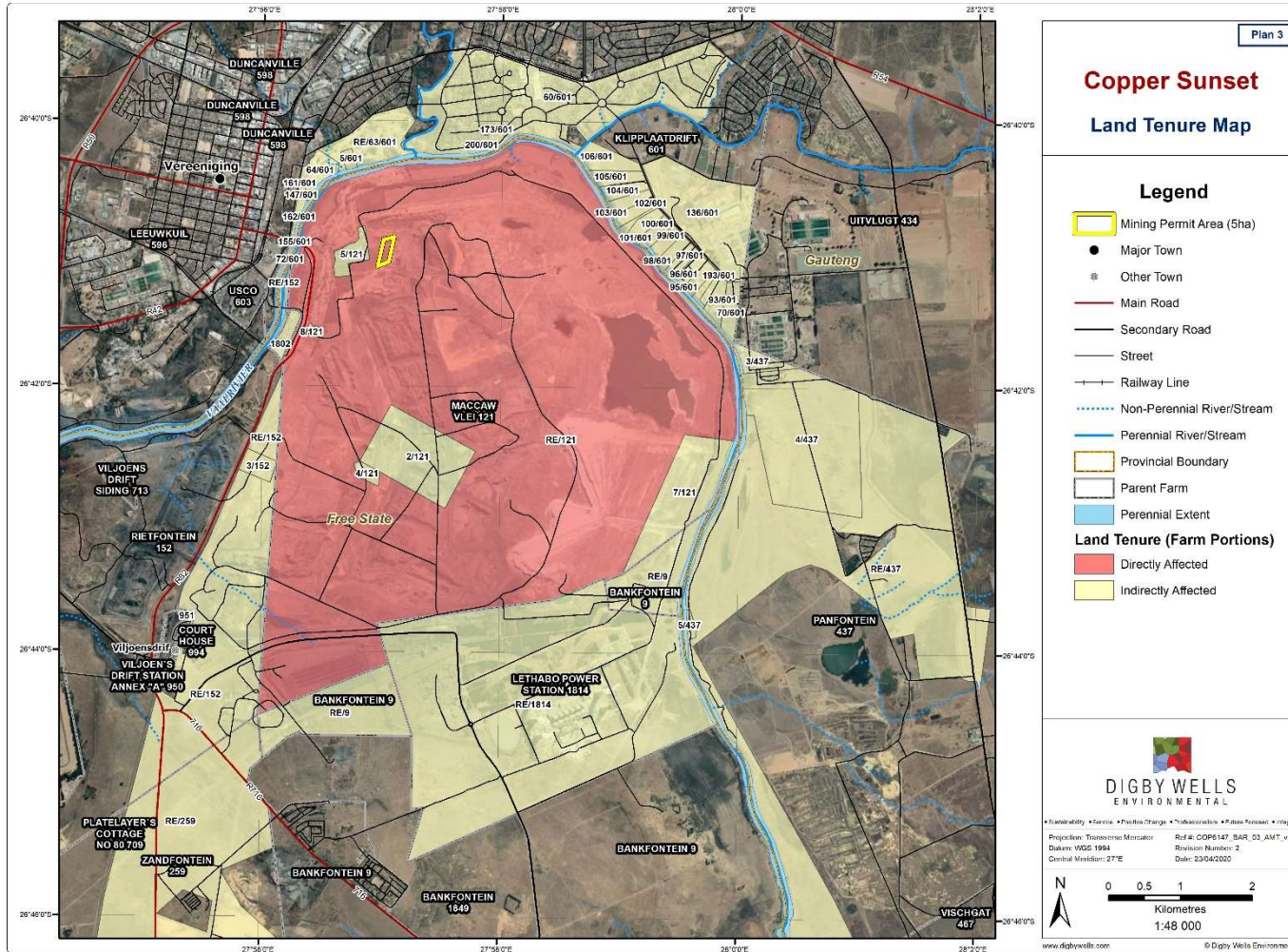


Figure 4-1: Land Tenure Map

5 Description of the Scope of the Proposed Overall Activity

Copper Sunset’s proposed sand mining operation is located within an existing MRA. The mining method to be applied includes:

- Stripping and stockpiling of topsoil;
- Construction of a temporary haul road;
- Mining of the sand resource including a screening process;
- Backfilling of the mined excavations with overburden and the stockpiled topsoil; and
- Concurrent rehabilitation.

5.1 Listed and Specified Activities

Table 5-1 provides the identified Listed Activities as provided by the NEMA EIA Regulations 2014 (as amended). As indicated in the table below, only Regulation GN R.327 will be triggered, and therefore a BA process must be undertaken, and approval received prior to the activities being commenced with.

Table 5-1: Listed Activities

Name of Activity	Aerial Extent of the Activity	Listed Activity	Applicable Listing Notice
<p>Sand Mining of a 5ha area.</p> <p>“Any activity including the operation of that activity which requires a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)”.</p>	5 ha	X	Listing Notice 1 (GN R 327) Activity 21
<p>Construction of the haul road</p> <p>The development of a road— (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres</p>	4km in length 20m in width	X	Listing Notice 1 (GN R 327) Activity 24

5.2 Description of the Activities to be Undertaken

Copper Sunset intends to mine sand on a portion of the remaining extent of Maccaw Farm no. 121 located within the New Vaal Life Extension Project in the Free State Province. The sand deposit lies between 0.35 – 0.5 m below the surface. Strip mining will be utilised to recover the resource, with the sand mined in strips of 30 – 50 m in width and 3 m in depth. The length of the strips is dependent on the area to be mined but approximate lengths are in the region of 180 – 600 m. As each strip is excavated, the overburden will be placed in the excavation previously mined. Levelling and contouring of the backfilled excavation will be carried out and topsoil will be laid over to be revegetated. Once an excavation has been rehabilitated the next strip will be mined. The mining method and associated activities includes:

- Stripping and stockpiling of topsoil;
- Construction of a temporary haul road;
- Mining of the sand resource;
- Backfilling of the mined excavations with overburden and the stockpiled topsoil; and
- Concurrent rehabilitation.

The mine infrastructure to be constructed at the new proposed mining area is shown in Figure 5-1 and Plan 4 in Appendix B.

5.2.1 Resource Deposit

Copper Sunset is applying for a Mining Permit to mine general sand within the existing New Vaal Colliery MRA. The deposit extends over an area of 5 ha. The deposit is known to be an average of 3 m thick, yielding a total resource of approximately 150 000 m³ of sand. The sand will be extracted and mined out within five months.

The general sand to be mined comprises 90% plaster sand and 10% building sand. Copper Sunset intends to supply a number of clients who will most likely use the sand in the construction industry in the rapidly growing Northern Free State and Gauteng areas.

It is proposed that Copper Sunset will in future apply for a Mining Right to mine an additional 9.2 ha to extract the remaining sand within the area. This, however, has not been included in this application (BAR) and will require an additional environmental authorisation process.

5.2.2 Establishment Phase

A haul road will be constructed to gain access to the sand mining area so as not to disturb the coal mining operation. There will be no change to the existing New Vaal Colliery infrastructure and minimal infrastructure will be constructed on site for the sand mining operation. All machinery will be mobile and brought in by Copper Sunset. A mobile office will also be brought in, which will be utilised to house the mining equipment when not in use. The proposed mining area will also contain a portable toilet, portable diesel storage tank and water bowser.

5.2.3 Mining Method

The operation will make use of tipper trucks, a front-end loader, excavator, grader, water bowser; and bulldozer to mine the sand. Mining will commence with the removal of vegetation by means of a bulldozer, which will entail the removal of the oak trees (area was previously utilised for an oak plantation) and surrounding shrubbery. It is also noted that sand mining will also take place on top of some of the existing mine stockpiles and road. The topsoil will be removed by a bulldozer to a depth of about 0.3 – 0.4 m and stockpiled in a separate area for use for rehabilitation. Strip mining will take place in sequences of 30 – 50 m wide to extract the sand by means of light weight excavators. A screening process will also be utilised where required should sand become contaminated with unusable particles. The screening process will include the use of a Mobile Terex 3-Screening Machine or similar equipment. The mixed sand will be loaded onto the top of the machine and separated out into separate stockpiles, depending on the sand particle sizes. Only one additional Mobile Terex 3-Screening Machine or similar equipment would be utilised in the sand mining process, which will be moved from one area to the next within the MRA, as required. The use of the machine will not disturb any additional areas and will be placed on top of areas which will or have already been disturbed by the sand mining process.

The customer trucks will enter on the constructed haul road into the mining area. The haul road will be constructed as a loop so as to avoid the need to turn around and allow continuous flow of traffic. The mined-out sand will be placed directly onto the customers trucks and removed off site once full.

5.2.4 Closure and Rehabilitation Phase

Sand mining will cease once the resource has been extracted. Concurrent rehabilitation will be implemented during the sand mining process. The area which has been mined of sand will be backfilled with overburden, levelled and then contoured to avoid ponding of water. The topography is anticipated to be slightly lower as a result of the removal of sand. The area will then be allowed to naturally re-vegetate. This area is earmarked for future coal mining by Seriti as per their approved mining right. It is understood that if Seriti wish to mine the area immediately after Copper Sunset have ceased mining, the area may not be fully rehabilitated, however, Copper Sunset is choosing to rehabilitate the area to avoid the possibility of the area not being mined and left unrehabilitated.

5.2.5 Maintenance of Rehabilitated Areas

Copper Sunset will remain responsible for the rehabilitated area until such time as Seriti re-mine the area to extract the coal deposits. The rehabilitated area will be monitored to ensure that vegetation regrowth is occurring and that alien invasive species are continuously removed/managed.

5.2.6 Management of Stockpiles

Topsoil will be stockpiled around the mining area in a berm of 200 m in length and the height will not exceed 3 m. The overburden of the first few pits will be stockpiled such that they can be used to close the last open strips (if necessary). Due to the lack of watercourses on the site, there is no risk of sedimentation occurring should erosion from the stockpiles occur. It is anticipated that the topsoil stockpiles will remain for a short period of time before being utilised for rehabilitation purposes.

5.2.7 Mining Associated Infrastructure

5.2.7.1 Electricity

Electricity for the mining operation will be received from solar power batteries which will be installed at the proposed mine offices. No electricity will be received from the New Vaal Colliery or from Eskom.

5.2.7.2 Water Management

Water will be utilised for potable water and for dust suppression. The water will be extracted from an approved borehole located at the existing Copper Sunset MRA (DMR Reference No. FS30/5/1/2/3/2/1 (164) MR). The borehole is authorised by the Department of Water and Sanitation (DWS) under Water use Licence (WUL) No. 08/C22F/AG/2315 granted 18 September 2013. It is anticipated that the water previously utilised for this sand mining operation will no longer be needed and can therefore be utilised at the new sand mining operation. The water will be pumped from the borehole and stored at the existing Copper Sunset Mining Operation. Water bowsers will be utilised to transport the water from the existing sand mining area to the new proposed sand mining area, which is located 6.5 km north of the existing sand mining area. The maximum allowable limit to be extracted from the borehole is 140 650 m³ per annum.

5.2.7.3 Vehicle Maintenance

No maintenance of vehicles will be undertaken at the mining area; therefore, no used oil or other associated waste will be generated. Should the vehicles require servicing, they will be removed off site and taken back to the existing Copper Sunset workshop which is located 8km from the proposed sand mining operation. Therefore, washing of vehicles will not be required. It is however noted that should the vehicle breakdown while onsite and cannot be relocated to the existing Copper Sunset workshop, emergency maintenance may take place onsite.

5.2.7.4 Waste Management

The following waste types are anticipated to be generated at the operation:

- General waste
 - Domestic Waste;
 - Paper;

- Plastic;
- Cardboard;
- Tins; and
- Glass.

- Hazardous Waste:
 - Hydrocarbon waste such as oily rags as a result from the hydrocarbon stored onsite; and
 - Chemical waste from the chemicals that may be utilised for domestic cleaning purposes.

It is anticipated that all general waste will either be recycled or disposed of at the local municipality landfill site. Hazardous waste will be removed offsite by a hazardous waste contractor. A safe disposal certificate for the removal of hazardous waste will be retained as proof of safe disposal.

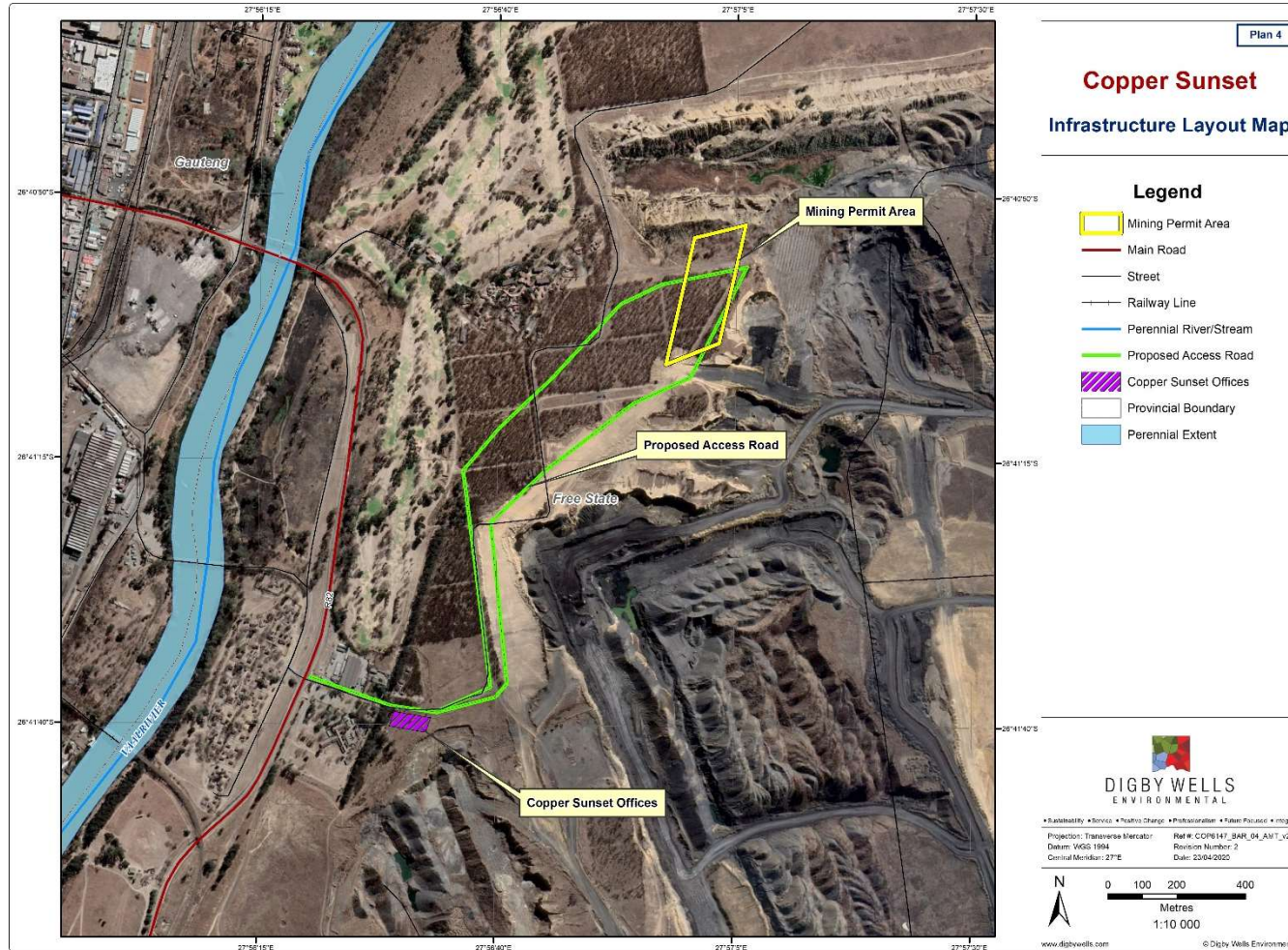


Figure 5-1: Proposed Infrastructure Map

6 Policy and Legislative Context

From an environmental and social perspective, the proposed project is required to comply with all the obligations in terms of the provisions of the NEMA and MPRDA. The legislative guidelines directing the project are outlined in further detail in Table 6-1.

Table 6-1: Legislation and Guidelines Applicable to the Proposed Project

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></p> <p>Section 24 of the Constitution provides that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –</p> <ul style="list-style-type: none"> i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	<p>The implementation of the mitigation and management measures to minimise and prevent negative impacts associated with the proposed project, while promoting justifiable socio-economic development, have been included in Part B, Section 5.</p>	<p>The environmental management objectives of the proposed project will be to protect ecologically sensitive areas and to support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>Mineral and Petroleum Resource Development Act, 2002 (Act No. 28 of 2002) (MPRDA)</u></p> <p>The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. The MPRDA ensures that environmental management principles as set out in the NEMA are applied to all mining operations. The MPRDA serves as a guideline for interpretation, administration and implementation of environmental requirements and ensures that mineral resources are exploited in a sustainable manner to serve both present and future generations.</p>	<p>Copper Sunset wish to mine sand within the New Vaal Colliery MRA. Copper Sunset are thus applying for a Mining Permit in terms of Section 27 of the MPRDA to mine an area of 5 ha.</p>	<p>A Basic Assessment application with associated Mining Permit Application to apply for the required Mining Permit was submitted via the SAMRAD to the Free Regional office of the DMR in Welkom on 2 July 2020 detailing the activities proposed to be undertaken as part of the proposed project. A Basic Assessment Process has been undertaken which includes the compilation of a BAR where the impacts associated with the activities proposed to be undertaken at the proposed sand mine have been determined (Part A: Section 12). The proposed measures in which to mitigate and manage the impacts are also detailed as part of this process in (Part B: Section 5 and Section 6). A monitoring programme has also been compiled to ensure the proposed project does not result in significant environmental damage during Life of Mine (Part B: Section 8).</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>National Environmental Management Act, 1998 (Act No 107 of 1998) and EIA Regulations (December 2014)</u></p> <p>NEMA, as amended, was set in place in accordance with Section 24 of the Constitution. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment.</p> <p>Section 24 (1)(a) and (b) of NEMA state that:</p> <p><i>The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The EIA Regulations, Government Notice (GN) Regulation (R) 982 were published on 04 December 2014 and promulgated on 08 December 2014 together with the Listing Notices. The regulations were subsequently amended by GNR 327 published on 7 April 2017. The following regulations were amended: GN R326, (EIA Regulations) GN R 327 (Listing Notice 1); GN R325 (Listing Notice 2) and GN R324 (Listing Notice 3) of 7 April 2017.</p>	<p>The sand mining project proposed by Copper Sunset triggers listed activities in accordance with the EIA regulations, 2014 (as amended). The listed activities have been included in Table 5-1.</p>	<p>This Basic Assessment Report has been compiled in accordance with the requirements of the NEMA EIA Regulations, 2014 (as amended), with the environmental management objective to protect ecologically sensitive areas.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></p> <p>The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority (PHRA), be notified as early as possible of any developments that may exceed certain minimum thresholds.</p>	<p>A Notification of Intent to Develop (NID) has been compiled and will be submitted to the SAHRA and PHRA. The heritage baseline is provided in Section 11.1.13.</p>	<p>A heritage assessment was undertaken to determine if any heritage resources would be impacted by the proposed project. It was determined that no heritage resources are located within the proposed mining area. Any chance finds will be communicated to SAHRA and the PHRA.</p>
<p><u>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA)</u></p> <p>According to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA) the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured.</p>	<p>Air Quality has been considered for the proposed project. The activities proposed to take place do not trigger any air quality activities and therefore no Air Emissions License will be applied for.</p>	<p>The mitigation and management measures to be implemented as part of the proposed project aim to manage and prevent potential impacts to air quality. The mitigation measures will be in compliance with the NEM: AQA, as referred to in Part B Section 5.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</u></p> <p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA) regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. This Act works in accordance to the framework set under NEMA. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance:</p> <ul style="list-style-type: none"> ● Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014); ● National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and ● National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011). 	<p>As part of this sand mining project, flora, fauna, wetlands and aquatic have been investigated to determine the current status of the environment and to determine any potential ecological sensitivity to be avoided and/or mitigated. There are currently no applications submitted in terms of NEM:BA for the proposed project.</p>	<p>The mitigation and management measures to be implemented as part of the proposed project aim to manage and conserve biological diversity, as well as to minimise the spread of alien invasive species.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)</u></p> <p>CARA aims to provide for the conservation of the natural agricultural resources of the country through the maintenance of the production potential of land, by combatting and preventing erosion and the weakening of water sources. In addition, this Act aims to protect vegetation, while combatting weeds and invader plants</p>	<p>As part of this sand mining project, flora, fauna, wetlands and aquatic have been investigated to determine the current status of the environment and to determine any potential ecological sensitivity to be avoided and/or mitigated.</p>	<p>Section 12 of the CARA details the maintenance of soil conservation in which every land user will be responsible for the maintenance and conservation of soil. The mitigation measures recommended as part of this Basic Assessment Report aim to prevent the compaction, erosion and degradation of the soil resources.</p>
<p><u>Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA)</u></p> <p>ECA makes provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.</p>	<p>Mitigation measures have been included for the potential impacts due to the generation of noise. The mitigation measures will be in compliance with the ECA.</p>	<p>The proposed project is not anticipated to exceed the SANS 10103: 2008 limits for baseline noise measurements, thus conforming to the requirements of the ECA.</p>
<p><u>National Environmental Management: Waste Act, 2008 (Act No.59 of 2008)</u></p> <p>NEMWA aims to provide regulation for waste management in order to protect health and the environment, for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.</p>	<p>The proposed project will not warrant a WML, however the norms and standards for waste management under the Act will be duly observed.</p>	<p>Mitigation measures for the effective management of waste to prevent the possibility of pollution or contamination to the area. All domestic waste will be removed by the Municipality while any hazardous waste generated will be removed off site by a registered hazardous waste contractor for disposal at a hazardous waste landfill site.</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>National Water Act, 1998 (Act No. 36 of 1998) (NWA)</u> NWA makes provision for water resource management, protection of the quality of water resources and recognising the need for the integrated management of all aspects of water resources to achieve sustainable use of water.</p>	<p>No WUL will be applied for, for the proposed project as no water uses as listed in Section 21 of the NWA will be triggered.</p>	<p>Mitigation measures for the effective management of water will be implemented to prevent any impact to water resources identified outside of the mining area.</p>

7 Need and Desirability of the Proposed Activities

7.1 Economic Consideration

It is an established fact that mining activities are essential to the economic development of South Africa. Provincial strategic growth and development have been identified in the Free State Province Spatial Development Framework (FSPSDF) (2014) as an important goal to achieve. This goal is supported by several pillars, one of which deals with inclusive economic growth and job creation. The second driver for this pillar aims to minimise the impact of the declining mining sectors and ensure that existing mining potential is harnessed. The proposed project being applied for by Copper Sunset is aligned with the goals of the FSPSDF.

Sand is one of the key materials used in the construction of roads, buildings and other infrastructure. There is an increased market demand on the requirements for building sand in the proposed project area. Thus, providing general sand (90% plaster and 10% building sand) within the Province or local area will support numerous building activities being implemented, and address the growing demand of sand in the market. Additionally, the proposed project will be located within an existing MRA. Seriti has been granted the approval to mine coal within the proposed location. The sand contained within the MRA would be lost if no sand mining is undertaken. Copper Sunset therefore intends to maximise the mineral before the commencement of coal mining activities ensuring that the resources located in this area are fully realised.

The proposed mining area being applied for in this application has a total resource of about 150 000 m³ of sand with a LoM of five months, with mining of sand expected to yield 3 000 m³ per month. The mining of sand would also result in tax contributions towards the country. It is also noted that the existing Copper Sunset MRA is reaching its LoM and therefore should this mining application be approved the mine will aim to replace the supply of sand to the market, which was previously supplied by the existing Copper Sunset mining operations.

7.2 Social Consideration

South Africa is rich in a variety of mineral resources and has thus become a world leader in mining. Mining has vital socio-economic benefits for the country by providing job opportunities and contributing considerably to the country's Gross Domestic Product (GDP). The proposed project will lead to employment opportunities. Employment opportunities will be created during the sand excavation, sand transportation and in the trade services. Employment in these sectors will be primarily contractual. It is anticipated that the community will be involved in the proposed project, thus a major part of the labour force will be from local community members. This will enhance their income and lead to overall economic growth of the area.

Thus, the socio-economic benefits of the proposed project include job creation, skills development, local economic development through the availability of the sand, and increased business development for the area. It is also noted that once the existing Copper Sunset mining area reaches its LoM, the jobs created by that operation will be lost. However, should this project be approved it is anticipated that the jobs created by the existing Copper Sunset

mine will be carried through to the new proposed mining area therefore no job losses would be expected.

7.3 Environmental Consideration

As part of the BAR process, specialist studies were undertaken, which relate to the physical, biological and social environmental aspects potentially affected by the proposed project. The objective of these specialist studies is to mitigate, as far as possible, the physical; biological and social environmental impacts that result from the proposed mining activities. It should be considered that although it is not anticipated that any positive environmental impacts will occur as a result of the implementation of the proposed project, it is also not anticipated that any significant negative impacts will occur in comparison to the impact that will arise from the approved open cast mining activities to be undertaken by Seriti in this area.

Additionally, the mining area holds no apparent conservation value, in terms of heritage aspects, fauna or flora.

8 Motivation for the Overall Preferred Site, Activities and Technology Alternative

The proposed mining area is limited in extent (5 ha) and is categorised as having been already disturbed by the development of an oak plantation and mining activities (mine stockpiles). The area to be mined is surrounded by other mining activities, specifically the New Vaal Colliery coal mine. The site is situated within the New Vaal Colliery MRA. There is no surface water on the site and the closest water course is the Vaal River which is located 800 m from the north western point of the proposed mining area. The existing Copper Sunset MRA operates in close proximity to the proposed new mining area and therefore some of the infrastructure located at the existing mining area will be utilised to ensure the effective management of the mining operation. No sensitive environments and receptors have been identified within the proposed project area. Due to the shallow location of the sand, strip mining is the only possible mining process to remove the material. A lease agreement has been agreed between Copper Sunset and New Vaal Colliery, the landowners for the application area.

9 Full Description of the Process Followed to Reach the Proposed Preferred Alternatives within the Site

9.1 Details of the Development Footprint Alternatives Considered

Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives aid in identifying the most appropriate method of developing the project, taking into account location or site alternatives, activity alternatives, technology alternatives, as well as the no-project alternative. Alternatives also aid in determining the activity with the least environmental impact.

Some of the potential alternatives that have been identified to date are provided below.

9.1.1 Location Alternative

The location of the mining activity is determined by the location of the resource. The property was selected based on existing knowledge of sand deposits and as such, no location alternatives have been considered for the proposed project. The infrastructure to be utilised by the mine will not be permanent. Where possible, existing roads will be utilised to avoid unnecessary impacts to the environment. The offices have been strategically placed at the entrance to the area to be mined. A flora and faunal specialist study was undertaken to determine the current species content in the project area and has determined that the mining operation will have a low impact on sensitive species and its habitat. No sensitive environments were identified within the mining area and therefore no significant negative impacts have been identified from the placement of the infrastructure.

9.1.2 Mining Method

Due to the shallow location of the sand, strip mining is the only possible mining process to remove the material. The use of any other alternative mining method such as underground mining will not target the resource being mined and will possibly cause more damage to the environment than the strip-mining method.

9.1.3 No-go Option

The no-go option would result in the sand resource not being mined and would therefore not be available for the construction industry within the Gauteng and Free State Provinces. If the Mining Permit is not approved, the opportunity to utilize this mineral as well as valuable socio-economic opportunities will be lost. The no-go option would, however, mean that all the negative impacts associated with mining will still be realised as the area will still be open cast mined by the New Vaal Colliery (i.e. vegetation removal, dust creation and noise generation). Therefore, the no-go option would just mean that the sand resource will not be realised but the area will still be mind for coal.

Additionally, if the Permit is not granted, the jobs that would have been created by the proposed mining project as well as the jobs that would have been retained from the existing Copper Sunset mine, would be lost.

10 Details of the Public Participation Process Followed

PPP is a legislative requirement in terms of Chapter 6 of the EIA Regulations, 2014 (as amended) in accordance with the NEMA. The main objective of the PPP is to provide a platform for the applicant, Interested and Affected Parties (I&APs) and relevant organs of state to work together to enable the relevant authorities to make an informed decision on the proposed project. Through the PPP, I&APs can contribute local knowledge and raise comments and concerns applicable to the Project planning and design.

For this Basic Assessment Process, the PPP has been divided into three phases as follows:

- Announcement Phase;
- Basic Assessment; and
- Decision Making Phase.

10.1 Announcement Phase

The proposed project was announced together with availability of the Basic Assessment Report for public comment. The announcement phase included the activities detailed below.

10.1.1 Identification of Stakeholders

To ensure a proper representation of stakeholders interested in or affected by the proposed project, the following stakeholder identification methods were used to develop a stakeholder database:

- Conducting Windeed and related desktop searches in and around the project area to verify landownership and obtain contact details;
- Responses to be received from newspaper advertisement and site notices;
- Responses on the distribution of the Background Information Document (BID); and
- Telephonic consultations with landowners to identify additional I&APs.

Stakeholders for the proposed project are grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners:** Directly affected and indirectly affected landowners;
- **Land occupiers:** Directly affected and indirectly affected land occupiers;
- **Communities:** Surrounding communities;
- **Non-Governmental Organisations (NGOs):** Environmental and social organisations;
- **Agriculture:** associations or organisations focussed on agricultural activities; and
- **Business:** small medium enterprises and formal organisations.

10.1.2 Public Participation Documentation

The following documents were developed for the announcement of the proposed project:

- **Background Information Document (BID):** a BID, which included a project description, information about the required legislation, the competent authorities and details of the appointed EAP. The BID also included a registration and comment form for stakeholders to use for formal registration as I&APs or to submit comments. Information regarding the availability of the BAR was also provided;

- **Newspaper advertisement:** a newspaper advertisement was placed in one local newspaper. The advert included a brief project description, information about the required legislation, the competent authorities, details of the appointed EAP, registration process for I&APs, and information regarding the availability of the BAR for public comment; and
- **Site notices:** site notices were put up around the project area. The site notices contained a brief project description, information about the required legislation, the competent authorities and details of the EAP, registration process for I&APs and information regarding the availability of the BAR for public comment.

10.2 Basic Assessment Phase

The draft Basic Assessment will be available for public comment for 30 days on the Digby Wells website from the **08 July 2020 to 08 August 2020** (www.digbywells.com under Public Documents).

Due to the COVID-19 national lock down, the draft BAR has been released electronically. To access the report (free of charge/ data-free); please click on the following link <http://view.datafree.co/PublicDocuments/> or copy the link to your URL or visit our website.

During the Draft BA phase, engagement with I&APs will take place by means of telephonic consultations to obtain comments and I&APs can submit comments to the Digby Wells Stakeholder Engagement Office. Comments received will be captured into the Comment and Response Report (CRR).

With lapse of the 30-day public comment period the Draft BAR will be updated and finalised for submission to the DMR for consideration. The updated BAR will also be placed on the Digby Wells website and I&APs will be informed of its availability by means of a letter. This will enable I&APs to verify that their comments have been captured and have received a response.

10.2.1 Summary of Public Participation Activities Undertaken to Date

Table 10-1 provides a summary of the PPP activities undertaken to date, referencing material is included in Appendix C.

Table 10-1: Public Participation Activities

Activity	Details	Reference in Report
Identification of stakeholders	Stakeholder database which represent various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.	Appendix C Stakeholder database
Distribution of BID announcement letter,	A BID with registration and comment form was emailed to stakeholders on 08 July 2020.	Appendix C Public Participation Materials

Activity	Details	Reference in Report
	An SMS was also sent to stakeholders on 08 July 2020 announcing the availability of the Draft BAR.	
Placing of newspaper advertisement	A newspaper advertisement was placed in the Vaalweekblad on 08 July 2020.	Appendix C Public Participation Materials
Putting up of site notices	Site notices were put up at the proposed project area, local libraries and other public places on 07 July 2020. A site notice placement report and map will be developed to indicate the locations of site notices in and around the project area.	Appendix C Public Participation Materials
Announcement of Draft Basic Assessment Report	Announcement of availability of the Draft BAR was emailed to stakeholders together with the formal project announcement on 08 July 2020. The Draft BAR has been released electronically and copies are available to stakeholders on the Digby Wells website (www.digbywells.com under Public Documents) and can be accessed via our data-free service. Note: Due to COVID-19 Regulations, no documents were placed at public areas. Stakeholders were sent a data-free link where they can access the reports. http://view.datafree.co/PublicDocuments/	Appendix C Public Participation Materials
Telephonic engagement	Engagement with directly and adjacent landowners will be done by means of telephonic consultations to obtain comments.	-
Obtaining comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders will be captured in the CRR. The CRR will be appended to the updated BAR, which will be submitted to the DMR and simultaneously made available to I&APs.	-
Announcement of Final Basic Assessment Report	The final report will be made available on www.digbywells.com (under Public Documents)	-

10.3 Decision Making Phase

Once the competent authority has taken a decision regarding the application, all registered I&APs will be notified of the environmental authorisation decision by SMS, email, letter or fax.

10.4 Summary of Issues Raised by IA&Ps

At the time of submission for public comment of this Draft BAR, no stakeholder consultation had commenced. Feedback, comments and issues raised by stakeholders will be included in the Final BAR and submitted to the DMR and to the public to verify that their comments have been captured and have had a response.

11 The Environmental Attributes Associated with the Alternatives

The environmental baseline studies conducted in support of this Draft Basic Assessment Report include:

- Fauna and Flora;
- Heritage; and
- Rehabilitation Assessment.

Baseline information was also obtained extrapolated from the approved BAR/EMP Report undertaken for Copper Sunset at their existing MRA, which is in close proximity to the proposed project area.

11.1 Baseline Environment

A summary of the baseline environment is provided in Sections 11.1.1 to 11.1.13.

11.1.1 Climate

The project area falls under the Moist Highveld Grassland climatic zone (Kruger, 2004). The region is characterised by cold, dry winters from April to September and warm, wet summers. Data from the Automatic Weather Station (AWS) operated by the South African Weather Service was utilised to determine the meteorological conditions in the project area.

11.1.1.1 Rainfall

The mean average rainfall is 641.7 mm, which mostly occur in the summer months of October to March. Thunderstorms are frequent during the rainy season and are usually characterised by lightning, heavy rain, strong winds and sometimes hail. Drought conditions can occur during winter. The winter months (June to August) contribute very little (4%) to the annual rainfall for this area.

11.1.1.2 Temperature

Temperatures for the area are consistent with the Northern Free State climatic zone, with warm summers and cool dry winters. The maximum temperatures range from 27.8°C in January to 17.7°C in July, with minimum temperatures ranging from 15.5°C in January to near 0°C in June and July. Frost is common and occurs on average between the middle of May and the beginning of September. The most prevalent strong wind direction is from the north and east during the year and particularly during the summer months.

11.1.2 Topography and Visual Environment

The project area is characterised by flat topography with no significant topographical features such as hills or ridges, or water courses. Mining and agricultural activities dominate the surrounding area and have impacted the local topography. Most of the site is dominated by an old oak plantation (Figure 11-1), that will need to be removed prior to sand mining being undertaken. The main visual receptors include the New Vaal Colliery's Community centre which is located approximately 7 km south west of the site and Viljoensdrif community approximately 6 km south west of the project area. Elevation of the project area ranges from 1308 to 1920 meters above mean sea level (m.a.m.s.l) (Figure 11-2 and Plan 5 in Appendix B).



Figure 11-1: General View of the Current State of the Environment

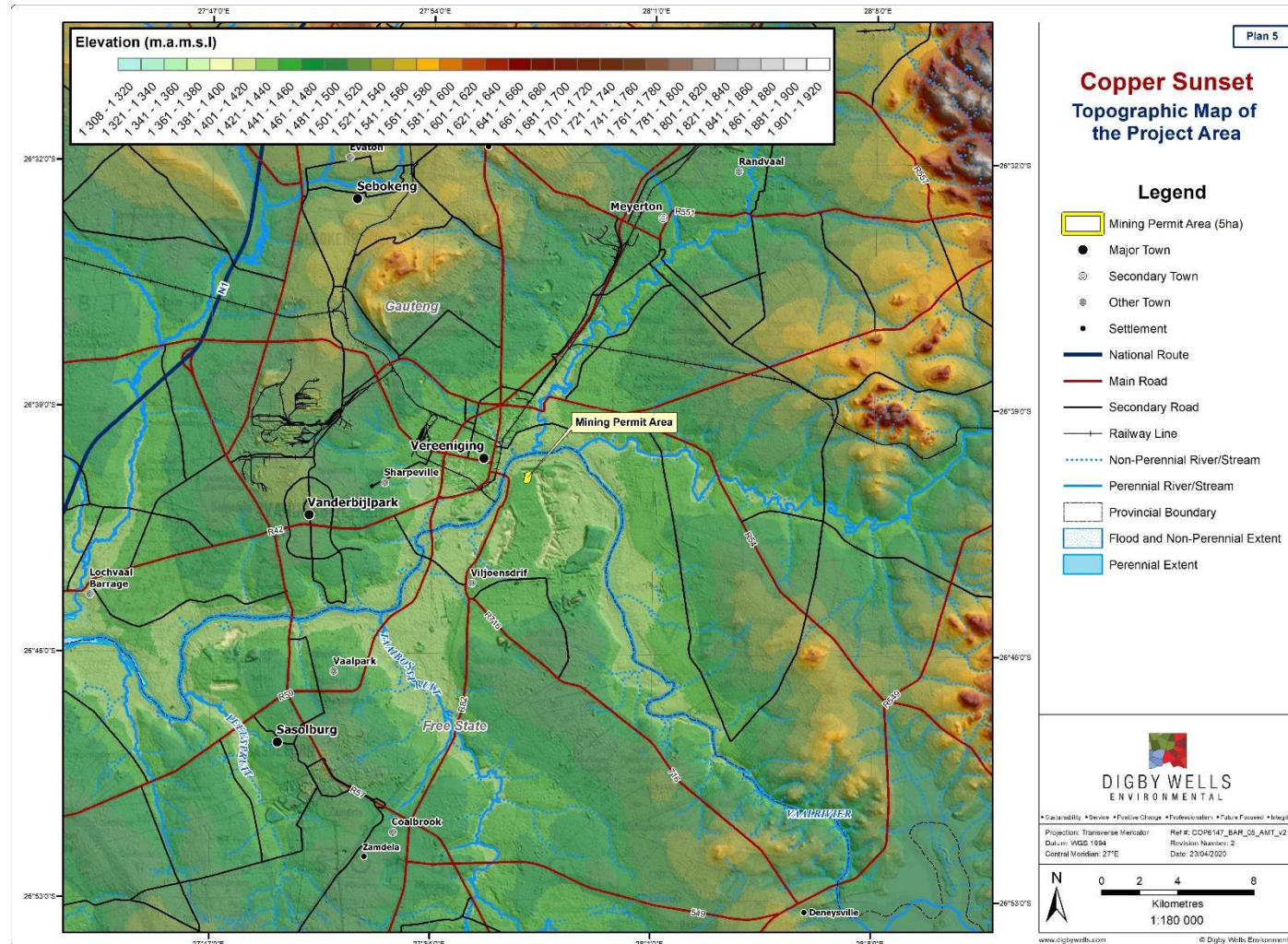


Figure 11-2: Topographic Map of the Project Area

11.1.3 Geology

The proposed project area lies within the Vryheid Formation that forms part of the Eccca Group, which is part of the Karoo Supergroup. Underlying the Vryheid Formation are lithologies associated with the Dwyka Group (Karoo Supergroup) and the Transvaal and Ventersdorp Supergroups. The Vryheid Formation consists predominantly of thick beds of yellowish to white cross-bedded sandstone and grit alternating with beds of soft sandy shale. The Vryheid Formation is interpreted to have been deposited in deltaic, fluvial and peat swamp environments, resulting in the accretion of sand, mud and organic matter which are currently represented as sandstones, shales and coal beds. The economically important coal seams are hosted in the fluvial depositional sequence which is represented by upward fining cycles of coarse (immature) to fine grained sandstones (Johnson *et al*, 2006). The weathered sandstones define the approximate 150 000 m³ resource for Copper Sunset based on a mining permit area of 5 ha and an approximate resource depth of 3 m. The geology of the area contains coal seams that support the coal mining activities of the adjacent properties. The geology of the area is depicted in Figure 11-3 and Plan 6 in Appendix B.

11.1.4 Soil and Land Capability

Existing Land Type data was used to obtain generalised soil patterns and terrain types for the project area. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar terrain types, pedosystems (uniform terrain and soil pattern) and climate (Land Type Survey Staff, 1989). These maps are general guidelines of what soils can be expected in the area.

The general terrain is flat, and the soils are derived from Aeolian sand moved in over local colluvium derived from Eccca sandstone. The soil boundaries were established by augering the area (Figure 11-4). Refer to Figure 11-5 for the location of the auger points. According to a soils study completed for the previous Copper Sunset expansion on the adjacent property, the soils were found to extend further than 1.2 m deep (Jackson, 2014). Groundwater studies completed for the New Vaal Colliery approximately 1 km south from the proposed project area found that the alluvium of fine sand extends 6 m deep (Golder Associates, 2012). The dominant soil form in the proposed project area is the Calvic Luvisols (LVk) (Figure 11-6).

Land capability is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. The Land Type has been defined as Upland Duplex and/or Margalithic soils (Ca1) (Jackson, 2014).

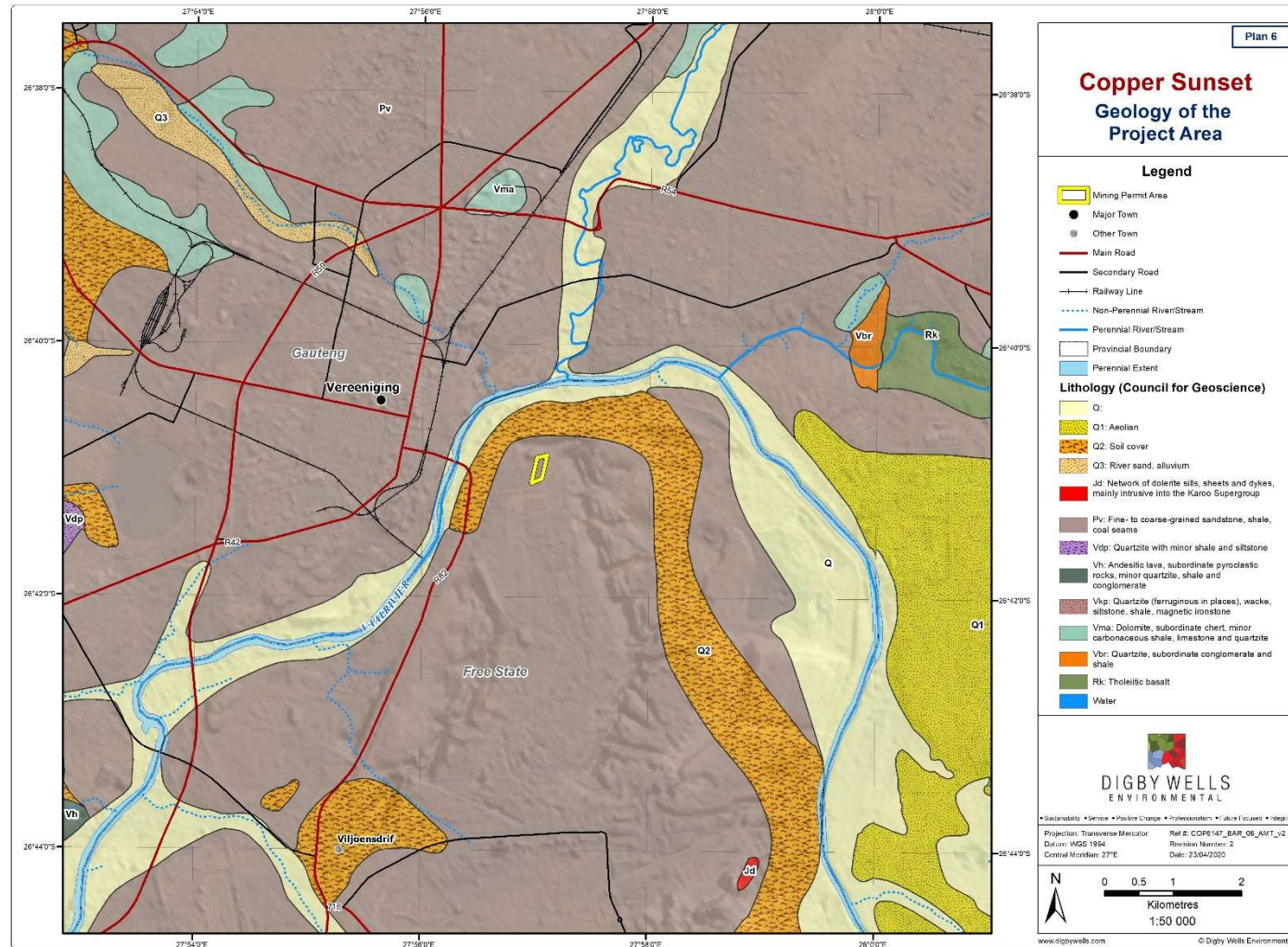


Figure 11-3: Geology of the Project Area



Figure 11-4: Augered Soils on Site

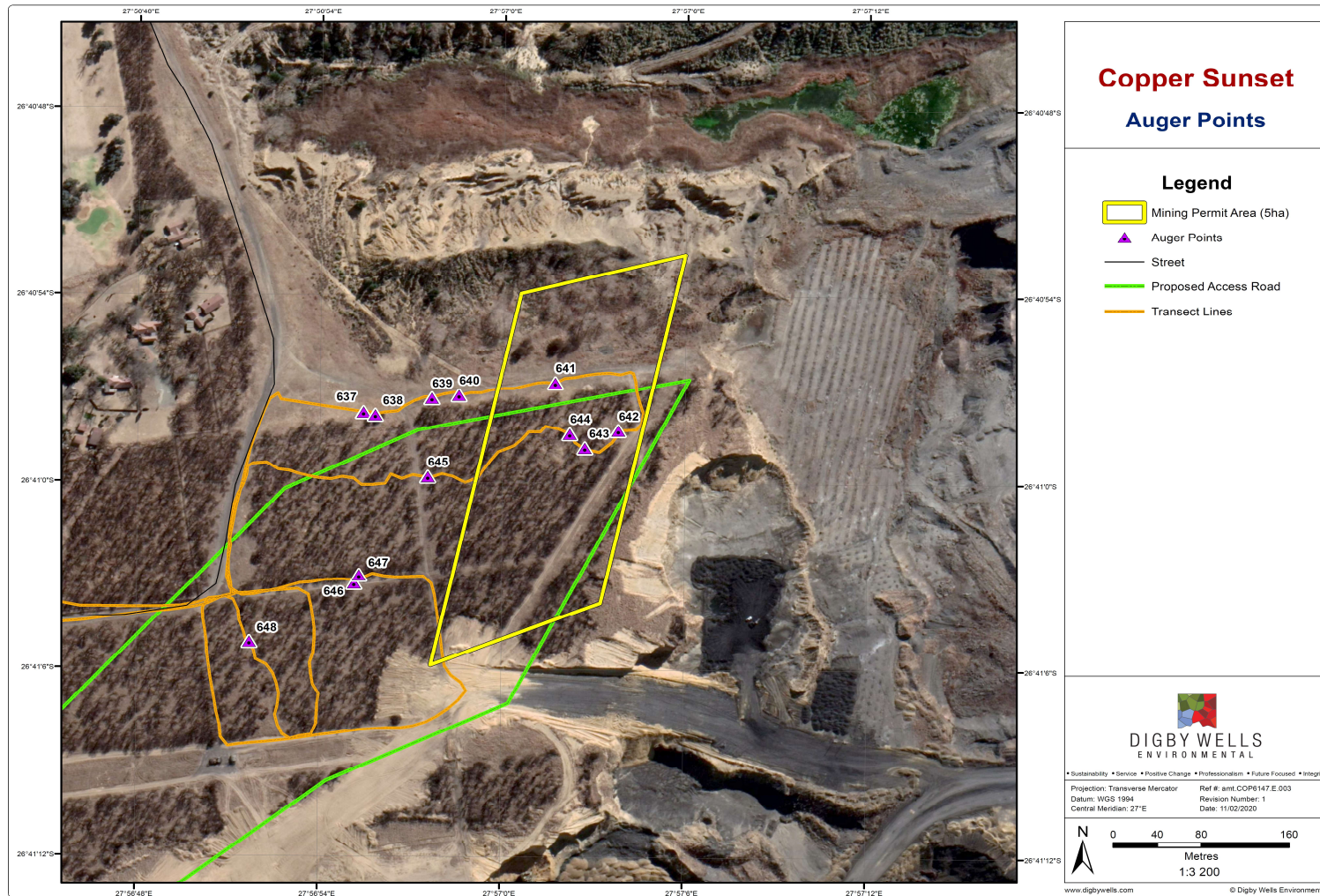


Figure 11-5: Auger Points

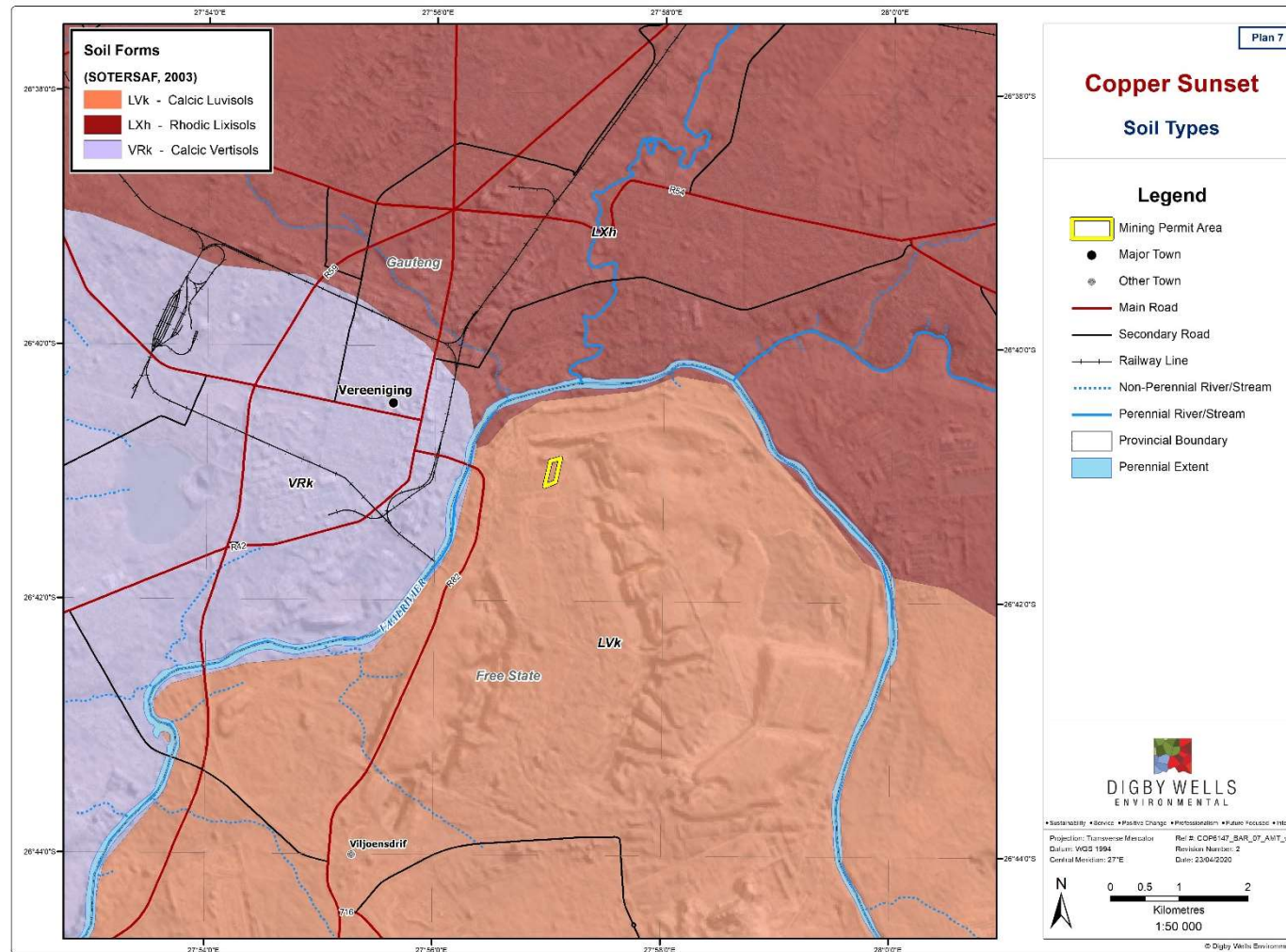


Figure 11-6: Soil Types

11.1.5 Flora

The proposed project falls within the Grassland Biome, with the regional vegetation characterised by the Central Free State Grassland (Gh 6) (Mucina and Rutherford, 2006).

This vegetation type is characterised by undulating plains supporting short grassland naturally dominated by *Themda triandra*, and by *Eragrostis curvula* and *E. chloromelas* when degraded. Dwarf karoo bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to Acacia karoo encroachment.

This vegetation is classified as Vulnerable. Only small portions enjoy statutory conservation such as Willem Pretorius, Rustenfontein and Koppies Dam Nature Reserves. Almost a quarter of the area has been transformed either for cultivation or by dams. Refer to Table 11-1 for dominant grass species that occur within this vegetation type.

Table 11-1: Naturally Occurring Grasses in the Local Vegetation Types

Central Free State Grassland	<i>Aristida adscensionis</i> ; <i>Aristida congesta</i> ; <i>Cynodon dactylon</i> ; <i>Digitaria argyrograpta</i> ; <i>Elionurus muticus</i> ; <i>Eragrostis chloromelas</i> ; <i>Eragrostis lehmanniana</i> ; <i>Eragrostis obtusa</i> ; <i>Eragrostis plana</i> ; <i>Eragrostis curvula</i> ; <i>Eragrostis trichophora</i> ; <i>Heteropogon contortus</i> ; <i>Panicum stapfianum</i> ; <i>Setaria sphacelata</i> ; <i>Themeda triandra</i> ; <i>Tragus keolerioides</i> ; <i>Cymbopogon pospischilii</i> .
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Most of the site is dominated by an old oak plantation, that will need to be removed prior to sand mining being undertaken. In terms of grass species *Panicum maximum* (White Buffalo Grass) was observed to be growing underneath the canopy of the oak plantation. There are several other exotic and alien invasive species that were also identified and noted within the site footprint (Refer to Table 11-2). The majority of the site has been impacted upon as a result of the old oak plantation, mining activities and tracks running through the site, resulting in no natural areas remaining. Based on the site assessment undertaken, the overall sensitivity was considered to be low as a result of the level of disturbance noted. Refer to Figure 11-7 and Plan 8 in Appendix B below for vegetation delineation.

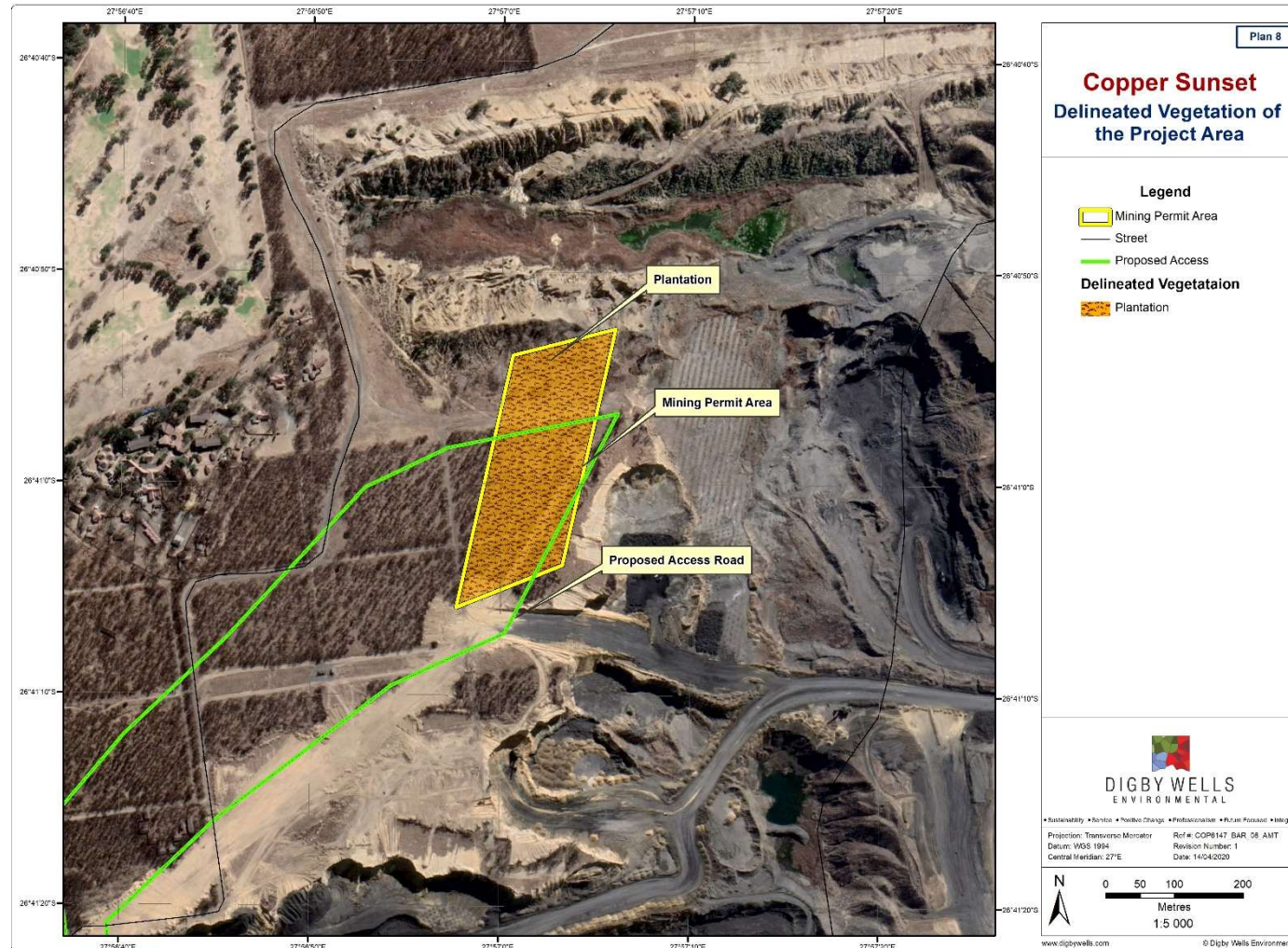


Figure 11-7: Vegetation Delineation

11.1.5.1 Alien Plant Invasion

Alien plant species invasion is significant on site with alien bushclumps of woody species covering the old oak plantations within the sand mining area. Invasion by destructive alien plant species erodes the natural capital of ecosystems, compromises their stability and is a growing problem in South Africa (Richardson and Van Wilgen, 2004). Species such as *Acacia mearnsii* (Black Wattle) and *Eucalyptus spp.* out-compete native species, forming dense mono-specific stands. This reduces the area available for grazing by domestic and wild animals.

Certain species have different alien invasive categories for different provinces in South Africa. Table 11-2 lists the alien plant species that were recorded within and surrounding the proposed project area, including invasive categories for those species that have been recognised as invasive.

Table 11-2: Alien Plant Species Recorded on Site

Family	Species Name	Common Name	NEM:BA Category
Simaroubaceae	<i>Ailanthus altissima</i>	Tree of Heaven	1b
Solanaceae	<i>Datura Ferox</i>	Apple Thorn	1b
Asteraceae	<i>Mikania sp</i>	Mile a Minute	Prohibited
Asteraceae	<i>Senecio sp</i>	Ragot	Prohibited
Amaranthaceae	<i>Alternanthera pungens</i>	Paper Thorn	Weed
Fagaceae	<i>Quercus Robustus</i>	English Oak	Not listed (Alien Tree)
Salicaceae	<i>Populus deltoides</i>	Poplar	No listed (Alien Tree)
Pinaceae	<i>Pinus sp</i>	Pine sp	Certain species are listed
Ulmaceae	<i>Ulmus sp</i>	Elm sp	Not listed
Solanaceae	<i>Solanum sp</i>	Tree tomato/giant devil fig/sliver-leaf bitter apple/bugweed/Jerusalem cherry/potato creeper/wild tomato	All species listed as 1b

11.1.5.2 National Spatial Biodiversity Assessment

The proposed project area occurs in a Vulnerable ecosystem (grassland) with a small amount of Least Threatened (savanna) occurring on site. As most of the area is transformed, the implications of this are that ideally, any remaining natural grasslands should be conserved and managed for biodiversity gain.

11.1.5.3 National List of Ecosystems that are Threatened and in need of Protection

The National List of Threatened Ecosystems (NEM:BA, Act No. 10 of 2004) was referenced to ascertain the level of ecosystem threat of the ecosystems present within the proposed project area. According to the National List of Threatened Ecosystems, no Threatened Ecosystems occur on site.

11.1.5.4 National Protected Areas Expansion Strategy (NPAES)

The NPAES are areas designated for future incorporation into existing protected areas (both National and Informal protected areas). These areas are large, mostly intact areas required to meet biodiversity targets, and suitable for protection. They may not necessarily be proclaimed as protected areas in the future and are a broad scale planning tool allowing for better development and conservation planning. No expansion focus areas exist within a 30 km radius of the site.

11.1.6 Fauna

Based on the data available, there is a chance that certain sensitive species may occur within the region, however; no evidence of such species was evident at the time of the site assessment (Refer to Table 11-3).

Table 11-3: Threatened Fauna Likely to occur in the Region

Scientific Name	Common Name
<i>Chrysofalax villosus</i>	Rough-haired Golden Mole
<i>Orycteropus afer</i>	Aardvark
<i>Proteles cristatus</i>	Aardwolf
<i>Poecilogale albinucha</i>	African Striped Weasel
<i>Atelerix frontalis</i>	Southern African Hedgehog
<i>Felis serval</i>	Serval
<i>Mystromys albicaudatus</i>	White Tailed Mouse
<i>Aonyx capensis</i>	Cape Clawless Otter

Based on the site assessment undertaken there was evidence of certain faunal activities on site. The following species were identified on site: Cape Porcupine (*Hystrix africaeaustralis*), Black Backed Jackal (*Canis mesomelas*), Cape Clawless Otter (*Aonyx capensis*), Fallow Deer (*Dama Dama*), and Springbok (*Antidorcas marsupialis*).

Tracks associated with the Cape Clawless Otter were identified during the site assessment. It must be noted that the Otter is considered near threatened according to the IUCN Red Data List. Only tracks were found, and no direct burrows or nests were observed indicating that the Otter is not residing within the area to be impacted upon. However, this cannot be assumed

to be the case and it is recommended that prior to clearing activities an inspection is undertaken to ensure that Species of Conservation Concern (SCC) like the Otter, are not impacted upon and mitigation measures are undertaken to minimise the impact to such species.

A bird count for the New Vaal Colliery was carried out on 02 February 2019. Table 11-4 lists the birds, which were identified during the count.

Table 11-4: Bird Species Identified during the Field Survey

Common Name		
European Honey Buzzard	Cape Longclaw	Grey-headed Gull
European Bee-eater	White-winged Widowbird	Egyptian Goose
Reed Cormorant	African Stonechat	Blacksmith Lapwing
Western Cattle Egret	Zitting Cisticola	Pin-tailed Whydah
Red-knobbed Coot	Helmeted Guineafowl	Crowned Lapwing
Levaillant's Cisticola;	Common Shelduck	Whiskered Tern
Long-tailed Widowbird	White-faced Whistling Duck	African Spoonbill
Southern Red Bishop	Little Swift	Hadeda Ibis
Common Myna	Black-winged Stilt	African Darter
White-rumped Swift	Cape Turtle Dove	Barn Swallow
Squacco Heron	Cloud Cisticola	African Sacred Ibis
Southern Fiscal	Long-crested Eagle	Swainson's Spurfowl
White-faced Whistling Duck	Crested Barbet	Speckled Pigeon and Pied Starling

Based on the bird count undertaken, none of the species listed above are considered of ecological concern. However, this does not eliminate the fact that there could be SSC within and surrounding area.

11.1.7 Wetlands

The National Freshwater Ecosystem Priority Area (NFEPA) strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources were considered to evaluate the importance of the wetland areas that could occur within the proposed project area. Spatial layers (Freshwater Ecosystem Priority Areas (FEPA's)) used by the NFEPA project for this study include the wetland classification and ranking. An onsite assessment was undertaken to identify any potential wetlands within the area that will be impacted upon (DWA, 2005).

Based on the site assessment conducted and auger points done, there were no wetlands identified within the proposed project area.

11.1.8 Surface Water

11.1.8.1 Catchment Description

The proposed project area is located in the Upper Vaal Water Management Area (WMA 08) within quaternary catchment C22F. Figure 11-8 and Plan 9 in Appendix B provides a map of the catchment areas surrounding the proposed project area.

The surface water attributes of the affected catchments, namely Mean Annual Runoff (MAR), Mean Annual Precipitation (MAP) and Mean Annual Evaporation (MAE) are summarised in Table 11-5 which indicates a ratio of precipitation to evaporation at 40%, with 3% of the rainfall becoming runoff (WRC, 2005).

Table 11-5: Summary of the Surface Water Attributes of the C22F Quaternary Catchment

Quaternary Catchment	Total Area (km ²)	Rainfall Zone	MAP (mm)	MAR (mm)	MAR m ³ * 10 ⁶	Evaporation Zone	MAE (mm)
C22F	440	11A	655	20.5	9.04	C2C	1650

Source: WRC, 2005

11.1.8.2 Water Resources

No water courses are located within the proposed mining area. The Vaal River is located 800 m to the north west of the mining area and is the closest river to the site.

The 1:50 year flood line of the Vaal River in the catchment is situated on the 1 433 m.a.m.s.l contour line. The proposed mining area will, therefore, fall outside of the 1:50 year flood line.

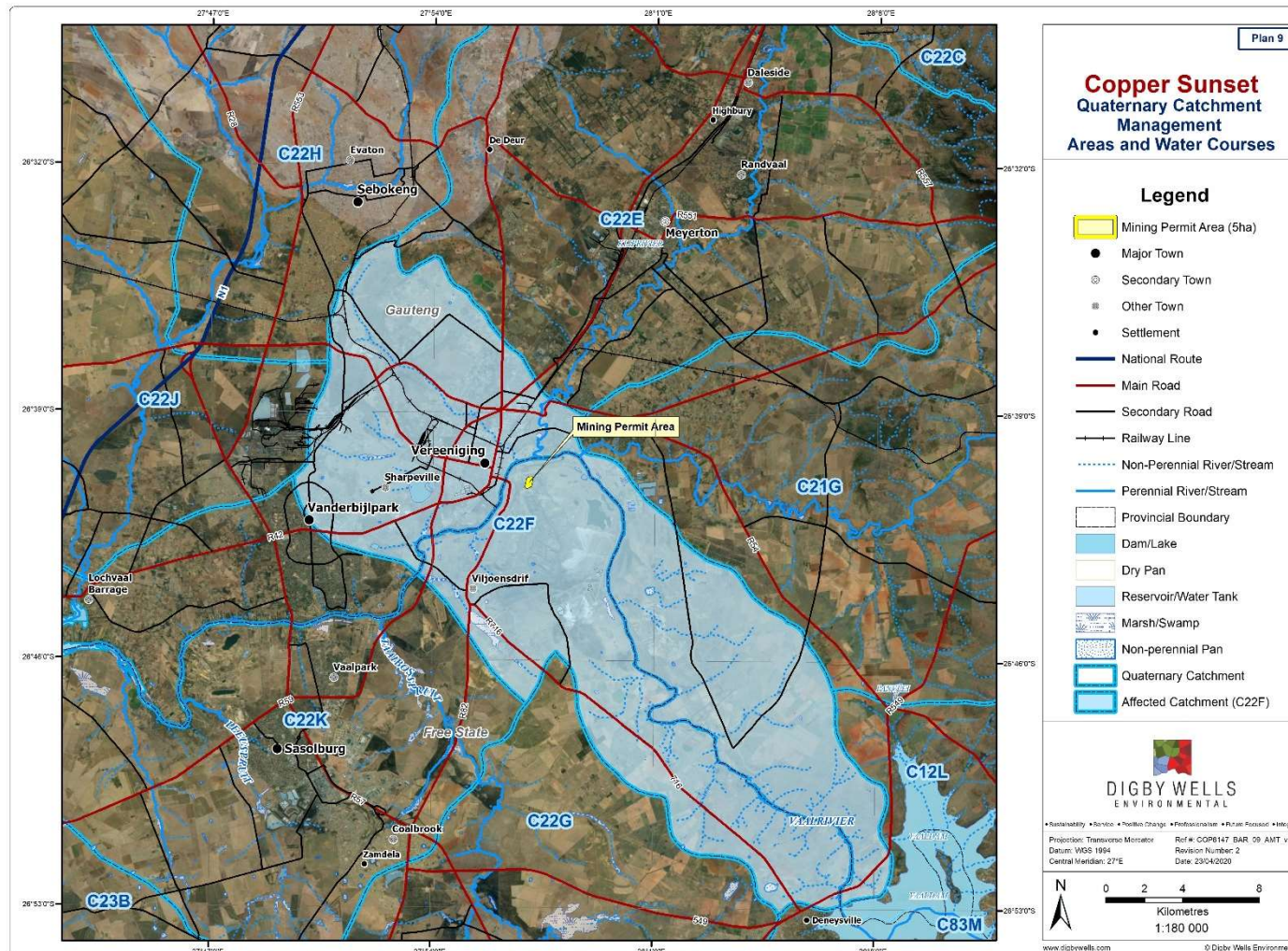


Figure 11-8: Quaternary Catchment Management Areas and Water Courses

11.1.8.3 Surface Water Quality

No water samples were taken due to the lack of water on the site. As there is no surface water present on the site, the establishment of baseline surface water quality is not applicable to the BAR/EMP.

11.1.9 Groundwater

Two aquifer types occur in the Vryheid formation. The upper weathered aquifer consists of transported or in-situ weathered material and is between 5 – 12 m thick. The other aquifer is the lower fractured Karoo aquifer which includes the underlying Ecca sediments, this aquifer is recharged by the interflow from the weathered aquifer.

The regional groundwater levels vary from approximately 5 m below the surface in the lower lying areas to a maximum of 22 m below the ground. Groundwater yields are classed as low, with 83% of boreholes on record producing less than 2 l/s in the Vryheid Formation (Harvest Potential Map, Vegter, 1996).

According to regional analysis (Barnard, 2000) the quality of groundwater is indicated by the average electrical conductivity value of 57 mS/m and a mean pH of 7.5. There are, however, significant variation in concentrations of sodium, chloride and sulphate, which indicates contamination by the surrounding coal mining activities. Use of groundwater in the area is mostly for mining purposes.

11.1.10 Air Quality

The proposed project area falls within the Vaal Triangle Airshed Priority Area (VTAPA), which was declared as a priority area and was published in the Government Gazette in terms of Section 18 (1) of the NEM: AQA, 2004 (Act No. 39 of 2004) under Notice No. 365 of 21 April 2006, as amended by Notice 711 of 17 August 2007. VTAPA is the first priority area in South Africa and was declared such due to the concern of elevated pollutant concentrations within the area, specifically particulates.

The Vaal Triangle is a highly industrialised area with numerous industries, coal fired power stations, and various smaller industrial and commercial activities in addition to a number of collieries and quarries. In this whole mix are large informal settlements using coal and woody biomass for cooking and space heating. The area is also home to commercial agricultural activities and a host of other fugitive sources of air pollution, which can have implications on the health and wellbeing of exposed residents in the area.

11.1.11 Noise

According to the Free State Noise Control Regulations “disturbing noise” means a noise level that exceeds the ambient sound level measured continuously at the same measuring point by 5 dBA or more.

Previous environmental noise studies undertaken at the existing Copper Sunset Mine, which is located within close proximity of the new proposed mining area indicated that the main noise

sources contributing to the ambient daytime and night-time noise levels are the sirens and conveyer belts at the coal stockyard as well as the occasional railway noise. Based on the daytime results measured at the New Vaal Colliery's Community Centre, the ambient noise levels were mostly below the SANS rating levels for the maximum allowable outdoor daytime limit for ambient noise in industrial districts as well as below the daytime limit for ambient noise in suburban districts. Based on the night-time results, the existing ambient noise levels are mostly below the SANS rating levels for the maximum allowable outdoor night-time limit for ambient noise in industrial districts but above the night-time limit for ambient noise in suburban districts.

11.1.12 Social

11.1.12.1 Population Density, Growth and Location

The proposed project falls under Metsimaholo Ward 19. The total population within the MLM was estimated at 169 779 people in 2018, according to the Metsimaholo Municipality Annual Report (2016/2017). The average population density is fairly low at 86.7 people per km², which is typical of a rural area (although it can be expected that the population density will be higher in towns, such as Sasolburg).

The Local Municipality covers an area of 1 739 km² and includes the towns of Sasolburg, Deneysville and Oranjeville, among others.

Table 11-6: Population Statistics for Metsimaholo Local Municipality, 2001 to 2013

	Census 2001	Global Insight (GI) 2007	Census 2011	MM Annual Report 2013
Metsimaholo Local Municipality Population	115 955	137 481	149 109	154 658

In terms of racial population distribution according to the Census (2011), majority of the population is black African, with approximately 16% being White. Coloured, Indian / Asian and other races represent a minimal percentage of the population, as illustrated in Figure 11-9.

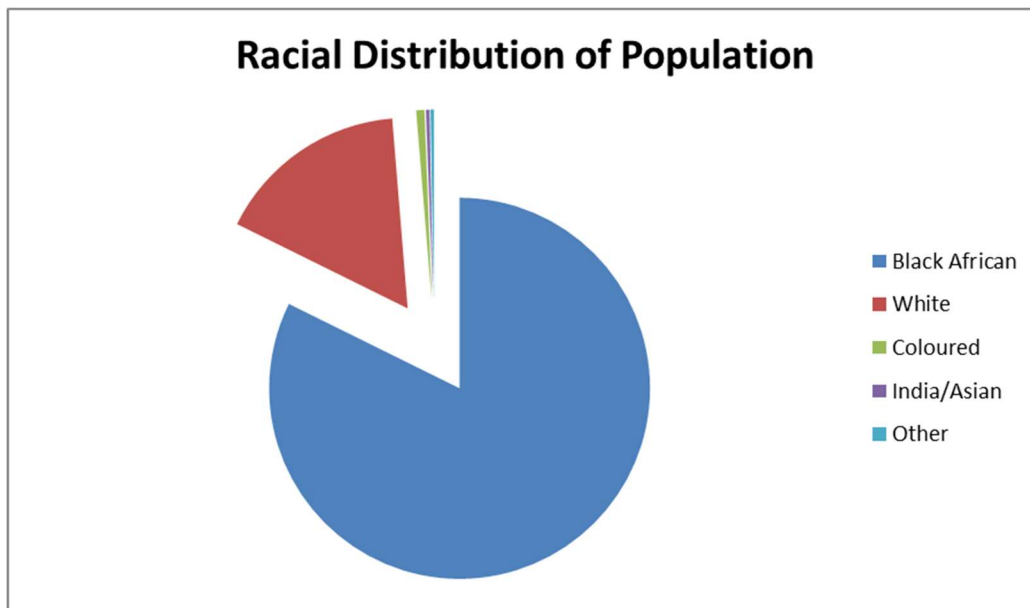


Figure 11-9: Racial Distribution of Population (Source Census, 2011)

11.1.12.2 Major Economic Activities and Sources of Employment

While mining and industry dominate the Sasolburg and Deneysville areas of the municipality, agricultural activities tend to dominate the remainder of the region. A fairly significant portion of the area is currently under cultivation, which is attributed to the availability of water for irrigation purposes. Maize, sunflowers and sorghum tend to be the predominant plant crops grown in the area. Stock farming in the region focuses on grazing and dairy farming.

11.1.12.3 Unemployment Estimate for the Area

There is a 32.1% unemployment rate within the municipality with 41.6% of the economically active youth in the municipality being unemployed (Statistics South Africa, 2011). It is expected that informal areas, such as Zamdela, will consist of higher unemployment rates than Sasolburg and Deneysville.

11.1.12.4 Access to Basic Services

According to Statistics South Africa (2011), 71.7% of the municipal population had access to piped water inside the dwelling and yard. Twenty six percent (26%) of households did not have access to flush toilets or ventilated pit latrines and 78.9% of households received a weekly refuse removal service. More than 80% of households had access to electricity for lighting and cooking.

11.1.13 Cultural Heritage

The proposed project area is underlain by geological features within the Karoo Supergroup, specifically the Vryheid Formation. The Vryheid Formation is the basal layer of the Ecca Group and dates to approximately 280 million years ago (mya). These layers were deposited in a deltaic environment (Bamford, 2016). The Vryheid Formation includes shales, mudstones,

sandstones and coal. This unit is considered of very-high palaeontological sensitivity (SAHRA, 2013; Groenewald & Groenewald, 2014).

Fossil plants are usually preserved in the shales between the coal horizons and, to a lesser extent, within the sandstone surface outcrops (Bamford, 2012; 2014; 2016). Common fossil plants within the Vryheid Formation include Glossopteris leaves, roots and inflorescences; and Calamites stems. Coal deposits can potentially also include fossils of mammal-like reptiles and amphibians. These are however, rarely, if ever, preserved with plant fossils.

Table 11-7 provides a general breakdown of the timeframes within the archaeological and cultural past in South Africa. Figure 11-10 below provides a breakdown of the previously identified heritage resources representing each of these periods.

Table 11-7: Archaeological Periods in South Africa

The Stone Age	Early Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era ¹)
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1994 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (Stories in Stone, 2007)

¹ Common Era (CE) refers to the same period as *Anno Domini* ("In the year of our Lord", referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as 'Before Christ' (BC) or, here, BCE (Before Common Era).

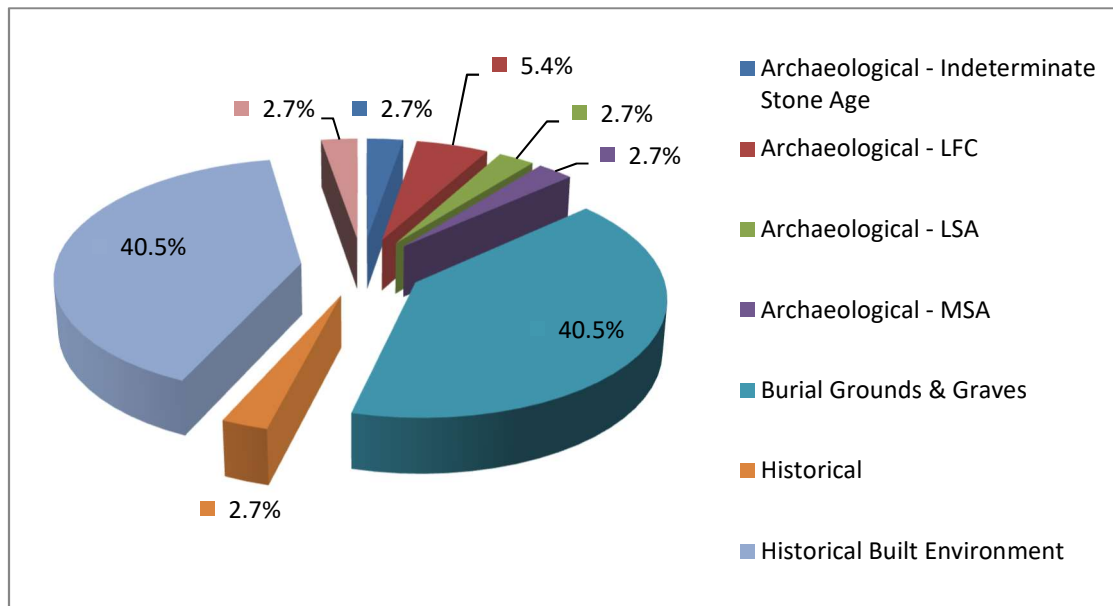


Figure 11-10: Heritage Resources Identified within the Regional Project Area

The cultural heritage landscape is dominated by the historical built environment and burial grounds and graves, although there are expressions of the MSA, LSA and LFC periods. The section that follows will present a brief overview of the archaeological periods present within the regional project area. The reviewed literature included no reports of archaeological material representing the ESA or EFC periods and, as such, these will not be described further in this report.

The Stone Age is divided into three phases defined by the production of stone tools by various hominid species: the ESA, the MSA and the LSA. The MSA dates from approximately 250 to 20 kya. High proportions of blades that are created through the Levallois technique and which are minimally modified characterise the early MSA (Clark, 1982). The MSA is further defined by blades and points which were produced from good-quality raw materials and the use of bone tools, ochre, beads and pendants (Deacon & Deacon, 1999). A low-density scatter of MSA tools exposed by transmission lines represents the period in this area (Du Piesanie & Nel, 2014). An additional stone tool scatter was recorded but the period was not established (Du Piesanie & Nel, 2014).

The LSA started approximately 40 kya and continued up to the historical period, overlapping in some areas with the Farming Community period. LSA stone tools are specialised and specific tools are created for specific functions (Mitchell, 2002). The inclusion of bone tools into the archaeological record further characterises this period. LSA sites commonly include diagnostic artefacts, such as microlithic scrapers and segments.

In southern Africa, the LSA is closely associated with hunter-gatherer groups, including the San (Mitchell, 2002). Due to the nomadic nature of the LSA peoples, open-air sites are generally poorly preserved and difficult to identify. The LSA is further characterised by evidence of ritual practises and complex societies (Deacon & Deacon, 1999). This can be expressed through rock art. No rock art was identified within the proposed project area. The

LSA was represented by a low-density scatter of lithics (Van Schalkwyk, Naude, & Smith, 1996).

The Farming Community period correlates to the movements of Bantu-speaking agropastoralists into southern Africa. The results of the literature review demonstrate heritage resources associated only with the LFC. The LFC is represented by stonewalling or through secondary tangible indicators such as ceramics and evidence for domestic animals, including dung deposits and faunal remains.

Stonewalling is the most visible indicator of LFC settlements. Several types of stonewalling have been described through decades of research and, within the larger project area, the most common is Type V. Maggs (Iron Age Communities of the Southern Highveld, 1976) first described these settlements, which consist of many primary enclosures grouped around a ring. The enclosures may be contiguous or linked by secondary walling to form a secondary enclosure. There is no surrounding perimeter wall, although there may be additional free-standing structures around the periphery of the settlement.

Heritage resources associated with the LFC account for 5.4% of the identified heritage resources. Two instances of stonewalling have been identified in the area (Van Schalkwyk, Naude, & Smith, 1996). Van Schalkwyk *et al.* (A Survey of Cultural Resources in the Proposed Sigma Colliery North West Strip Mine, Sasolburg District, Free State Province, 1996) did not describe the type of walling, but it is most likely Type V.

The historical period² is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

The period of approximately 1817 to 1826 AD is generally referred to as the Mfecane or, north of the Orange River, the Difaqane. Many aspects of the Mfecane/Difaqane have been debated and challenged (Landau, 2010). The traditional understanding of the period is that Mzilikazi and his Ndebele group were pushed out of their territory by the Zulu group led by Shaka. This displacement had a knock-on effect, as multiple groups were subsequently displaced to the north and the west. A drought during this time exacerbated the instability and increased the pressure on food supplies, which were already running low. European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles. The Mfecane/Difaqane was characterised by unprecedented (at least within the records of the Europeans travelling within southern Africa) social and political mobilisation and violence across the Highveld as individuals sought personal and food security

As a result of social and political upheaval, the Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*. Groups of Afrikaners initiated a move from the Cape

² In southern Africa, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented, but is being explored through the 500 year initiative (Swanepoel, et al., 2008).

to the interior to establish an independent state in approximately 1835. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*) (Delius & Cope, 2007; Voortrekkers, 2014).

Soon after settling in the Highveld area, the Trekboers (now farmers) discovered and exploited the Highveld Coalfields. The coal was initially used by the Boers as a domestic resource; however the discovery of gold in the Witwatersrand in 1886 created an enormous demand for coal (Brodie, 2008; Pistorious, 2008a; Phase 1 Heritage Impact Assessment (HIA) Study for Sasols proposed new shaft complex on Strybult 542 and for the North Block on the Eastern Highveld in the Mpumalanga Province of South Africa., 2008b). This increase in the demand for coal drove the commercial exploitation of the coal, until the industry was put on hold by the outbreak of the South African War of 1899-1902 (previously referred to as the Second Anglo-Boer War), which officially started on October 9th, 1899.

Heritage resources representing the historical period include the historical built environment (15 records or 40.5% of the total records), a historical place of significance (one record or 2.7% of all records), a memorial (one record or 2.7% of all records) and burial grounds and graves (15 records or 40.5% of all records). These have been recorded as:

- Burial grounds and graves, which range in size from single graves to more than fifty but less than one hundred graves (Van Schalkwyk, Naude, & Smith, 1996; Dreyer, 2005; Birkholtz & James, 2008; Beater, 2017; Hardwick & Du Piesanie, 2019);
- The historical place of significance is the site of the Coalbrook Mine Disaster of 21 January 1960 (Birkholtz & James, 2008);
- The memorial was constructed in the memory of Frits Pistorius, a young boy who had been murdered in 1952 (Dreyer, 2005); and
- Historical buildings which include buildings, structural remains, remains of functional structures and the remains of *werwe* (farmsteads) (Dreyer, 2005; Van Ryneveld, 2007; Du Piesanie & Nel, 2014; Higgitt & Du Piesanie, 2015; Beater, 2017; Hardwick & Du Piesanie, 2019).

11.1.13.1 Results from the Pre-Disturbance Survey

No heritage resources were identified during the pre-disturbance surveys. Figure 11-11 presents the results of the historical layering. The old plantation established in 1948 covered the entire project area. The project area therefore has a long history of disturbance and this could explain why no heritage resources were identified in the Project area. No structures that may be associated with the plantation were identified within the proposed development footprint.

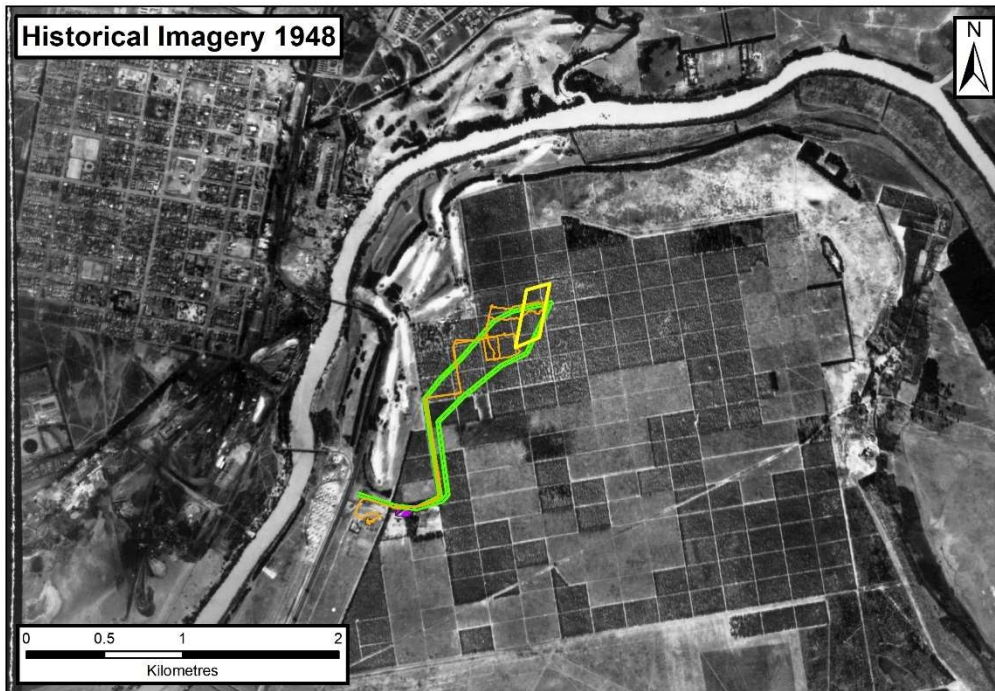


Figure 11-11: Historical Imagery Showing the Project Area in 1948

11.2 Description of the Current Land Uses

The proposed project is located within an active coal mine, although the proposed project footprint has not yet been affected by mining activities. The area has, been extensively disturbed since at least 1948 though the establishment and operation of an oak plantation. Many of the oak trees from the plantation are still present in the proposed development footprint. The area has also been impacted upon by mine stockpiles, roads and other mining activities.

The general project area (including outside the borders of the project area) includes extensive farmland and mining, with associated houses and buildings. A land use map has been included in Figure 11-12 and in Plan 10 in Appendix B.

11.3 Description of Specific Environmental Features and Infrastructure on the Site

There are currently no watercourses, wetland, sensitive environments or heritage resources present within the mining footprint. The area has been degraded from the establishment of an oak plantation and coal mining, which is undertaken around the mining footprint area. No infrastructure is currently located onsite.

The infrastructure proposed to be utilised for the mine includes an office area and haul roads. Minimal infrastructure will be constructed, and all machinery will be mobile.

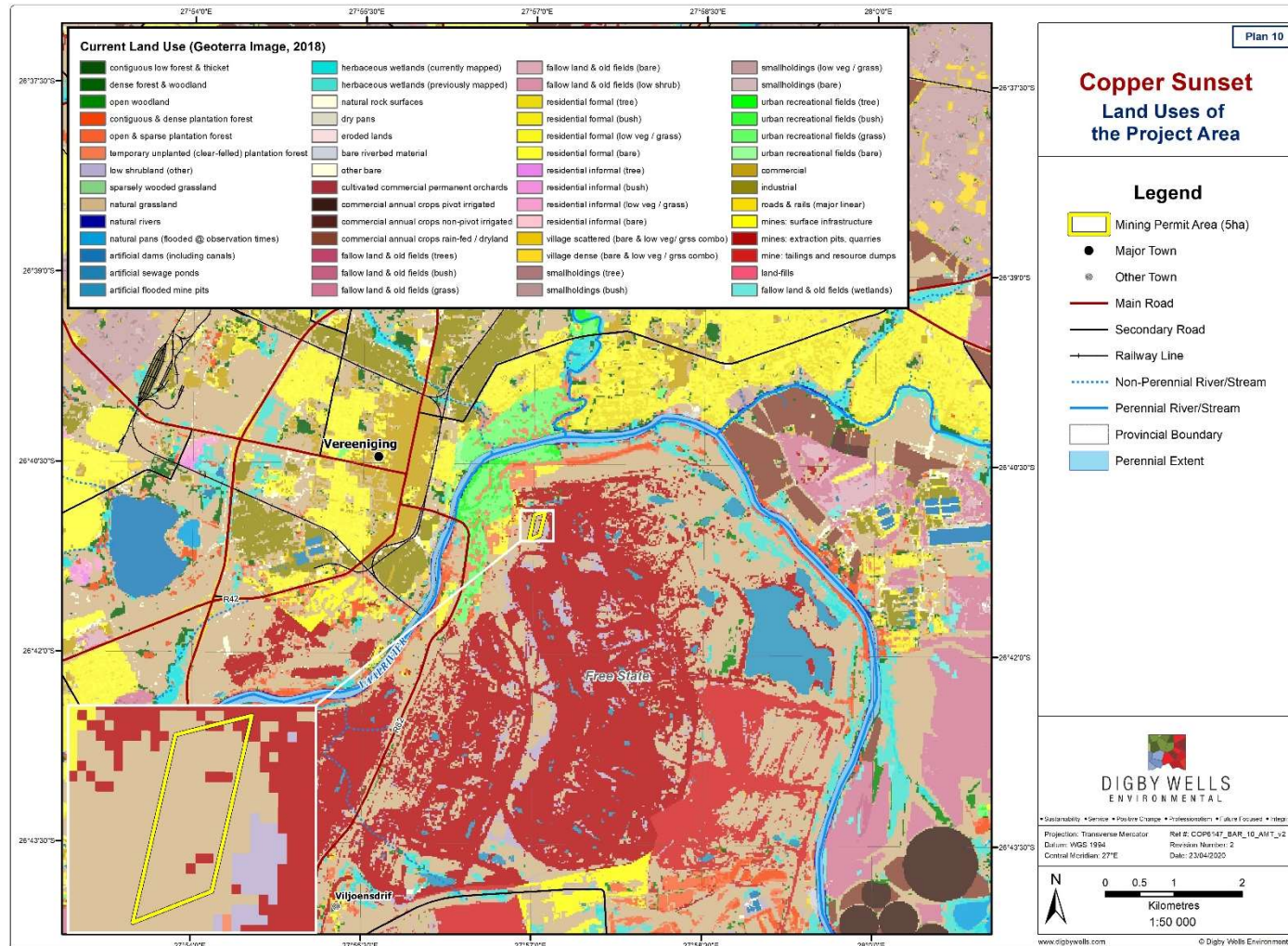


Figure 11-12: Land Uses of the Project Area

12 Impacts and Risks Identified Including the Nature, Significance, Consequence, Extent, Duration and Probability of the Impacts, including the Degree to which these Impacts Occur

The potential impacts are discussed according to each phase of the proposed project: The establishment, operational and closure and rehabilitation phases. The proposed project activities are summarised in Table 12-1.

This section also rates the significance of the potential impacts pre-mitigation and post-mitigation. The impacts below are a result of both the environment in which the activity takes place, as well the activity itself. The impacts associated with the proposed project include the NEMA EIA Regulations, 2014 (as amended) Listed Activities, as well as the mining and associated activities to take place at the project area. The methodology utilised to assess the significance of the potential impacts is described in Section 12.1.

Table 12-1: Summary of Project Activities

Activity No.	Activity
Establishment Phase	<ul style="list-style-type: none"> ● Site clearance and vegetation removal; ● Establishment of a haul road / tracks; and ● Stockpiling of topsoil.
Operational Phase	<ul style="list-style-type: none"> ● Mining of sand resources including screening (if required); and ● Transportation of sand.
Closure and Rehabilitation Phase	<ul style="list-style-type: none"> ● Backfilling of the mined excavations with overburden; ● Dismantling and removal of infrastructure; and ● Rehabilitation (topsoil cover, ripping and vegetation establishment).

12.2 Methodology used in Determining and Ranking the Nature, Significance, Consequence, Extent, Duration and Probability of Potential Environmental Impacts and Risks

The methodology used to assess the significance of potential ecological and heritage impacts is described below. The significance rating formula is as follows:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

$$\text{Consequence} = \text{Type of Impact} \times (\text{Intensity} + \text{Spatial Scale} + \text{Duration})$$

And

$$\text{Probability} = \text{Likelihood of an Impact Occurring}$$

In addition, the formula for calculating consequence:

$$\text{Type of Impact (Nature)} = +1 \text{ (Positive Impact) or } -1 \text{ (Negative Impact)}$$

The weight assigned to the various parameters for positive and negative social and heritage impacts is provided for in the formula and is presented in Table 12-2. The probability consequence matrix for social and heritage impacts is displayed in Table 12-3, with the impact significance rating described in Table 12-4.

Table 12-2: Impact Assessment Parameter Ratings

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
7	<p>Very significant impact on the environment.</p> <p>Irreparable damage to highly valued species, habitat or eco system.</p> <p>Persistent severe damage.</p> <p>The positive impact will result in a significant improvement to the initial/post disturbance environmental status and will benefit ecological and natural resources.</p>	<p>Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.</p> <p>The positive impact will be of high significance which will result the improvement of the socio-economic status of a greater area beyond the boundary of the directly affected of the community and/or promote archaeological and heritage awareness and contribute towards research and documentation of sites and artefacts through phase two assessments.</p>	<p>International</p> <p>The effect will occur across international borders</p>	<p>Permanent: The impact is irreversible, even with management, and will remain after the life of the project</p>	<p>Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
6	<p>Significant impact on highly valued species, habitat or ecosystem.</p> <p>The positive impact is of high significance which will result in a vast improvement to the environment such as ecological diversification and/or rehabilitation of endangered species</p>	<p>Irreparable damage to highly valued items of cultural significance or breakdown of social order.</p> <p>The positive impact will be of high significance and will result in the upliftment of the surrounding community and/or contribute towards research and documentation of sites and artefacts through phase two assessments</p>	<p>National</p> <p>Will affect the entire country</p>	<p>Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management</p>	<p>Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
5	<p>Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate</p> <p>The positive impact will be moderately high and will have a long-term beneficial effect on the natural environment</p>	<p>Very serious widespread social impacts. Irreparable damage to highly valued items</p> <p>The positive impact will be moderately high and will result in visible improvements on the socio-economic environment of the local and regional community, and/or promote archaeological and heritage awareness through mitigation</p>	<p>Cercle/ Region</p> <p>Will affect the entire Cercle or region</p>	<p>Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management</p>	<p>Likely: The impact may occur. <65% probability.</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
4	<p>Serious medium-term environmental effects. Environmental damage can be reversed in less than a year</p> <p>The positive impact on the environment will be moderate with visible improvement to the natural resources and regional biodiversity</p>	<p>On-going serious social issues. Significant damage to structures / items of cultural significance</p> <p>The positive impact on the socio-economic environment will be of a moderate extent and benefits should be experience across the local extent and/or potential benefits for archaeological and heritage conservation</p>	<p>Commune Area</p> <p>Will affect the whole municipal area</p>	<p>Long term: 6-15 years and impact can be reversed with management</p>	<p>Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
3	<p>Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month.</p> <p>The positive impact will be moderately beneficial to the natural environment but will be short lived.</p>	<p>Ongoing social issues. Damage to items of cultural significance.</p> <p>The positive impact will be moderately beneficial for some community members and/or employees, but will be short lived and/or there will be a moderate possibility for archaeological and heritage conservation</p>	<p>Local</p> <p>Local extending only as far as the development site area</p>	<p>Medium term: 1-5 years and impact can be reversed with minimal management</p>	<p>Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
2	<p>Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. The positive impacts will be minor and slight environmental improvement will be visible.</p>	<p>Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected. Minor positive impacts on the social/cultural and/ or economic environment</p>	<p>Limited Limited to the site and its immediate surroundings</p>	<p>Short term: Less than 1 year and is reversible.</p>	<p>Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.</p>

Rating	Intensity / Replaceability		Extent	Duration/Reversibility	Probability
	Environmental	Social, Cultural and Heritage			
1	<p>Limited damage to minimal area of low significance, (e.g. ad hoc spills within plant area). Will have no impact on the environment.</p> <p>The positive impact on the environment will be insignificant and will not result in visible improvements</p>	<p>Low-level repairable damage to commonplace structures.</p> <p>The positive impact on social and cultural aspects will be insignificant</p>	<p>Very limited</p> <p>Limited to specific isolated parts of the site.</p>	<p>Immediate: Less than 1 month and is completely reversible without management.</p>	<p>Highly unlikely / None: Expected never to happen. <1% probability.</p>

Table 12-3: Probability / Consequence Matrix

		Significance																																					
Probability	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
			Consequence																																				

Table 12-4: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the project. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative)
-73 to -108	A serious negative impact which may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe effects	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects	Major (negative)

12.3 Establishment Phase

The Establishment Phase involves the stripping and stockpiling of topsoil for the specific strip to be mined, as well as the clearing of vegetation. The topsoil will be stockpiled along the mined-out strip and less than 3 m high. A temporary haul road will be constructed.

12.3.1 Soil and Land Capability Impacts

The impacts associated with soil and land capability during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-5.

Table 12-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Establishment Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> • Site clearance and vegetation removal; • Establishment of haul road / tracks; and • Stockpiling of topsoil. 				
Description of impact	<ul style="list-style-type: none"> • Soil compaction due to movement of machinery; • Hydrocarbon contamination due to oil leakages or spillages; • Sewage contamination as a result of potential spillages from portable toilets; and • Soil erosion and ultimate loss of topsoil resources and land capability due to site clearance and stockpiling of topsoil. 				
Mitigation required	<ul style="list-style-type: none"> • Only clear vegetation and remove topsoil when and where necessary; • Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; • Ensure that machinery is regularly serviced; • Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; and • Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices and serviced by a registered supplier. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	7	3	6	-72
Post-Mitigation	1	2	2	5	-25

12.3.2 Fauna and Flora Impacts

The impacts associated with fauna and flora during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-6.

Table 12-6: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Establishment Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> Site clearance and vegetation removal; Establishment of haul road / tracks; and Stockpiling of topsoil. 				
Description of impact	<ul style="list-style-type: none"> Loss of habitat (AIP vegetation types) 				
Mitigation required	<ul style="list-style-type: none"> The footprint area must be kept as small as possible and only existing haul roads must be used to reach the site for clearing and vehicles should not be allowed to traverse natural areas or leave the demarcated road; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and An AIP management plan must be implemented, whereby existing AIP's within the project area are eradicated as well as the disturbed site is monitored quarterly for at least two years to ensure that alien invasion does not take place. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	7	1	7	-70
Post-Mitigation	1	5	1	7	-49

12.3.3 Surface Water Impacts

The impacts associated with surface water during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-7.

Table 12-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Establishment Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> • Site clearance and vegetation removal; • Establishment of haul road / tracks; and • Stockpiling of topsoil. 				
Description of impact	<ul style="list-style-type: none"> • Site clearing activities will expose soils and increase the risk of erosion; and • Dirty water generated from the mining operation or associated activities can contaminate clean water areas. 				
Mitigation required	<ul style="list-style-type: none"> • Ensure site clearing is limited to the designated areas; • Machinery used during topsoil stripping must be checked, serviced and maintained to reduce the risk of surface water contamination; • Berms must be constructed around the periphery of the mining site to separate clean and dirty water; and • Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	3	3	-24
Post-Mitigation	1	3	2	2	-12

12.3.4 Air Quality Impacts

The air quality dust fallout model undertaken for the area where the proposed sand mine will be located observed exceedances in 2015. Deposition rates in the area were all within the non-residential limit (1200 mg/m²/d). However, it was found that at some stages the deposition rates were higher than the residential limit of 600 mg/m²/d. The exceedances recorded were not in consecutive months, according to the dust fallout standards, permissible exceedance is twice within a year but not in sequential months. This indicates that in general the area is expected to have higher dust fallout levels and therefore should the sand mine be approved it is expected that the air quality impact would increase however due to the size of the mine the increased impact is expected to be minimal.

The impact assessment rating for air quality is presented in Table 12-8.

Table 12-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Air Quality during the Establishment Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> Site clearance and vegetation removal; Establishment of haul road / tracks; and Stockpiling of topsoil. 				
Description of impact	<ul style="list-style-type: none"> The levels of dust are anticipated to increase during the stripping and removal of vegetation as well as the loading and offloading of sand material. 				
Mitigation required	<ul style="list-style-type: none"> Use of dust suppression measures such as watering must be implemented on the haul road and on areas where vegetation has been removed. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	4	2	5	6	-66
Post-Mitigation	2	2	2	4	-24

12.3.5 Noise Impacts

The impacts associated with noise during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-9.

Table 12-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Noise during the Establishment Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> Site clearance and vegetation removal; Establishment of haul road / tracks; and Stockpiling of topsoil. 				
Description of impact	<ul style="list-style-type: none"> Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors. 				
Mitigation required	<ul style="list-style-type: none"> Mining related machines and vehicles are to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Limit operational activities to daylight hours; and Switch off equipment when not in use. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	2	3	6	-42
Post-Mitigation	1	2	2	6	-30

12.3.6 Social Impacts

The impacts associated with social nuisance to the neighbouring communities during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-10 and Table 12-11.

Table 12-10: Pre-mitigation and Post-mitigation Significance Ratings for Impacts on Social Nuisance Impacts during the Establishment Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> Site clearance and vegetation removal; Establishment of haul road / tracks; and Stockpiling of topsoil. 				
Description of impact	<ul style="list-style-type: none"> Increased dust levels due to site clearing, use of haul roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery. 				
Mitigation required	<ul style="list-style-type: none"> Keep topsoil stockpiles moist to suppress dust; Site clearing to take place during daylight hours only; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Vehicles will obey speed limits (30 km/h); and Bulk Delivery of materials must be maximised to reduce the frequency of deliveries. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	1	3	5	-30
Post-Mitigation	1	1	1	4	-12

Table 12-11: Pre-mitigation and Post-mitigation Significance Ratings for Impacts on Social Impacts during the Establishment Phase

Criteria	Details / Discussion
Activities	<ul style="list-style-type: none"> Site clearance and vegetation removal; Establishment of haul road / tracks; and Stockpiling of topsoil.
Description of impact	<ul style="list-style-type: none"> Generation of income due to continued employment.

Criteria	Details / Discussion				
Mitigation required	<ul style="list-style-type: none"> Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction methods. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	1	3	5	30
Post-Mitigation	1	1	1	4	12

12.4 Operational Phase

The Operational Phase includes the strip mining of the sand resources, where required the use of screening, and the transportation of the sand to the customers.

12.4.1 Soils and Land Capability Impacts

The impacts associated with soil and land capability during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-12.

Table 12-12: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase

Criteria	Details / Discussion
Activities	<ul style="list-style-type: none"> Mining of sand resources; Screening of sand (if required); and Transportation of sand.
Description of impact	<ul style="list-style-type: none"> Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; Sewage contamination as a result of potential spillages from portable toilets; and Soil erosion and ultimate loss of topsoil resources and land capability during sand mining.
Mitigation required	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; Visual assessments of the site will be conducted on a regular basis to monitor potential soil erosion; Ensure that machinery is regularly serviced; Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards;

Criteria	Details / Discussion				
	<ul style="list-style-type: none"> Should a hydrocarbon spillage occur, the spillage must be immediately cleaned up and the contaminated soil removed as hazardous waste. A safe disposal certificate must be retained as proof of safe disposal; Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices; and Ensure that waste is disposed of correctly according to different waste streams. 				
Parameters	Spatial	Duration	Severity	Probability	Significant rating
Pre-Mitigation	2	7	3	6	-72
Post-Mitigation	2	2	3	6	-42

12.4.2 Fauna and Flora Impacts

The impacts associated with fauna and flora during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-13.

Table 12-13: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Operational Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> Mining of sand resources; Screening of sand (if required); and Transportation of sand. 				
Description of impact	<ul style="list-style-type: none"> Potential disturbance and movement of mining machinery 				
Mitigation required	<ul style="list-style-type: none"> Erect signage with speed limits; Restrict vehicle movement to daylight hours; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and Concurrent rehabilitation should take place. 				
Parameters	Spatial	Duration	Severity	Probability	Significant rating
Pre-Mitigation	2	5	3	4	-40
Post-Mitigation	2	5	3	3	-30

12.4.3 Air Quality Impacts

The air quality dust fallout model undertaken for the area where the proposed sand mine will be located observed exceedances in 2015. Deposition rates in the area were all within the non-residential limit (1200 mg/m²/d). However, it was found that at some stages the deposition

rates were higher than the residential limit of 600 mg/m²/d. The exceedances recorded were not in consecutive months, according to the dust fallout standards, permissible exceedance is twice within a year but not in sequential months. This indicates that in general the area is expected to have higher dust fallout levels and therefore should the sand mine be approved it is expected that the air quality impact would increase however due to the size of the mine the increased impact is expected to be minimal.

The impact assessment rating for air quality in the location area is presented in Table 12-14.

Table 12-14: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Air Quality during the Operational Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> • Mining of sand resources; • Screening of sand (if required); and • Transportation of sand. 				
Description of impact	<ul style="list-style-type: none"> • The levels of dust are anticipated to increase during the mining of sand coupled with the screening and loading of sand for transportation 				
Mitigation required	<ul style="list-style-type: none"> • Apply dust suppressant on haul roads and on areas where vegetation has been removed; • Enclose the screening circuit to contain associated airborne dust (if screening process is used); • Conduct activities judiciously on windy days (wind speed ≥ 5.4 m/s); • Set maximum vehicle speed limits at 30 km/hr on site and enforce these limits; • Minimise drop heights when loading onto trucks and at conveyor tipping points; and • Monitoring of dustfall rates and PM₁₀ on a monthly basis around the mining area to ensure compliance with the National Dust Control Regulation 2013 (GG36974 GN 827) (NDCR). 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	4	2	5	6	-66
Post-Mitigation	2	2	2	4	-24

12.4.4 Surface Water Impacts

The impacts associated with surface water during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-15.

Table 12-15: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Operational Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> • Mining of sand resources; • Screening of sand (if required); and • Transportation of sand. 				
Description of impact	<ul style="list-style-type: none"> • As mining progresses soils will continue to be exposed and increase the risk of erosion and possible sedimentation of streams nearby; and • Dirty water generated from the mining operation or associated activities can contaminate clean water areas. 				
Mitigation required	<ul style="list-style-type: none"> • Only clear vegetation when and where necessary; • Machinery used during mining will be checked, serviced and maintained to reduce the risk of surface water contamination; • Berms on the periphery of the mining site must be inspected daily and maintained to ensure runoff from within the mining site does not report to the catchment; and • Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	5	2	4	-40
Post-Mitigation	2	5	2	3	-27

12.4.5 Noise Impacts

The impacts associated with noise during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-16.

Table 12-16: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Noise during the Operational Phase

Criteria	Details / Discussion
Activities	<ul style="list-style-type: none"> • Mining of sand resources; • Screening of sand (if required); and • Transportation of sand.
Description of impact	<ul style="list-style-type: none"> • Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors.
Mitigation required	<ul style="list-style-type: none"> • Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; • Switching off equipment when not in use; and

Criteria	Details / Discussion				
	<ul style="list-style-type: none"> Limit operational activities to daylight hours. 				
Parameters	Spatial	Duration	Severity	Probability	Significant rating
Pre-Mitigation	3	2	3	6	-48
Post-Mitigation	1	2	2	6	-30

12.4.6 Social Impacts

The impacts associated with the social nuisance to the neighbouring communities during the Operational phase, as well as significance ratings and potential mitigation measures are detailed in Table 12-17 and Table 12-18.

Table 12-17: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisances during the Operational Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> Mining of sand resources; Screening of sand (if required); and Transportation of sand. 				
Description of impact	<ul style="list-style-type: none"> Mining could increase the ambient noise levels in the area; and Dust generation from vehicular activity and erosion from stockpiles. 				
Mitigation required	<ul style="list-style-type: none"> Maintain mining equipment and, if possible, fit silencing equipment; Mining will only take place during daylight hours; Put road signs in place to indicate hazardous areas; Use a dust suppressant on haul roads; Allow topsoil stockpiles to vegetate (but not with alien species); Public participation will continue through the life of the mine to ensure local communities are kept informed and allowed to raise issues. These issues will then be addressed by the mine manager; I&APs that are affected by Copper Sunset's activities will be consulted with on a regular basis. A complaints management system will be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately; and All incidents that occur onsite must be recorded in an incident register. Where repeat incidents occur mitigation measures must be implemented to prevent the reoccurrence of the incident. 				
Parameters	Spatial	Duration	Severity	Probability	Significant rating
Pre-Mitigation	2	5	3	5	-50
Post-Mitigation	1	5	2	4	-32

Table 12-18: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisances during the Operational Phase

Criteria	Details / Discussion				
Activities	<ul style="list-style-type: none"> • Mining of sand resources; and • Transportation of sand. 				
Description of impact	<ul style="list-style-type: none"> • Generation of income due to continued employment. 				
Mitigation required	<ul style="list-style-type: none"> • Employ local people at the mine; • Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and • Promote labour -intensive construction method. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	5	3	7	70
Post-Mitigation	2	5	4	7	77

12.5 Closure and Rehabilitation Phase

The activities associated with the rehabilitation of the site will entail the back-filing of the mined excavations with the haul road material being utilised as overburden. The overburden will be placed, and the land shaped to resemble the drainage patterns of the pre-mining environment. The topsoil will then be placed according to the landscape created. The office's and associated mining infrastructure will be removed off site and any possible soil contamination will be removed. The area will then be permitted to revegetate naturally.

It is worth noting that these impacts and associated mitigation measures will only be applicable if Seriti does not mine coal within the area once sand mining activities have been completed.

12.5.1 Soils and Land Capability Impacts

The impacts associated with soil and land capability during the Closure and Rehabilitation Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-19.

Table 12-19: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Closure and Rehabilitation Phase

Criteria	Details / Discussion
Activities	<ul style="list-style-type: none"> • Backfilling of the mined excavations with overburden; • Dismantling and removal of infrastructure; and • Rehabilitation (topsoil cover, ripping and vegetation establishment).

Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Soil erosion and ultimate loss of topsoil resources and land capability during rehabilitation phases. 				
Mitigation required	<ul style="list-style-type: none"> Visual assessments of the site must be conducted on a regular basis to monitor potential soil erosion; The backfilled area must be sloped so as to avoid ponding of water. Should ponding occur the area must be re-sloped, and water must be drained from the area; Limited movement of vehicles on newly rehabilitated areas; Ensure no contaminated soil is used for rehabilitation purposes; A waste management system must be implemented to ensure that domestic and hazardous waste, including sewage, generated during decommissioning and closure are disposed of in a manner that will not affect the soil environment; and All infrastructure must be completed removed from site. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	4	1	6	-36
Post-Mitigation	1	2	1	4	-16

12.5.2 Fauna and Flora

The impacts associated with fauna and flora during the Closure and Rehabilitation Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-20.

Table 12-20: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Flora and Fauna during the Closure and Rehabilitation Phase

Criteria	Details / Discussion
Activities	<ul style="list-style-type: none"> Backfilling of the mined excavations with overburden; Rehabilitation (topsoil cover, ripping and vegetation establishment); and Dismantling and removal of infrastructure.
Description of impact	<ul style="list-style-type: none"> Profiling of the area and rehabilitation (topsoil cover, ripping and vegetation establishment).
Mitigation required	<ul style="list-style-type: none"> An alien plant species management plan must be implemented for two years after rehabilitation is completed; All emergent alien plant species must be removed before they reach a seed-bearing or flowering maturity; Monitoring of the rehabilitated area for vegetation regrowth and removal of alien invasive plant species; and Where vegetation establishment is not successfully implemented additional measures to encourage vegetation growth must be undertaken.

Criteria	Details / Discussion				
	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	4	4	-36
Post-Mitigation	2	2	3	3	+21

12.5.3 Noise Impacts

The impacts associated with noise during the Rehabilitation Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 12-21.

Table 12-21: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Noise during the Rehabilitation Phase

Criteria	Details / Discussion				
	Activities	<ul style="list-style-type: none"> Backfilling of the mined excavations with overburden; Rehabilitation (topsoil cover, ripping and vegetation establishment); and Dismantling and removal of infrastructure. 			
Description of impact	<ul style="list-style-type: none"> Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors. 				
Mitigation required	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and Switching off equipment when not in use. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Severity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	2	1	2	-8
Post-Mitigation	1	2	1	1	-4

12.6 Cumulative Impacts

12.6.1 Fauna and Flora

Cumulative impacts may arise from the proposed sand mining project in association with existing impacts from other operations. New Vaal Colliery are planning on mining within the area once sand mining activities have been completed and it is expected that there may be additional impacts that may occur as a result of mining within the area. It is also noted that fauna and flora have already been impacted upon with the area already been disturbed by mining activities.

12.6.2 Air Quality

The affected environment has been heavily altered through time. To the west of the proposed project area, the landscape is dominated by urban development associated with

Vanderbijlpark and Sharpville. To the north of the proposed project area, the landscape is utilised for industrial purposes. Also, several mining activities exist in close proximity to the proposed project. This has resulted in exceedances of air quality rates near the proposed project location with an increase in mining activities. It is, therefore, recommended that ambient dust deposition be monitored continuously in the area and dust suppressant be utilised on haul roads.

12.6.3 Heritage

No heritage resources were identified within the proposed development footprint area and therefore no direct impacts to heritage resources are envisaged. This notwithstanding, the proposed project does pose the risk of cumulative impacts on the landscape and there is potential for low-risk and unplanned events to occur. The development and operation of the proposed project will add to the existing and proposed infrastructure in the area and will contribute to the degradation of the sense-of-place of the cultural landscape. Considering the greater development landscape, the effects from the various proposed developments will interact to produce a total greater effect on the cultural landscape and degradation thereof.

12.7 Project Related Risks

The following project risks (Table 12-22) have been identified for the proposed project, for which risk avoidance measures have been proposed. These measures shall also be incorporated into the EMP.

Table 12-22: Associated Project Related Risks

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of <i>in situ</i> historical built environment sites during the implementation of the project.	Damage or destruction of heritage resources generally protected under Section 34 of the NHRA	Establish a Project-specific Chance Find Procedure (CFP) Fossil Finds Procedure (FFP) as a condition of authorisation.
Accidental exposure of <i>in situ</i> palaeontological or archaeological material during the implementation of the project.	Damage or destruction of heritage resources generally protected under Section 35 of the NHRA	
Accidental exposure of <i>in situ</i> burial grounds or graves during the implementation of the project.	Damage or destruction of heritage resources generally protected under Section 36 of the NHRA.	

Unplanned event	Potential impact	Mitigation / Management / Monitoring
Accidental exposure of human remains during the construction phase of the project.		
Hydrocarbon spillages	Contamination	No servicing of vehicles will be permitted at the operation. Drip trays must be placed beneath vehicles not in use. Procedures must be put in place to clean-up spillages in the event that they should occur. Spill kits need to be obtained and must be available on site to clean up any leaks or spills. Spillages of magnitude should also be reported to the authorities within 24 hours and an internal incident reporting system implemented.
Poaching of animal species on site due to increase activity on site.	Small mammals and reptiles may be at risk due to increased human activity on site.	Ensure continuous environmental awareness training takes place.
Occurrences of unplanned fires.	Primary and Secondary grasslands vegetation and habitat types will be destroyed.	Ensure a fire management plan is in place and that appropriate and dedicated equipment is available for firefighting.

12.8 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

12.8.1 Positive Impacts

Positive impacts of the proposed project can be summarised as follows:

- **Employment** – The proposed project is expected to contribute (directly or indirectly) to the employment of people in an area where unemployment is a challenge;
- **Continued Tax Base and Revenue** – The continued mining of sand would result in a significant increase of revenue for Copper Sunset and associated tax contributions towards the country. The market share of the existing operation is about 46% and this is not expected to change as the mining area comes into operation; and

- The proposed mine has the potential to contribute to the upgrading/ maintenance of infrastructure in and around the local area and indirectly contribute the economy of the area.

12.8.2 Negative Impacts

Negative impacts of the proposed project can be summarised as follows:

- **Dust Generation** – During the establishment and operation phase it is expected that the mining operation will have a negative impact on air quality. Site clearing and construction activities may result in fugitive dust emissions;
- **Noise Generation** – machinery and vehicles, will be used in the establishment, operation and rehabilitation phase which will result in an increase in the ambient noise levels;
- **Spillage of hydrocarbon products:** Negative impacts with regards to the biophysical environment include potential contamination of the area due to spillage of hydrocarbon products;
- **Social Nuisance** – The increased dust levels due to site clearing, use of haul roads and vehicular activity as well as the increase in ambient noise levels from mining machinery and the movement of vehicles will result in social nuisance;
- **Loss of Fauna and Flora Habitat** – the mining activity will result in further site clearance, thus result in the further loss of fauna and flora habitat; and
- **Heritage** – Heritage resource that may be encountered during the establishment and operational phases may be disturbed or destroyed.

12.9 The Possible Mitigation Measures That Could Be Applied and the Level of Risk

Mitigation measures for each identified impact have been proposed and are presented with the impact ratings in Section 12 above.

12.10 Motivation Where No Alternative Sites were Considered

In terms of mining, alternative sites (i.e. locations) could not be considered since the location of the mineral resource determines the location of the mining operations. A more detailed description is provided in Section 9.

12.11 Statement Motivating the Alternative Development Location Within the Overall Site

The location of the haul road and offices have been placed in relation to the mining area. No sensitive environments were identified onsite therefore there were no restrictions where the mining infrastructure could be placed. The haul road was placed in such a way as to avoid

any disruptions to the New Vaal Colliery coal mining operation. A more detailed description is provided in Section 9.

13 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

Refer to Section 12 for a description of the process undertaken to identify, assess and rank the impacts, the proposed project will impose on the preferred site.

The main impact is seen as the loss of soil, with rehabilitation being the mitigation measure, concurrent rehabilitation will take place as the next strip is mined. Maintenance of the rehabilitated area will ensure the control of soil erosion.

Exceedances of air quality rates have been observed near the proposed project location, with an increase in mining activities. It is recommended that ambient dust deposition be monitored continuously in the area. Dust suppressant must be applied to the haul road.

The proposed project is considered a causative source of noise pollution of low significance however, cumulative impacts should be considered for the overall improvement of ambient noise levels. The existing noise sources in the immediate area of the proposed project are the New Vaal Colliery coal stock yard, vehicular movement as well as the power generation activities at Lethabo power station. The proposed sand mining activities at the New Vaal Extension Area will, however, not significantly contribute to the existing noise sources in the area.

Chance Finds and Fossil Finds Procedures must be implemented in the proposed area as a mitigation measure for heritage resources.

Refer to Section 14 below for a description of all environmental issues and risks that were identified during the environmental impact assessment process.

14 Assessment of each identified potentially significant impact and risk

The potential impacts per activity are detailed in Table 14-1. The impacts per project phase indicate the mitigation measures proposed, as well as the impact significance pre-mitigation and post mitigation

Table 14-1: Assessment of Each Identified Impact

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
<ul style="list-style-type: none"> Site clearance and vegetation removal Establishment of haul road Stockpiling of topsoil 	<ul style="list-style-type: none"> Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; Sewage contamination as a result of potential spillages from portable toilets; and Soil erosion and ultimate loss of topsoil resources and land capability due to site clearance and stockpiling of topsoil. 	Soils	Establishment Phase	Moderate Negative	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; Ensure that machinery is regularly serviced; Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; and Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices. 	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	Loss of habitat (AIP vegetation types)	Fauna and Flora	Establishment Phase	Moderate Negative	<ul style="list-style-type: none"> The footprint area must be kept as small as possible and only existing haul roads must be used to reach the site for clearing and vehicles should not be allowed to traverse natural areas or leave the demarcated road; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and An AIP management plan must be implemented, whereby existing AIP's within the Project area are eradicated as well as the disturbed site is monitored quarterly for at least two years to ensure that alien invasion does not take place. 	Minor Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	<ul style="list-style-type: none"> Site clearing activities will expose soils and increase the risk of erosion; Dirty water generated from the mining operation or associated activities can contaminate clean water areas 	Surface water	Establishment Phase	Negligible Negative	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Machinery used during topsoil stripping must be checked, serviced and maintained to reduce the risk of surface water contamination; Berms must be constructed around the periphery of the mining site to separate clean and dirty water; and Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 	Negligible Negative
	The levels of dust are anticipated to increase during the stripping and removal of vegetation as well as the loading and offloading of sand material.	Air Quality	Establishment Phase	Minor Negative	<ul style="list-style-type: none"> Use of dust suppression measures such as watering must be implemented on the haul roads and on areas where vegetation has been removed. 	Negligible Negative
	Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors.	Noise	Establishment Phase	Minor Negative	<ul style="list-style-type: none"> Mining related machines and vehicles are to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Limit operational activities to daylight hours; and Switch off equipment when not in use. 	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	<ul style="list-style-type: none"> Increased dust levels due to site clearing, use of haul roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery. 	Social	Establishment Phase	Negligible Negative	<ul style="list-style-type: none"> Keep topsoil stockpiles moist to suppress dust; Site clearing to take place during daylight hours only; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Vehicles will obey speed limits (30 km/hr); and Bulk Delivery of materials must be maximised to reduce the frequency of deliveries. 	Negligible Negative
	Generation of income due to continued employment.	Social	Establishment Phase	Negligible Positive	<ul style="list-style-type: none"> Employ local people at the mine; Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction methods. 	Negligible Positive
<ul style="list-style-type: none"> Mining of sand resources; Screening of sand (if required); and Transportation of sand 	<ul style="list-style-type: none"> Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; 	Soils	Operational Phase	Moderate Negative	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; 	Minor Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	<ul style="list-style-type: none"> • Sewage contamination as a result of potential spillages from portable toilets; and • Soil erosion and ultimate loss of topsoil resources and land capability during sand mining. 				<ul style="list-style-type: none"> • Visual assessments of the site will be conducted on a regular basis to monitor potential soil erosion. • Ensure that machinery is regularly serviced; • Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; • Should a hydrocarbon spillage occur, the spillage must be immediately cleaned up and the contaminated soil removed as hazardous waste. A safe disposal certificate must be retained as proof of safe disposal; • Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices; • Ensure that waste is disposed of correctly according to different waste streams. 	

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	Potential disturbance and movement of mining machinery	Fauna and Flora	Operational Phase	Minor Negative	<ul style="list-style-type: none"> Erect signage with speed limits; Restrict vehicle movement to daylight hours; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and Concurrent rehabilitation should take place. 	Negligible Negative
	The levels of dust are anticipated to increase during the mining of sand coupled with the screening and loading of sand for transportation	Air Quality	Operational Phase	Moderate Negative	<ul style="list-style-type: none"> Apply dust suppressant on haul roads and on areas where vegetation has been removed; Enclose the screening circuit to contain associated airborne dust (if screening process is used); Conduct activities judiciously on windy days (wind speed ≥ 5.4 m/s); Set maximum vehicle speed limits on site and enforce these limits; Minimise drop heights when loading onto trucks and at conveyor tipping points; and Monitoring of dustfall rates and PM₁₀ on a monthly basis around the mining area to ensure compliance with the NDCR. 	Minor Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	<ul style="list-style-type: none"> As mining progresses soils will continue to be exposed and increase the risk of erosion and possible sedimentation of streams nearby; and Dirty water generated from the mining operation or associated activities can contaminate clean water areas. 	Surface Water	Operational Phase	Minor Negative	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Machinery used during mining will be checked, serviced and maintained to reduce the risk of surface water contamination; Berms on the periphery of the mining site must be inspected daily and maintained to ensure runoff from within the mining site does not report to the catchment; and Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 	Negligible Negative
	Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors	Noise	Operational Phase	Minor Negative	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Switch off equipment when not in use; and Limit operational activities to daylight hours. 	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	<ul style="list-style-type: none"> • Mining could increase the ambient noise levels in the area; and • Dust generation from vehicular activity and erosion from stockpiles. 	Social	Operational Phase	Minor Negative	<ul style="list-style-type: none"> • Maintain mining equipment and, if possible, fit silencing equipment; • Mining will only take place during daylight hours; • Put road signs in place to indicate hazardous areas; • Use a dust suppressant on haul roads; • Allow topsoil stockpiles to vegetate (but not with alien species); • Public participation will continue through the life of the mine to ensure local communities are kept informed and allowed to raise issues. These issues will then be addressed by the mine manager; • IAPs that are affected by Copper Sunset activities will be consulted with on a regular basis. A complaints management system will be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately; • All incidents that occur onsite must be recorded in an incident register. Where repeat incidents occur mitigation measures must be implemented to prevent the reoccurrence of the incident. 	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
	Generation of income due to continued employment	Social	Operational Phase	Moderate Positive	<ul style="list-style-type: none"> Employ local people at the mine; Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction method 	Moderate Positive
<ul style="list-style-type: none"> Backfilling of the mined excavations with overburden; Rehabilitation (topsoil cover, ripping and vegetation establishment); and Dismantling and removal of infrastructure. 	Soil erosion and ultimate loss of topsoil resources and land capability during rehabilitation phases.	Soil	Rehabilitation Phase	Minor Negative	<ul style="list-style-type: none"> Visual assessments of the site must be conducted on a regular basis to monitor potential soil erosion; The backfilled area must be sloped so as to avoid ponding of water. Should ponding occur the area must be re-sloped and water must be drained from the area; Limited movement of vehicles on newly rehabilitated areas; Ensure no contaminated soil is used for rehabilitation purposes; A waste management system must be implemented to ensure that domestic and hazardous waste, including sewage, generated during decommissioning and closure are disposed of in a manner that will not affect the soil environment; and 	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Mitigation Type	Significance (Post Significance)
					<ul style="list-style-type: none"> All infrastructure must be completely removed from site. 	
	Profiling of the area and rehabilitation (topsoil cover, ripping and vegetation establishment)	Flora and Flora	Rehabilitation Phase	Minor Negative	<ul style="list-style-type: none"> An alien plant species management plan must be implemented for two years after rehabilitation is completed; All emergent alien plant species must be removed before they reach a seed-bearing or flowering maturity; and Monitoring of the rehabilitated area for vegetation regrowth and removal of alien invasive plant species; and Where vegetation establishment is not successfully implemented additional measures to encourage vegetation growth must be undertaken. 	Small Positive
	Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors.	Noise	Rehabilitation Phase	Negligible Negative	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and Switch off equipment when not in use. 	Negligible Negative

15 Summary of specialist reports

Brief specialist inputs included in the baseline environment, potential impacts and the recommended mitigation measures are discussed in Table 15-1 .

Table 15-1: Specialist Studies undertaken for the Proposed Project

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the BAR	Reference to applicable section of report where specialist recommendations have been included
Fauna and Flora Impact Assessment	<p>The following recommendations are provided:</p> <ul style="list-style-type: none"> ● The footprint area must be kept as small as possible and only existing haul roads must be used to reach the site for clearing and vehicles should not be allowed to traverse natural areas or leave the demarcated road; ● Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; ● An AIP management plan must be implemented, whereby existing AIP's within the project area are eradicated as well as the disturbed site is monitored quarterly for at least two years after rehabilitation to ensure that alien invasion does not take place; ● Erect signage with respect to speed limits; ● Restrict vehicle movement to daylight hours; ● Concurrent rehabilitation should take place; and ● Monitoring of the rehabilitated area once completed for vegetation establishment. 	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Fauna and Flora Specialist.

List of studies undertaken	Recommendations of specialist reports	Specialist Recommendations that have been included in the BAR	Reference to applicable section of report where specialist recommendations have been included
Heritage Impact Assessment	It is recommended that Copper Sunset develop and implement a Chance Finds Procedure (CFP) prior to the commencement of the construction phase of the proposed project.	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Heritage Specialist.
Rehabilitation Assessment	<p>To work towards achieving an environmentally safe and sustainably closed project area, concurrent rehabilitation is the key (dependant on whether or not New Vaal mines the area once Copper Sunset is complete with their sand mining operations).</p> <p>Monitoring and maintenance for the areas impacted upon must be undertaken for two to three years after closure.</p> <p>The key to the success of the proposed project is defined by the implementation of the proposed mitigation measures, with a key focus on the following:</p> <ul style="list-style-type: none"> ● Remove and control of alien invasive species; ● Management of topsoil resources; and ● Communication and integration of workflows between Seriti and Copper Sunset. 	X - All recommendations have been considered and included in this report.	All mitigation and management measures included in this report were recommended by the Rehabilitation Specialist.

Copies of specialist reports have been attached as appendices.

16 Environmental Impact Statement

16.1 Summary of the Key Findings of the Environmental Impact Assessment

The Environmental Impact Statement is a summary of all the potential environmental impacts identified during each phase of the proposed project. The significance of the impacts associated with the biophysical environment, pre-mitigation and post-mitigation, is summarised in Table 16-1.

Table 16-1: Summary of the Potential Impacts

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
Site clearance and vegetation removal Establishment of haul road Stockpiling of topsoil	Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; Sewage contamination as a result of potential spillages from portable toilets; and Soil erosion and ultimate loss of topsoil resources and land capability due to site clearance and stockpiling of topsoil.	Soils	Establishment Phase	Moderate Negative	Negligible Negative
	Loss of habitat (AIP vegetation types)	Fauna and Flora	Establishment Phase	Moderate Negative	Minor Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
	Site clearing activities will expose soils and increase the risk of erosion; Dirty water generated from the mining operation or associated activities can contaminate clean water areas	Surface water	Establishment Phase	Negligible Negative	Negligible Negative
	The levels of dust are anticipated to increase during the stripping and removal of vegetation as well as the loading and offloading of sand material.	Air Quality	Establishment Phase	Minor Negative	Negligible Negative
	Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors.	Noise	Establishment Phase	Minor Negative	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
	Increased dust levels due to site clearing, use of haul roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery.	Social	Establishment Phase	Negligible Negative	Negligible Negative
	Generation of income due to continued employment.	Social	Establishment Phase	Negligible Positive	Negligible Positive
Mining of sand resources; Screening of sand (if required); and Transportation of sand	Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; Sewage contamination as a result of potential spillages from portable toilets; and Soil erosion and ultimate loss of topsoil resources and land capability during sand mining.	Soils	Operational Phase	Moderate Negative	Minor Negative
	Potential disturbance and movement of mining machinery	Fauna and Flora	Operational Phase	Minor Negative	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
	The levels of dust are anticipated to increase during the mining of sand coupled with the screening and loading of sand for transportation	Air Quality	Operational Phase	Moderate Negative	Minor Negative
	As mining progresses soils will continue to be exposed and increase the risk of erosion and possible sedimentation of streams nearby; and Dirty water generated from the mining operation or associated activities can contaminate clean water areas.	Surface Water	Operational Phase	Minor Negative	Negligible Negative
	Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors	Noise	Operational Phase	Minor Negative	Negligible Negative

Project Activity	Potential Impact	Aspects Affected	Phase	Significance (Pre-Mitigation)	Significance (Post Significance)
	Mining could increase the ambient noise levels in the area; and Dust generation from vehicular activity and erosion from stockpiles.	Social	Operational Phase	Minor Negative	Negligible Negative
	Generation of income due to continued employment	Social	Operational Phase	Moderate Positive	Moderate Positive
Backfilling of the mined excavations with overburden; Rehabilitation (topsoil cover, ripping and vegetation establishment); and Dismantling and removal of infrastructure.	Soil erosion and ultimate loss of topsoil resources and land capability during rehabilitation phases.	Soil	Rehabilitation Phase	Minor Negative	Negligible Negative
	Profiling of the area and rehabilitation (topsoil cover, ripping and vegetation establishment)	Flora and Flora	Rehabilitation Phase	Minor Negative	Small Positive
	Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors.	Noise	Rehabilitation Phase	Negligible Negative	Negligible Negative

The main impacts of concern are the potential establishment of alien invasive species and the impact on soil (soil compaction, soil contamination and soil erosion). These impacts can be mitigated to minor significance. There are no fatal flaws associated with the proposed project and is further considered to be a suitable activity for the location it is being proposed in.

16.2 Final Site Map

The final infrastructure layout map is located in Appendix B, Plan 4.

16.3 Summary of the Positive and Negative Implications and Risks of the Proposed Activity and Identified Alternatives

Refer to Section 12.8.

17 Proposed Impact Management Objectives and the Impact Management Outcomes for Inclusion in the EMPR

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

- To minimise the extent of an impact during the life of the project;
- To ensure appropriate restoration of areas affected by the project; and
- To prevent long term environmental degradation.

18 Item 3(m): Final Proposed Alternatives

The alternatives considered and motivations for the preferred alternatives are detailed in Section 9 above.

19 Aspects for Inclusion as Conditions of Authorisation

The EAP recommends that the following conditions be considered for inclusion into the Authorisation, should it be granted:

- The mitigation measures contained in the attached specialist reports and EMPr for the proposed sand mining operation must be adhered to;
- Annual environmental audits against the conditions of the EMPr and licence must be undertaken to ensure mitigation measures are being implemented; and
- Monitoring must be undertaken as described in the monitoring programme provided in Part B Section 8.

The specialist studies and impact assessment have been based on the proposed preferred site layout for the proposed project. Should there be any changes to the project description or

site layout plan as provided, the adequacy and accuracy of the work may be affected, and additional studies may be required to assess the impacts of these proposed changes.

20 Description of any Assumptions, Uncertainties and Gaps in Knowledge

- A high-level desktop baseline assessment was undertaken for this project including site visits conducted by the flora, fauna and heritage specialists;
- Based on the geology of the area and the palaeontological record as it is known, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils as they have been transported. The source area for the fluvial sands is in ancient volcanic rocks. Aeolian sands could only entrap sand sized particles; and
- Many tangible heritage resources, specifically archaeological resources, commonly occur below the surface, and may not be identified, documented and assessed without intrusive and destructive methods. Intrusive archaeological assessments require permits issued as per Section 35 of the NHRA, however these are not issued as part of impact assessments. Therefore, the findings in the reviewed literature, and especially existing HIA reports, are in themselves limited to surface observations.

21 Reasoned Opinion as to Whether the Proposed Activity Should or Should Not be Authorised

21.1 Reasons Why the Activity Should Be Authorised or Not

Digby Wells recommends that the proposed mining activities be granted authorisation, provided that the stipulated mitigation and management measures are implemented for the proposed project. The project area is surrounded by mining activities and the current land type is degraded as a result of the planation. The proposed project will result in no loss of critical habitats, will not contribute to significant noise or dust pollution and there are no wetlands or surface water in close proximity. No significant impacts as a result of the proposed project have been identified as long as the mitigation measures and implemented in accordance with Section 12.

21.2 Conditions that Must be Included in the Authorisation

The implementation of the mitigation measures provided in this report must be a condition of the authorisation. The following mitigation measures must be included into the authorisation:

- Only clear vegetation and remove topsoil when and where necessary;
- Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high;

- Ensure that machinery is regularly serviced in accordance with manufacturing specifications;
- Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with the South African National Standards;
- Sewage will be collected in portable chemical toilets to reduce the risk of contamination. The portable toilets must be available in the area where mining is taking place as well as at the mine offices and supplied and serviced by a legally compliant and reputable supplier;
- Any dirty water generated from the mining operation or office area must be collected and are not permitted to be discharged to the environment;
- Visual assessments of the site will be conducted on a regular basis to monitor potential soil erosion;
- Ensure that waste is disposed of correctly according to different waste streams;
- Appropriate dust abatement measures must be implemented in areas where required;
- Enclose the screening circuit to contain associated airborne dust (if screening process is used);
- Conduct activities judiciously on windy days (wind speed ≥ 5.4 m/s);
- Vehicles will obey speed limits (30 km/hr);
- Minimise drop heights when loading onto trucks and at conveyor tipping points;
- Monitoring of dustfall rates and PM10 on a monthly basis around the mining area;
- Switch off equipment when not in use;
- Berms must be constructed around the periphery of the mining site to separate clean and dirty water. Water within the mining site must be diverted to the water sump;
- Site clearing and mining activities to take place during daylight hours only;
- Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided;
- Promote labour -intensive construction methods;
- Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities;
- Invasive or exotic plant species should not be allowed to establish during and after the operational phase (undertake an alien invasive monitoring programme);
- Concurrent rehabilitation should take place;

- Chance Finds Procedures (CFPs) and Fossil Finds Procedure (FFP) must be developed and clearly describe the reporting process and appropriate management of the exposure of previously unidentified heritage resources;
- The backfilled area must be sloped so as to avoid ponding of water. Should ponding occur the area must be re-sloped, and water must be drained from the area;
- Limited movement of vehicles on newly rehabilitated areas;
- Ensure no contaminated soil is used for rehabilitation purposes;
- A waste management system must be implemented to ensure that domestic and hazardous waste, including sewage, generated during decommissioning and closure are disposed of in a manner that will not affect the soil environment;
- All infrastructure must be completed removed from site after mining is completed;
- Monitoring of the rehabilitated area for vegetation regrowth and removal of alien invasive plant species; and
- Where vegetation establishment is not successfully implemented additional measures to encourage vegetation growth must be undertaken.

22 Period for which the Environmental Authorisation is Required

The environmental authorisation is required for a period of 2 years.

23 Undertaking

An undertaking is provided at the end of the EMPR and is applicable to both the Basic assessment report and the Environmental Management Programme report.

24 Financial Provision

The focus of this financial provision calculation is to estimate the cost of backfilling the area impacted upon by sand mining activities and the general surface rehabilitation of the disturbed areas. The costing provided for is for the rehabilitation of the total area that will be disturbed to ensure that enough provision is available in the event that Seriti does not mine the area.

The financial provision estimate based on the DMR calculation model is **R 1,338,857.00**. This includes P&Gs (12%) and a Contingency cost (10%) as per the DMR Guideline document. The DMR cost includes VAT at 15%.

The assumptions that the costing is based on are provided below:

- The rehabilitation of the mined strips has been included under general surface rehabilitation as the mining is not considered open pit mining as defined by the guideline;
- Five (5) hectares has been included under general surface rehabilitation for areas impacted upon by sand mining activities;

- Rehabilitation of haul roads has been included and the width of the haul road has been assumed to be five meters wide;
- Costs for water management have been included to allow for general shaping of mined areas; and
- Monitoring for a period of two-three years has been included.

24.1 Explain how the Aforesaid Amount was Derived

The environmental closure liability for the proposed project was calculated according to the DMR’s “Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision Provided by a Mine”.

The DMR Guideline format makes use of a set template for which defined rates and multiplication factors are utilised.

The 2005 DMR Master Rates were updated and published by the DMR in 2012 however, due to inflation, these are no longer accurate. The 2005 Master Rates were escalated yearly by the average annual inflation rate to reflect rates more representative of the year 2020.

The DMR Guideline Document classifies a mine according to a number of factors which allows the determination of appropriate weighting factors to be used during the quantum calculation. The following factors are considered:

- The mineral mined;
- The risk class of the mine;
- Environmental sensitivity of the mining area;
- Type of mining operation; and
- Geographic location.

The classification of the mine as per the DMR Guideline document is given in Table 24-1.

Table 24-1: Mine Classification

Mine	Risk Class	Sensitivity	Terrain	Proximity to Urban Area
Copper Sunset	C	Medium	Flat	Urban

Table 24-2 provides a summary of the estimate calculated for each component for the proposed project.

Table 24-2: Summary of Financial Provision

Class C (Medium Risk)		Unit:	A	B	C	D	E=A*B*C*D
Component	Description:		Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount (Rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & Power lines)	m ³		R 15.82	1.00	1.00	R 0
2 (A)	Demolition of steel buildings & Structures	m ²		R 220.31	1.00	1.00	R 0
2 (B)	Demolition of reinforced concrete buildings & structures	m ²		R 324.66	1.00	1.00	R 0
3	Rehabilitation of haul roads	m ²	5,000.00	R 39.42	1.00	1.00	R 197,118
4(A)	Demolition & rehabilitation of electrified railway lines	m		R 382.64	1.00	1.00	R 0
4(B)	Demolition & rehabilitation of non-electrified railway lines	m		R 208.71	1.00	1.00	R 0
5	Demolition of housing &/or administration facilities	m ²		R 440.62	1.00	1.00	R 0
6	Opencast rehabilitation including final voids & ramps	ha		R 224,250.39	0.52	1.00	R 0
7	Sealing of shafts, adits & inclines	m ³		R 118.27	1.00	1.00	R 0
8(A)	Rehabilitation of overburden & spoils	ha		R 153,983.72	1.00	1.00	R 0
8(B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha		R 191,783.95	1.00	1.00	R 0
8(C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha		R 557,031.48	0.66	1.00	R 0
9	Rehabilitation of subsided areas	ha		R 128,938.18	1.00	1.00	0
10	General surface rehabilitation	ha	5.00	R 121,981.08	1.00	1.00	R 609,905
11	River diversions	ha		R 121,981.08	1.00	1.00	R 0
12	Fencing	m		R 139.14	1.00	1.00	R 0
13	Water management	ha	5.00	R 46,380.64	0.25	1.00	R 57,976
14	2 to 3 years of maintenance & aftercare	ha	5.50	R 16,233.22	1.00	1.00	R 89,283
15(A)	Specialist studies						
							R 954,282
Weighting Factor 2 (step 4.4)			1.00		Sub Total 1		R 954,282
					Preliminary and General	12% of Sub Total 1	R114,513.80
					Contingency	10% of Sub Total 1	R95,428.17
Sub Total 2							R 1,164,224
VAT (15%)							R 174,634
GRAND TOTAL							R 1,338,857

24.2 Confirmation that this Amount can be Provided for from Operating Expenditure

Copper Sunset confirms that the amount determined in Section 24 has been provided in the form of a bank guarantee. A liability assessment update will continue to be undertaken annually to ensure the financial provision is in line with the closure cost.

25 Specific Information Required by the Competent Authority

25.1 Impact on the Socio-economic Conditions of any Directly Affected Person

- Positive impacts of the proposed project can be summarised as follows:
 - **Employment** – The proposed project is expected to contribute (directly or indirectly) to the employment of people in an area where unemployment is a challenge and other social economic benefits. The sand to be removed from the mining area will be used for the upgrading of roads in the area, and possible upgrading of roads closer to the mining area as well as possible housing development in the local area.
- Negative impacts of the proposed project can be summarised as follows:
 - **Social Nuisance** – Due to the remote location of the proposed mining area very few negative impacts on the community were identified. The increased dust levels due to site clearing, use of haul roads and vehicular activity as well as the increase in ambient noise levels from mining machinery and the movement of vehicles will result in social nuisance if the mitigation measures proposed in this document are not implemented and managed on-site. However, due to the small size of the proposed mining activity these impacts are deemed to be of low significance.

25.2 Impact on any National Estate Referred to in Section 3(2) of the National Heritage Resources Act.

No sites of archaeological or cultural importance were identified at the proposed mining area during the site assessment. Therefore, no heritage resources will be directly impacted upon by the sand mining activities.

26 Other Matters Required in Terms of Sections 24(4)(a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. Refer to Section 9.1 for alternatives assessed. Refer to section 11 above for the environmental baseline.

Part B: Environmental Management Programme Report

1 Details of the EAP

The details of the EAP have been provided in Section 2.2, Part A of this report.

2 Description of the Aspects of the Activity

The aspects of the activity that are covered by the environmental management programme have been described Section 5 of Part A.

3 Composite Map

The composite plan for the project area is included in Appendix B, Plan 11. No Sensitive environments and receptors have been identified within the proposed project area.

4 Description of Impact Management Objectives Including Management Statements

4.1 Determination of Closure Objectives

Closure and rehabilitation is a continuous series of activities that begin with planning prior to the project's design and construction and end with achievement of long-term site stability and the establishment of a self-sustaining ecosystem. Not only will the implementation of this concept result in a more satisfactory environmental outcome, but it will also reduce the financial burden of closure and rehabilitation.

4.1.1 Copper Sunset's Principles for Mine Closure

The guiding principles that have been adopted to guide the development of the RCP as well as subsequent plans are as follows:

- The closure measures stipulated in the closure plan must limit the potential adverse effects of the closed mining site on the receiving environment, and that the quality of life of the surrounding communities is not severely compromised after closure;
- An acceptable residual risk outcome is sought;
- The closure plan must be progressively developed and refined as information becomes available, resulting in an appropriate and up-to-date closure plan at the time of closure;
- The closure measures must be sustainable under foreseeable natural events; and
- Priority must be given to the use of locally available natural materials and/or vegetation as opposed to imported/synthetic material and/or exotic vegetation to improve/add to the 'natural' feel of the reclaimed facility.

4.2 Volumes and Rate of Water Use Required for the Operation

Water will be utilised for potable water and for dust suppression. The water will be extracted from an approved borehole located at the existing Copper Sunset MRA (DMR Reference No. FS30/5/1/2/3/2/1 (164) MR). The borehole is authorised by the Department of Water and Sanitation (DWS) under Water use Licence (WUL) No. 08/C22F/AG/2315 granted 18 September 2013. It is anticipated that the water previously utilised for this sand mining operation will no longer be needed and can therefore be utilised at the new sand mining operation. The water will be pumped from the borehole and stored at the existing Copper Sunset Mining Operation. Water bowsers will be utilised to transport the water from the existing sand mining area to the new proposed sand mining area, which is located 6.5 km north of the existing sand mining area. The maximum allowable limit to be extracted from the borehole is 140 650 m³ per annum this limit will thus not be exceeded.

4.3 Has a Water Use Licence been applied for?

No water use licence is required as no water uses are triggered in terms of Section 21 of the NWA, by the proposed project.

5 Impacts to be Mitigated in their Respective Phases

The proposed mitigation measures and its compliance with the relevant standards are presented in Table 5-1.

Table 5-1: Impacts to be Mitigated

Activities	Aspects Affected	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with standards	Time period for implementation
Establishment Phase						
Site clearance and vegetation removal Establishment of haul road Stockpiling of topsoil	Soil and Land Capability	Establishment Phase	5 ha	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; Ensure that machinery is regularly serviced; Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; and Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices. 	<ul style="list-style-type: none"> Land Rehabilitation Guidelines, May 2019 Chamber of Mines Guidelines 	<ul style="list-style-type: none"> Establishment Phase
	Fauna and Flora	Establishment Phase	5 ha	<ul style="list-style-type: none"> The footprint area must be kept as small as possible and only existing haul roads must be used to reach the site for clearing and vehicles should not be allowed to traverse natural areas or leave the demarcated road; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and An AIP management plan must be implemented, whereby existing AIP's within the project area are eradicated as well as the disturbed site is monitored quarterly for at least two years to ensure that alien invasion does not take place. 	<ul style="list-style-type: none"> NEMA NEM:BA CARA 	<ul style="list-style-type: none"> Establishment Phase

Activities	Aspects Affected	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with standards	Time period for implementation
	Surface Water	Establishment Phase	5 ha	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Machinery used during topsoil stripping must be checked, serviced and maintained to reduce the risk of surface water contamination; Berms must be constructed around the periphery of the mining site to separate clean and dirty water; and Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 	<ul style="list-style-type: none"> Based on the GN 704 requirements regarding stormwater management for mining activities it is noted that all clean and dirty water must be separated. NWA 	<ul style="list-style-type: none"> Establishment Phase
	Air Quality	Establishment Phase	5 ha	<ul style="list-style-type: none"> Use of dust suppression measures such as watering must be implemented on the haul roads and on areas where vegetation has been removed. 	<ul style="list-style-type: none"> NEMAQA 	<ul style="list-style-type: none"> Establishment Phase
	Noise	Establishment Phase	5 ha	<ul style="list-style-type: none"> Mining related machines and vehicles are to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Limit operational activities to daylight hours; and Switch off equipment when not in use. 	<ul style="list-style-type: none"> National Noise Control Regulations 	<ul style="list-style-type: none"> Establishment Phase
	Social	Establishment Phase	5 ha	<ul style="list-style-type: none"> Keep topsoil stockpiles moist to suppress dust; Site clearing to take place during daylight hours only; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Vehicles will obey speed limits (30 km/h); and Bulk Delivery of materials must be maximised to reduce the frequency of deliveries. 	<ul style="list-style-type: none"> MPRDA Mine Health and Safety Act (Act of 1996) (MHSA) Occupational Health and Safety, 1993 (Act no. 85 of 1993) (OHS) International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities 	<ul style="list-style-type: none"> Establishment Phase
	Social	Establishment Phase	H ha	<ul style="list-style-type: none"> Employ local people at the mine; Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction methods. 	<ul style="list-style-type: none"> MPRDA MHSA OHS International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities 	<ul style="list-style-type: none"> Establishment Phase

Activities	Aspects Affected	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with standards	Time period for implementation
Operational Phase						
Mining of sand resources; Screening of sand (if required); and Transportation of sand	Soils and Land Capability	Operational Phase	5 ha	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; Visual assessments of the site will be conducted on a regular basis to monitor potential soil erosion. Ensure that machinery is regularly serviced; Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; Should a hydrocarbon spillage occur, the spillage must be immediately cleaned up and the contaminated soil removed as hazardous waste. A safe disposal certificate must be retained as proof of safe disposal; Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices; and Ensure that waste is disposed of correctly according to different waste streams. 	<ul style="list-style-type: none"> Land Rehabilitation Guidelines, May 2019 Chamber of Mines Guidelines 	<ul style="list-style-type: none"> Operational Phase
	Fauna and Flora	Operational Phase	5 ha	<ul style="list-style-type: none"> Erect signage with speed limits; Restrict vehicle movement to daylight hours; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and Concurrent rehabilitation should take place. 	<ul style="list-style-type: none"> NEMA NEM:BA CARA 	<ul style="list-style-type: none"> Operational Phase

Activities	Aspects Affected	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with standards	Time period for implementation
	Air Quality	Operational Phase	5 ha	<ul style="list-style-type: none"> Apply dust suppressant on haul roads and on areas where vegetation has been removed; Enclose the screening circuit to contain associated airborne dust (if screening process is used); Conduct activities judiciously on windy days (wind speed \geq 5.4 m/s); Set maximum vehicle speed limits on site and enforce these limits; Minimise drop heights when loading onto trucks and at conveyor tipping points; and Monitoring of dust fall rates and PM₁₀ on a monthly basis around the mining area to ensure compliance with the NDCR. 	<ul style="list-style-type: none"> NEMAQA 	<ul style="list-style-type: none"> Operational Phase
	Surface Water	Operational Phase	5 ha	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Machinery used during mining will be checked, serviced and maintained to reduce the risk of surface water contamination; Berms on the periphery of the mining site must be inspected daily and maintained to ensure runoff from within the mining site does not report to the catchment; and Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 	<ul style="list-style-type: none"> Based on the GN 704 requirements regarding stormwater management for mining activities it is noted that all clean and dirty water must be separated. NWA 	<ul style="list-style-type: none"> Operational Phase
	Noise	Operational Phase	5 ha	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Switch off equipment when not in use; and Limit operational activities to daylight hours. 	<ul style="list-style-type: none"> National Noise Control Regulations 	<ul style="list-style-type: none"> Operational Phase

Activities	Aspects Affected	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with standards	Time period for implementation
	Social	Operational Phase	5 ha	<ul style="list-style-type: none"> Maintain mining equipment and, if possible, fit silencing equipment; Mining will only take place during daylight hours; Put road signs in place to indicate hazardous areas; Use a dust suppressant on haul roads; Allow topsoil stockpiles to vegetate (but not with alien species); Public participation will continue through the life of the mine to ensure local communities are kept informed and allowed to raise issues. These issues will then be addressed by the mine manager; IAPs that are affected by Copper Sunset activities will be consulted with on a regular basis. A complaints management system will be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately; and All incidents that occur onsite must be recorded in an incident register. Where repeat incidents occur mitigation measures must be implemented to prevent the reoccurrence of the incident. 	<ul style="list-style-type: none"> MPRDA MHSA OHS International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities 	<ul style="list-style-type: none"> Operational Phase
	Social	Operational Phase	5 ha	<ul style="list-style-type: none"> Employ local people at the time; Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction method 	<ul style="list-style-type: none"> MPRDA MHSA OHS International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities 	<ul style="list-style-type: none"> Operational Phase
Closure and Rehabilitation Phase						

Activities	Aspects Affected	Phase	Size and scale of disturbance	Mitigation Measures	Compliance with standards	Time period for implementation
Backfilling of the mined excavations with overburden; Rehabilitation (topsoil cover, ripping and vegetation establishment); and Dismantling and removal of infrastructure.	Soils and Land Capability	Closure and Rehabilitation Phase	5 ha	<ul style="list-style-type: none"> Visual assessments of the site must be conducted on a regular basis to monitor potential soil erosion; The backfilled area must be sloped so as to avoid ponding of water. Should ponding occur the area must be re-sloped and water must be drained from the area; Limited movement of vehicles on newly rehabilitated areas; Ensure no contaminated soil is used for rehabilitation purposes; A waste management system must be implemented to ensure that domestic and hazardous waste, including sewage, generated during decommissioning and closure are disposed of in a manner that will not affect the soil environment; and All infrastructure must be completed removed from site. 	<ul style="list-style-type: none"> Land Rehabilitation Guidelines, May 2019 Chamber of Mines Guidelines 	<ul style="list-style-type: none"> Closure and Rehabilitation Phase
	Fauna and Flora	Closure and Rehabilitation Phase	5 ha	<ul style="list-style-type: none"> An alien plant species management plan must be implemented for two years after rehabilitation is completed; All emergent alien plant species must be removed before they reach a seed-bearing or flowering maturity; and Monitoring of the rehabilitated area for vegetation regrowth and removal of alien invasive plant species; and Where vegetation establishment is not successfully implemented additional measures to encourage vegetation growth must be undertaken. 	<ul style="list-style-type: none"> NEMA NEM:BA CARA 	<ul style="list-style-type: none"> Closure and Rehabilitation Phase
	Noise	Closure and Rehabilitation Phase	5 ha	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and Switching off equipment when not in use. 	<ul style="list-style-type: none"> National Noise Control Regulations 	<ul style="list-style-type: none"> Closure and Rehabilitation Phase

6 Impact Management Outcomes

A description of objectives and outcomes of the Environment Management Plan is outlined in Table 6-1, taking into account the impact and mitigation type.

Table 6-1: Summary of Impact Management Outcomes

Activities	Aspects Affected	Phase	Potential Impact	Mitigation Measures	Compliance with standards
Establishment Phase					
Site clearance and vegetation removal Establishment of haul road Stockpiling of topsoil	Soil and Land Capability	Establishment Phase	<ul style="list-style-type: none"> Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; Sewage contamination as a result of potential spillages from portable toilets; and Soil erosion and ultimate loss of topsoil resources and land capability due to site clearance and stockpiling of topsoil. 	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; Ensure that machinery is regularly serviced; Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; and Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices. 	<ul style="list-style-type: none"> Land Rehabilitation Guidelines, May 2019 Chamber of Mines Guidelines
	Fauna and Flora	Establishment Phase	<ul style="list-style-type: none"> Loss of habitat (AIP vegetation types) 	<ul style="list-style-type: none"> The footprint area must be kept as small as possible and only existing haul roads must be used to reach the site for clearing and vehicles should not be allowed to traverse natural areas or leave the demarcated road; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and An AIP management plan must be implemented, whereby existing AIP's within the project area are eradicated as well as the disturbed site is monitored quarterly for at least two years to ensure that alien invasion does not take place. 	<ul style="list-style-type: none"> NEMA NEM:BA CARA
	Surface Water	Establishment Phase	<ul style="list-style-type: none"> Site clearing activities will expose soils and increase the risk of erosion; Dirty water generated from the mining operation or associated activities can contaminate clean water areas 	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Machinery used during topsoil stripping must be checked, serviced and maintained to reduce the risk of surface water contamination; Berms must be constructed around the periphery of the mining site to separate clean and dirty water; and Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 	<ul style="list-style-type: none"> Based on the GN 704 requirements regarding stormwater management for mining activities it is noted that all clean and dirty water must be separated. NWA
	Air Quality	Establishment Phase	<ul style="list-style-type: none"> The levels of dust are anticipated to increase during the stripping and removal of vegetation as well as the loading and offloading of sand material. 	<ul style="list-style-type: none"> Use of dust suppression measures such as watering must be implemented on the haul roads and on areas where vegetation has been removed. 	<ul style="list-style-type: none"> NEMAQA

Activities	Aspects Affected	Phase	Potential Impact	Mitigation Measures	Compliance with standards
	Noise	Establishment Phase	<ul style="list-style-type: none"> Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors. 	<ul style="list-style-type: none"> Mining related machines and vehicles are to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Limit operational activities to daylight hours; and Switch off equipment when not in use. 	<ul style="list-style-type: none"> National Noise Control Regulations
	Social	Establishment Phase	<ul style="list-style-type: none"> Increased dust levels due to site clearing, use of haul roads and vehicular activity; and Ambient noise levels will increase due to vehicles and site clearing machinery. 	<ul style="list-style-type: none"> Keep topsoil stockpiles moist to suppress dust; Site clearing to take place during daylight hours only; Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; Vehicles and machinery will be properly maintained to minimise operating noise; Vehicles will obey speed limits (30 km/h); and Bulk Delivery of materials must be maximised to reduce the frequency of deliveries. 	<ul style="list-style-type: none"> MPRDA Mine Health and Safety Act (Act of 1996) (MHSA) Occupational Health and Safety, 1993 (Act no. 85 of 1993) (OHS) International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities
	Social	Establishment Phase	<ul style="list-style-type: none"> Generation of income due to continued employment. 	<ul style="list-style-type: none"> Employ local people at the mine; Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction methods. 	<ul style="list-style-type: none"> MPRDA MHSA OHS International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities
Operational Phase					

Activities	Aspects Affected	Phase	Potential Impact	Mitigation Measures	Compliance with standards
Mining of sand resources; Screening of sand (if required); and Transportation of sand	Soils and Land Capability	Operational Phase	<ul style="list-style-type: none"> Soil compaction due to movement of machinery; Hydrocarbon contamination due to oil leakages or spillages; Sewage contamination as a result of potential spillages from portable toilets; and Soil erosion and ultimate loss of topsoil resources and land capability during sand mining. 	<ul style="list-style-type: none"> Only clear vegetation and remove topsoil when and where necessary; Ensure topsoil is stockpiled along the mined-out strip and is less than 3 m high; Visual assessments of the site will be conducted on a regular basis to monitor potential soil erosion. Ensure that machinery is regularly serviced; Storage and use of hydrocarbons must be confined to bunded areas and stored in accordance with SANS Standards; Should a hydrocarbon spillage occur, the spillage must be immediately cleaned up and the contaminated soil removed as hazardous waste. A safe disposal certificate must be retained as proof of safe disposal; Sewage will be handled in portable chemical toilets to reduce the risk of contamination. Portable toilets must be available in the area where mining is taking place as well as at the mine offices; and Ensure that waste is disposed of correctly according to different waste streams. 	<ul style="list-style-type: none"> Land Rehabilitation Guidelines, May 2019 Chamber of Mines Guidelines
	Fauna and Flora	Operational Phase	<ul style="list-style-type: none"> Potential disturbance and movement of mining machinery 	<ul style="list-style-type: none"> Erect signage with speed limits; Restrict vehicle movement to daylight hours; Walk through of the area to ensure that no SCC are impacted upon as a result of sand mining activities; and Concurrent rehabilitation should take place. 	<ul style="list-style-type: none"> NEMA NEM:BA CARA
	Air Quality	Operational Phase	<ul style="list-style-type: none"> The levels of dust are anticipated to increase during the mining of sand coupled with the screening and loading of sand for transportation 	<ul style="list-style-type: none"> Apply dust suppressant on haul roads and on areas where vegetation has been removed; Enclose the screening circuit to contain associated airborne dust (if screening process is used); Conduct activities judiciously on windy days (wind speed ≥ 5.4 m/s); Set maximum vehicle speed limits on site and enforce these limits; Minimise drop heights when loading onto trucks and at conveyor tipping points; and Monitoring of dustfall rates and PM₁₀ on a monthly basis around the mining area to ensure compliance with the NDCR. 	<ul style="list-style-type: none"> NEMAQA

Activities	Aspects Affected	Phase	Potential Impact	Mitigation Measures	Compliance with standards
	Surface Water	Operational Phase	<ul style="list-style-type: none"> As mining progresses soils will continue to be exposed and increase the risk of erosion and possible sedimentation of streams nearby; and Dirty water generated from the mining operation or associated activities can contaminate clean water areas. 	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Machinery used during mining will be checked, serviced and maintained to reduce the risk of surface water contamination; Berms on the periphery of the mining site must be inspected daily and maintained to ensure runoff from within the mining site does not report to the catchment; and Any dirty water generated from the mining operation or office area must be collected and not permitted to be discharged to the environment. 	<ul style="list-style-type: none"> Based on the GN 704 requirements regarding stormwater management for mining activities it is noted that all clean and dirty water must be separated. NWA
	Noise	Operational Phase	<ul style="list-style-type: none"> Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors 	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; Switch off equipment when not in use; and Limit operational activities to daylight hours. 	<ul style="list-style-type: none"> National Noise Control Regulations
	Social	Operational Phase	<ul style="list-style-type: none"> Mining could increase the ambient noise levels in the area; and Dust generation from vehicular activity and erosion from stockpiles. 	<ul style="list-style-type: none"> Maintain mining equipment and, if possible, fit silencing equipment; Mining will only take place during daylight hours; Put road signs in place to indicate hazardous areas; Use a dust suppressant on haul roads; Allow topsoil stockpiles to vegetate (but not with alien species); Public participation will continue through the life of the mine to ensure local communities are kept informed and allowed to raise issues. These issues will then be addressed by the mine manager; IAPs that are affected by Copper Sunset activities will be consulted with on a regular basis. A complaints management system will be maintained by the mine to ensure that all issues raised by community members are followed up and addressed appropriately; and All incidents that occur onsite must be recorded in an incident register. Where repeat incidents occur mitigation measures must be implemented to prevent the reoccurrence of the incident. 	<ul style="list-style-type: none"> MPRDA MHSA OHS International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities

Activities	Aspects Affected	Phase	Potential Impact	Mitigation Measures	Compliance with standards
	Social	Operational Phase	<ul style="list-style-type: none"> Generation of income due to continued employment 	<ul style="list-style-type: none"> Employ local people at the mine; Provide local employees with reference letters that they can submit to gain further employment. Also, provide certificates of completion for in-house (on-the-job) training provided; and Promote labour -intensive construction method 	<ul style="list-style-type: none"> MPRDA MHSA OHS International Human Rights Guiding Principles IFC PS 4: Community Health, Safety and Security NEMA IDPs and SPFs of affected municipalities
Closure and Rehabilitation Phase					
Backfilling of the mined excavations with overburden; Rehabilitation (topsoil cover, ripping and vegetation establishment); and Dismantling and removal of infrastructure.	Soils and Land Capability	Closure and Rehabilitation Phase	<ul style="list-style-type: none"> Soil erosion and ultimate loss of topsoil resources and land capability during rehabilitation phases. 	<ul style="list-style-type: none"> Visual assessments of the site must be conducted on a regular basis to monitor potential soil erosion; The backfilled area must be sloped so as to avoid ponding of water. Should ponding occur the area must be re-sloped and water must be drained from the area; Limited movement of vehicles on newly rehabilitated areas; Ensure no contaminated soil is used for rehabilitation purposes; A waste management system must be implemented to ensure that domestic and hazardous waste, including sewage, generated during decommissioning and closure are disposed of in a manner that will not affect the soil environment; and All infrastructure must be completely removed from site. 	<ul style="list-style-type: none"> Land Rehabilitation Guidelines, May 2019 Chamber of Mines Guidelines
	Fauna and Flora	Closure and Rehabilitation Phase	<ul style="list-style-type: none"> Profiling of the area and rehabilitation (topsoil cover, ripping and vegetation establishment) 	<ul style="list-style-type: none"> An alien plant species management plan must be implemented for two years after rehabilitation is completed; All emergent alien plant species must be removed before they reach a seed-bearing or flowering maturity; and Monitoring of the rehabilitated area for vegetation regrowth and removal of alien invasive plant species; and Where vegetation establishment is not successfully implemented additional measures to encourage vegetation growth must be undertaken. 	<ul style="list-style-type: none"> NEMA NEM:BA CARA
	Noise	Closure and Rehabilitation Phase	<ul style="list-style-type: none"> Mining machinery and vehicles may increase ambient noise levels at surrounding noise sensitive receptors. 	<ul style="list-style-type: none"> Mining related machines and vehicles to be serviced on a regular basis to ensure noise suppression mechanisms are effective e.g. installed exhaust mufflers; and Switch off equipment when not in use. 	<ul style="list-style-type: none"> National Noise Control Regulations

7 Financial Provision

7.1 Determination of the Amount of Financial Provision

A closure plan has been compiled in support of this application which provides the closure objectives, rehabilitation plan and financial provision for the site. The report has been attached as Appendix F.

7.1.1 Describe the Closure Objectives and the Extent to which they have been Aligned to the Baseline Environment Described under the Regulations

The rehabilitation and closure objectives have been set out in Section 4.1 (Part B) above. The overarching objective for closure is to ensure that impacted land is rehabilitated in a manner that allows it to be ceded for other sustainable land uses.

7.1.2 Confirm Specifically that the Environmental Objectives in Relation to Closure have been Consulted with Landowner and Interested and Affected Parties

As part of the PPP, this BAR, along with the closure objectives, will be provided for comment and review to I&APs and stakeholders.

7.1.3 Provide a Rehabilitation Plan that Describes and Shows the Scale and Aerial Extent of the Main Mining Activities, Including the Anticipated Mining Area at the Time of Closure

The mining site will be rehabilitated concurrently meaning that as a new strip is mined the previous mined section will be rehabilitated. The rehabilitation process is summarised as follows:

- The open mined strip will be backfilled with waste rock removed from the pit and the rock that was put down for the haul road;
- The site will be re-shaped, levelled and ripped to ensure there is no compaction;
- The topsoil will be spread over the site and the site vegetated with indigenous vegetation;
- All waste will be removed from site and disposed of accordingly; and
- The site will be monitored for the success of the rehabilitation.

It must be noted that the rehabilitation plan provided is based on the assumptions that Copper Sunset will be responsible for the rehabilitation of the area once sand mining activities have been undertaken, assuming that Seriti does not mine the area. If Seriti do mine the area as planned, then the rehabilitation plan contained within the New Vaal Closure and Rehabilitation Plan will take precedent over what has been recommended within this report

7.1.4 Explain why it can be Confirmed that the Rehabilitation Plan is Compatible with the Closure Objectives

The rehabilitation plan has been compiled in support of the primary closure objective, which is to rehabilitate the mining area to as close as possible to a natural state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation remediation of the impact land to a post-mining land use capable of supporting grazing activities.

7.1.5 Calculate and State the Quantum of the Financial Provision Required to Manage and Rehabilitate the Environment in Accordance with the Applicable Guideline

The environmental closure liability for the proposed project was calculated according to the DMR's "Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision Provided by a Mine".

The DMR Guideline format makes use of a set template for which defined rates and multiplication factors are utilised.

The 2005 DMR Master Rates were updated and published by the DMR in 2012 however, due to inflation, these are no longer accurate. The 2005 Master Rates were escalated yearly by the average annual inflation rate to reflect rates more representative of the year 2020.

The DMR Guideline Document classifies a mine according to a number of factors which allows the determination of appropriate weighting factors to be used during the quantum calculation.

The following factors are considered:

- The mineral mined;
- The risk class of the mine;
- Environmental sensitivity of the mining area;
- Type of mining operation; and
- Geographic location.

Table 7-1 provides a summary of the estimate calculated for each component for the proposed project.

Table 7-1: Environmental Liability for the Proposed Project According to the DMR Methodology

Class C (Medium Risk)		Unit:	A	B	C	D	E=A*B*C*D
Component	Description:		Quantity	Master rate	Multiplication factor	Weighting factor 1	Amount (Rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant & related structures (incl. overland conveyors & Power lines)	m ³		R 15.82	1.00	1.00	R 0
2 (A)	Demolition of steel buildings & Structures	m ²		R 220.31	1.00	1.00	R 0
2 (B)	Demolition of reinforced concrete buildings & structures	m ²		R 324.66	1.00	1.00	R 0
3	Rehabilitation of haul roads	m ²	5,000.00	R 39.42	1.00	1.00	R 197,118
4(A)	Demolition & rehabilitation of electrified railway lines	m		R 382.64	1.00	1.00	R 0
4(B)	Demolition & rehabilitation of non-electrified railway lines	m		R 208.71	1.00	1.00	R 0
5	Demolition of housing &/or administration facilities	m ²		R 440.62	1.00	1.00	R 0
6	Opencast rehabilitation including final voids & ramps	ha		R 224,250.39	0.52	1.00	R 0
7	Sealing of shafts, adits & inclines	m ³		R 118.27	1.00	1.00	R 0
8(A)	Rehabilitation of overburden & spoils	ha		R 153,983.72	1.00	1.00	R 0
8(B)	Rehabilitation of processing waste deposits & evaporation ponds (basic, salt producing waste)	ha		R 191,783.95	1.00	1.00	R 0
8(C)	Rehabilitation of processing waste deposits & evaporation ponds (acidic, metal-rich waste)	ha		R 557,031.48	0.66	1.00	R 0
9	Rehabilitation of subsided areas	ha		R 128,938.18	1.00	1.00	0
10	General surface rehabilitation	ha	5.00	R 121,981.08	1.00	1.00	R 609,905
11	River diversions	ha		R 121,981.08	1.00	1.00	R 0
12	Fencing	m		R 139.14	1.00	1.00	R 0
13	Water management	ha	5.00	R 46,380.64	0.25	1.00	R 57,976
14	2 to 3 years of maintenance & aftercare	ha	5.50	R 16,233.22	1.00	1.00	R 89,283
15(A)	Specialist studies						
							R 954,282
Weighting Factor 2 (step 4.4)			1.00		Sub Total 1		R 954,282
Preliminary and General					12% of Sub Total 1		R114,513.80
Contingency					10% of Sub Total 1		R95,428.17
Sub Total 2							R 1,164,224
VAT (15%)							R 174,634
GRAND TOTAL							R 1,338,857

7.1.6 Confirm that the Financial Provision will be Provided as Determined

Copper Sunset confirms that the amount determined in Section 7.1.5 has been provided in the form of a bank guarantee. A liability assessment update will continue to be undertaken annually to ensure the financial provision is in line with the closure cost.

8 Monitoring Compliance with and Performance Assessment

Copper Sunset will be responsible for the implementation of all of the monitoring of mitigation and management measures, as well as compliance with the EMP. The recommended monitoring for the identified impacts is detailed in Table 8-1. Copper Sunset will keep a record of all environmental monitoring carried out on site.

8.1 Monitoring of Impact Management Actions

The identified impacts that require monitoring programmes include the following:

- Site clearing and establishment:
 - Removal of vegetation; and
 - Soil erosion.
- Mining:
 - Soil erosion;
 - Dust and noise; and
 - Water generated.
- Heritage landscape;
- Hydrocarbon spillages;
- Domestic waste;
- Fires; and
- Rehabilitation.

Supervisors must be appointed to monitor the potential impacts of the above-mentioned activities and Project Managers will foresee that all of the management plans are implemented. Once the mining activities have been completed, Copper Sunset will appoint an independent environmental officer to conduct a site visit to audit the rehabilitation following which a report will be compiled and submitted to the DMR.

8.2 Monitoring and Reporting Frequency

Table 8-1 discussed the monitoring and reporting frequency for the management of impacts.

8.3 Responsible Persons

The roles and responsibilities with respect to the monitoring programme are discussed in Table 8-1.

8.4 Time Period for Implementing Impact Management Actions

Table 8-1 captures the time period for implementing the impact management actions.

8.5 Mechanism for Monitoring Compliance

The method for monitoring the implementation of the impact management actions, the frequency of monitoring the implementation of the impact management actions, an indication of the persons who will be responsible for implementation of the impact management actions, the time periods within which the impact management actions must be implemented and the mechanism for monitoring compliance with the identified impact management actions are summarised in Table 8-1.

Table 8-1: Monitoring Plan

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
All project activities	Removal of vegetation/ Impacts on vegetation structure and health/ Impacts on faunal populations and numbers	<ul style="list-style-type: none"> Vegetation cleared from the mining site will be stored for rehabilitation or removed from the area should it not be adequate to use for rehabilitation. Only the necessary vegetation required for the mining activities will be cleared. Ensuring sustainable populations of both fauna and flora persist until closure 	<ul style="list-style-type: none"> Environmental Manager Terrestrial Ecologist 	<ul style="list-style-type: none"> Daily Every year, during the wet season
	Soil erosion	<ul style="list-style-type: none"> All topsoil removed will be stored in a stockpile and protected from erosion for use during rehabilitation. Daily site inspections will be undertaken by the site manager to ensure that all soil erosion mitigation measures are in place and implemented. 	<ul style="list-style-type: none"> Environmental Manager 	<ul style="list-style-type: none"> Daily
	Dust	<ul style="list-style-type: none"> Monitoring of dustfall rates and PM₁₀ on a monthly basis around the site to ensure compliance with the Regulations. 	<ul style="list-style-type: none"> Environmental Manager 	<ul style="list-style-type: none"> Monthly
	Noise	<ul style="list-style-type: none"> Heavy machinery and vehicles must be maintained and serviced regularly and, if possible, a silencing system should be fitted. Mining must only take place during daylight hours, which are to be communicated to directly affected persons. 	<ul style="list-style-type: none"> Environmental Manager 	<ul style="list-style-type: none"> Daily
	Establishment of alien plant species	<ul style="list-style-type: none"> Alien plant monitoring 	<ul style="list-style-type: none"> Qualified Botanist 	<ul style="list-style-type: none"> Quarterly for 2 years after closure
	Haul roads	<ul style="list-style-type: none"> Machinery operators and drivers must be made aware of the possible safety hazards that they could pose 	<ul style="list-style-type: none"> Environmental Manager 	<ul style="list-style-type: none"> Daily
	Heritage landscape	<ul style="list-style-type: none"> A Watching Brief must be implemented during site establishment in the event that heritage resources are discovered. Identified heritage resources (historical structures, graves and Iron Age sites) must be avoided and a 50 m buffer implemented 	<ul style="list-style-type: none"> Environmental Manager 	<ul style="list-style-type: none"> Daily during site establishment
	Use of hydrocarbons	<ul style="list-style-type: none"> Spill trays will be placed under the machinery to collect any hydrocarbon leaks and spillages. Should spillages occur, the soil must be cleared and treated utilising bioremediation techniques. Should the soil not be adequately treated on site, the soil must be removed from the prospecting drill site and disposed of at a waste handling facility 	<ul style="list-style-type: none"> Environmental Manager 	<ul style="list-style-type: none"> Daily
	Rehabilitation (Success of rehabilitation)	<ul style="list-style-type: none"> Review of rehabilitation after each mining strip has been rehabilitated Rehabilitation monitoring to be undertaken to determine the success of rehabilitation to ensure vegetation has been adequately re-established, soil erosion is limited, and alien invasive species have been removed. 	<ul style="list-style-type: none"> Environmental Manager/ Rehabilitation Specialist 	<ul style="list-style-type: none"> After the completion of each mining strip Quarterly for 2 years after closure
Environmental Impacts	<ul style="list-style-type: none"> Annual environmental audits to ensure compliance to the EMPr and authorisation conditions 	<ul style="list-style-type: none"> Independent EAP 	<ul style="list-style-type: none"> Annually 	

9 Indicate the Frequency of the Submission of the Performance Assessment / Environmental Audit Report

An environmental audit report for the proposed project will be submitted on an annual basis to the DMR from commencement of the activity until a closure application has been submitted.

10 Environmental Awareness Plan

10.1 Manner in which the Applicant Intends to Inform his or her Employees of any Environmental Risk which may Result from their Work

Copper Sunset has developed Environmental, Health and Safety Policies. The Environmental Policy will be communicated to all personnel, whether they are contractors or permanent staff, and the policy will be erected at the mining site.

Employees will receive general environmental awareness training on specific items contained in this EMP, as well as on Best Possible Environmental Practices (BPEP).

10.1.1 Specific Environmental Training

Environmental Awareness Training will be undertaken to make employees and contractors aware of the following:

- The importance of conforming with the environmental policy and procedures and with the requirements of the EMP;
- The significant social and environmental impacts of their work activities and the environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- The potential consequences of departure from specified operating procedures; and
- Possible archaeological finds action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

The guidelines for training are summarised below (Table 10-1), which are in line with the ISO 14001:2004 guidelines with regards to training and awareness creation.

Table 10-1: Training Guidelines

Types of Training	Audience	Purpose
Raising awareness of the strategic importance of environmental management	Senior management	To gain commitment and alignment to the organisation's environmental policy.
Raising general environmental awareness	All employees	To gain commitment to the environmental policy and objectives and to instil a sense of individual responsibility.
Skill enhancement	Employees with environmental responsibilities	To improve performance in specific tasks.
Compliance	Employees whose actions can affect compliance	To ensure that regulatory and internal requirements for training are met.

The training programme will consist of the following elements:

- Identification of employee training needs;
- Development of a training plan to address defined needs;
- Verification of conformance of the training programme to regulatory or organisational requirements and standards;
- Training of target employee groups;
- Documentation of training received; and
- Evaluation of training received.

This training will be undertaken on an annual basis for all personnel, together with the annual required induction programmes. The training material provided will be subject to annual review, based on issues such as incidents, accidents, new legislative requirements, modified processes and environmental and social aspects identified from time to time. This training is to be carried out and coordinated internally by Copper Sunset.

Copper Sunset will, therefore, develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

In addition, an Emergency Preparedness Plan will be communicated and trained to all site personnel during the induction process.

10.2 Manner in which Risks will be Dealt with to Avoid Pollution or the Degradation of the Environment

An Emergency Response Plan has been developed and is the approach used by Copper Sunset to respond to risks that may pollute or degrade the environment during the establishment, operational and closure and rehabilitation phases.


11 Specific Information Required by the Competent Authority

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by National Environmental Management Act, 1998, (Act No. 107 of 1998), as amended, (NEMA) which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually.

12 Undertaking

I Claire Wannenburg, herewith confirm: -

- the correctness of the information provided in the reports
- the inclusion of comments and inputs from stakeholders and I&APs;
- the inclusion of inputs and recommendations from the specialist reports where relevant; and
- the acceptability of the proposed project in relation to the finding of the assessment and level of mitigation proposed.

Signature of the Environmental Assessment Practitioner:	
Name of Company:	Digby Wells Environmental (Pty) Ltd
Date:	July 2020

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Appendix A: Details of the EAP



Appendix B: Plans

Plan 1: Regional Setting

Plan 2: Local Setting

Plan 3: Land Tenure Map

Plan 4: Infrastructure Map

Plan 5: Topographic Map of the Project Area

Plan 6: Geology of the Project Area

Plan 7: Soil Type Delineated

Plan 8: Delineated Vegetation of the Project Area

Plan 9: Quaternary Catchment Management Areas and Water Courses

Plan 10: Land Uses of the Project Area

Plan 11: Composite Map



Appendix C: PPP Documents



Appendix D: Fauna and Flora Impact Assessment



Appendix E: Heritage Impact Assessment



Appendix F: Rehabilitation Assessment