CAPE LIME (Pty) Ltd
Reg.no. 1999/002171/07

ENVIRONMENTAL AUTHORISATION FOR AN EXTENSION OF DOLOMITIC LIMESTONE MINE AND CONSTRUCTION OF LIME KILNS ON FARM WELVERDIEND NEAR VANRHYNSDORP, WESTERN CAPE PROVINCE

Draft EIAR and EMPr

DMR Reference Number: WC 30/5/1/2/3/2/1(401) EM

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COMPILED BY:
Afrimat (Pty) Ltd
Environmental Consultant and
Contact Person:
Ntsanko Ndlovu
PO Box 5278
Tyger Valley
7536
Tel: 012 664 5649
Cell: 082 728 8975
E-mail: ntsanko.ndlovu@afrimat.co.za

REVIEWED BY:
Victor Manavhela
Biogeotech Environmental Consultance
01 Goldengroove
Cnr Oosthuizen and Leiphodt
Germiston
1401
Cell: 072 130 2832
E-mail: info@biogeotech.co.za

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: Cape Lime (Pty) Ltd

TEL NO: 027 213 3090/ 201 1200

FAX NO: 027 213 3095/ 213 2573

POSTAL ADDRESS: PO Box 400, Vredendal, 8160

PHYSICAL ADDRESS: Vredendal Office, Karoovlakte, Vredendal

FILE REFERENCE NUMBER SAMRAD: WC 30/5/1/2/3/2/1(401) EM

1. MPORTANT NOTICE

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

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

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

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

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

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

- determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- determine the—-

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

  (ii) degree to which these impacts— (aa)can be reversed;
  (bb)may cause irreplaceable loss of resources, and
  (cc) can be avoided, managed or mitigated;

- identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- identify suitable measures to manage, avoid or mitigate identified impacts; and
- identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and correspondence address

a) Details of

i) Details of the EAP

Name of the Practitioner: Ntsanko Ndlovu
Tel No.: 011 439 3260
Fax No. : 086 607 1354
e-mail address: ntsanko.ndlovu@afrimat.co.za

ii) Expertise of the EAP.

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

Ms Ntsanko Ndlovu has been assigned as the lead Environmental Practitioner to undertake the necessary environmental authorisation process. Ntsanko is a certified Environmental Assessment Practitioner (EAPASA – 2019/1335 and Pri.Sci.Nat (127870) holds a Masters degree in Environmental Management from North-West University with over 11 years of professional experience as an environmentalist. Ntsanko is currently Senior Environmental Specialist based at Afrimat. She has a wealth of experience in managing Environmental Impact Assessments (EIAs) with the required Public Participation Process (PPP), carrying out environmental audits and conducting environmental awareness, which she gained through the years. EAP's qualifications are attached as Appendix A of this report.

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

Copies of Ms Ntsanko Ndlovu's curriculum vitae and that of the independent EAP (Mr Victor Manavhela) are attached as Appendix G.

b) Project Description and background.

(i) Description of the scope of the proposed overall activity.

Cape Lime (Pty) Ltd, a subsidiary of Afrimat (Pty) Ltd, has applied for an Environmental Authorisation to extend the current mining area of dolomitic limestone mine and construction of limekilns on Remainder Farm Welverdiend No 511. Cape Lime (Pty) Ltd. (hereafter referred to as "the Applicant") has, in June 2012 been awarded a Mining Right, in terms of Section 22 of the Mineral and Petroleum Resources Development Act 2002 (Act No. 28 of 2002), for the mining of

limestone and dolomite from within a 321.11ha area on the Remainder of Farm 511 (Farm Welverdiend), Vanrhynsdorp. Subsequently, environmental authorization has been obtained in June 2015 in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) related to mining activities on 6ha. It was followed by a General Authorization in terms of section 39 of the National Water Act (Act 36 of 1998) as well as authorization by the Matzikama Municipality in terms of article 25 of the Land Use Planning Ordinance , 1985 (No 15 of 1985) LUPO. The proposed expansion activities are intended to expand the already authorised mining activities of 6Ha. The table below shows the property details of the proposed mining right. The proposed expansion activities are intended to expand the already authorised mining activities of 6Ha. The table below shows the property details of the proposed mining right and **Figures 1** and **2** shows the aerial view of the proposed mining right area while **Figure 3 and 4** shows the site coordinates and aerial and topographical locality of the site below.

Table 1: Description of the property

Farm Name:	Farm Welverdiend
Application area (Ha)	43 ha
Magisterial district:	Vanrhynsdorp RD
Distance and direction from nearest town	The proposed site is located ±9 km south of Vanrhynsdorp, ±12 km north-east of Klawer and ±19 km east of Vredendal. The property on which the proposed activities will occur is currently accessed via an existing un-surfaced road and intersection from the N7.
21 digit Surveyor General Code for each farm portion	C07800000000051100000

The proposed project entails the clearing of 45ha of virgin (undeveloped) land for the purposes of mining limestone deposits, the erection of a crushing plant, four (4) Fluid Bed Lime Calciners and associated supporting services. The total footprint of the mining development on the Remainder of Farm 511 (Welverdiend), Vanrhynsdorp, will be ± 34 ha and the process plant and logistical facilities will have a maximum footprint of 11ha (see **Figure 2** below).

It is envisaged that the following supporting service infrastructure will be provided on site:

- Workshops for mechanical and electrical maintenance.
- Laboratory for quality control testwork.
- Administrative offices including a weighbridge.

The layout will be planned to allow the phasing in of the four (4) kilns to the process line as and when required and justified. It will also include related logistical facilities, workshops and an office complex. The application for the approval of the EIA is triggered by the enlarged mining area, still well within the approved Mining Right area of 321 ha, and the erection of Lime Kilns.

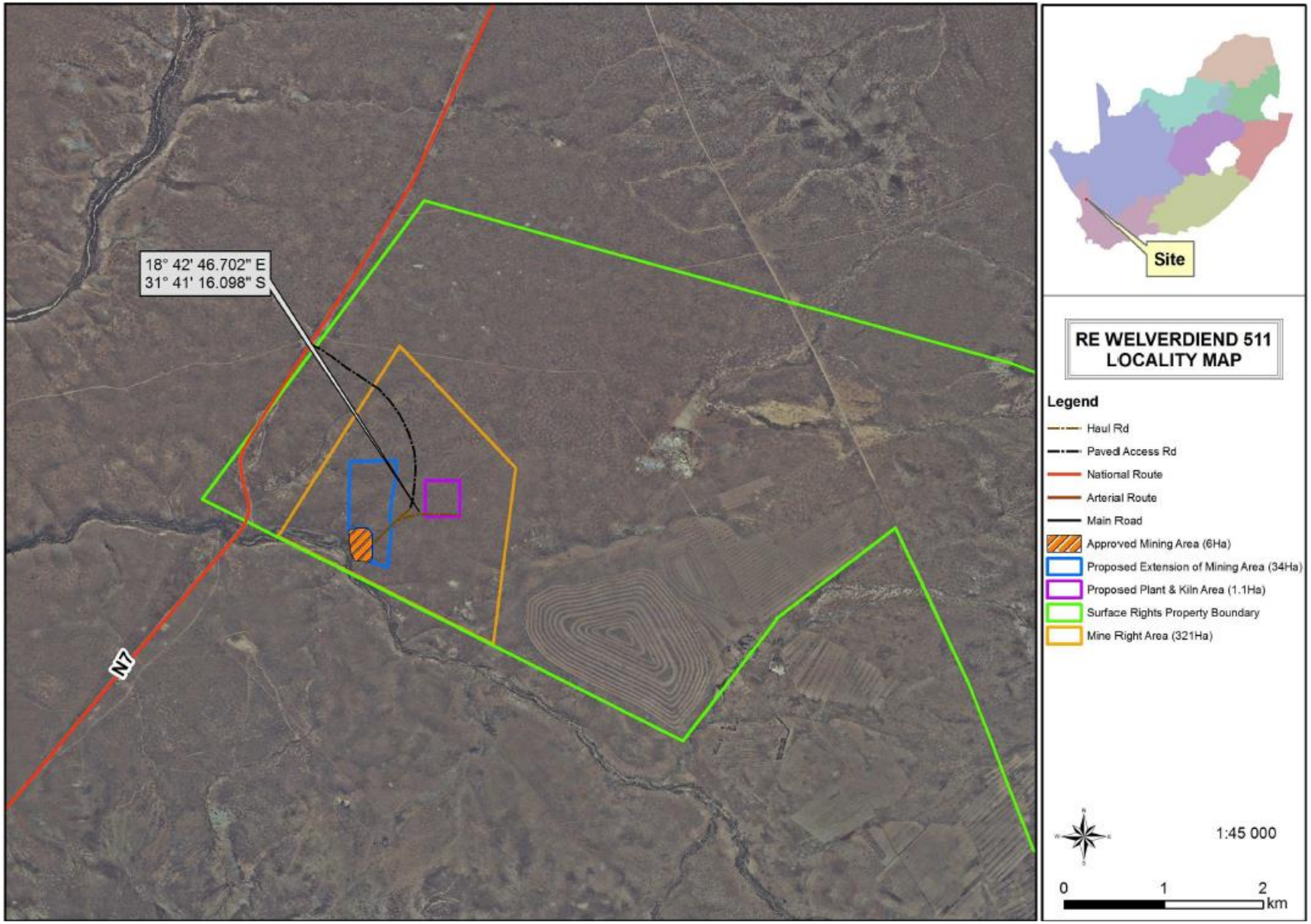


Figure 1: Aerial Locality Map for the proposed mine extension on farm Welverdiend

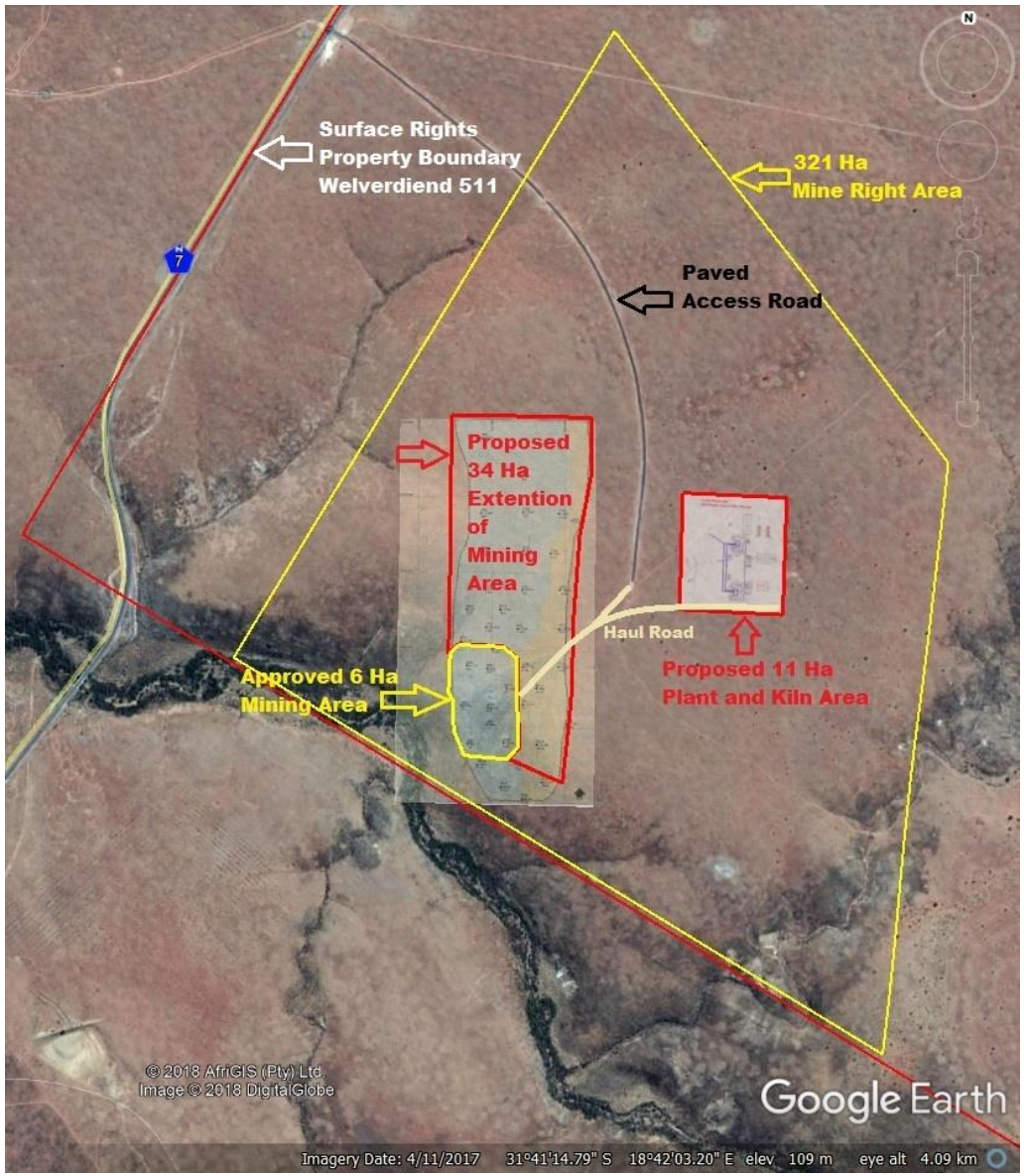


Figure 2: Aerial view of the site showing the position of the proposed mining extension area and mine kilns site. The mining rights area is outlined in Yellow

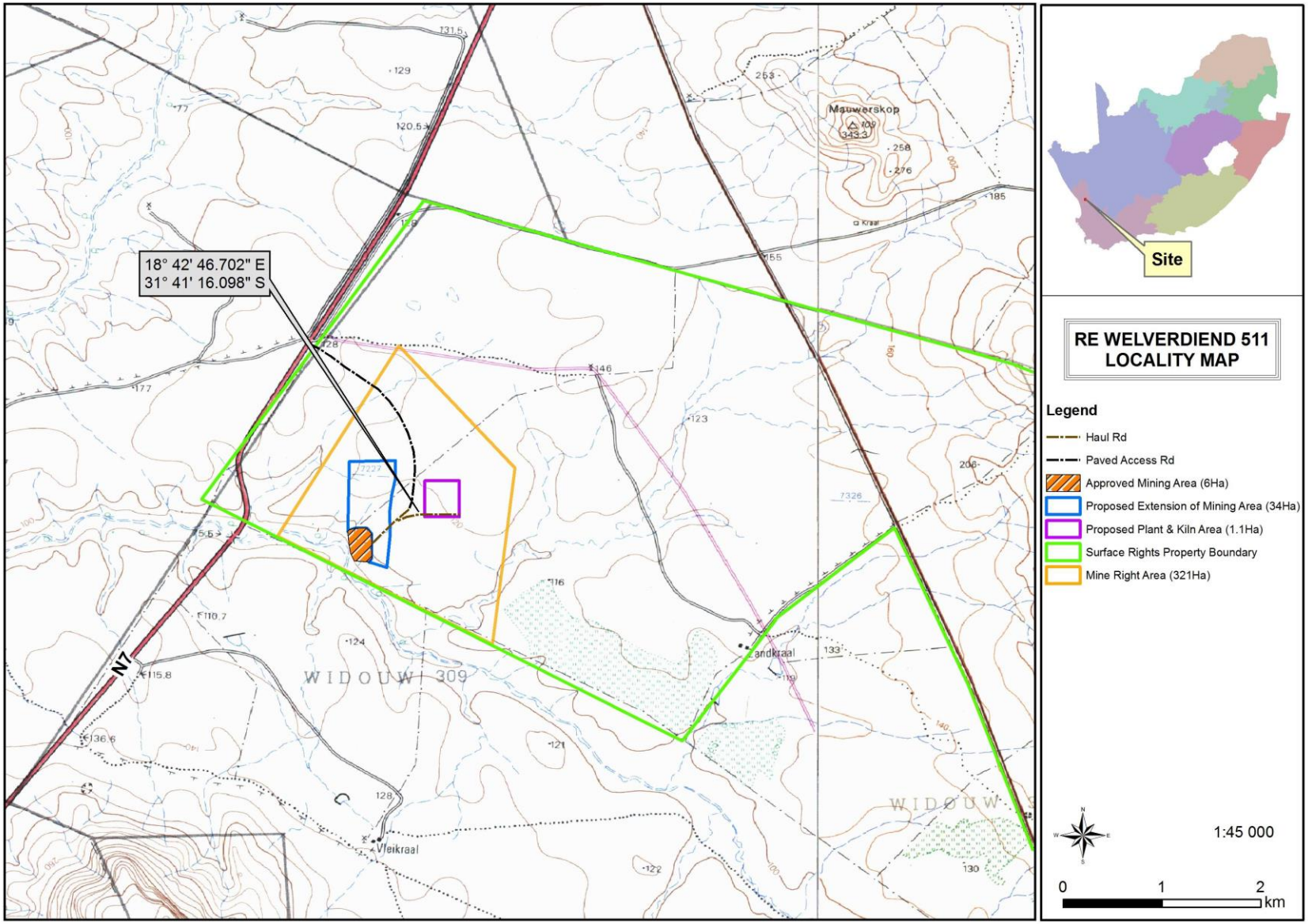


Figure 3: Zoomed in locality map showing the proposed mine extension on farm Welverdiend

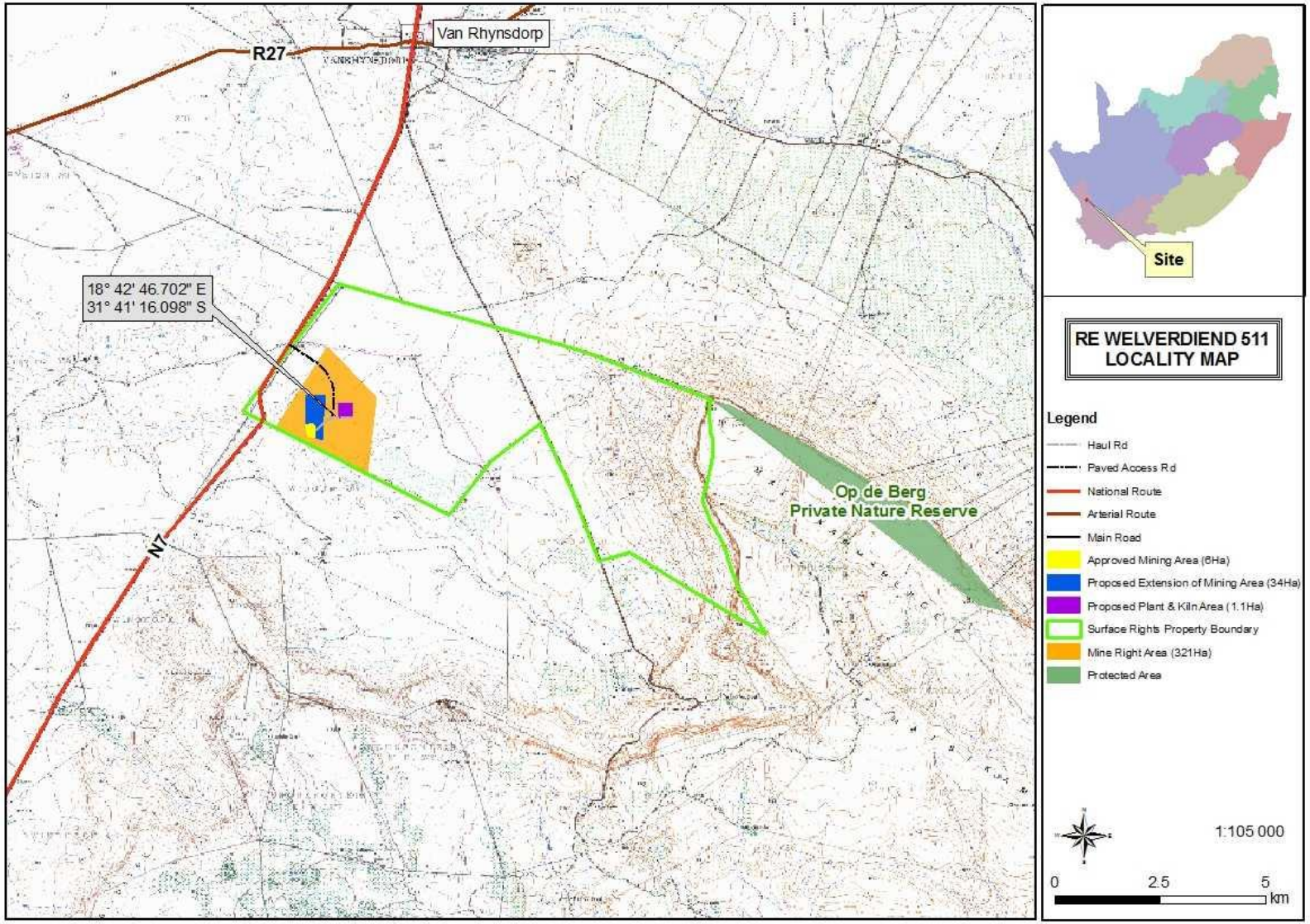


Figure 4: Locality map of the proposed mine extension and the entire Mining right of the farm Welverdiend

Cape Lime currently mines and processes limestone and dolomite, on the Farm Vaderlandsche Rietkuil, 7 km east of the proposed project (see **Figure 5** below). The current activities entail, apart from mining of limestone and dolomite, crushing and screening of all mined material as well as calcination of limestone in an existing Fluid Bed Lime Kiln. The markets currently served are:

- Water treatment (potable and effluent)
- Glass Industry (Flat glass and container glass)
- Aggregates
- Chemical Industries (Calcium Mineral Fillers
- Hypochlorite, mineral separation processes and tanneries)

The extent of the current limestone deposit being mined is such that it cannot support the supply of limestone to additional processing facilities without drastically reducing the life of the resource. Expansion in terms of additional capacity on the current site is also limited due to numerous constraints. Cape Lime is confronted on a regular basis with enquiries with regard to supply of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity.

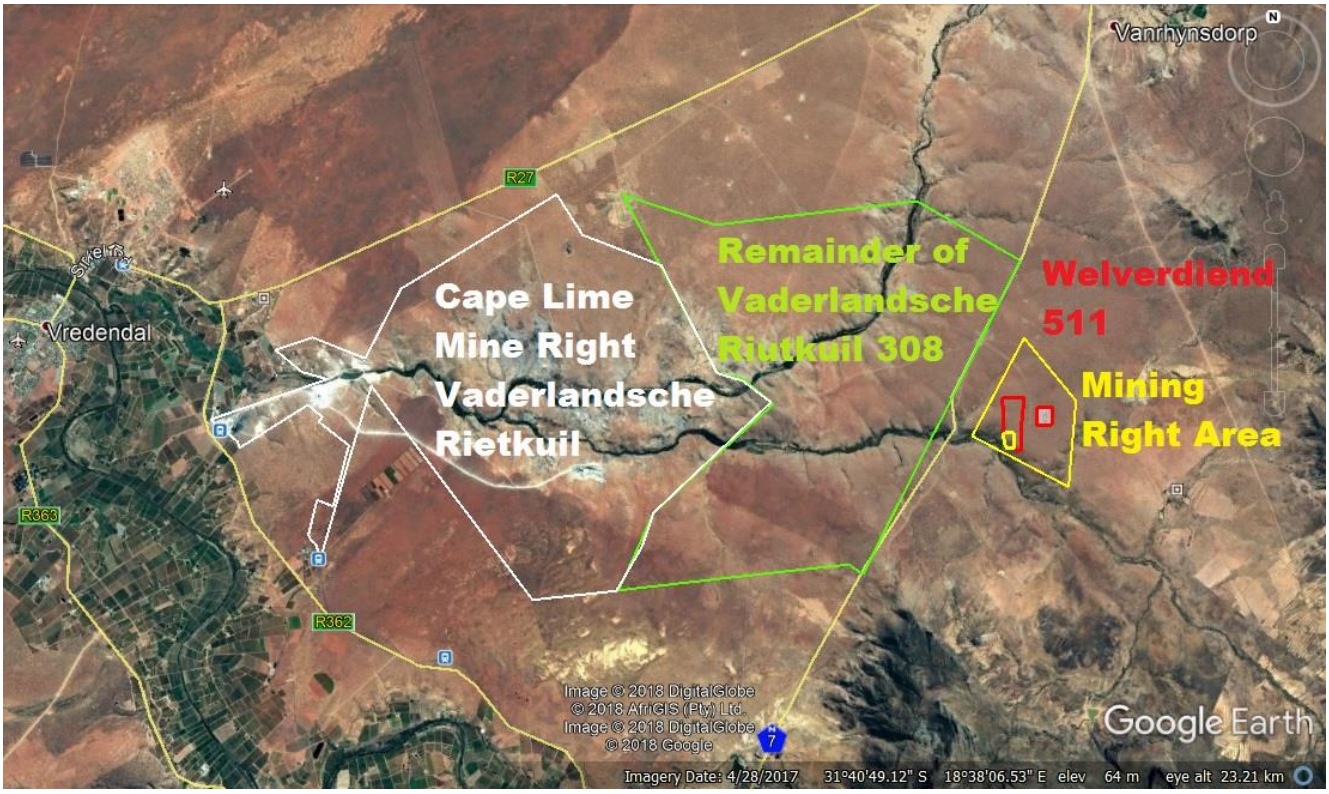


Figure 5: Google Earth Map showing the two Cape Lime mining rights: Farm Vaderlandsche Rietkuil and Welverdiend Farm

Mining/Excavation

Mining process will entail removal of overburden to expose the underlying limestone. Overburden thickness varies from virtually none on the southern end of the deposit to ±10m on the northern side. This allows strip mining to be undertaken by drilling and blasting ±30m wide and 50m long strips on the shallow end of the deposit (see schematic diagrams of open pit mining process and pictures from Vaderlanche mining site below (5-8)). This will facilitate backfilling of the southern end of the excavation to commence relatively early (±3 years after start), thereby minimizing the need for overburden stockpiles. This will assist in minimizing the visual impact of the operation and expedite rehabilitation of backfilled slopes.

Excavation of blasted limestone will be done by an excavator and trucks will haul the limestone to the crushing plant less than 500m from the excavation. The mining and crushing plant will operate on a single day shift basis.

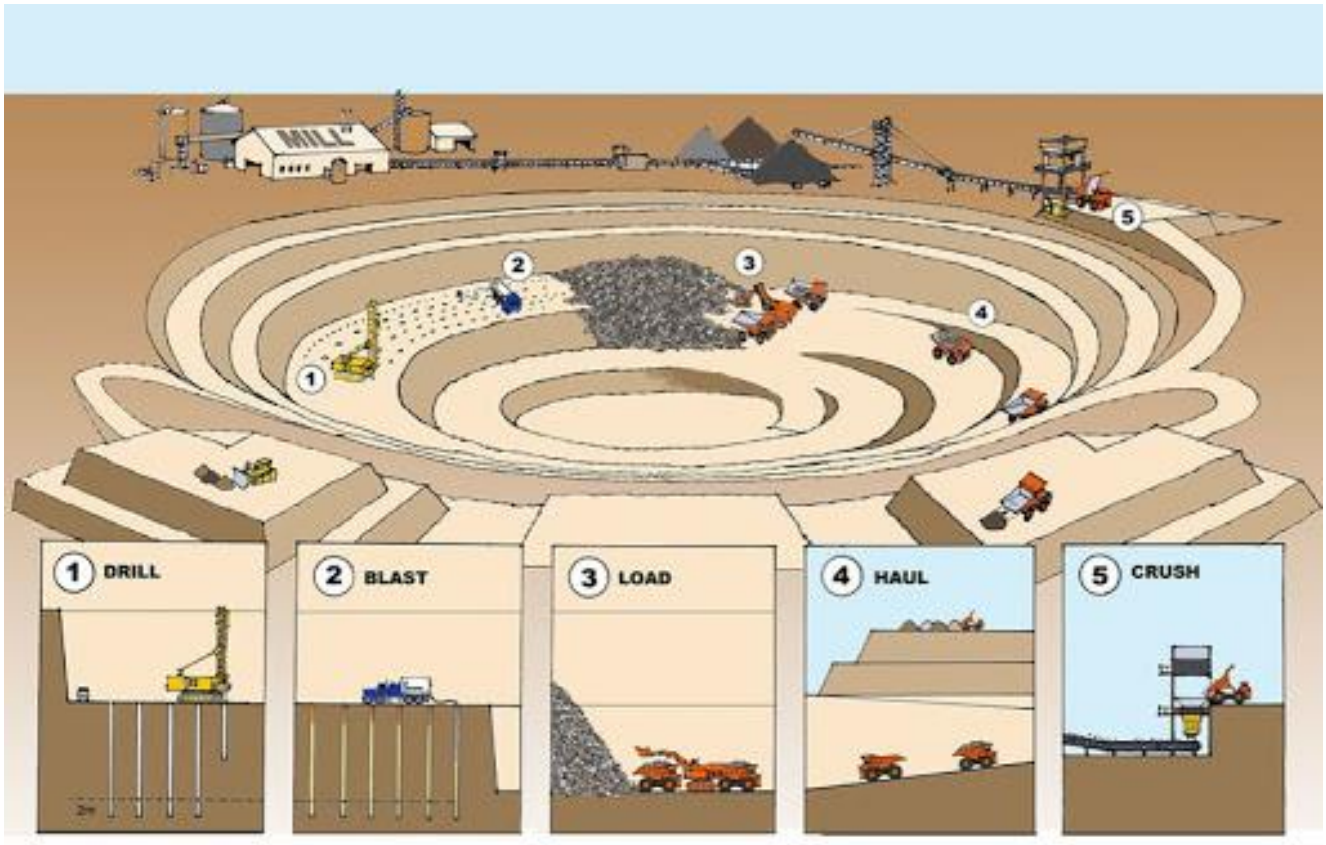


Figure 6: Open Pit mine system overview

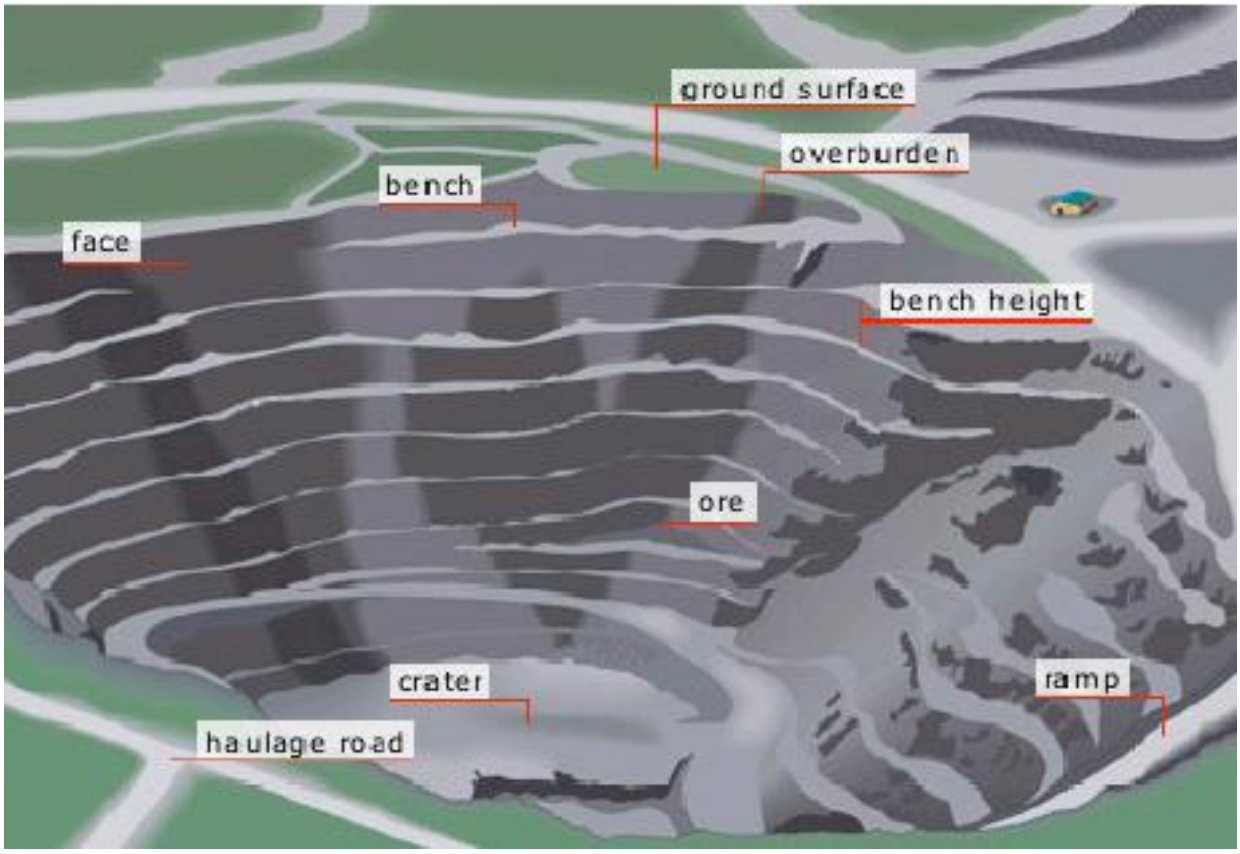


Figure 7: Schematic illustration of an open pit mine

Figure 8: An existing pit in Vaderlanche

Processing

Crushing will consist of a three stage crushing operation to reduce the limestone to < 6mm particle size (see figure 9 for examples of crushing plant). Co-products in the crushing and screening process will be <1mm material which will be supplied to existing and new customers in the glass and industrial minerals industry. The <6mm material will be stockpiled for use as feed to the lime

kilns.

The lime kilns will be fed by a common limestone feed conveyor, drawing from underneath the limestone stockpile. The coal to be used as fuel in the kilns will also be fed from underneath a coal stockpile, via a common coal conveyor, to the respective kilns.

Figure 9: Pictures of example primary crushing plant from Vaderlanche

The kilns will be replicas of the existing Fluid Bed Calciner, which has been in operation at Cape Lime's Vredendal operation since 2004. Lime produced will be stored in silos before being dispatched to various clients in bulk tanker or bulk bags. The operation of the kilns will be, by nature of the process, a continuous operation.

The calcination or burning of limestone is a simple chemical process. When heated the carbonate decomposes according to the equation:

$CaCO_3$ + approx. 3180 kJ / kg = CaO + CO_2

Calcium Carbonate + Heat = Calcium Oxide + Carbon Dioxide

The decomposition temperature depends on the partial pressure of the carbon dioxide present in the process atmosphere. In a combustion gas atmosphere of normal pressure and 25% CO_2, the dissociation of limestone commences at 810 °C. In an atmosphere of 100% CO_2, the initial dissociation temperature would be 900 °C. In order to fully calcine the stone and to have no residual core, heat supplied to the stone surface must penetrate via conductive heat transfer to the core. A temperature of 900 °C has to be reached in the core at least for a short period of time since the atmosphere inside the material is pure CO_2. The stone surface must be heated to greater than 900 °C to maintain the required temperature gradient and overcome the insulating effect of the calcined material on the stone surface. When producing soft-burnt lime the surface temperature must not exceed 1100 to 1150 °C as otherwise re-crystallisation of the CaO will occur and result in lower reactivity and thus reduced slaking properties of the burnt product.

The limestone is then crushed and sized to between 1 and 6mm. The limestone fed to the kiln is set according to the production rate. The feed is introduced via the preheater in which it is contacted with hot gases from the hot product cyclone. The heated limestone falls into the bed from the port in the freeboard. Pea sized coal is also introduced to the kiln via this feed port. The feed rate is set to control the heat input into the kiln.

The kiln operates by maintaining a bed of material about 1m deep through which preheated air is blown. The air is distributed evenly over the kiln floor area by specially designed jetcaps making “bubbles” which pass through the bed and exit into the freeboard. The bed and jetcaps cause a significant pressure drop requiring positive displacement air blowers. The bed contains a mixture of limestone, partially calcined limestone and coal which burns in the bed transferring heat to the air and stone at a relatively constant temperature. The decrepitated burnt lime – typically finer than 0,5mm is carried out of the kiln riser by the upflowing gases – is recovered in the hot product cyclone. The product is cooled by quenching in air after which it is collected by the cold product cyclone and transferred to storage silos.

The product in the silos is quality tested and then transferred either into bulk bags for storage or sales, tankers for dierect sales, or to the hydrater plant for further processing.

Hydration Plant

Quicklime is mixed with water in a process reactor to yield dry hydrated lime ($Ca(OH)_2$), which is air classified to remove oversize material. The oversize material separated by the air classifying system passes through a milling section to reduce its particle size. The final

product is then bagged or dispatched in bulk road tankers.

Pictures of lime processing plant are shown on **Figure 10** while the process flow diagram are shown in **Figure 11** and **Figure 12** shows detailed Fluid Bed Calciner flow process. The operation hours of various activities at the mine are as follows:

Table 2: Operating Hours

Activity	Hours/Day	Actual hours/day	Utilization	Days/Annum
Mining	8.5	6.8	80%	244
Crushing plant Primary	8.5	6.8	80%	244
Crushing plant - secondary	24	19.2	80%	330
Calcination plant	24	22.2	95%	330

Table 3: Unit Processes

Unit process	Unit Process Function	Batch or continuous process
Crushing plant	The run-of-mine is fed through a series of crushing and screening stages and size reduced to 1mm-6mm.	Continuous
Fluid bed lime calciners (x4)	Limestone is calcined at ±920oC to obtain quicklime using coal as fuel.	Continuous

Figure 10: Examples of lime processing plant in Vaderlanche

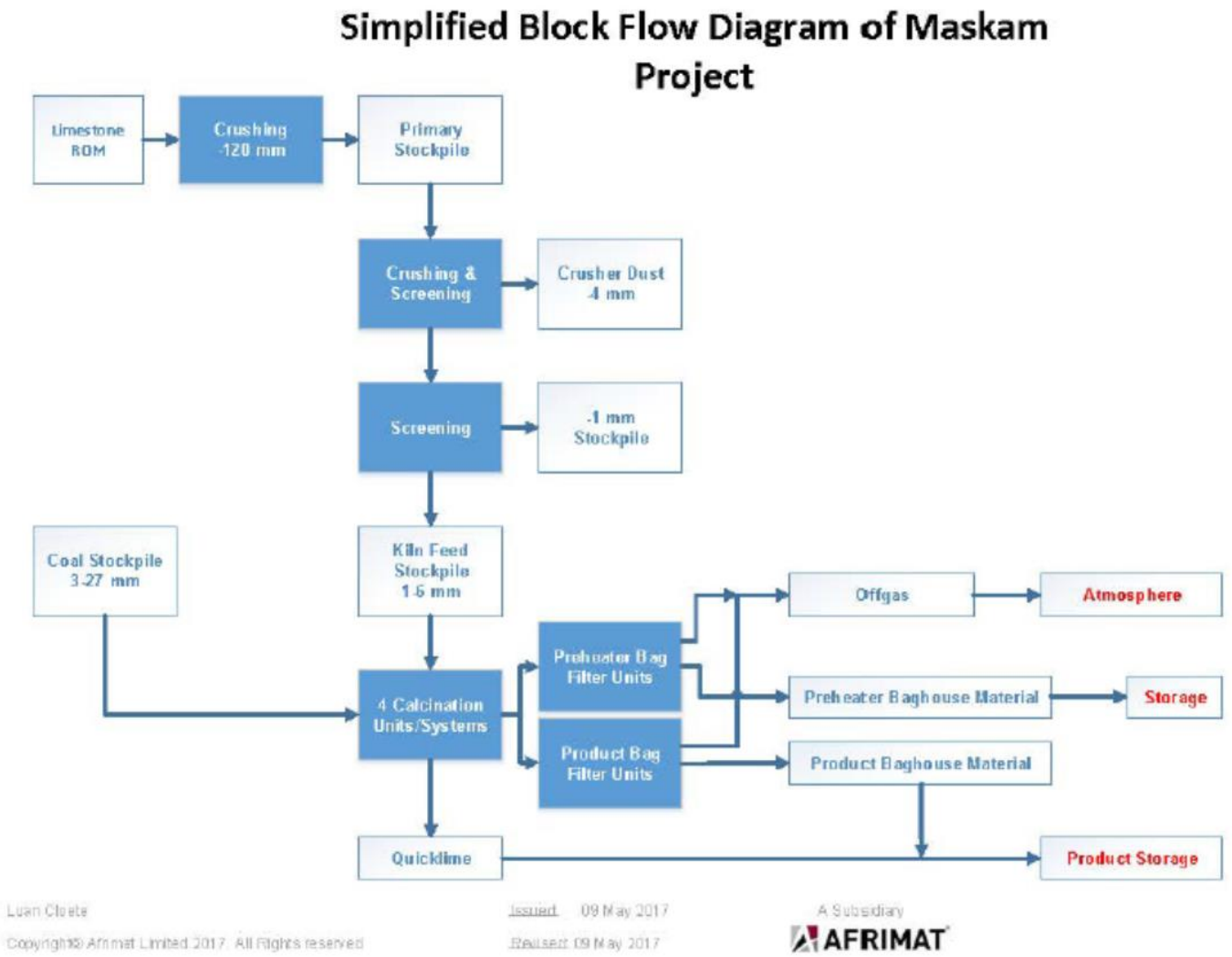


Figure 11: Process Flow Diagram

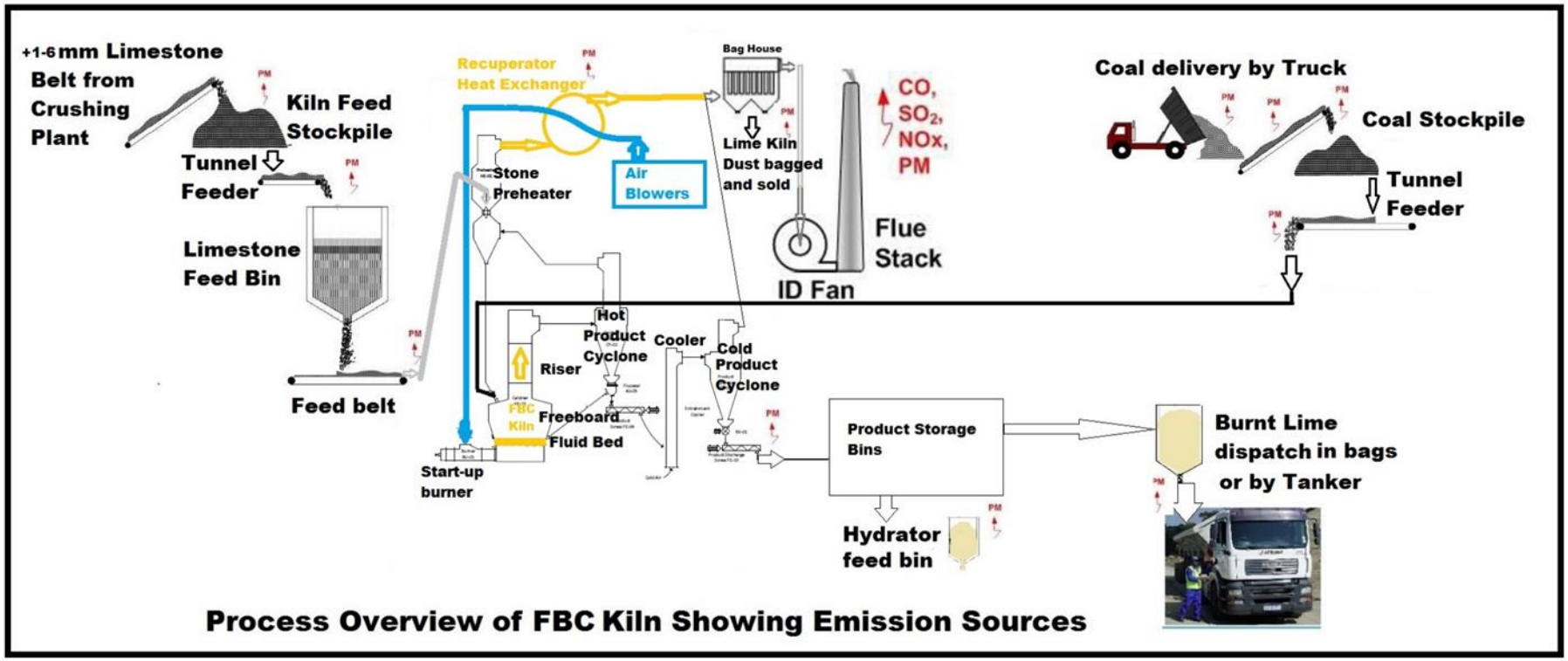


Figure 12: Fluid Bed Calciner flow process

Waste Management

Domestic Waste

Waste will be stored in designated waste bins on site that will be located strategically around the site (i.e. the office, the processing plant, laboratory and workshop). A demarcated salvage yard that will be subdivided into a general and waste oil storage area will be established (see example on **Figure 13 below**). Domestic waste will be disposed off at Vanrhynsdorp municipal site. No hazardous waste will be generated as a result of the operation. Metal scrap will be handled by any of the scrap dealers located in Vredendal. African Green Oil will be contracted to collect the used oil which will be stored in drums until collection.

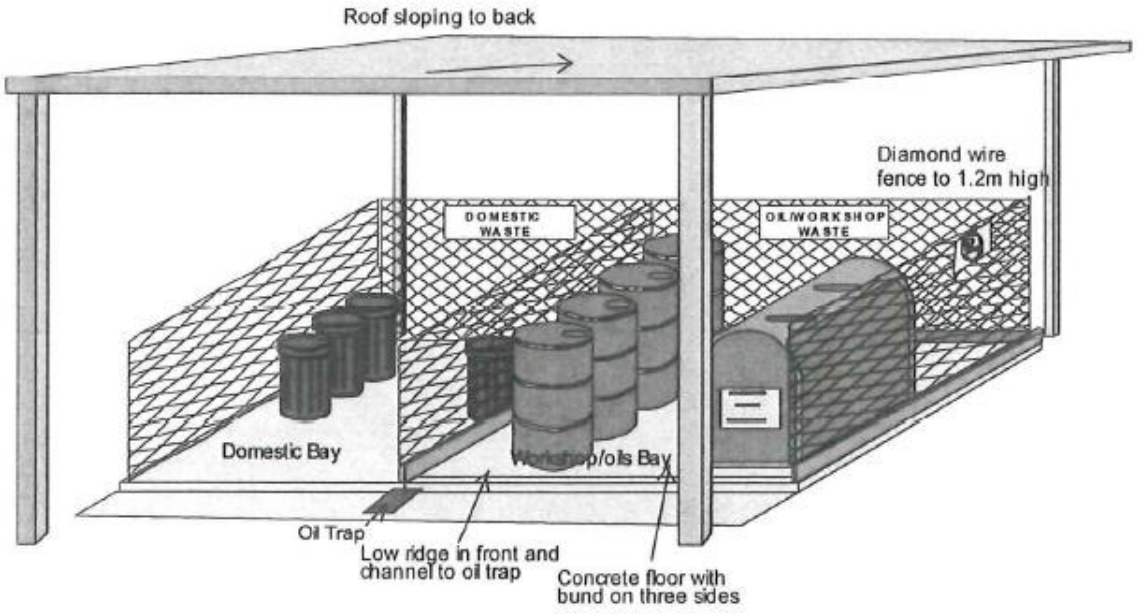


Figure 13: Example of temporary waste storage to be constructed on site

Industrial Waste

The proposed temporary waste storage facility as shown above includes a facility for used oil and fuel waste handling. This facility must have a concreted floor and be constructed with a low ridge at the leading edge, guiding run-off water into an oil trap. All used oil, leaked oil/fuel saturate soil, oil contaminated spares, oily rags etc must be placed in facilities as provided and marked. From there the oil/waste will either be:

- Collected by oil recycling company (such as Oilkol) or,
- Transported by the applicant to a suitable regional licensed hazardous waste handling facility, dependent on the nature of the material

Stormwater Management

Vredendal lies at 37m above sea level and the climate is very much like the desert. During the year, there is virtually no rainfall in Vredendal. Vredendal's climate is classified as BWh (desert climate). In Vredendal, the average annual temperature is 18.4 °C | 65.2 °F. In a year, the rainfall is 170 mm.

The desert climate (in the Köppen climate classification BWh and BWk), is a climate in which there is an excess of evaporation over precipitation. The typically bald, rocky, or sandy surfaces in desert climates hold little moisture and evaporate the little rainfall they receive. There is not enough rain to cause flowing rivers in the area.

Stormwater mitigation and management measures to be employed o site will be similar to the one currently employed at Cape Lime portion1 of the farm Vederlandsche Rietkuil 308, farm Nuwedrift 450, remainder of portion farm 510 and portion 40 of the farm 301, situated in the magisterial district of Vredendal. Refer to Appendix D5 for the Detailed Stormwater management

Table 4: Summary of Current stormwater mitigation and management measures employed at Cape Lime

Source	Description	Management Measures	Responsible Personnel
Rainfall	Water build up in Quarry pits	• Make use of the diesel pump to reduce the level of rainwater build up in the quarry. The diesel pump takes approximately 2 days to drop the high-water level to manageable levels. • Manage the quarry so that rainwater gets directed to the current water collection areas.	Quarry Supervisor and Quarry team
	Water build up on haul roads	• During and after the rainy season, road maintenance will be conducted making use of the in-house grader ad grader operator. The roads will be scraped and any potholes will be filled with mined road material. • During the rainy season, haul truck speeds will be reduced to cater for wet and slippery conditions.	Quarry Supervisor and Quarry team
	Water build up in roads around processing plants and stockpiles	• During and / or after the rainy season, smaller stockpiles of crushed stone will be deposited around the site and used to cover water-laden areas. These large puddles of water will be removed by placing stone on top of it. This allows for	Production Supervisor and Shift Foreman

		safer access of trucks and other vehicles.	
		• Water will be pumped out of the tunnels using small submersible pumps, left to dry and then removed and disposed of at the waste site.	
	Water build up in Limestone and Coal tunnels	• During and / or after the rainy season, the Coal dust that covered the ground will be collected and disposed of. Quarry crushed stone will be deposited around the Coal storage area and used to cover water laden areas. These large puddles of water will be removed by placing stone on top of it. This allows for safer access of trucks and other vehicles.	

(ii) Listed and specified activities

Table 5: Listed activities triggered by the proposed project

NAME OF ACTIVITY (All activities including activities not listed) **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**	**Aerial extent of the Activity** **Ha or m²**	**LISTED ACTIVITY** **Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (*GNR 544, GNR 545 or GNR 546)/NOT LISTED***
• Clearance of more than 20 ha of indigenous vegetation for the purposes of mining limestone deposits, the erection of a crushing plant, 4 Fluid Bed Lime Calciners and associated supporting services	±40ha	X	EIA Regulations, 2014 (as amended) Listing Notice 2, Activity 15 of the 2014 EIA Regulations (as amended).

• Replace topsoil over mined-out area • Final rehabilitation of entire major area	15ha	X	EIA Regulations, 2014 (as amended)GNR 981, Listing Notice 1, Activity 22 of the 2014 EIA Regulations (as amended).
• Construction of 4 Fluid Bed Lime Calciners	±5ha	X	EIA Regulations, 2014 (as amended), GNR 984, Listing Notice 2, Activity 6 of the 2014 EIA Regulations (as amended).
• Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource or the primary processing of a mineral resource including winning, extraction, classifying, concertation, crushing, screening or washing	45ha	X	EIA Regulations, 2014 (as amended), GNR 984, Listing Notice 2, Activity 17 of the 2014 EIA Regulations (as amended).
• Replace topsoil over mined-out area • Final rehabilitation of entire major area	±40ha		EIA Regulations, 2014 (as amended), GNR 983, Listing Notice 1, Activity 22 of the 2014 EIA Regulations (as amended).

The proposed development includes the construction of 4 Fluid Bed Lime Kilns. As such, in

terms section 21 of the National Environmental Management Air Quality Act (Act No. 39 of 2004) (NEM: AQA) an Air Emissions License (AEL) is required.

Table 6: Listed Activity that require an Air Emission License

Listed Activity Number	Category of Listed Activity	Sub-category of the Listed Activity	Name of the Listed Activity	Description of the Listed Activity
Subcategory 5.5	Category 5: Mineral Processing, Storage and Handling	Subcategory 5.5: Lime Production	Burning of lime, magnesite, dolomite, and calcium sulphate.	Burning of lime by means of a fluid bed calcination process.

The proposed mine extension will take place within 150m of the Wiedou River and a borehole would need to be drilled to serve as water supply for dust suppression and small quantities of process water, therefore, in terms of the National Water Act No. 36 of 1998, a Water Use license is required as per the following listed activities:

(a) Taking water from a water resource – drilling of two boreholes to use ground water

(c) Impeding or diverting the flow of water in a watercourse – mining within 500m of a water course (Wiedou River)

(i) Altering the bed, banks, course or characteristics of a water courses - mining within 500m of a water course (Wiedou River)

c) Policy and Legislative Context

Table 7: Legislation applicable to the proposed project

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);	REFERENCE WHERE APPLIED **(i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)**	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT **(E.g In terms of the National Water Act:-Water Use Liscence has/has not been applied for).**

An application for a Water Use License (WULA) in terms of section 21 of the National Water Act no 36 of 1998 (NWA) will be lodged. This Act provides mechanisms for the prevention of the pollution of water resources to support the management of water as a renewable resource. Section 21 of the Act lists water uses for which authorisation is required from the DWS, while Section 39 identifies several water uses where the need for a license is dispensed with.	An integrated application approach has been taken by Cape Lime. Therefore, an application for a water use license has been submitted to the Western Cape Department of Water and Sanitation.	An application for a Water use license (WULA) in terms of section 21 of the National Water Act no 36 of 1998 (NWA) has been lodged with the Western Cape Department of Water Sanitation through the Electronic Water Use Licence Application and Authorisation System (e-WULAAS) for the following listed activities: (a) Taking water from a water resource. (c) Impeding or diverting the flow of water in a watercourse (i) Altering the bed, banks, course or characteristics of a watercourses A pre-application site visit has been conducted with an official from Western Cape Department of Water and Sanitation on Tuesday 13th November 2018. The EAP has been provided with a list of documents that will be required for processing after submission

The Mineral and Petroleum Resources Development Act, No. 28 of 2002 (MPRDA) is the key legislation governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The Department of Mineral Resources (DMR) is the competent authority that deals with all mining related applications.	An integrated application in terms of the MPRDA and NEMA is being undertaken.	A mining right application has been applied for in terms of Section 22 of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA). Application for an Environmental Authorisation has been applied for in terms of the National Environmental Management Act, 2008 in respect of the listed activities that have been triggered by the mining activities in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (As amended) with the Western Cape Department of Mineral Resources (DMR) and the project has been granted the following reference number: WC 30/5/1/2/3/2/1(401) EM.

National Environmental Management Act (NEMA) 1998 (Act No 107 of 1998) is the enabling legislation intended to provide a framework for integrating environmental management into all development activities to promote cooperative environmental governance with regard to decision making by state organs on matters affecting the environment. The EIA Regulations of GNR 982, December 2014 serve to regulate the procedure and criteria for submitting, processing and considering decisions for applications for environmental authorisation in order to avoid the commencement of activities, which may have a detrimental impact on the environment. These regulations provide details on the process to be followed for the consultation of stakeholders and IAPs, the identification of the Competent Authority, and the various timeframes and application requirements for environmental authorisation. A further three Regulations, GNR983, GNR 984 and GNR985 (all of 2014), provide lists of activities for which environmental authorisation, either in the form of a Basic Assessment or Scoping and EIA report or EMP report is required before any activity can commence. In instances where Environmental Authorisation is required for a mining project, in terms of the MPRDA as well as NEMA, the DMR is identified as the competent authority. An application for Environmental Authorisation in terms of Section 24 of NEMA was submitted on the 1st October 2015 to the DMR for the NEMA and listed activities triggered by the proposed Welverdiend project.	GNR 984:2014 (Listing Notice 2) Activity 15, 17 and 21	Scoping and Environmental Impact Assessment process is conducted according to the NEMA 1998, Act No 107 of 1998.

The National Heritage Resources Act, No. 25 of 1999 (NHRA) serves to protect and manage South African heritage and cultural resources, which include places, buildings, structures and equipment of cultural significance.	Refer to Appendix D1 for specialist Heritage studies.	A Heritage Impact Assessment study was conducted and Indications are that proposed mining of the ± 34ha ore reserve on Farm Welverdiend No. 511, as well as construction and operation of a logistical facility, will impact negatively on archaeological heritage, resulting in the destruction and irreversible loss of archaeological resources. The overall impact significance of proposed mining on Farm 511 is, however, rated as being low. Measures to ensure the protection and conservation of archaeological heritage within and outside the footprint of the Mine and Plant Area are proposed.

The Mineral and Petroleum Resources Development Act, No. 28 of 2002 (MPRDA) is the key legislation governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The Department of Mineral Resources (DMR) is the competent authority that deals with all mining related applications.	An integrated application in terms of the MPRDA and NEMA is being undertaken.	A mining right application has been applied for in terms of Section 22 of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA). Application for an Environmental Authorisation has been applied for in terms of the National Environmental Management Act, 2008 in respect of the listed activities that have been triggered by the mining activities in terms of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (As amended) with the Department of Mineral Resources (DMR) and the project has been granted the following reference number: WC 30/5/1/2/3/2/1(401) EM.

The purpose of the National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMBA. This includes: the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity Institute (SANBI).	Refer to appendix D2 for Ecological Impact Assessment study.	An ecological assessment study has been conducted for site was undertaken on 14-15 November 2016, and a follow-up survey on 6 August 2018. The study indicated that The proposed mining site is located inside a largely untransformed, but severely degraded or overgrazed shrubland, classified as Vanrhynsdorp Gannabosveld and Knersvlakte Dolomite Vygieveld. The largest portion of the mining site lies inside the former. None of the vegetation types are currently listed as threatened. However, CapeNature commented that Vanrhynsdorp Gannabosveld is under threat from mining and agriculture, while Knersvlakte Dolomite Vygieveld has a very limited range with no formal protection. The southernmost portion of the proposed mining site, being located inside Knersvlakte Dolomite Vygieveld and encroaching onto the Wiedou River, poses the greatest impact as this area is more species rich and potentially more sensitive to erosion. Impact on ecological linkage is also likely to have some significance, due to the mining site's encroachment of the Wiedou River. However, the proposed mining area extends northwards and eastwards away from the approved mining area and river. There will be no direct impact on any known SCC, although SCC were previously recorded directly adjacent to the site by other authors. Alien infestation and the impact on indigenous fauna will be of a lesser concern. The impact is expected to be long term to permanent, depending on rehabilitation success after the completion of mining activities.

The National Environmental Management : Air Quality Act, (Act No. 39 of 2004) (NEMAQA) has placed the responsibility for air quality management on local authorities that will be tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and emissions reduction strategies. GN893 of 2013 provides the list of activities in terms of Section 21(1)(a) for which licensing is required in terms of Chapter 5 of the Act. This notice further establishes minimum emission standards for the listed activities. The ambient air quality standards (GN1210 of 2009) were determined based on international best practice for PM10 (particulates with an aerodynamic diameter of 10 micron), dust-fall, Sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), lead (Pb), benzene and recently PM2.5. The PM2.5 standards were published in GN486 of 2012. Section 32 of NEMAQA allows for the promulgation of measures to control and monitor dust. The National Dust Control Regulations (GNR827 of 2013) prescribe general measures for the control of dust in all areas, including residential and light commercial areas. Section 33 of NEMAQA relates to rehabilitation of mining operations, which states that an Applicant must notify the minister five years prior to mine closure of the planned closure and provide a closure and rehabilitation plan for the prevention of pollution of the atmosphere by dust after operations have ceased.	Refer to Appendix D6 for the specialist Air quality study which provides a detailed description of the ambient air quality within the proposed Welverdiend Project area. Air quality management has been addressed in the EMPr (Part B of this document).	The proposed development includes the construction of 4 Fluid Bed Lime Kilns. As such, in terms of the National Environmental Management Air Quality Act (Act No. 39 of 2004) (NEM: AQA) an Air Emissions License (AEL) is required.

The Mine Health and Safety Act, No. 29 of 1996 as amended and the Regulations thereto provide for protection of the health and safety of employees and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; to promote training and human resources development; to regulate employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety; to entrench the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations of the Republic relating to mining health and safety.	The commitment to abide by the requirements of the Mine Health and Safety Act, No. 29 of 1996 have been included in the EMPr in the relevant plans.	The Applicant will ensure that operations on site are in line with the requirements of the Act and Regulations.

d) Need and desirability of the proposed activities.

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

The Matzikama Municipality Integrated Development Plan (2012-2017) identifies the reduction of poverty & unemployment, the creation of an environment that maximizes the social well-being of the community and the creation of an environmentally sustainable economy as key priorities and strategic objectives for the Municipality. The proposed mining project will support these strategic objectives by creating employment opportunities, supporting community development (via provision of funding for the Thusong Service Centre in Lutzville, and the creation of a bursary scheme), building workforce capacity (via the provision of employee skills development programmes), contributing to local economic development, and contributing to a reduction in local poverty. These positive socio-economic benefits will be achieved in an environmentally sustainable manner. Given the relatively high rates of poverty & unemployment and low levels of skills development in the community (as highlighted by the local IDP and the National Census 2011), the proposed development and its associated positive socio-economic impacts is regarded as desirable and needed by the surrounding community at this time and place.

The proposed extension of the Welverdiend Mine is required in order to support Cape Lime's limestone mining operations and it is dictated by the locality of the limestone reserve. Cape Lime has investigated the economic viability, including the environmental sustainability and technical feasibility of the limestone mining in the region of the proposed mine. Cape Lime (Pty) Ltd, a subsidiary of Afrimat Ltd, currently mine and process limestone and dolomite on the Farm Vaderlandsche Rietkuil, 7 km east of the proposed project. The current activities entail, apart from mining of limestone and dolomite, crushing and screening of all mined material as well as calcination of limestone in an existing Fluid Bed Lime Kiln. The markets currently served are:

- Water treatment (potable and effluent)
- Glass Industry (Flat glass and container glass)
- Aggregates
- Mineral Fillers
- Chemical Industries (Calcium hypochlorite, mineral separation processes and tanneries)

The extent of the current limestone deposit being mined is such that it cannot support the supply of limestone to additional processing facilities without drastically reducing the life of the resource. Expansion in terms of additional capacity on the current site is also limited due to numerous constraints. Cape Lime is confronted on a regular basis with enquiries with regard to supply of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity.

This project will ensure that Cape Lime is able to continue with its considerable contribution to the regional and national economy. It will also become a contributor to the economies of the local and district municipality.

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

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

i. Details of the development footprint alternatives considered.

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

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

(a) Property and Location/Site Alternatives

No alternatives in terms of project locality were considered as the proposed project entails the extension of an existing mining area where a mining right has already been granted. The study site is dictated by the locality of the limestone reserve. The site was chosen on the basis of proximity to the access road and centre of the ore body in order to minimize the impact on disturbance of vegetation and life-of-mine dust emissions due to product hauling.

(b) The type of activity to be undertaken

No activity alternatives were considered as the project involves the expansion of a mining area to get more limestone product.

(c) The design or layout of the activity;

A general layout has been developed paying special consideration to the current location of the existing environmental sensitivities. The existing biophysical perspective of the site guided the final layout of the site as well. The proposed development does not lie on pristine ground and no communities exist within the vicinity of the site. Some areas have been physically disturbed in the past, while heavy grazing pressure has led to a general decline in the condition and diversity of the vegetation of the area. The proposed development is not considered fatally flawed, and the expansion of the mine would be acceptable.

(d) Technology to be used

Technological improvements in calcination technology have focused on (1)

improving energy efficiency and (2) improving the yield of calciner feed from the orebody.

(i) Alternative 1: energy efficiency - vertical shaft type kilns are best because heat exchange is optimised by the intimate contact between the stone and gas to achieve efficiencies close to the theoretical requirement for dissociating the carbon dioxide from the carbonate mineral. When the mineral decrepitates on heating, it breaks up, fills the voids and stops the gas flow. The Japanese have developed a small scale rotating preheater vertical shaft system capable of calcining smaller stones. They confirmed that their technology will not work with Maskam limestone. The only conventional technology capable of calcining our limestone is the long shaft rotary kiln.

(ii) Alternative 2: maximizing the yield of stone from the quarry - various techniques have been developed to calcine the finer limestone fractions. For example the vertical shaft kilns which typically fire a -100+50mm size fraction, can also fire the -50+25mm fraction in a separate fine lime kiln or by loading these fractions as alternating layers in the shaft thereby enabling the firing of the -100+25mm limestone from the crushing plant. The -25mm fraction represents the yield loss of the mined limestone. For the calcination of this fine limestone, there are three technologies: The rotary, fluid bed (FBC) and flash calciners.

The remote location at Van Rhynsdorp relative to the market and fuel sources saddles the project with serious price and cost handicaps unless lime uses arise in the area. On the other hand, the limestone has unique quality properties enabling entry to high value specialty markets which are currently being supplied by imports. The environmental applications have been made with a 400 TPD (ton per day) capacity based on an enquiry for a new development, other new markets and existing market growth. The advantage of the FBC kiln, like the one running in Vredendal, is that it is modular and units can be added as indicated by the market. The other technologies like the rotary or flash calciners would require the installation of the full capacity upfront. The preferred technology is therefore the FBC option.

(e) The operational aspects of the activity; and

A number of process alternatives have been considered by the applicant and they anticipate that the process that will be followed at the proposed plant will be Fluid Bed Calciners. Process alternatives include, for example, the calcination of limestone by different available technologies paying attention to the suitability of the product being mined and the quantity (in tonnages) of product to be mined in ensuring that high quality lime is produced.

The lime kilns will be fed by a common limestone feed conveyor, drawing from underneath the limestone stockpile. The coal to be used as fuel in the kilns will also be fed from underneath a coal stockpile, via a common coal conveyor, to the respective kilns. Limestone (CaCO3) is calcined at ±920oC to obtain quicklime (CaO) using coal as fuel. The plant is fully automated, and all of the process parameters are to be monitored and controlled.

Different types of kilns have been considered for the proposed plant, i.e.

- Alternative 1: Fluid Bed Calciner;
- Alternative 2: Long Shaft Rotary Kiln;
- Alternative 3: Polcal Flash Calciner
- Alternative 4: Polcal Preheater with Rotary Conditioning Kiln
- Alternative 5: Producer Gas Add-On

i. Alternative 1: Fluid Bed Calciners

The FBC has a capacity of 100TPD. Cape Lime therefore need four of these units. The FBC uses a 1-6mm feed limestone and peas coal. It has no moving parts, does not recover any heat from the product and makes use of a fluidizing pod and recuperator heat exchanger to recover some heat from the kiln exit gases. Recent trials have shown that the feed size can be adjusted to 0,3-6mm which will improve the yield of crushed stone that can be fed to the kiln.

The kiln operates by maintaining a bed of material about 1m deep through which preheated air is blown. The air is distributed evenly over the kiln floor area by specially designed jetcaps making “bubbles” which pass through the bed and exit into the freeboard. The bed contains a mixture of limestone, partially calcined limestone and coal which burns in the bed transferring heat to the air and stone at a relatively constant temperature around 920 °C. The decrepitated burnt lime – typically finer that 0,5mm is carried out of the kiln by the upflowing gases – is recovered in a product cyclone. It product is cooled by quenching in air after which it is transferred to storage silos.

ii. Alternative 2: Long Shaft Rotary Kiln

Rotary kilns have been used for many years in calcining operations. They can be scaled to any size of operations from a few tons per day to 2 000 TPD. The length of the rotary kiln is used to provide sufficient contact time for the complex heat transfer processes between the gas, kiln refractory and limestone being fed into the kiln. It can be fed with a variety of sizes 10-20mm, 20-40mm, 25-50mm and combinations of these sizes. We have assumed the standard lump size 20-40mm, but for Cape Lime a -50mm may be preferable. The kiln is fired with a pulverised coal burner, which means that this technology requires a coal milling and pulverised coal storage options (PF – pulverised fuel). Alternatively, the kiln could be fired with

producer gas made by gasifying coal if ash, sulphur and carbon contamination are issues. A partial heat recovery of the heat in the fired product is obtained via a rotary cooler. See **Figure 14** below.

Limestone is fed into the kiln which due to the shaft inclination and rotation causes the limestone to move towards the discharge end. The speed of rotation determines the residence time of the stone in the kiln. At the discharge end, a burner introduces hot air (1 300-1 450 °C) which heats the refractory and the stone. The calcined product at ~1 100 °C falls into the rotary cooler which contacts the hot product with air thereby cooling it to about 80 °C. The cooled product is discharged directly onto a product belt for transfer to storage. The heated air from the cooler is used as secondary air for the burner and to transfer heat up the kiln shaft.

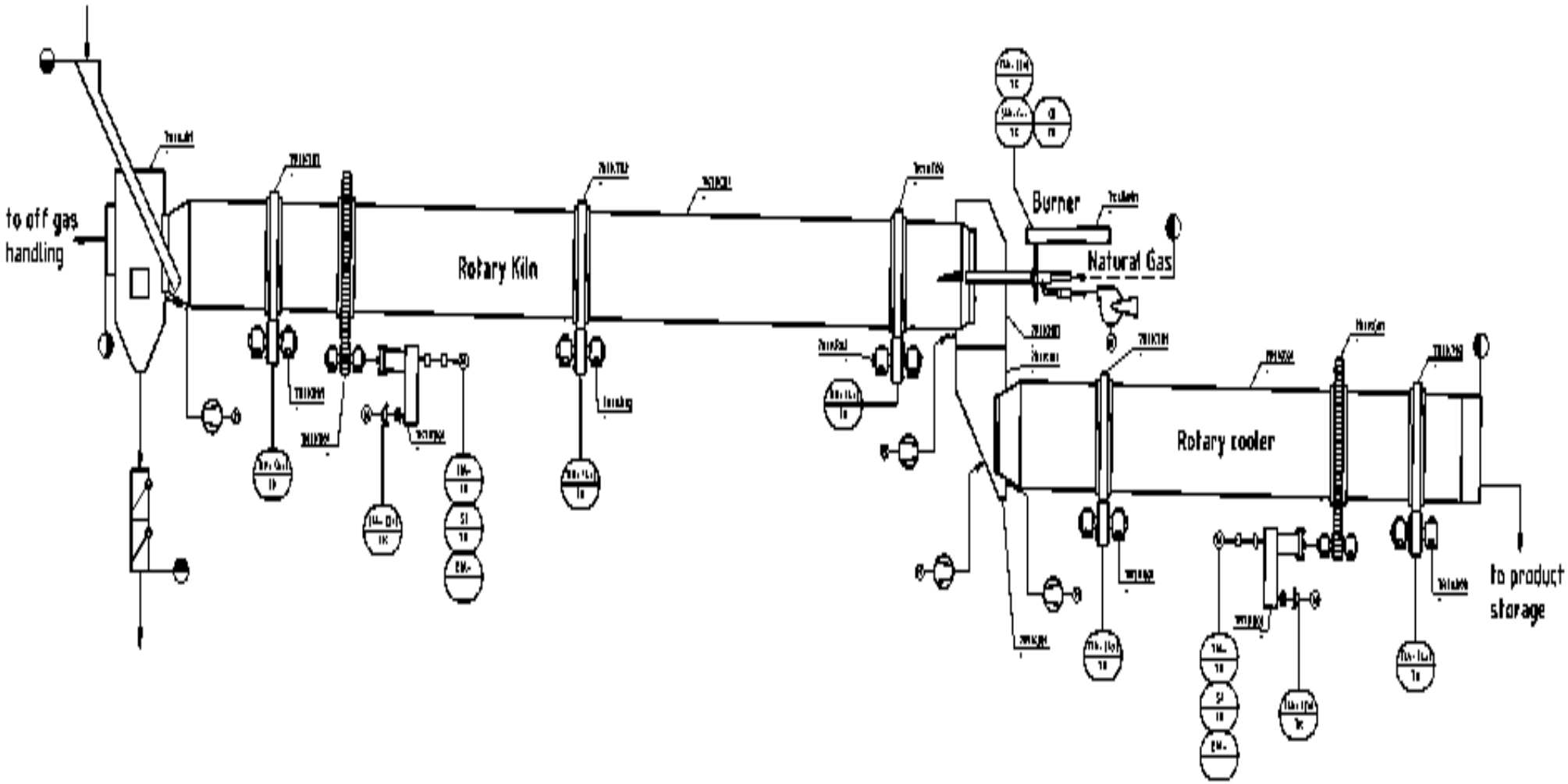


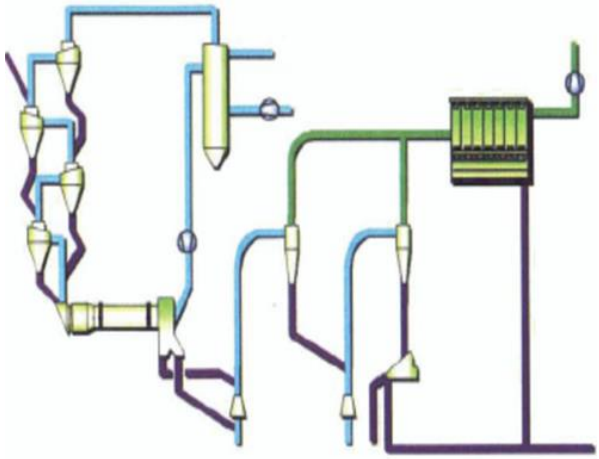
Figure 14: Image of Rotary Shaft Kiln

iii. Alternative 3: Polcal Flash Calciner

Since the limestone decrepitates, Thyssenkrupp suggested that flash calcining might be an option. They have tested a sample of the Maskam limestone and found it suitable for their Polcal process. The plant uses a feed limestone that is crushed to below 2mm before feeding into the calciner. The kiln is also fired with either (PF – pulverised fuel) or producer gas in a specially designed chamber which contacts the preheated limestone with hot gases. Heat recovery from the product is achieved by the use of a flash, grate, or rotary cooler. This technology is essentially the back end of a cement plant – counter current contact of hot gas and ground limestone in multi stage cyclones. It has no moving parts and can be scaled to very large capacities.

iv. Alternative 4: Polcal Preheater with Rotary Conditioning Kiln

This is a combination of options 2.2 and 2.3 for making controlled reactivity quicklime for example the AAC market. The preheated / partially calcined limestone from the cyclones is treated in a short rotary kiln for adjustment of the final reactivity characteristics.



v. Alternative 5: Producer Gas Add-On

Since the burning of coal exposes the lime to ash and sulphur contaminants, the idea has been put forward to first convert the coal to producer gas by gasifying it. Although the gas operation will have a very beneficial effect on the product quality and the kiln operating stability, it may have a negative effect in terms of the overall plant availability because of the sequential linking of two plants.

The use of producer gas will also improve the yield of premium product and eliminate the need for beneficiation. It can be applied to the FBC, rotary and flash calciners – using a gas instead of pulverised fuel burners. This

improvement comes at the cost of a lower energy efficiency because of the coal energy loss in the gasifying process. This option will only be considered if required by the market.

The remote location at Van Rhynsdorp relative to the market and fuel sources burdens the project with serious price and cost handicaps unless lime uses arise in the area. Due to the fact that the Fluid Bed Calciner is modular and units can be added as indicated by the market, it is the preferred kiln option from the above-mentioned alternatives. The other technologies, like the rotary or flash calciners, would require the upfront installation of the full processing capacity and thus were not considered cost-effective.

(f) No-Go alternative

The No-Go alternative implies no change in the site's status quo, in other words no mine expansion will take place. Should the mine extension be granted not commence the applicant will not be able to mine the dolomitic limestone from the property. This will result in a loss of income to the applicant and continued shortage of production of high quality lime to the different industries that needs lime. The work opportunities to the proposed employees will be lost and the project that will be identified as the LED project by the Social Labour Plan should the project not go ahead will not be implemented.

ii. Details of the Public Participation Process Followed

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

The Public Participation Process (PPP) for this project satisfied the requirements stipulated in Chapter 6, Sections 41, 42, 43 and 44 of R982 of the NEMA EIA Regulations 2014 promulgated in terms of the National Environmental Management Act, Act 107 of 1998.

Scoping Phase

Announcement of the project and its EIA process

The proposed project and its EIA process were announced in the study area in the following ways:

Notification of I&APs

At the commencement of the project, written notices and Background Information Documents (BIDs), were sent to the landowners surrounding the Welverdiend farm, as

well as stakeholders and organs of state with a direct interest in the project. Since then, there has been ongoing distribution of these documents via email to I&APs that are identified as the project progresses. Copies of these letters, together with the details of the recipients are included in **Appendix B3**.

Site Notices

Six (6) site notices of A2 size were erected in various conspicuous places including Vanrhynsdorp Public Library at 9 Church Street; Vanrhynsdorp Agrimark Store on 16 Kerk Street; Van Rhijn Museum in Van Riebeek Street; Vanrhynsdorp Usave Store on 22 Voortrekker Road; Vredendal Public Library on 37 Kerk Street as well as on the the boundary fence of the farm Welverdiend no 511 along the N7. Proof of the placement of the site notices is included in **Appendix B2**.

Media Announcement

A newspaper advert was placed on Ons Kontrei Newspaper on the 07th February 2020 notifying the general public and other interested and affected parties about the public participation process that will be taking place. See **Appendix B1**.

Consultation of Stakeholders

A pre-application Focus group meeting was held with the Matzikama Local Municipality on 21 November 2019

Minutes and attendance registers for the above consultation meetings are attached as **Appendix B9.**

Comments and responses during scoping phase

Comments received were responded to as per the requirements of Regulation GN No. R.982. as amended. The comments and response report as well as all comments received have been attached to this report in **Appendix B8.** A record of all comments received, together with a note of the responses given, will be maintained continuously.

The interested and affected parties (I&APs) in and around the study area were identified and a dedicated stakeholder database for the project was developed. A list with complete details of the I&APs is kept by the EAP and will be updated as the project progresses. The I&APs register is included in **Appendix B5**.

EIA PHASE

An advertisement regarding the availability of the Draft EIA/EMP reports will be placed in the Ons Kontrei and Weslander Newspapers.

iii. **Summary of issues raised by I&Aps**

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

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner/s Cape Lime (Pty) Ltd	X		The Portion 4 of Farm Welverdiend No 511 is privately owned by Cape Lime (Pty) Ltd, a subsidiary of Afrimat Limited which is the applicant of the proposed extension of Welverdiend mine and give full consent of the application.		
Lawful occupier/s of the land			The land is vacant with no one staying on the property.		

Landowners or lawful occupiers on adjacent properties	X				
Nick Helme has been sent and their comments have been Neighbour - 314		10 February 2020	Design and implementation of appropriate Biodiversity offset	. The Ecological specialist has explained that	
			Extensive search and rescue of all bulbs, including *Heamanthus luaceifolocus* (vulnerable)	Mitigation measure added on the EMPr section	
			Rescued material to be translocated to formal conservation area that must be established by Afrimat funding administered by Cape Nature or Wilderness foundation	Mitigation measure also identified by the Ecological specialist and added on the EMPr section	
			Strongly do not approve of mining in the sensitive area, ecologically important and poorly protected	It will be impossible to mine on the sensitive because the area south of the approved BAR area is a sensitive CBA area which the department of environmental affairs and Cape Nature has indicated that it should always be treated as a “No-Go Area. The orebody does not extend that far south and Cape Lime cannot mine closer to the river as is currently approved.	

Matzikama Local Municipality		17 March 2020	Dear Mrs Ndlovu The email below and attached as well as the BID document with reference "WC 30/5/1/2/2/294MR" dated March 2020, refer. Please register the Matzikama Municipality as an Interested and Affected Party. No record of any approval for mining activities on Portion 4 of the Farm Welverdiend No 511 can be found and therefor it seems that Portion 4 of the Farm Welverdiend No 511, which is a portion of land that is for road widening of the N7 (see following inserts and attached SG Diagrams 2696/2013-1 and -2) is an incorrectly used property description.	The applicant is the process of preparing the required documents to apply for land zoning and will liaise with the mucinipality. The road widening is not occurring on the N7 but will join to the N7 from the farm Vaderlansche Rietkuil.	

Matzikama Local Municipality	X	Focus Group Meeting with Local Municipality on 21 February 2019	It was indicated that the application for mining departure will lapse in in 28th May 2020. Cape Lime must therefore submit an extension soon as the process takes 7 months and must also apply for the land use application	The applicant has been informed of this and a land use application will be submitted to the Matzikama Municipality in due course of the project	
			It was advised that the process for land use application run concurrently with the EIA process and that a town planner be appointed to conduct the process.	The applicant has appointed a town planner to carry out the process	
West Coast District Municipality	X	10 March 2020	An application for an Atmospheric Emission License (AEL) must be submitted to the relevant competent authority in terms of Section 36(5)(e) of the National Environmental Management: Air Quality (Act 39 of 2004)	An AEL application will be lodged with the National Department of Environmental Affairs (DEA) after the completion of the EIA process as advised by the DEA. DEA has also been registered as an I&AP and has been provided with all the drafts reports for commenting on the project.	
			The National Dust Control Regulations, no R827 dated 1 November 2013 must be complied with during the construction and operational phases of the development. A dust monitoring programme must be established to determine the potential increase of dust pollution of the activities	Mitigation measures for dust control as per the National Dust Control Regulations will be included on the EMPr that will be compiled with the Environmental Impact Assessment Report	

West Coast District Municipality	10 March 2020	The West Coast District Municipality's Air Quality Officer may call for additional requirements on receipt of specialist reports and the EMPr	Comment noted	
		The mining area must be properly demarcated prior to commencement of the activities	Mitigation measure included on the EMPr section	
		A portion of the proposed mining area is demarcated as a Critical Biodiversity Area (CBA). Mining poses the greatest threat poses the great threat as this area since it is species rich and potentially more sensitive and difficult to rehabilitate. The CBA must be excluded from the mining area, properly demarcated as no-go area and offset for conservation purposes	The EAP has engaged the applicant to discuss the sensitivity within the proposed extension area. Cape Lime is aware that this area is regarded as sensitive and no mining will take place on the CBA area. The area has been regarded as a no-go area by the approved BAR and the Department of Environmental Affairs and Cape Nature has indicated that it should always be treated as a "No-Go Area. The orebody does not extend that far south and Cape Lime cannot mine closer to the river as is currently approved.	
		Alternatives in terms of project and site must be investigated. In terms of the environmental sensitivities, it is recommended that alternative layouts and designs be considered for the proposed extension area. All CBA area should be considered no-go area and demarcated as buffer area where no mining should be allowed	No alternatives in terms of project site were considered as the proposed project entails the extension of an existing mining area where a mining right has already been granted. The revised Draft EIAR has discussed Technology and Operational aspects for the proposed development. It is however important to note that Cape Lime aims not to do any mining on the CBA area	

West Coast District Municipality		10 March 2020	The impact on biological linkage is significant, due to the proposed mining site's southern associated with Wiedou River. Loss of designated CBA's must be avoided and the proposed mining area should be moved northward, out of the CBA. Ideally, a buffer area of 250 to 300 meters between the Wiedou River and mining activities should be maintained at all times to secure drainage lines and prevent erosion	The mitigation measure for a buffer area of 250 to 350 meters between Wiedou River and mining activities has been included on the EMPr as well as aspects of conditions of authorisation to be included on the EA	
			A detailed rehabilitation plan with rehabilitation measures and methods must be provided. Information regarding the proposed future use of the land after mine closure must be submitted. During rehabilitation only species indigenous to the West Coast must be used, together with species collected during the search and rescue	A rehabilitation plan has been compiled and is part of this Draft EIAR,the Rehab plan will be updated on annual basis should the mine activities be authroised	
			In terms of NEMBA as alien eradication and monitoring plan needs to be compiled to address alien vegetation management and to control invasive species (*Propsopis spp* etc) on the property.	Mitigation measure on control of invasive species has been included in the EMPr.	
			All adjacent landowners and interested affected parties must be notified of the application as part of the public participation process and should be given the opportunity to comment	All adjacent landowners have been notified of the proposed extension through registered letters. All comments received from adjacent landowners and other I&APs will be considered and captured on the issues and response report (this report)	
			Only existing roads on the property may be	The existing road will be used to gain access	

West Coast District Municipality		10 March 2020	used and no new roads are to be created through natural veld	to the mining area. The existing haul road will however be expanded to accommodate mining vehicles. The applicant will do continuous maintenance of the surfaced access road for the duration of the operational phase.	
			The impact of groundwater extraction on other users in the surrounding area, especially agricultural users, should be investigated. Groundwater in the area is limited and compromising this resource will have severe negative impacts on the agricultural sector.	A Geohydrological study has been conducted by GEOSS South Africa (Pty) Ltd and explains that the proposed mining area will not intersect any groundwater as it will take place by means of surface drilling and blasting up to a maximum depth of 60 mbgl. No groundwater abstraction will take place on the mining site at this stage, hence impact on other groundwater users due to abstraction. The depletion of the groundwater resource because of the abstraction is thus highly improbable to occur.	
			The comments of the Provincial Department of Transport and Public Roads must be obtained regarding the impact of heavy vehicle traffic on surrounding public roads.	The Department of Road Planning Transport and Public Works has been provided with the opportunity to review the Draft Scoping Report and they have requested to be regsitered as I&APs and be kept informed about the project	
			The requirements of all relevant legislation must be observed. Your attention is drawn to the legislation regulating land use planning. A land use application must be submitted and approved by Matzikama Municipality prior to the commencement of any activities related to mining and construction.	A land use application is in the process of being submitted to the Matzikama Municipality by the appointed town planner	

Western Cape Department of Road Planning Transport and Public Works	Email	13 March 2020	Good Day Your letter to interested and affected parties referenced 30/5/1/2/3/2/1(401) dated 6 February 2020 refers. It appears as if this proposal will take access from the N7. However please keep this Branch informed as an interested and affected party	Comment noted	

Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA etc	X				
Department of Agriculture and Forestry: Land Use and Soil Management		12 March 2020	Department of Agriculture, Fisheries & Forestry Directorate: Land Use and Soil Management administer and implement the Conservation of Agricultural Resources Act, (CARA) 43 of 43 of 1983). The Act is regarded as one of the principal Acts governing the protection of agricultural and other natural resources to ensure the conservation of soil, water and vegetation, as well as the combating of alien and invasive plants. According to Section 1 of the Act, conservation of natural agricultural resources includes the protection, restoration as well as the reclamation thereof. The objectives of CARA are to provide for		

Department of Agriculture and Forestry: Land Use and Soil Management		12 March 2020	for the conservation of the natural agricultural resources through maintaining the production potential of the land, combating and prevention of erosion, preventing the weakening or destruction of the water resources, protecting the vegetation and combating weeds and invader plants. In order to achieve the objectives, certain control measures may be prescribed which shall be compiled with by the land users and which may relate to: • All slopes and degraded areas should be rehabilitated prior to the onset of the rainy season to prevent surface water run-off and top soil should be utilize as much possible in these area. According to Regulation 3, sub-regulation 3 (1) "Except on authority of a written permission by the executive officer, no land user shall cultivate and land if it: or (a) has a slope of more than 20 per cent; or (b) has a slope of more than 12 per cent, is situated in an area specified in column 1 of Table 1, consist mainly of a soil form and soil series respectively specified in column 2 and 3 of the said Table opposite the area concerned and, if applicable, has such physical properties as my be specified in column 4 of the said Table opposite the soil series concerned	Mitigation measure added on the EMPr section under rehabilitation	

Department of Agriculture and Forestry: Land Use and Soil Management	12 March 2020	• Topsoil compromises the soil-cover including all the vegetation, organic matter etc. Soil that will be removed must be kept separate for later re-use. It should be done in manner to retain any suitable vegetation on the land concerned in order to expedite the restoration and reclamation thereof, prevent wind, and water erosion throughout the period. To improve the soil health of the area, the bare areas should be re-seeded with annual grass and pioneer plant species which been found to establish in these soils and in the area	Mitigation measure added on the EMPr section under soil management	
		• The land owner/user must protect the cultivated land before/during/after the cultivation of the proposed sites effectively against excessive soil loss as a result of erosion through the action of water and wind	No cultivation of the soil will take place, the propose activity will involve clearing of topsoil which will be stored separately for rehabilitation	
		• Monitoring and evaluation procedures should be put in place to determine if there is any improvement and to ascertain if more rehabilitation initiatives are needed or if the area should be left to spontaneously rehabilitate. However the continuous rehabilitation program will attempt the area to an acceptable standard to accommodate agricultural activities	Mitigation measure include on the EMPr section under rehabilitation	

Department of Agriculture and Forestry: Land Use and Soil Management		12 March 2020	• Applicant or landowner must protect all areas susceptible to erosion by preventing storm water. Develop procedures to minimize surface water run-off and soil erosion	Mitigation measure added on the EMPr section under soil management	
			• According to Regulation 4, sub-regulation 1 (a) "Every land user shall by means of as many of the following measures as are necessary in his situation, protect the cultivated land on his farm unit effectively against excessive soil loss as a result of erosion through the action of water: (a) A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off speed of running-off water	No cultivation of the soil will take place, the propose activity will involve clearing of topsoil which will be stored separately for rehabilitation	
			• According to Regulation 5, sub-regulation 1(a)(j) "Every land user shall be means of as many of the following measures as are necessary in his situation, protect the cultivated land on his farm unit effectively against excessive soil loss as a result of erosion through the action of wind	No cultivation of the soil will take place, the propose activity will involve clearing of topsoil which will be stored separately for rehabilitation	

(a)The land concerned shall be cultivated in accordance with such method or be laid out in such manner that the surface movement of soil particles through the action of wind is restricted (j) A suitable soil conservation work shall be constructed and thereafter be maintained in order to restrict the surface movement of soil particles through the action of wind		
• According to regulation 7 sub-regulation (1)"Subjec to the provisions of the water Act 1956 (Act 54 of 1956), and sub-regulation (2) of this regulation, no land user shall utilize the vegetation in vlei, masrch or water sponge or within the flood area of a water course or within 10 metres horizonally outside flood area in a manner that causes or may cause the deterioration of or damage to the natural agricultural resources". It is recommended that a 32m buffer zone is kept in a natural condition	Mitigation measure added on the EMPr section under vegetation management	
• The restoration or reclamation of eroded land; Regulation 13, sub-regulation 1 & 2(1) "Every land user shall by means of as many of the measures set out in regulations 4,5 and 9 as area necessary in his situation, effectively restore and reclaim the land on his farm unit on which excessive soil loss due to erosion occurs or has occurred".	Mitigation measure added on the EMPr section under soil management	

		(2) If the executive officer is satisfied that the measure applied by a land user in a particular case in terms of sub-regulation (1) are not sufficient to restore or reclaim land on which excessive soil loss due to erosion occurs or has occurred, he may direct such land user in writing to apply such additional measures as the executive officer may determine”		
		• Regulation 14 “If a land user disturbs or denudes any land on his farm unit for purposes other than prospecting or mining activities”; (c) such land user shall by means of as many of the following measures as are necessary in his situation, effectively restore and reclaim that disturbed or denuded land. (i) Topsoil shall be removed and kept separate with a view to replacing it later on the disturbed or denuded land. (ii) Topsoil shall be used to stabilise the sides of a hollow that has been caused by the exploitation or removal of material and, where possible, to reclaim part of the disturbed or denuded land. (iv) The flow pattern of run-off water, the topography and the slope shall, depending on the volume of material exploited or removed, be restored as closely as possible to the original condition.	Mitigation measures on top soil, stormwater management and vegetation management has been included on the EMPr	

		(v) Suitable vegetation shall be established on the land concerned in order to expedite the restoration and reclamation thereof. (vi) The land concerned shall be fenced off and withdrawn from grazing until vegetation has been sufficiently restored or established. (Vii) A suitable soil conservation work shall be constructed and thereafter be maintained in order to protect the land concerned against excessive soil loss through the action of water or wind or in order to collect sediment from run-off water		
		• It is stated in the report that aliens species recorded include *Limonium sinuatum, Prosopis glandulosa* and *Nerium oleander* are declared as alien invader, such plants need to be controlled and removed annually (on-going programs) as they can cause damage to the surrounding natural vegetation. According to Conservation of Agricultural Resources Act, (Act 43 of 1983), Regulation 15E methods of controlling alien plants are as follows: • Uprooting; felling; cutting or burning • Treatment with a weed killer is registered for use in connection with such plants in accordance with the directions for use of such • Biological control carried out in accordance with the stipulations of the Agricultural Pests Act, (Act no 36 of 1983)	Mitigation measures included on rehabilitation section of EMPr	

		Combination of one or more methods mentioned above, and any action taken to control alien plants shall be executed with caution and in a manner that will cause least possible damage to the environment. The Department reserves the right to revise its initial comments and request further information from you based on any new or revised information received		

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	The Department notes that the application is a resubmission of a Scoping & Environmental Impact Reporting ("S&EIR") application that was withdrawn by the applicant. Comments are hereby offered by various Directorates within the Department based on the information provided in the DSR and Plan of Study for Environmental Impact Assessment ("EIA") dated February 2020, and information provided during the previous S&EIR application. Clarity is requested on the property description of the farm earmarked for the proposed development. The DSR indicates that the applicant wishes to undertake the proposed development on Portion 4 of the Remainder of the Farm Welverdiend No. 511. It is further noted that the applicant is in possession of a mining right issued on 19 June 2012 for mining of 321ha of limestone and dolomite on the Remainder of the Farm	The proposed development will take place Portion 0 of Remainder Farm Welverdiend No 511 and is an extension of the authroised Basic Assessment area. The 45ha is within the 321ha that already has a mining right. According to the Deeds Property Office, the Welverdiend, 511, (Remaining Extent) has a SG code of C07800000000051100000.	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	No. 511. This Directorate further granted an environmental authorisation ("EA") on 5 June 2015 for mining operations and associated infrastructure with a development footprint of approximately 8ha on the Remainder of Farm Welverdiend No. 511. Table 1, page 4 of the DSR indicates the Surveyor-General ("SG") Code for the proposed development site as C07800000000005110000. It thus appears that development is proposed on the Remainder of the Farm Welverdiend No. 511. Please confirm whether the proposed development will be undertaken on the Remainder of the Farm Welverdiend No. 511; or on Portion 4 of the Remainder of the Farm Welverdiend No. 511. If the latter, please provide the correct SG Code for Portion 4 of the Remainder of the Farm Welverdiend No. 511.	The applicant has provided the EAP with a incorrect portion number of the farm	
			The BID and DSR indicate that Activity 12 of Listing Notice 3 of the EIA Regulations, 2014 (as amended) is applied for as the proposed development will entail the clearance of vegetation within portions of a Critical Biodiversity Area. The Draft Biodiversity Assessment dated February 2017 compiled by Mark Berry Consultants did not identify any endangered or critically	Activity has been removed	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	or critically endangered ecosystems on the proposed site listed in terms of the *National List of Ecosystems that are Threatened and in Need of Protection* published in Government Notice ("GN") No. 1002 of 9 December 2011 in terms of section 52(1)(a) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Activity 12 of Listing Notice 3 of the EIA Regulations, 2014 (as amended) is therefore not applicable to the proposed development.		
			CapeNature must be consulted whether the Draft Biodiversity Assessment dated February 2017 and follow-up survey undertaken by the botanical specialist on 6 August 2018 is adequate for decision-making, or whether further assessments are required.	Cape Nature is a registered interested and affected party and will be provided an opportunity to review this Draft EIAR and the specialist studies	
			Please be advised that Activity 17 of Listing Notice 2 of the EIA Regulations, 2014 (as amended) must be applied for and included in section 3.2 of the DSR.	The applicant already has a mining right under the property where the proposed project is located. Comment has however been noted and the activity included on the amended application	
			Your attention is drawn to GN No. 960 of 5 July 2019: Notice of the Requirement to Submit a Report generated by the National Web Based Environmental Screening Tool in terms of section 24(5)(h) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") and regulation 16(1)(b)(v) of the EIA Regulations, 2014 (as amended). Please note that the submission of a report generated from the National Web Based Environmental Screening Tool ("screening tool") became	A screening report has been generated and submitted to DMR with the application form.	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	became a compulsory requirement from 4 October 2019 when applying for EA in terms of regulations 19 and 21 of the EIA Regulations, 2014 (as amended).		
			A screening report is attached hereto as Appendix A for your consideration, which identified several specialist studies to be undertaken. Please note that according to the attached screening report, the proposed site is located within a medium sensitivity area from an agricultural perspective, a high sensitivity area from an animal species theme perspective, a low sensitivity area from an aquatic biodiversity perspective and a defence theme perspective, a medium sensitivity area from a civil aviation theme perspective and a relative plant species theme perspective, and a very high sensitivity area from a terrestrial biodiversity perspective. It is the responsibility of the environmental assessment practitioner ("EAP") to confirm whether these specialist studies will be undertaken, or to provide a motivation why the specialist studies will not be conducted or deemed necessary for the undertaking of the EIA process. The Plan of Study for EIA must accordingly be amended to indicate which additional specialist studies will be undertaken.	The report was generated prior to submitting an application to DMR. Only specialist studies for impacts that deem to be significant for the proposed development have been conducted	
			The Draft EIA Report must provide a schematic indication of the proposed strip mining process across the proposed 34ha mining area. Photographs of the applicant's existing limestone and dolomite mining operations on the Farm Vaderlandsche Rietkuil,	A schematic diagram and photos have been indicated on the project background above	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	which is situated 7km east of the proposed site, may be included in the Draft EIA Report to provide a visual representation of what the proposed mining operations on the proposed site would entail.		
			If available, the co-ordinates of the following components of the proposed development must be provided in the Draft EIA Report. Alternatively, the components of the proposed development must be depicted on a map at an appropriate scale that indicate the following components of the proposed development: 1.7.1 Internal roads; 1.7.2 Primary and secondary crushing plants; 1.7.3 Lime kilns/ fluid bed calciners; 1.7.4 Waste salvage yard; 1.7.5 Any offices or buildings; 1.7.6 Coal loading area; 1.7.7 Diesel tanks, and 1.7.8 Any “no-go” areas identified by various specialists and the EAP.	The information has been indicated on the proposed layout attached in Appendix B5	
			This Directorate notes that a water use application for the abstraction of groundwater for dust suppression purposes will be submitted to the Department of Water and Sanitation (“DWS”). (In this regard, also refer to paragraph 2.2 below.) The Draft EIA Report must clearly indicate the type of water use application applied for, i.e.	According to the outcome of the site pre-application meeting with a DWS official, the application should fall under the ambits of a GA. The Draft Scoping Report was sent to DWS for commenting but no comments have been received to date.	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	i.e. whether a General Authorisation or water use licence is required. Comments from the relevant water use authority must be obtained and included in the Draft EIA Report. As indicated during the previous S&EIR application, if the "One Environmental System" is applicable to this application, specifically in terms of the synchronisation of the consideration of the application in terms of the NEMA and the National Water Act, 1998 (Act No. 36 of 1998), the applicant would be required to apply the requirements of the One Environmental System to this application.		
			Please note that the Final Scoping Report ("FSR") to be submitted to the competent authority must include proof of notifying I&APs of the BID and the DSR. The proof must include, inter alia, the following: 1.9.1 If registered or regular mail was sent, a list of the recipients of the registered or regular mail, as obtained from the post office; 1.9.2 If a facsimile was sent, a copy of the facsimile report and transmission receipt; 1.9.3 If an electronic mail was sent, a copy of the electronic mail sent and delivery reports; and 1.9.4 If a "mail drop" was done, a signed register of "mail drops" must be provided.	All the public participation process documents have been submitted to DMR and also attached on Appendix C of this report	
			A description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans, guidelines, spatial tools municipal development	A description of applicable legislation and policies has be provided in Table 7 above	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Development Management (Region 1)**		11 March 2020	planning frameworks, and instruments that are applicable to the proposed development, must be included in the FSR and Draft EIA Report.		
			It is noted on page 46 of the DSR that the proposed project entails an increase in the mining activities in the region, which may lead to an increase in traffic. Traffic impacts must be investigated as part of the proposed development and reported on in the Draft EIA Report. In this regard, comments from the District Roads Engineers must be obtained and included in the Draft EIA Report.	An off ramp and on ramp have been already for easy access into and outside of the mine. The Draft Scoping Report has been sent to the Department Roads and Transport and they have only that they should be registered as I&APs.	
			A copy of the EAP's Curriculum Vitae and expertise must be included in the FSR. Furthermore, the findings of the externally appointed review EAP on all documents reviewed must be included with the submission any reports to the competent authority.	Comment noted	
			Please include a table of contents in the FSR.	Comment noted	
Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Pollution and Chemicals Management**		11 March 2020	The DSR identifies the potential for contamination of runoff emanating from the proposed site, and the need for the implementation of a storm water management plan. A storm water management plan for inclusion in the Draft EIA Report is supported	Cape Lime already has stormwater plan in place for the on the Farm Vaderlandsche Rietkuil, 7 km east of the proposed project and will implement such for this proposed development	
			This Directorate notes that a water use application will be submitted for the use of groundwater for dust suppression purposes. The use of potable water	Other dust suppression measures have been indicated on the EMPr section. However the applicant has indicated that there will be need of use of groundwater	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Pollution and Chemicals Management**		11 March 2020	for dust is generally not supported and it is advised that other dust mitigation measures be investigated and reported on	as alternative as to the dust suppression product	
			Please confirm whether the proposed mining area overlie an important aquifer. The static water level(s) of any such underlying aquifer(s) must be indicated in the Draft EIA Report	The site's aquifer information has been detailed on Baseline description section below	
			Figure 38, page 41 includes reference to bunded 30m^3 diesel tanks. Please be advised that the applicability of Activity 10 of Listing Notice 3 of the EIA Regulations, 2014 (as amended) must be investigated and reported on in the FSR and Draft EIA Report. The impacts associated with the potential listed activity must be reported on in the Draft EIA Report and Environmental Management Programme ("EMPr").	This activity will does not apply as the proposed diesel tanks will constructed more than 500m of the watercourse	
			Page 15 refers to waste oil and a waste storage oil area. The Draft EIA Report and EMPr must provide additional information on the source and handling of the waste oil and the proposed location of the storage area.	Details of waste management has been provided on the project description above	
			Impacts related to the storage and disposal of coal ash must be assessed and reported on during the EIR phase of the application.	Comment noted	

Dept. Environmental Affairs **Western Cape Department of Environmental Affairs and Development Planning** **Directorate: Air Quality Management**		11 March 2020	It is noted that an application for an atmospheric emission licence ("AEL") will be submitted to the national department responsible for environmental affairs. As per paragraph 1.8 above, the requirements of the One Environmental System would also apply to the AEL application, specifically in terms of the synchronisation of the consideration of the application in terms of the NEMA and the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA").	Comment noted, the EAP is liaising the competent authority regarding One Environmental System	
			Please note the requirements of section 38(3)(b) of the NEM:AQA, stipulating the publication of a notice in at least two newspapers circulating in the area in which the AEL listed activity is applied for.	Comment noted	
			Please direct any enquiries to the official/s indicated in this correspondence should you require any clarity on any of the comments provided.	Comment noted, the EAP is liaising the competent authority regarding One Environmental System Comment noted	
			The Department reserves the right to revise or withdraw comments or request further information based on any information received.	Comment noted	
Biogeotech Environmental Consultancy **Independent EAP**			The Agricultural study is outlined on the Baseline of the EIA but the impacts are not assessed on Appendix E. This will need to be addressed for consistency.	Agricultural impact assessment has been added on Appendix E.	
			The Financial provision is outdated; please ensure you insert the recent one, both in the EIA report and Rehabilitation Plan.	A 2019 financial provision has been added, no activities are currently taking place or took place in 2020 on site and as a result, no calculations were done on site.	

			The maps on Rehabilitation plan need to be updated, the ones used no longer feasible given the changes on the ground, the plan still make reference to the old maps.	Updated maps have been inserted	
			The newspaper advert still describes the NEMA EIA listed activities and NWA Water uses, please ensure to include NEM: AQA listed activities for the AEL. The same changes should be reflected on the site notices for consistency.	Advert rectified	
			In addition to the above, please ensure that at least the advert is published in two newspapers as required for AEL applications.	The Draft EIAR and EMPr will be advertised on the Ons Kontrei and Weslander Newspapers	
			Also be consistent with the font sizes on paragraphs for the neatness of the document.	Comment noted	

i. **The Environmental attributes associated with the development footprint alternatives.** **(The environmental attributed described must include socio- economic, social, heritage, cultural, geographical, physical and biological aspects)**

1. Baseline Environment

a. Type of environment affected by the proposed activity.

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

TOPOGRAPHY

The site is located in an undulating plain, with relatively flat areas interspersed with low-undulating hills. Mauwerskop is located ±5.5km north-east of the site, while the Matzikama mountains are ±7.5km due east, and the Gifberg, Windhoekberg and Spitsberg mountain ranges are located 4 – 6 km south of the proposed development site. The development site itself is relatively flat, with slight undulations in the eastern and southern sections. The southern-most portion of the proposed site slopes slightly more steeply towards the Wiedou River. The surrounding area comprises a relatively flat area that dips gently down towards the Wiedou River on the southern boundary of the Mining Right area (see Figure 15). The Gifberg forms a dramatic backdrop 7 km to the east.

Figure 15: Typical view across the northern portion of the proposed mining site, looking southwards towards the Matsikamma Mountains.

Temperature

The air temperature is utilised in the dispersion modelling as one of the incorporated parameters for the parametrisation of the atmospheric conditions. Temperature plays an important role in the transportation and dispersion of the air pollutants, since it affects the plume buoyancy and the atmospheric boundary layer development.

The historical monthly average maximum and minimum temperature profile of Vanrhynsdorp is presented in **Figure 16** below. The mean daily temperature in the Vanrhynsdorp area ranges between 32°C and 6°C during the summer and winter months respectively.

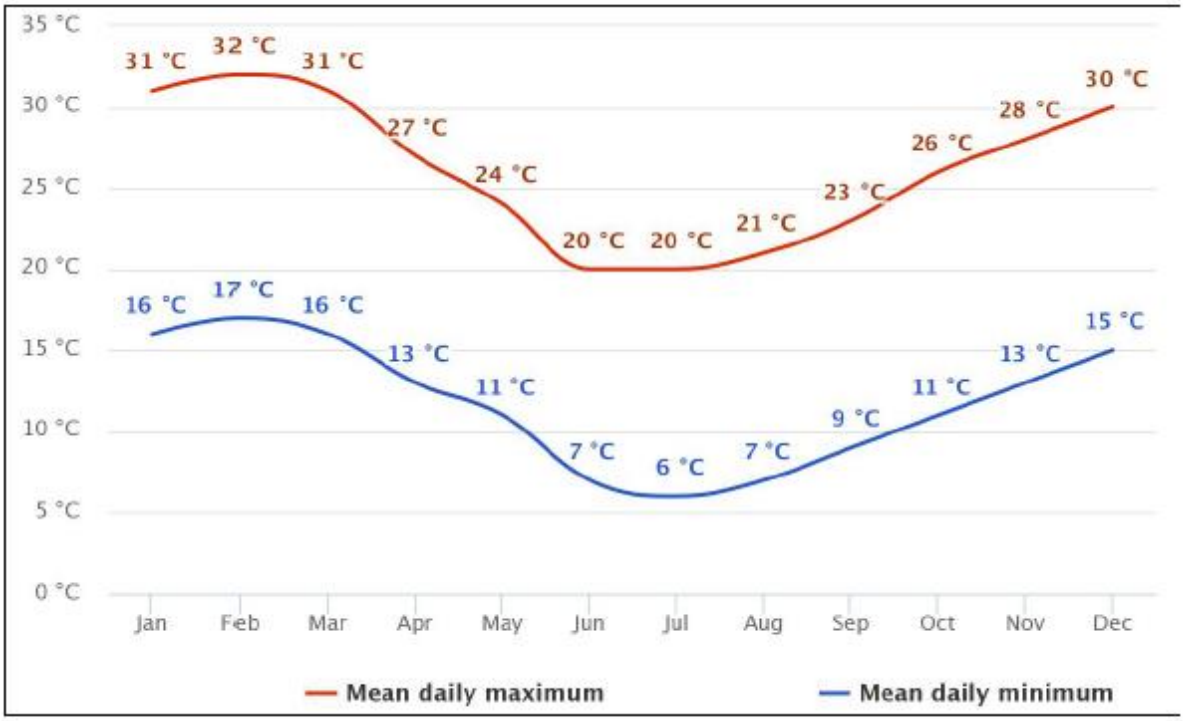


Figure 16: Monthly Temperature Profile

GEOLOGY

The underlying geology comprises Namibian Gariep Supergroup metasediments, in particular dolomite-rich sediments (Mucina & Rutherford 2006). The proposed development area is currently undeveloped and consists of natural Knersvlakte Dolomite Vygieveld and Vanrhynsdorp Gannabos vegetation in a generally poor/ degraded condition. Limestone is exposed on the steeper slopes above the Wiedou River.

BIOGEOGRAPHICAL CONTEXT

Being located in the north-western corner of the Western Cape interior, the site lies inside the Succulent Karoo Biome evidenced by a prominence of succulent shrubs, such as vygies, *Aloe falcata*, *Tylecodon wallichii* and *Euphorbia mauritanica*. Grasses are dominant

in the disturbed or overgrazed areas. The Vegetation Map of South Africa (Mucina & Rutherford 2006) classifies the main vegetation types found on site as Vanrhynsdorp Gannabosveld (SKk5) and Knersvlakte Dolomite Vygieveld (SKk6) (see **Figure 17**). Klawer Sandy Shrubland (SKs13) and Namaqualand Riviere are located outside the proposed mining area to the south. Vanrhynsdorp Gannabosveld is found in the southern Knersvlakte between Vredendal and Vanrhynsdorp at the foot of the Matsikamma and Gifberg Mountains, as well as northeast of Vanrhynsdorp (Mucina & Rutherford 2006). The landscape is mainly flat or slightly undulating, supporting succulent shrubland dominated by *Salsola*, vygies and *Galenia* species (Mucina & Rutherford 2006). In the south, the plains can acquire a grassland appearance through seasonal dominance of certain grass species, such as *Bromus pectinatus* and *Stipa capensis* (Mucina & Rutherford 2006).

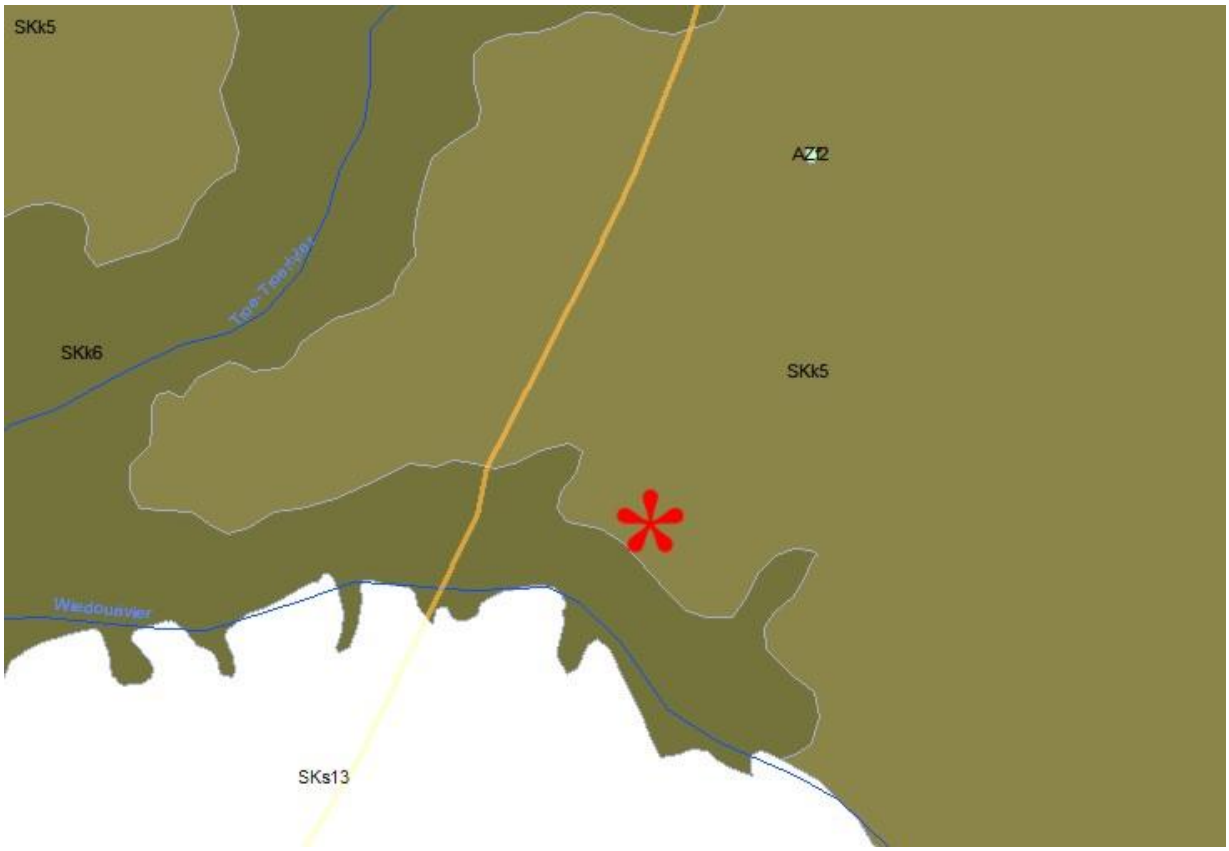


Figure 17: Extract of the SA Vegetation Map (Mucina & Rutherford 2006), showing the position of the study site (red asterisk) within Vanrhynsdorp Gannabosveld (SKk5) and Knersvlakte Dolomite Vygieveld (SKk6). Also found in the area to the south of the site are Klawer Sandy Shrubland (SKs13) and Namaqualand Riviere (along the Wiedou River).

According to the Vegetation Map of South Africa, Knersvlakte Dolomite Vygieveld follows the main river courses (Troe-troe and Wiedou Rivers) between Vanrhynsdorp and Vredendal. It is described as a sparse, succulent shrubland dominated by erect shrubs lower than 0.3 m with succulent leaves. Klawer Sandy Shrubland is restricted to the area south of the Troe-troe and Wiedou Rivers, and east of the Olifants River. It extends past

Klawer southwards. It is also found on a slightly undulating landscape and foothills covered with medium dense, tall shrubland. A narrow strip of Namaqualand Riviere vegetation is found along the Wiedou River where thickets of *Acacia karroo* dominate on alluvial deposits.

All these vegetation units are still well represented in the larger area. Vanrhynsdorp Gannabosveld is the most transformed vegetation type, with 79.5% remaining according to Mucina & Rutherford (2006). Knersvlakte Dolomite Vygieveld is the best represented unit, with 97.9% remaining (Mucina & Rutherford 2006).

VEGETATION

According to the biodiversity survey of the site conducted by Mark Berry Consultants on 14-15 November 2016, and a follow-up survey on 6 August 2018, the area proposed for the limestone mine comprises mainly a low grassland, dominated by *Stipa capensis*. *Salsola* (= *Caroxylon*) *cf. zeyheri* (vaalganna), *Atriplex lindleyi* subsp *inflata*, *Psilocaulon junceum*, *Asparagus capensis*, *Hoplophyllum spinosum*, *Trachyandra falcata* and *Brunsvigia bosmaniae* (Maartblom) are also common (see **Figure 18** above). The latter is especially plentiful on the eastern side of the site. The dominance of *Stipa capensis* indicates to disturbance or severe overgrazing. The increase in cover of *Stipa capensis* reduces grazing potential for sheep due to wool damage by seeds.

Succulent shrubs are dominant on the steeper limestone slopes directly above the Widou River where a low, open shrubland prevails (see **Figure 19**). *Euphorbia mauritanica* (dominant), *Tylecodon wallichii*, *Phyllobolus nitidus* (= *Mesembryanthemum nitidum*), *Mesembryanthemum cf. guerichianum*, *Ruschia cf. bolusiae*, *R. leucosperma*, *Aloe falcata*, *Didelta carnosa*, *D. spinosa*, *Eriocephalus microphyllus*, *Pteronia succulenta*, *Elytropappus rhinocerotis, Berkheya fruticosa*, *Asparagus retrofractus*, *Roepera morgsana*, *R. cordifolia*, *Lessertia* (= *Sutherlandia*) *frutescens*, *Hermannia* sp (not in flower), *Galenia africana*, *Searsia undulata* and *Atriplex semibaccata* were recorded on the limestone slopes. A single occurrence of *Quaqua cf. armata* (not in flower; 31° 41' 16.5"S, 18° 42' 27.4"E) was also recorded in the good quality vygieveld directly west of the proposed mining site. Unfortunately, this plant could not be found during the follow-up survey to determine its species.

The Wiedou River (seasonal) to the south of the site supports *Acacia* (= *Vachellia*) *karroo* thicket (see **Figure 20**). The latter has been invaded with *Prosopis glandulosa* and *Nerium oleander*. From a distance it is impossible to distinguish between the *A. karroo* and *P. glandulosa* due to their similar growth form and armed branches. It is understood that the

riverine area will not be affected by mining activities. Erosion does not seem to be a problem in the area (due to low rainfall), although signs of minor sheet and gully erosion were noted on the southern side (left bank) of the Wiedou River.

Figure 18: Knersvlakte Dolomite Vygieveld with exposed limestone. Insert: Aloe falcata

Figure 19: Widou River, with Acacia karroo and Prosopis glandulosa thicket.

Bulb species recorded include Trachyandra falcata, T. revoluta, T. tortilis, Brunsvigia bosmaniae, *Haemanthus coccineus*, *Ammocharis longifolia*, *Lachenalia unifolia*, L. marginata, Drimia elata, *Massonia depressa*, *Albuca canadensis*, *Gladiolus scullyi*, *Moraea lewisiae subsp. secunda*, *Lapeirousia pyramidalis, Eriospermum sp*, *Cyanella orchidiformis*, *Oxalis pes-caprae* and *O. purpurea*. Alien species recorded include Limonium sinuatum (alien weed), Prosopis glandulosa and Nerium oleander. Prosopis glandulosa is a declared alien invader under the Conservation of Agricultural Resources Act (Act 43 of 1983). It is considered the most important woody invader species in Namaqualand (Mucina & Rutherford 2006). Galenia africana can also become invasive along watercourses.

CapeNature mentioned in their comment letter (dated 27 Feb 2017) of the occurrence of a sizeable population of *Haemanthus lanceifolius* on the adjacent site. This species is listed as Vulnerable (see Red List of South African Plants online database). The survey on 6 August 2018 did not reveal any of this species on site, although *Haemanthus coccineus* is present in low numbers. Pictures taken of the leaves of several *Haemanthus* plants on and off the proposed mining site were that of *H. coccineus* as confirmed by Dee Snijman, an amaryllid specialist. Other Species of Conservation Concern1 recorded in the area by Simon Todd in an earlier study (Todd 2014), include *Gethyllis gregoriana* (Rare), *Quaqua framesii* (VU),

Eriospermum calcareum (EN) and *Oxalis blastorrhiza* (EN). Todd noted that very few of these species were observed, mostly single plants. He presumably recorded *H. lanceifolius* in the area directly west of the southern half of the site.

With regards to the presence of mammal fauna, only aardvark (see Figure 12), porcupine and mole or molerat activity was noted on site. Antelope species that may frequent the area include the common duiker, steenbok and grysbok. Rock hyrax and an angulate tortoise were recorded in the limestone area next to the N7. Termite (snout harvester termite mounds) and cocktail ant (*Crematogaster* sp) nests were also noted. The farm was utilised as a sheep farm until recently. The sheep was removed at the beginning of 2016.

Figure 20: An aardvark burrow. These burrows may also be occupied by aardwolf, bat-eared fox, Cape fox and black-backed jackal. Insert: termite mound.

CONSERVATION STATUS

Knersvlakte Dolomite Vygieveld is the best represented vegetation unit, with less than 5% transformed (Mucina & Rutherford 2006). Vanrhynsdorp Gannabosveld is the most transformed unit, with 79.5% remaining according to Mucina & Rutherford (2006). None of the vegetation types appear on the national list of threatened ecosystems (DEA 2011).

However, CapeNature commented (27 Feb 2017) that Vanrhynsdorp Gannabosveld is under threat from mining and agriculture and is poorly protected. They further commented that Knersvlakte Dolomite Vygieveld has a very limited range with no formal protection. In the larger area, both vegetation units are being threatened by overgrazing, cultivation (limited mainly to the Olifants River valley), mining activities and road construction. Mucina & Rutherford (2006) noted that "rehabilitation (of Vanrhynsdorp Gannabosveld) after open-cast mining is very limited due to lack of viable topsoil to cover the rehabilitated fields".

According to the Ecological study, site area falls within the Matzikama Terrestrial Biodiversity Network. **Figure 21** below shows that the proposed mining site protrudes significantly into a mapped critical biodiversity area (CBA), while the kilns site is located inside an ecological support area (ESA). The CBA comprises a wide east-west linking ecological corridor associated with the Wiedou River. CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Pool-Stanvliet et al. 2017). ESA's, on the other hand, are not essential for meeting biodiversity targets, but play an important role in supporting the functioning of protected areas or CBA's, and are often vital for delivering ecosystem services. These sites are selected for meeting national targets for species, habitats and ecological processes (Pool-Stanvliet et al. 2017). Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. They should be considered as essential regional priorities for conservation, and must be considered in all land-use planning initiatives (Pool-Stanvliet et al. 2017). Loss of designated CBA's is therefore not recommended.

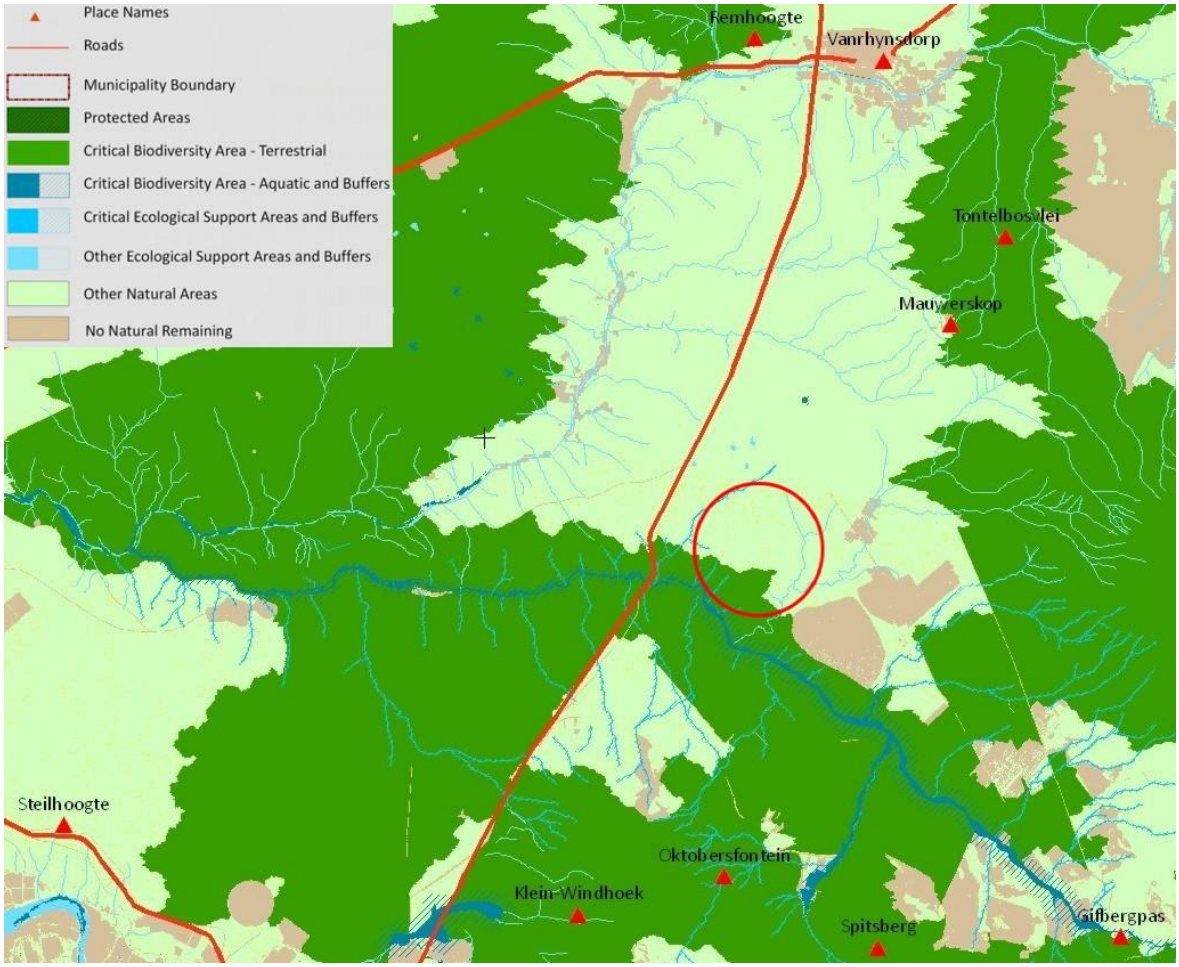


Figure 21: Biodiversity network map (produced by Cape Nature) with the mining rights area outlined in red and the proposed mining extension areas outlined in black. Green = critical biodiversity area (CBA); yellow = ecological support area (ESA)..

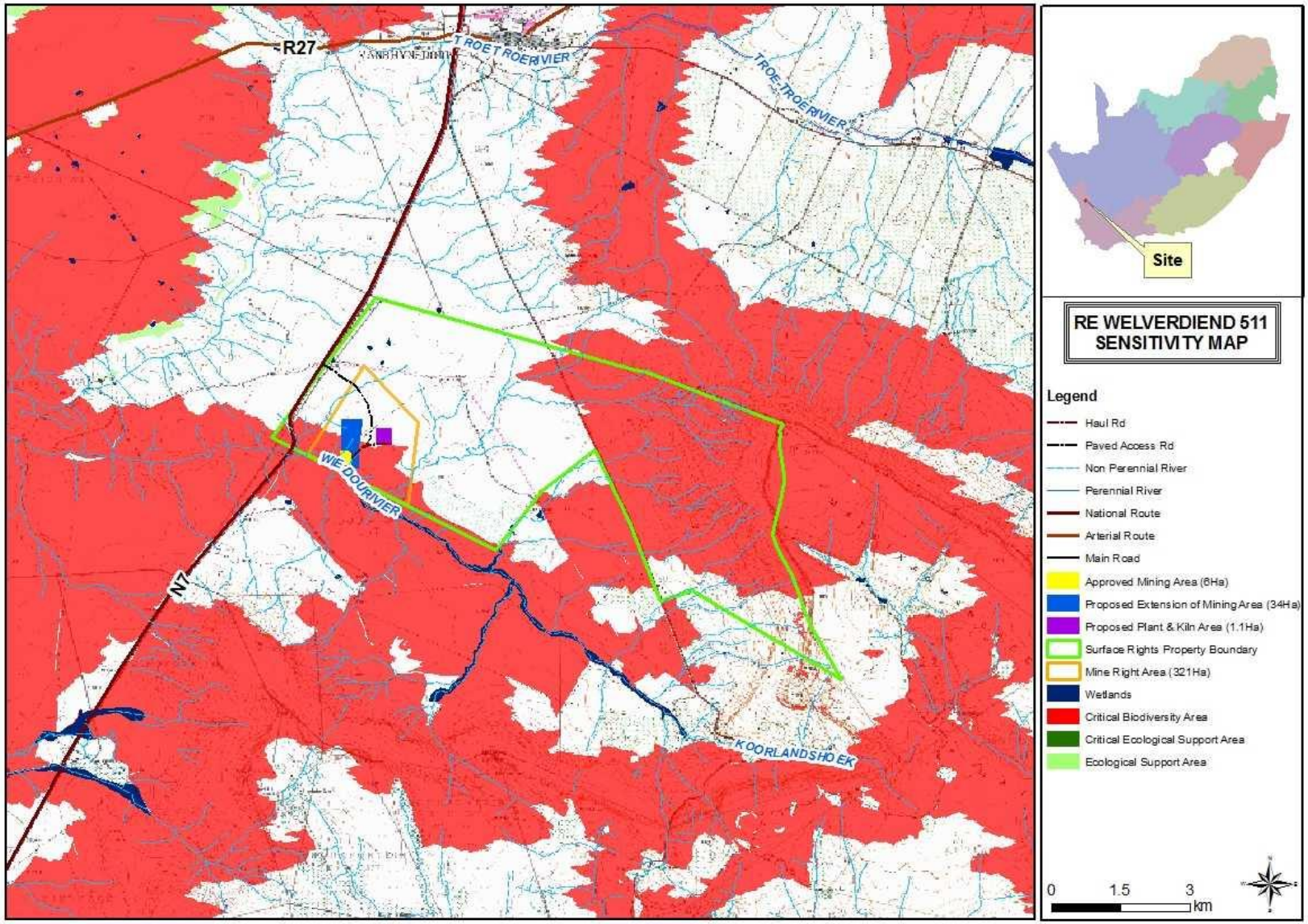


Figure 22: Welverdiend sensitivity map

SURFACE WATER AND GROUND WATER

Major watercourses in the surrounding landscape include the Wiedou River, which flows along the southern boundary of Welverdiend (120 – 200m south/ south-west of the development site), and the Troe-Troe River which flows ±3.5 km north-west of the site. An application for use of underground water to use for dust suppression will be submitted to the Department of Water and Sanitation (DWS).

Socio-economic background

The proposed development site falls within Ward 7 Matzikama Municipality under the jurisdiction of the West Coast District Municipality, ±9 km south of Vanrhynsdorp, ±12 km north-east of Klawer and ±19 km east of Vredendal. The baseline socio-economic of the Matzikama Municipality is highlighted below

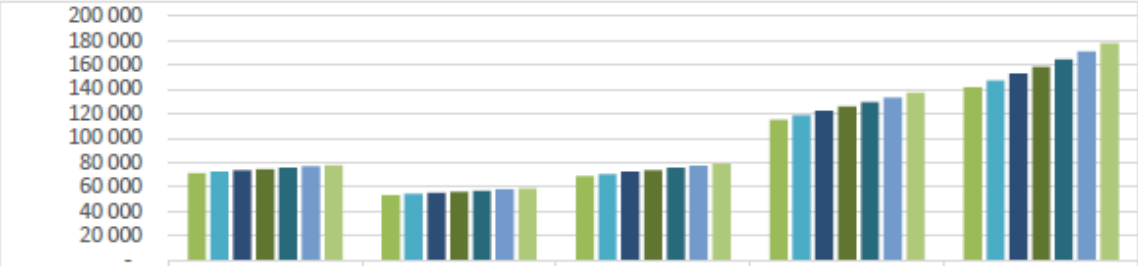
Population

The Matzikama Municipality is estimated to account for 16%of the West Coast District's population.

2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
68 584	70 052	71 045	72565	71403

The population declined by 1.6% from 72565 in 2016/17 to 71403 in 2017/2018.

According to the Department of Social Development's 2018 projections , Matzikama currently has a population of 71 403, rendering it the third smallest municipal area within the West Coast District. This total is estimated to increase to 77 926 by 2024 which equates to a 1.5 per cent growth rate. The estimated population growth rate of Matzikama is therefore well below the estimated population growth of the West Coast District figure of 2.8 per cent (Matzikama IDP 2019-2020).



	Matzikama	Cederberg	Bergrivier	Saldanha Bay	Swartland
2018	71 403	53 451	69 077	115 269	141 411
2019	72 574	54 424	70 772	118 809	147 111
2020	73 668	55 344	72 424	122 317	152 846
2021	74 698	56 222	74 046	125 813	158 641
2022	75 678	57 068	75 650	129 320	164 525
2023	76 854	58 067	77 485	133 263	171 043
2024	77 926	58 994	79 252	137 134	177 553

Figure 23: Socio-economic Profile, Matzikama Municipality

The Economy

Between seventy and eighty percent of the revenue of the Matzikama Municipality is generated by the local economy therefore, economic growth at the municipal level is essential for the growth of municipal revenue, attainment of economic development, reduction of poverty and improved accessibility. Fostering this growth requires an in-depth understanding of the economic landscape within which each respective municipality operates.

Matzikama Municipality's GDPR of R4 billion as at the end of 2016 makes up about 14% of the West Coast District's GDP. GDP growth averaged 3.0 per cent per annum over the period 2005 – 2015. This is below the District's average of 3.4 per cent. Average annual growth of 2.6 per cent per annum in the post-recessionary period is below the long-term trend and District average of 2.8 per cent per annum.

Matzikama employed 15.8 per cent (26 142 laborers) of the West Coast District's labour force in in 2015, and employed growth remain fairly stagnant, averaging 0.7 per cent per annum since 2005 (which was below the overall District employment growth rate of 1.1 per cent per annum). Employment growth has nevertheless picked up in the post-recessionary period (2010 – 2015) averaging 2.49 per cent per annum (which is slightly below the District's rate of 2.7 per cent over the same period). Matzikama has experienced significant job losses prior to and during the recession, but these jobs have been recovered and approximately 1973 (net) additional jobs have been created since 2005.

GDP Contribution and Average Growth Rates PerMunicipality

		Average GDPR Growth			
Municipality	**Contribution to GDPR 2015**	**Trend 2005 – 2015**	**Pre-Recession 2005 – 2007**	**Recession 2008 – 2009**	**Recovery 2010 – 2015**
Matzikama	15%	3,5%	4,8%	4,4%	2,6%
Cederberg	12%	5,1%	7,9%	4,8%	3,8%
Bergrivier	15%	4,4%	6,5%	6,9%	2,6%
Saldanha Bay	29%	3,1%	5,4%	0,7%	2,8%
Swartland	28%	4,4%	6,9%	5,2%	2,9%
Total West Coast District	**100%**	3,9%	6,1%	3,9%	2,9%
Western Cape Province	-	3,3%	1,3%	2,5%	3,3%

Source: Quantec Research, 2017

West Coast District Employment Growth

		Employment (net change)			
Municipality	**Contribution to Employment 2015 (%)**	**Trend 2005 – 2015**	**Pre-Recession 2000 – 2007**	**Recession 2008 – 2009**	**Recovery 2010 – 2015**
Matzikama	17,2%	295	822	-1 855	749
Cederberg	13,9%	297	542	-1 217	679
Bergrivier	17,5%	115	651	-2 644	766
Saldanha Bay	23,2%	197	895	-1 773	504
Swartland	28,2%	823	1 581	-1 656	1 271
Total West Coast District	**100%**	**1 727**	**4 492**	**-9 144**	**3 969**

According to the Matzikama IDP (2019-2020), majority (42.6 per cent or 11 132) of the workforce in Matzikama operate within the low-skill sector, which has contracted by 0.7 per cent per annum on average since 2005. Most of the job losses experienced during the recession emanated from this sector. The semi-skilled sector employed 24.8 per cent of the municipality's workforce, and stagnated (contracting by only 0.03 per cent per annum on average since 2005). The informal sector (which

employs 5794 workers or 22.2 per cent of the municipality's workforce) experienced robust growth of 6.1 per cent per annum over the past decade and absorbed most of the job losses from the low and semi-skilled sectors. The skilled sector employed only 2720 workers, and grew at a moderate rate of 1,01 per cent per annum since 2005. A detailed sectoral analysis is provided in the ensuing section.

The primary sector: Agriculture Forestry & Fisheries

This industry contributed R705.44 million (or 24.3 per cent) of the Municipality's GDP in 2015. It displayed robust growth of 5.4 per cent for the period 2005 – 2015. Growth has nevertheless deteriorated since the recession – the industry experiencing a growth rate of 4.1 per cent per annum over a period 2010 – 2015).

Agriculture, forestry and fishing employed 36.4 per cent of the Municipality's workforce. Employment contracted by one percent on average over the period 2005 – 2015. Employment growth nevertheless rebounded and grew at a rate of 4.6 per cent per annum on average since 2010, which is significantly higher. Despite the post-recessionary improvement, not all the jobs lost prior to and during the recession have been recovered, 1 346 jobs have been lost on net.

The majority (63.2 per cent or 6021 workers) of the workforce in agriculture, forestry and fishing operate within the low-skill sector, which has experienced growth of 4.4 per cent since 2010. The semi-skilled sector employs 1463 workers and the sector has grown at a rate of 4.8 per cent per annum since 2010. Despite the fast growth since 2010, employment in these two categories has contracted over the long term (2005 – 2015. The skilled sector employs the smallest proportion of the Municipality's workforce (3.1 per cent or 297 workers). This segment has shown robust growth post-recession (this growth nevertheless stemming from a small base), and more moderate growth over the long term. The informal sector makes up 18.3 per cent of the industry's workforce experienced the most favorable long term growth as employment grew by 2.5 per cent per annum over the period 2005 – 2015. Informal employment within the agriculture, forestry and fishing industry furthermore experienced robust growth of 4.6 per cent per annum since 2010.

		2015	Trend 2005 - 2015	Recovery 2010 - 2015
GDP		R705.44 million	5.4%	4.1%
Employment		9 523	-1.0%	4.6%
Skills Levels	Skilled	297	0.7%	6.7%
	Semi-skilled	1 463	-1.2%	4.8%
	Low-skilled	6 021	-1.7%	4.4%
	Informal	1 742	2.5%	4.6%

Table 8: Source: Socio Economic Profile 2017, Matzikama Municipality

The secondary sector

Manufacturing

The manufacturing industry comprised 13.8 per cent of the Municipality's GDP in 2017. The sector has experienced judicious growth of 2.6 per cent per annum on average over the period 2005 – 2017. GDP growth in the latter half of the decade (2.7 per cent per annum for period 2010 – 2017) is an improvement on the long term overall GDP trend for the region, implying that the sector has recovered after the recession.

The manufacturing industry employed 6.4 per cent of the Municipality's workforce. Employment growth has nevertheless remained modest over the past decade with a growth rate of 1.2 per cent recoded for the period 2005 – 2015, and a slightly lower growth rate of 0.9 per cent per annum in the post-recessionary period. Overall only 30 (net) jobs have been created in the manufacturing industry since 2005. Employment growth has yet to catch up with GDP growth.

The majority of the workers employed in the manufacturing sector are classified as semi-skilled (35.6 per cent) and low-skilled (35.0 per cent). Only 11.4 per cent of those employed in the manufacturing sector are categorized as skilled workers, while 17.9 per cent of the workforce found employment within the informal sector. Employment growth within the semi-skilled sector has remained relatively stagnant over the past decade, whilst the skilled and low-skilled sector experienced moderate employment growth. Employment within the informal sector grew the fastest over the long-term. Employment growth has nevertheless deteriorated within all four categories in the latter half of the decade (2010 – 2015) as the industry struggles to fully recover from the recession.

Table 9: Economical contribution of the Manufacturing sector (Source: Socio Economic Profile 2017, Matzikama Municipality

GDP		2017	Trend 2005 - 2017	Recovery 2010 - 2017
		R507 million	2.6%	2.7%
Employment		**1 678**	**1.2%**	**0.9%**
Skills Levels	**Skilled**	191	1.2%	1.0%
	Semi-skilled	598	0.4%	0.2%
	Low-skilled	588	1.1%	1.1%
	Informal	301	3.3%	2.0%

Construction

The construction industry comprised R117.15 million (only 4.0 per cent) of the municipality's GDP in 2015. Construction has been the fastest growing industry since 2005, with growth averaging 7.8 per cent per annum. GDP growth has nevertheless slowed since the recession and averaging 3.5 per cent over the period 2010 – 2015 as the sector struggles to fully recover after the recession.

The majority (42.9 per cent) of the workers employed in the construction industry operate within the informal sector. Employment growth within the industry has been consistently high since 2005. Low-skilled employment makes up 16.8 per cent and semi-skilled employment makes up 34.1 per cent of the workforce in the construction industry, and employment within both these sectors has contracted in the latter half of the decade. Workers employed in these sectors who have lost their jobs may have found employment in the informal sectors. Skilled employment makes up only 6.1 per cent of the construction industry's workforce, and has experienced robust growth over the past decade, with growth nevertheless tapering downward after 2010.

Table 10: Economical contribution of the Construction sector (Source: Socio Economic Profile 2017, Matzikama Municipality

GDP		2015	Trend 2005 - 2017	Recovery 2010 - 2017
		R185 million	7.8%	3.5%
Employment		**1 239**	**3.7%**	**2.3%**
Skills Levels	**Skilled**	76	3.9%	1.7%
	Semi-skilled	423	1.1%	-0.9%
	Low-skilled	208	-0.3%	-2.7%
	Informal	532	10.0%	9.1%

The tertiary sector: Commercial services

Commercial services encompass the wholesale & retail trade, catering & accommodation, transport, storage & communication and finance, insurance, real estate & business services industries. This sector contributed R993.79 million (or 34.3 per cent) of the Municipality's GDP in 2015 (the largest sector in the region). The industry grew at a slower rate than the Municipality overall over the period 2005 – 2015 (2.7 per cent per annum compared to the municipal average of 3.0 per cent per annum). Growth in the latter half of the decade was below the long-term trend with the industry growing at a rate of 1.9 per cent per annum on average(Matzikama IDP 2019-2020).

The commercial services industry employed 29.1 per cent per of the Municipality's workforce (making it the 2nd largest employer). Employment has shown consistent growth throughout the past decade averaging a 2.8 per cent per annum (which is above the overall municipal employment growth rate of 0.7 per cent per annum over the period of 2005 – 2015). Employment growth tapered downward in the post-recessionary period, averaging a more modest 1.4 per cent per annum (which is below the industry's long term trend and the overall municipal average of 2.5 per cent per annum over the period 2010 – 2015). Approximately 1 645 (net) jobs were created in the commercial service industry since 2005.

Table 11: Economical contribution of Commercial Services sector (Source: Socio Economic Profile 2017, Matzikama Municipality)

GDP		2015	Trend 2005 - 2017	Recovery 2010 - 2017
		R1.906 billion	2.7%	1.9%
Employment		**7 617**	**2.8%**	**1.4%**
Skills Levels	**Skilled**	923	0.5%	0.3%
	Semi-skilled	2 535	0.1%	-0.3%
	Low-skilled	1 551	2.0%	1.6%
	Informal	2 608	9.7%	3.8%

Unemployment

The unemployment rate for Matzikama according to Census 2011 is 14% with Youth unemployment rate at 19.3%. The current unemployment rate for the 2015/2016 financial year is:

- Economic active people 15%
- Working population (approximately) 29%

Education

According to the Matzikama IDP (2019-2020)The literacy rate in Matzikama was recorded at 76.4% in 2011 which is significantly lower than the average literacy rates of the West Coast (79.1 %), Western Cape (87.2 %) the rest of South Africa (80.9 %).

Learner enrolment in Matzikama rose marginally from 10 004 in 2015 to 10 247 in 2016, and increased slightly in 2017.

Matzikama's matric pass rate remained relatively stable at 93.8 and 93.9 per cent in 2015 and 2017 respectively, however declined slightly to 91.1 per cent in 2016. Higher matric pass rates could improve access for learners to higher education to broaden their opportunities. The matric pass rate within the Matzikama area remains well above that of the other regions in the West Coast District(Matzikama IDP 2019-2020)

Safety and security

The murder rate per 100 000 people in Matzikama decreased by 4.1 % from 44 reported cases in 2015 to 42 in 2016.Although the number of murders in the broader West Coast District decreased from 33 in 2015 to 32 in 2016, it remains relatively high.

The number of sexual related offences decreased notably within the broader West Coast region from 147 reported cases in 2015 to 132 in 2016. This equates to a 9.7per cent decrease.

Poverty

Poverty tends to be prevalent in areas where the majority of households fall within the low income bracket.

The number of poor people within the Matzikama municipal area decreased from 3.4 % of the population in 2011 to 0.8 % in 2016. The decreasing poverty headcount is positive as it translates to less strain on municipal resources.

Area	Poverty Headcount (Percentage)		Poverty Intensity (Percentage)	
	2011	2016	2011	2016
Matzikama	3.4	0.8	42.4	42.5
West Coast District	2.0	2.9	41.9	44.5
Western Cape	3.6	2.7	42.6	40.1

The intensity of poverty, i.e. the proportion of poor people that are below the poverty line within the Matzikama municipal area, increased marginally from 42.4 % in 2011 to 42.5% in 2017. This percentage is still high and should be moving towards zero as income of more households within the Matzikama municipal area moves away from the poverty line.

POVERTY			
No income Households	R3.41 per person per day	R23 per person per day	R28 per person per day
1844	7 090	23 162	33 340

Approximately 55.4% of households in Matzikama fall within the low income bracket, of which 8.1 % have no income (see table 10). A sustained increase in economic growth within the Matzikama municipal area is needed if the 2030 NDP income target of R110 000 per person, per annum is to be achieved.

Table 12: Household income, Socio-economic Profile 2018, Matzikama Municipality

Amount (2016)	West Coast District	Matzikama	
No income	10.7	8.1	Low income
R1 – R6 327	1.8	1.8	
R6 328 – R12 653	3.1	3.3	
R12 654 – R25 306	14.0	17.3	
R25 307 – R50 613	21.8	24.9	
R50 614 – R101 225	19.2	18.3	Middle Income
R101 226 – R202 450	13.2	11.6	
R202 451 – R404 901	9.4	8.5	
R404 902 – R809 802	4.9	4.4	High income
R809 803 – R1 619 604	1.3	1.1	
R1 619 605 – R3 239 208	0.4	0.5	
R3 239 209 or more	0.3	0.3	

HERITAGE

Archaeology

ACRM was appointed to conduct a Heritage Impact Assessment (HIA) for the proposed dolomitic limestone mine. According to this study, large numbers of stone implements were recorded in both the footprint area of the proposed Mine Area, as well as in the footprint area of the proposed Plant Area. The remains, however, are spread quite thinly and unevenly over the surrounding landscape.

Most of the tools occur on compact red Pleistocene sands, where the top soils have been washed or eroded away, indicating that more tools most likely occur below the surface deposits. Tools were also noted in disturbed areas such as old farm roads, along fence lines and in animal tracks.

The archaeologist Jayson Orton (pers. comm. 2013) has suggested that much of the Knersvlakte region around Vanryhnsdorp is covered by a thin layer of stone artefacts whose distribution is partly the result of erosive forces. The occurrences documented simply being surfaces revealed by erosion, rather than actual occupation sites.

Archaeological resources in the proposed Plant Area are associated with heuweltjies that are dotted around the footprint area. Areas surrounding heuweltjies are usually quite eroded and denuded of vegetation. Tools, including irregular cores, unmodified flakes, large flaked chunks, flake debris, anvils and hammerstones indicate possible activity/stone knapping areas.

It is estimated that more than 95% of the stone tools recorded during the study are assigned to the Middle Stone Age (MSA), while limited numbers of Early Stone Age (ESA) and Later Stone Age (LSA) tools were found. No organic remains such as ostrich eggshell or pottery were found.

More than 90% of the tools recorded are in a pale yellowish silcrete, with the remainder in quartzite, quartz, indurated shale and chalcedony. The source of the silcrete raw material is unknown, although the palaeontologists report indicates that the superficial sediments on the site contain silcrete clasts. No outcrops of silcrete were found, although several large, heavily flaked chunks were located in the proposed Plant Area, suggesting a nearby source may occur.

The majority of the tools encountered during the study comprise modified (i.e.

retouched & utilized), and unmodified, triangular shaped MSA flakes with prepared platforms, large, retouched and utilized blade tools, chunks, irregular cores, as well as several radial and flatter worked-out cores. Indications are, that most of the remains recorded represent discarded flakes and flake debris.

Few formal tools were found during the survey, restricted to one or two (possible) broken points and miscellaneous retouched pieces/possible scrapers, suggesting that formal retouched tools were removed from the site.

Indications therefore, are that the majority of the archaeological resources documented during the study represent discarded flakes and flake debris (i. e. cores, unmodified flakes & chunks), but that potentially significant activity areas are concentrated around eroded heuweltjies in the proposed Plant Area.

A collection of tools documented during the study and the context in which they were found is presented in **Figures 24-46.**

Figure 24: Scale is in cm

Figure 25: Scale is in cm

Figure 26. Site 2212. Context in which many of the remains were found

Figure 28: Site 2212. Context in which the remains were found

Figure 27: Scale is in cm

Figure 29: Scale is in cm

Figure 30: Scale is in cm

Figure 31: Scale is in cm

Figure 32:Scale is in cm

Figure 35: Scale is in cm

Figure 33: Scale is in cm

Figure 36: Site 2811

Figure 34: Scale is in cm

Figure 37: Scale is in cm

Figure 38: Site 2731

Figure 39: Scale is in cm

Figure 40: Hammer stone. Scale is in cm

Figure 41: Large core (Site) Scale is in cm

Figure 42: (Site 3191). Scale is in cm

Figure 44: Scale is in cm Scale is in cm

Figure 43: Scale is in cm

Figure 45: Scale is in cm

Figure 46: Scale is in cm

Integrated Specialist Services (Pty) Ltd was appointed to conduct Phase 2 mitigation as specified in the final comment by HWC (case number 6103109AS1129M) on the proposed extension of limestone mining and construction of kiln facilities in the Remainder of Farm 511 (Welverdiend) near Vanrhynsdorp. Recommendations from HWC's final commenting requested that an archaeologist with appropriate expertise should re-visit the area and;

a) Access the sites to establish which ones should be targeted for collection.
b) Identify and adequately map the sites and significant scatters to enable meaningful interpretation and significance assessment.
c) Assess and motivate for the significance/grading following HWC guidelines.
d) Collect artefacts from some of the sites with IIIB significance/grading.
e) Discuss the impact of the development on the areas between the two proposed localities, and place the analysis within regional context of Stone Age sites.

The purpose of the mitigation was to also clear sites graded as IIIB prior to mining and construction activities.

A total of 14 sites with 34 scatters (see **Figure 47**) were recorded but it should be noted that because of the significant admixture, the site boundaries are mere estimates and the significance of the sites is diminished from possible grade IIIB to IIIC. These 14 sites produced 823 lithics, 44 (5%) of which are informal tools (cores and flake cores). Six of these (Site 1, 7-11 and 13) are located on the development footprint for the proposed extension of the limestone mine, while only 1 (Site 14) is located within the proposed area for kiln site. The other six are outside the proposed development footprint, but will nonetheless be affected by the mining and construction operation due to their proximity.

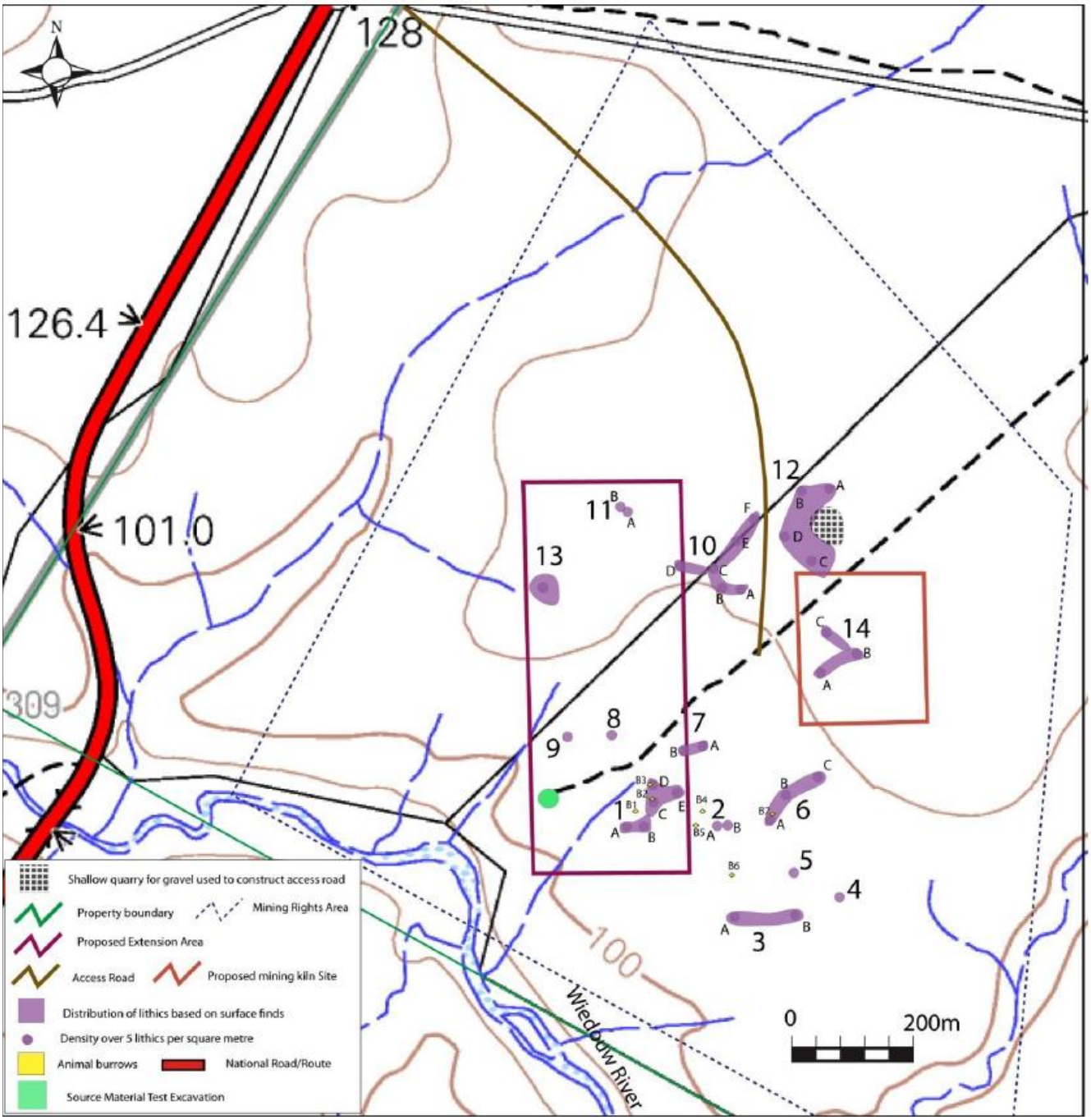


Figure 47: Stone Age sites in relation to the proposed development

The mitigation project has clarified the challenges encountered by the first researcher during Phase 1. The observation that the sites and lithic scatters were mixed up during tillage is very significant in terms of the subsequent approach to the study, as well as the significant assessment. The majority of the studied are predominantly MSA in character but ESA and LSA material are also represented. The presence of chunks (cores) at several sites intimates that some of the sites were production centres but the subsequent farming activities have robbed these potential IIIB sites of their significance. In their current state, none of the studied sites are particularly special, even though the material still has some teaching value.

Findings by Integrated Specialist Services (Pty) Ltd findings indicate that the area is now deemed clear of significant archaeological resources, and it is recommended that mining can proceed, if any human remains or accumulations of archaeological material are discovered during construction or mining activities, work should stop immediately and the finds must be reported to HWC. The procedure for reporting chance finding must be clearly followed.

Palaeontology

According to a Palaeontology study conducted for the proposed site by as part of the Heritage Impact Assessment, most of the proposed mining development area is covered by a thin veneer of Late Caenozoic superficial sediments that are underlain by ancient Precambrian rocks, some of which might contain fossil remains. The Late Precambrian carbonate bedrocks of the Widouw Formation (Gifberg Group, Gariep Supergroup) are metamorphosed, recrystallized and highly deformed, and therefore `very unlikely to contain any fossils'.

Almond notes that there have been previous reports of sizeable stromatolites (fossil microbial mounds) within the Widouw Formation near Vredendal, some 10kms or so to the east of the proposed new mine, but these records could not be confirmed. No fossil stromatolites were observed by Almond within the deformed marbles exposed in the study area, during the palaeontological field assessment.

The carbonate bedrocks in the study site are largely mantled by a range of Late Caenozoic superficial deposits (wind-blown sands, sandy soils, gravels, silcrete and calcrete pedocretes and alluvium) that are up to 2m thick and `all of low palaeontological sensitivity'.

AIR QUALITY

Background Ambient Air Quality

The area around the proposed mine is that of a typical rural environment with limited pollution sources, such that the air quality in the area is expected to be of a good standard with low pollution levels. The mine is an isolated facility, as there are no other pollution sources within a 5 km radius of the mine. There is another mine owned by Cape Lime located more than 7km away to the west. However, there is no relevant air quality monitoring data for the primary air pollutants within and around the mining area. Therefore, background concentrations have not been considered further in the present study.

Area's Meteorology

Turbulent, high-velocity winds such as pre-cold front winds help to both dilute air pollutants at their source and disperse them as they travel downwind, whereas gentle breezes under stable atmospheric conditions do little to dilute or disperse air pollution.

Cold, gentle winds flow down the slope on calm nights under clear skies, also flowing into hollows and into and down valleys. Such winds travel at less than 1 metre per second. Walls, steep

embankments and tree plantations can impede this air and mix it with the air above, thus helping to reduce the impact on air quality.

The minimum requirements for dispersion modelling are knowledge of the wind speed, wind direction, atmospheric turbulence parameters, the ambient temperature, as well as the mixing height. The atmospheric boundary during the day is normally unstable, as a result of the sun's heating effect on the earth's surface. The thickness of the mixing height depends strongly on solar radiation, amongst other parameters. This mixing layer gradually increases in height from sunrise, to reach a maximum at about five to six hours after sunrise. Cloudy conditions, surface and upper air temperatures also affect the final mixing height and its growth. During these conditions, dispersion plumes can be trapped in this layer and result in high ground-level concentrations. This dispersion process is known as Fumigation and is more pronounced during the winter months due to strong night-time inversions, weak wind conditions and slower developing mixing layers.

Precipitation and Air Pollution

Precipitation assists in the removal of air pollutants from the atmosphere. Gaseous air pollutants and particulate matter are removed by the falling rain droplets through adsorption and deposition.

West Coast is a semi-arid region, with a Mediterranean climate. It receives most of its rainfall in winter months. The historical average monthly precipitation profile is shown in **Figure 48** below. As can be seen, the highest monthly maximum precipitation is 30 mm in June. Precipitation in January and February is minimal, only 4 mm in each month.

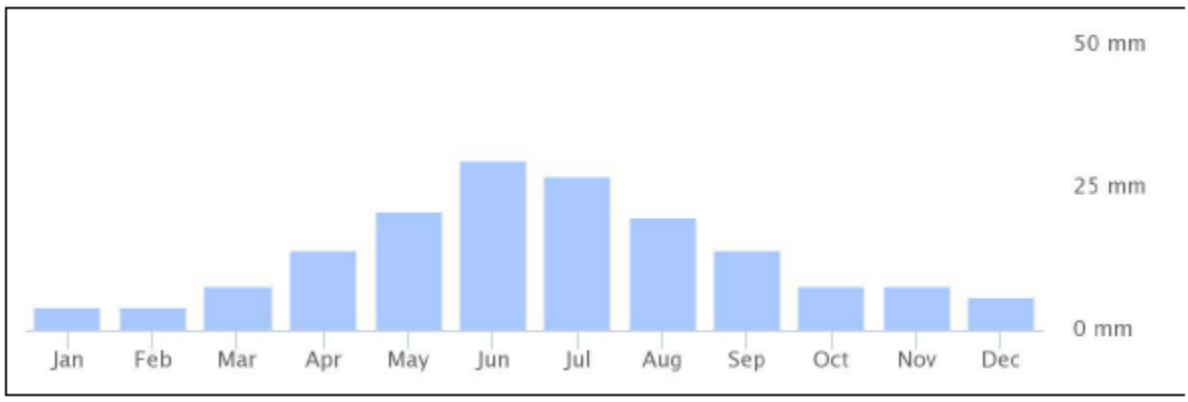


Figure 48: Monthly Precipitation Profile

Local Wind Field

Since meteorological data is not available at the project site, meteorological data from the Department of Environmental Affairs and Development Planning (DEADP) was used for the air pollution dispersion modelling. This set of data was generated by utilising a prognostic mesoscale model called the Weather Research and Forecast Model and a modelling resolution of 3 km. The data that is most applicable to the study area is located south-east of the site (latitude: -31.67946°

and longitude: 18.64372°). Three years (2008-2010) of hourly surface and upper air meteorological data was used as input into the model.

The wind roses and wind frequencies for all hours, daytime and night-time are shown in **Figure 49 below.**

As can be seen, the westerly and south-westerly winds are predominant, which account for approximately 41% of the time. The daytime and night-time wind patterns show a diurnal variation. During daytime, south-westerly and westerly winds are most frequent, whilst southerly and northerly winds are minimal. At night-time, the south-easterly winds increase to approximately 11% of the time. Furthermore, the south-westerly winds decrease. The average wind speed during daytime is 4.14 m/s and 3.57 m/s for night-time respectively.

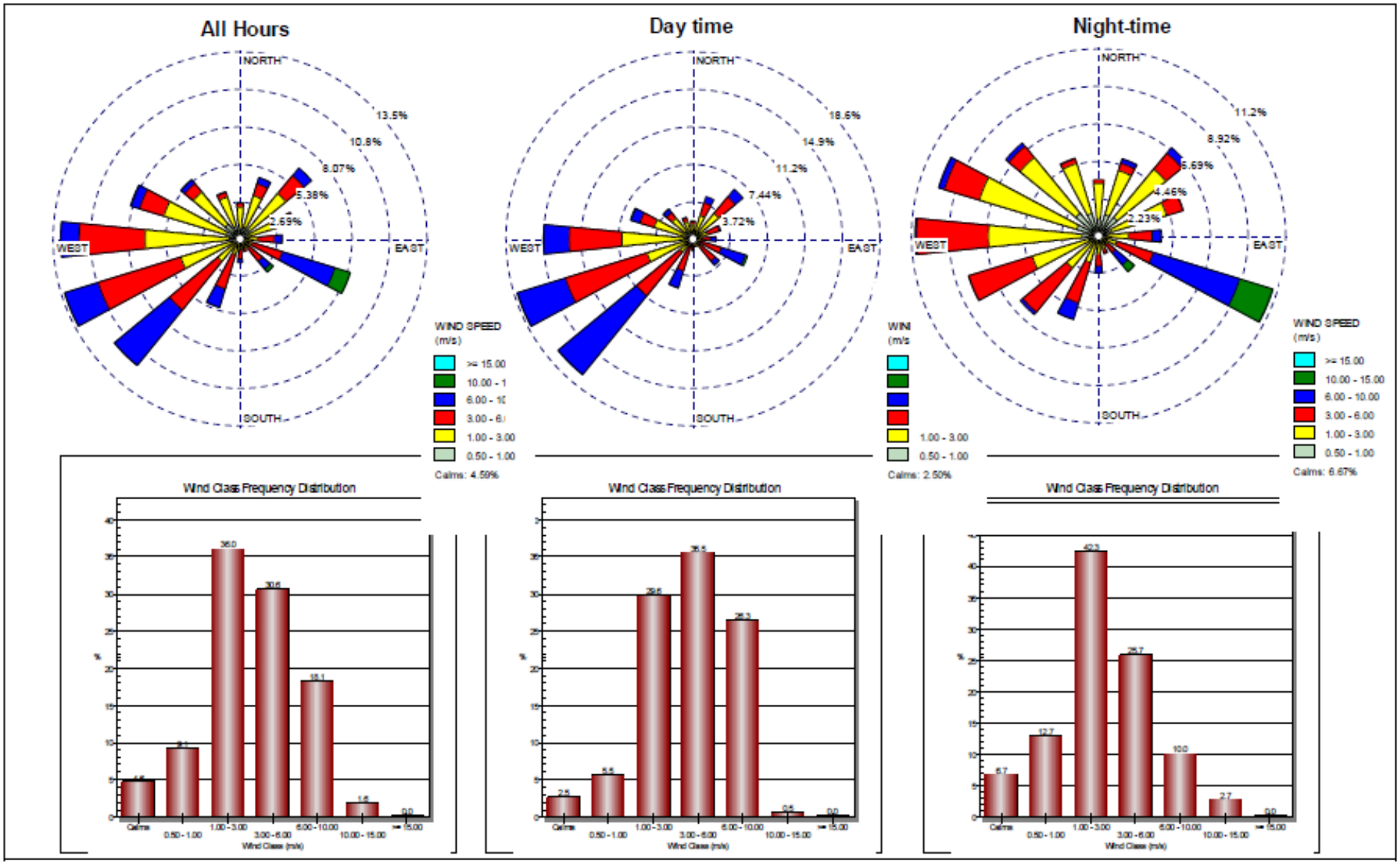


Figure 49: Wind Roses & Wind Speed Frequency Distribution: All-hours, Daytime and Night-time

The winter and summer wind patterns are presented in **Figure 50** below. In winter, the northeasterly winds are predominant, whereas in summer, the south-westerly winds are the most predominant. The wind speeds in winter and summer are comparable, with average wind speeds of 3.39 m/s and 3.87 m/s respectively.

Calm wind conditions occur 6.37% of the time during winter-time, compared to 2.56% during summer.

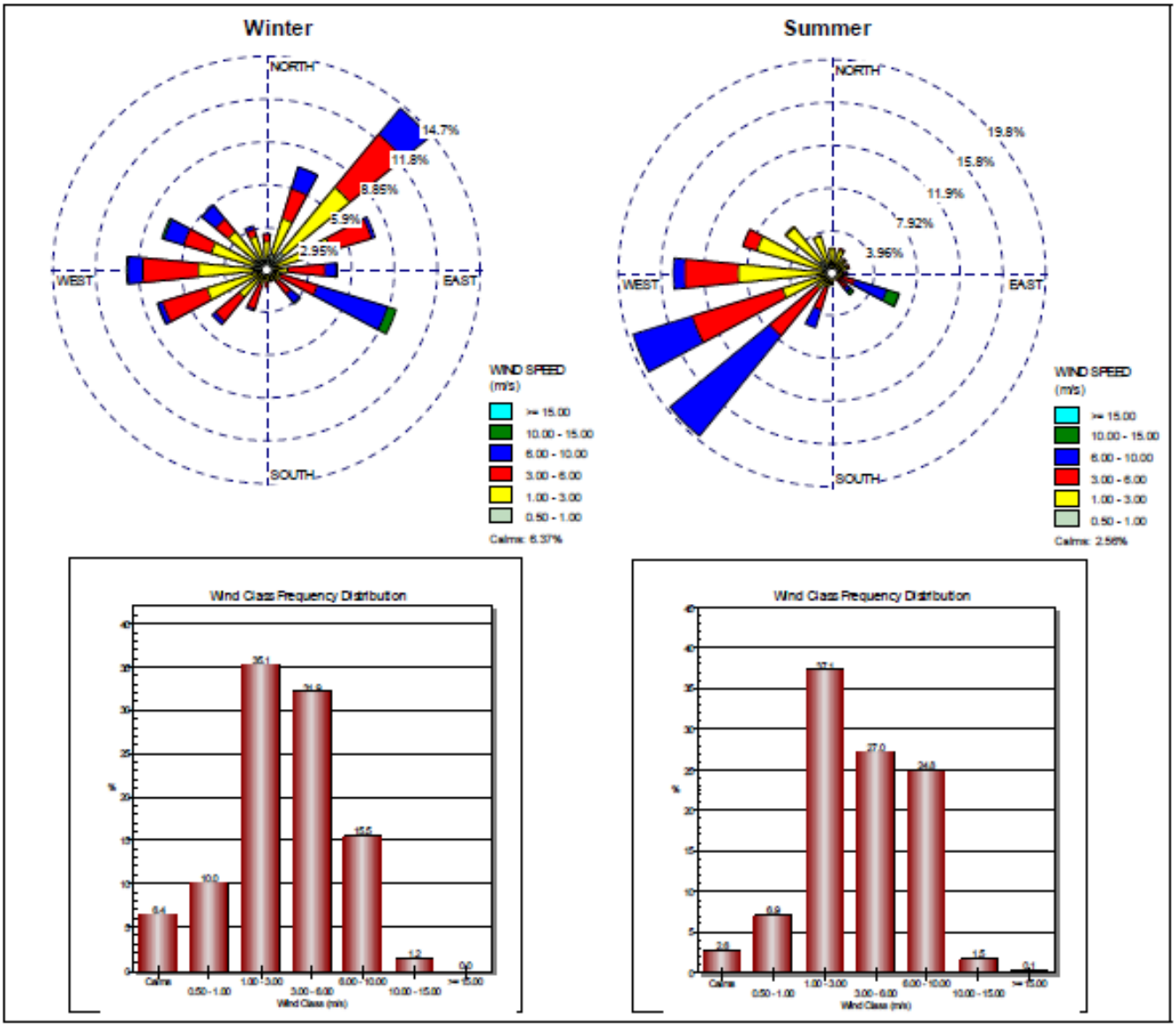


Figure 50: Wind Roses & Wind Speed Frequency Distribution: Winter and Summer

AGRICULTURAL SETTING

Soils

The soils are shallow sandy gravel and stone chips over solid rock, which precludes them from being used as arable land. The proposed development will have no effect on the physical or chemical properties of the soils. The soils at the site have a relative agricultural theme sensitivity of 1 to 2.

According to a study conducted by Bla Pau Managamenet Consulting, the entire site is covered by shallow, non-arable stony soils of the Mispah Soil Form. Topsoil depth ranged from a nominal 50 mm to 250 mm With the exception of one small area of a few hundred m^2. Rehabilitation of similar soils has been successfully carried out in other parts of the Karroo, the closest being at nearby Nieuwoudtville.

Mispah	Highly erodible, exceptionally good surface water management is required. Topsoil depth is often less than 200 mm, covering a stratum of densely bedded shale or solid rock. Often found in proximity are Glenrosa soils. Mispah soils also carry a high erosion hazard.

Physical Properties

Soil Form / Family	Clay % of Topsoil	Water Holding Capacity (mm/m)	Water Intake Rate	Drainage Capacity	Erosion Hazard	Tillage Constraints
Mispah	6 to 35	< 80	Medium	Moderate	Moderate to high	Cr, co, mw, sh

Tillage Constraints

Code	Restraint
Cl	Cloddy consistency, slippery when wet, hard and cloddy when dry
Co	Compaction, puddling and smearing when wet
Cr	Crusting, soft when wet, cemented and brittle when dry
Mw	Machine wear, abrasion in sharp sandy soils
Sh	Subsurface hindrance, shallow soils on rock or hard plinthite

Chemical Properties

Soil Form / Family	Base Status	Organic matter Content	N&S Mineralisation Capacity	K Reserves	Zn Reserves	Salinity/ Sodicity Hazard
Mispah	Low to moderate	Low to moderate	Low	Low	Low	Low to moderate

Crops

The only crops that will grow on these soils are locally habituated grasses and shrubs that have a very shallow root concentration and woody vegetation that has strong rooting systems that will spread and look for water.

Land Capability Class Determination

Only soils complying with Land Capability Classes I to III (LCCI to LCCIII) are readily acceptable for arable crop cultivation.

LCC IV soils may be cultivated under certain stringent and well-managed conditions.

LCC V usually refers to wetlands and LCC VI to non-arable land that can be used only for long-term crops due to steepness, soil depth and so forth

LCC VII and VIII soils are limited to domestic livestock and wild game.
Most of the profiles studied fell into LCC VII.

Table 13 below guided the land capability class determination and **Figure 51** Spatial representation of Land Capability Classes shows for Welverdiend.

Table 13: Land Capability Class Determination

Class	Concepts
I	Land in Class I has few limitations that restrict its use; it may be used safely and profitably for cultivated crops; the soils are nearly level and deep; they hold water well and are generally well drained; they are easily worked, and are either fairly well supplied with plant nutrients or are highly responsive to inputs of fertilizer; when used for crops, the soils need ordinary management practices to maintain productivity; the climate is favourable for growing many of the common field crops.
II	Land in Class II has some limitations that reduce the choice of plants or require moderate conservation practices; it may be used for cultivated crops, but with less latitude in the choice of crops or management practices than Class I; the limitations are few and the practices are easy to apply.
III	Land in Class III has severe limitations that reduce the choice of plants or require special conservation practices, or both; it may be used for cultivated crops, but has more restrictions than Class II; when used for cultivated crops, the conservation practices are usually more difficult to apply and to maintain; the number of practical alternatives for average farmers is less than that for soils in Class II.
IV	Land in Class IV has very severe limitations that restrict the choice of plants, require very careful management, or both; it may be used for cultivated crops, but more careful management is required than for Class III and conservation practices are more difficult to apply and maintain; restrictions to land use are greater than those in Class III and the choice of plants is more limited.
V	Land in Class V has little or no erosion hazard but has other limitations which are impractical to remove that limit its use largely to pasture, range, woodland or wildlife food and cover. These limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops; it is nearly level; some occurrences are wet or frequently flooded; others are stony, have climatic limitations, or have some combination of these limitations.
VI	Land in Class VI has severe limitations that make it generally unsuited to cultivation and limit its use largely to pasture and range, woodland or wildlife food and cover; continuing limitations that cannot be corrected include steep slope, severe erosion hazard, effects of past erosion, stoniness, shallow rooting zone, excessive wetness or flooding, low water-holding capacity; salinity or sodicity and severe climate.
VII	Land in Class VII has very severe limitations that make it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife; restrictions are more severe than those for Class VI because of one or more continuing limitations that cannot be corrected, such as very steep slopes, erosion, shallow soil, stones, wet soil, salts or sodicity and unfavourable climate.
VIII	Land in Class VIII has limitations that preclude its use for commercial plant production and restrict its use to recreation, wildlife, water supply or aesthetic purposes; limitations that cannot be corrected may result from the effects of one or more of erosion or erosion hazard, severe climate, wet soil, stones, low water-holding capacity, salinity or sodicity.

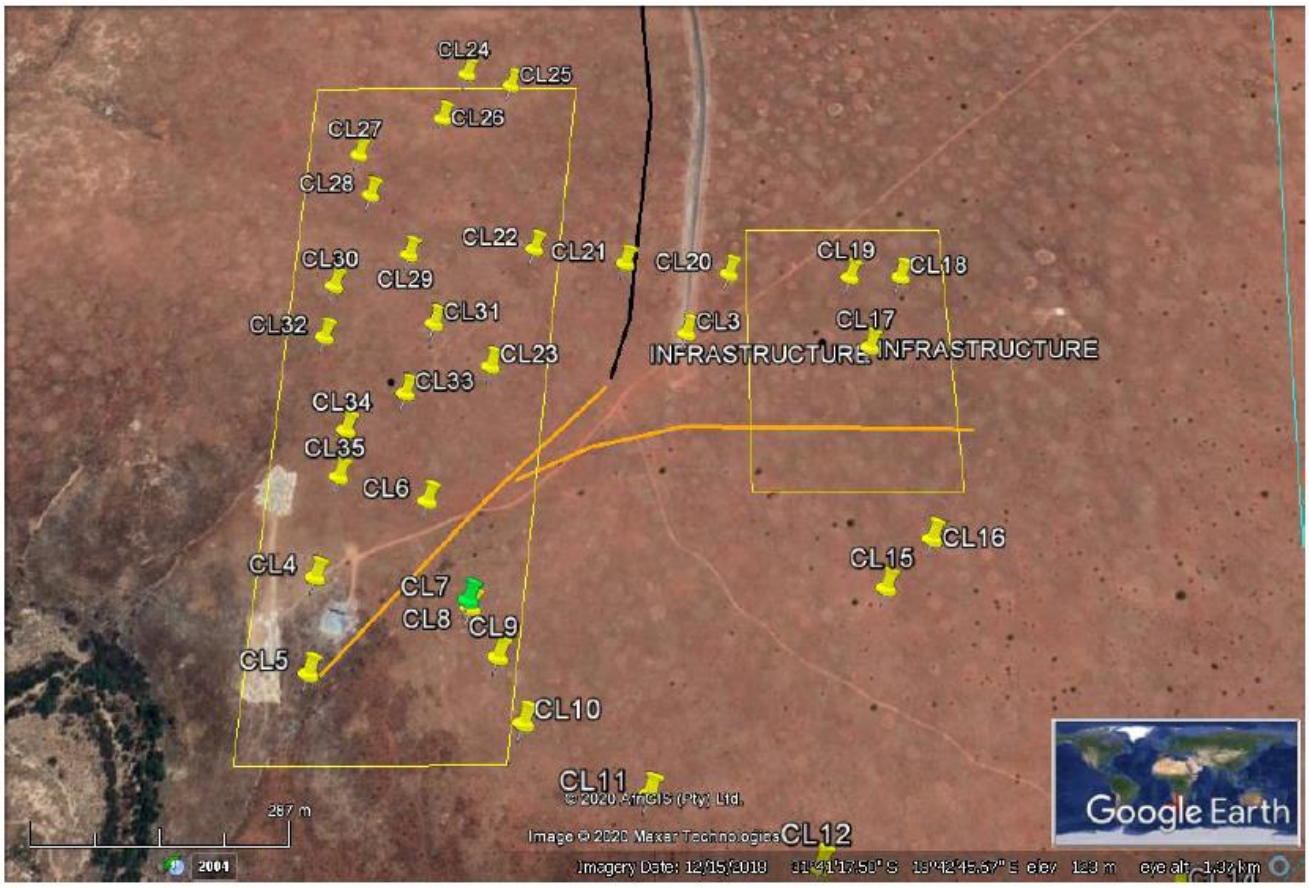


Figure 51: Welverdiend Spatial representation of Land Capability Classes

REGIONAL HYDROLOGY

General

The Farm Welverdiend (RE Farm 511) is located just south of Vanrhynsdorp in the Western Cape. The property is located within quaternary catchment E33G that forms part of the Berg-Olifants Water Management Area. The quaternary catchment E33G is approximately 894.2 km2. The site is located on an undulating plain, with relatively flat areas interspersed with low-undulating hills. Mauwerskop is located 5.5 km north-east of the site, while the Matzikama mountains are 7.5 km due east, and the Gifberg, Windhoekberg and Spitsberg mountain ranges are located 4 – 6 km south of the proposed mining site. The major watercourses in the surrounding landscape include the Wiedou River, which flows along the southern boundary of Welverdiend (120 – 200 m south/ south-west of the development site), and the Troe-Troe River which flows 3.5 km north-west of the site.

Figure 52 and Figure 53 show more detailed views of the site with relevant information (borehole positions on the property) superimposed on a 1:50 000 topo-cadastral map and aerial image respectively.

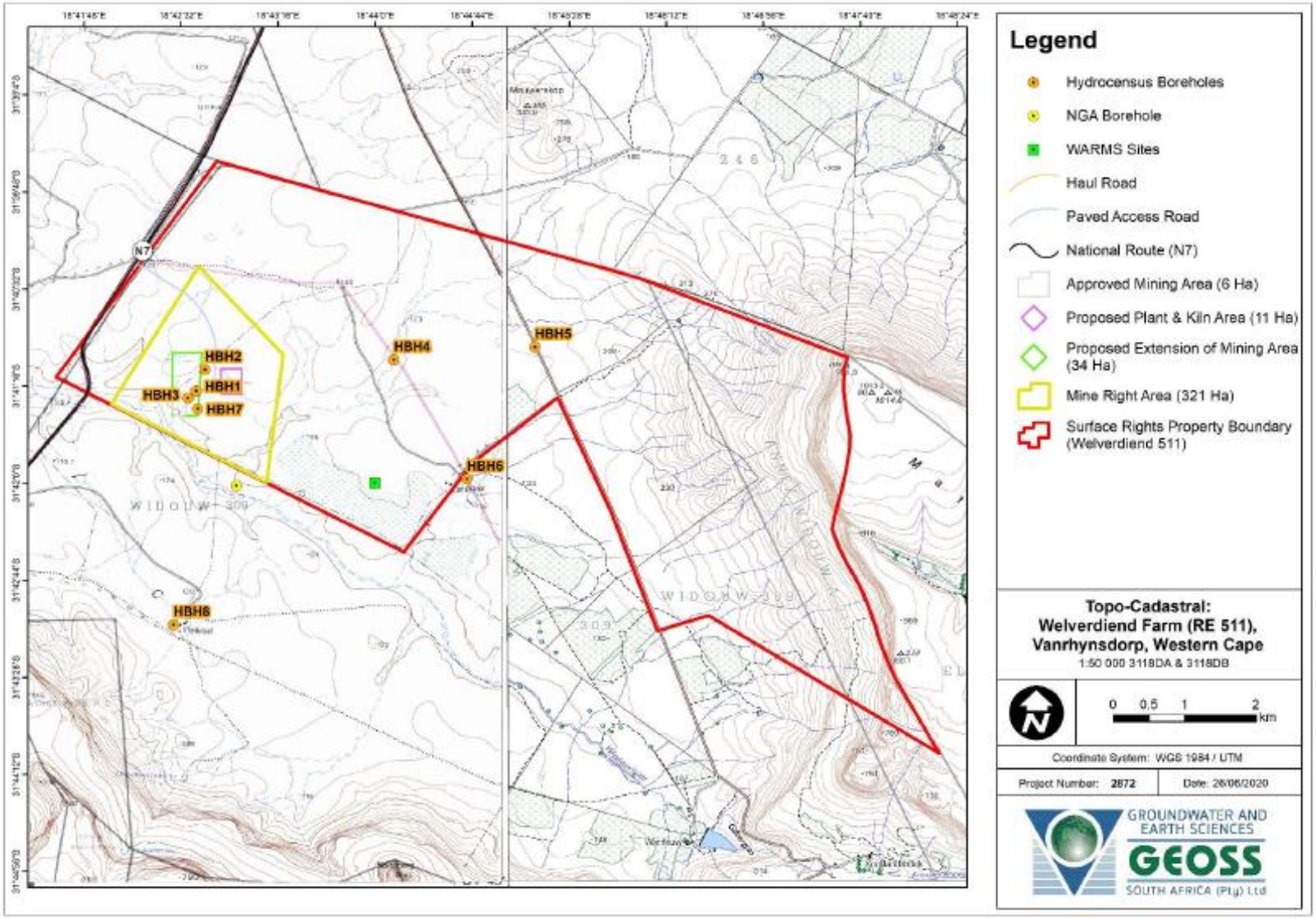


Figure 52: The study site, production borehole, NGA boreholes, WARMS sites and hydrocensus boreholes superimposed on a 1:50 000 scale topo-cadastral map (3318DB & 3318 DD).

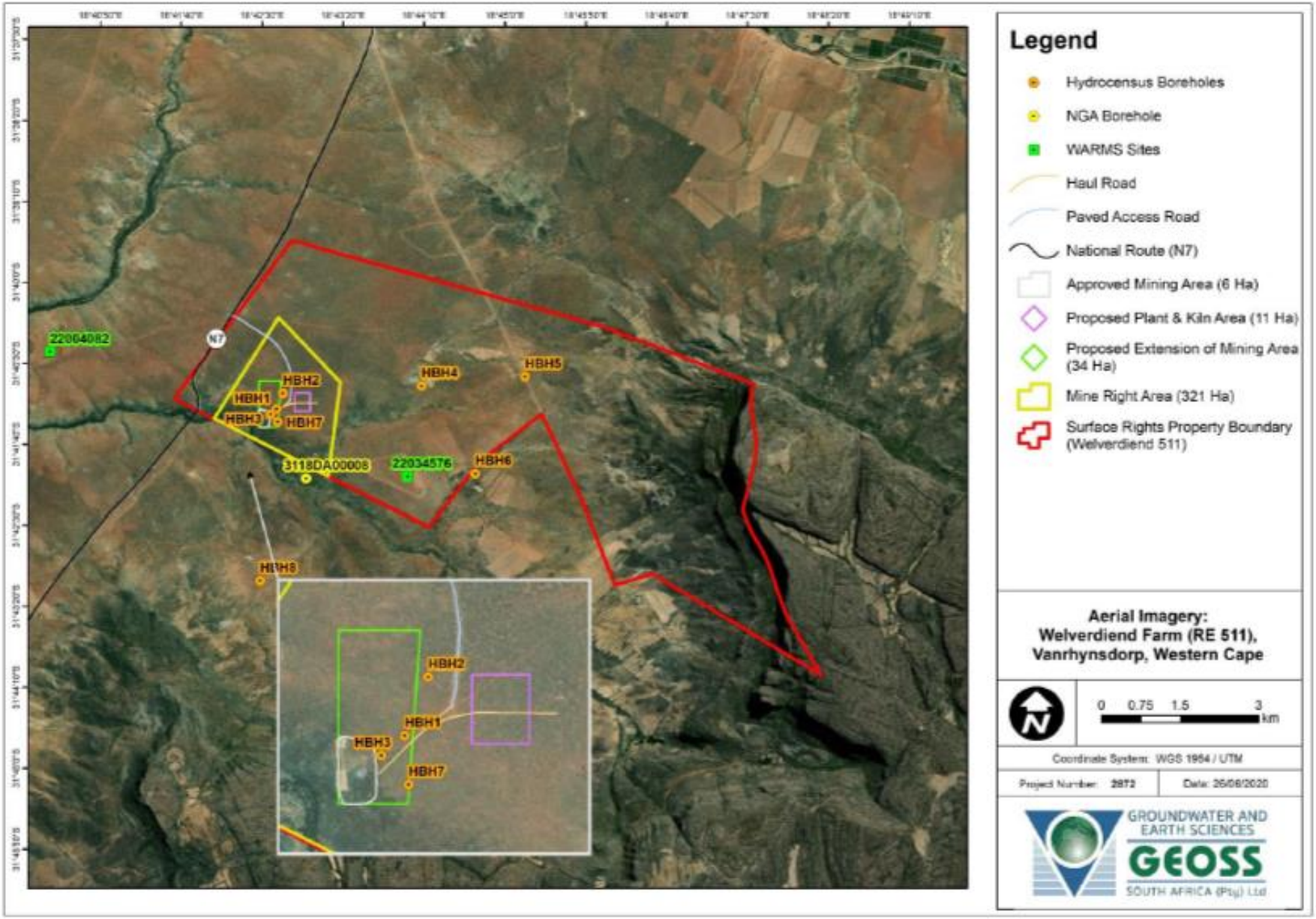


Figure 53: The study site, production borehole, NGA boreholes, WARMS sites and hydrocensus boreholes superimposed on an aerial photograp

The aquifer yield and aquifer quality classifications are based on regional datasets, and therefore, only provide an indication of conditions to be expected. As detailed earlier in this report the geological setting of the study area is complex, with a multitude of lithologies. This complex geological setting is then also reflected in the geohydrology of the area. There are both primary porosity and fractured bedrock aquifers within this area. Recharge rates and mechanisms are variable throughout the area. Flow paths and mechanisms also differ throughout the area. Geology plays a major role controlling geohydrological conditions and for this reason, groundwater response units do not conform to surface water catchment boundaries. In addition, the amount of groundwater inflow and outflow also needs to be taken into account when carrying out water balance equations for the area. The following section outlines some of the key geohydrological characteristics of the area.

Aquifer Yield

According to the 1:500 000 scale groundwater map of Calvinia (3117) the area does host a karst aquifer (i.e. the bedrock constitutes an aquifer) with an average borehole yield of 0.5 L/s to 2.0 L/s directly underlying the property (**Figure 54**) (DWAF, 2005). The Welverdiend Farm is located on a Karst aquifer (dolomite) which is characterised by water stored and moving through fractures and dissolution cavities.

Aquifer Quality

Electrical conductivity (EC) is a measure of the ability of the groundwater to conduct electricity and this is directly related to the concentration of ions in the water. This parameter is used as an indication of the quality of the groundwater. The groundwater map indicates that the karst aquifer has “marginal” water quality as indicated by electrical conductivity (EC) in the range of 70 – 300 mS/m (DWAF, 2005). In terms of domestic supply this is poor quality groundwater (DWAF, 1998) (**Figure 55**).

Aquifer Vulnerability

The national scale groundwater vulnerability map for South Africa (Conrad and Munch, 2007), which was developed according to the DRASTIC methodology (Aller et al, 1987), shows that groundwater under the property has a very-low to low vulnerability to surface based contaminants (**Figure 56**).

The DRASTIC method takes into account the following factors:

D	=	depth to groundwater	(5)
R	=	recharge	(9)
A	=	aquifer media	(5)
S	=	soil type	(4)
T	=	topography	(9)
I	=	impact of the vadose zone	(3)
C	=	conductivity (hydraulic)	(3)

The number indicated in parenthesis at the end of each factor description is the weighting or relative importance of that factor. The mining area is underlain by a Karst aquifer (Dolomite of the Wiedouw Formation) overlain by several meters (>25 meters) of relatively impermeable limestone and unconsolidated material at shallow depth. This “low to very low” rating is likely associated with the depth to groundwater being greater than 60 meters in boreholes within the regional setting.

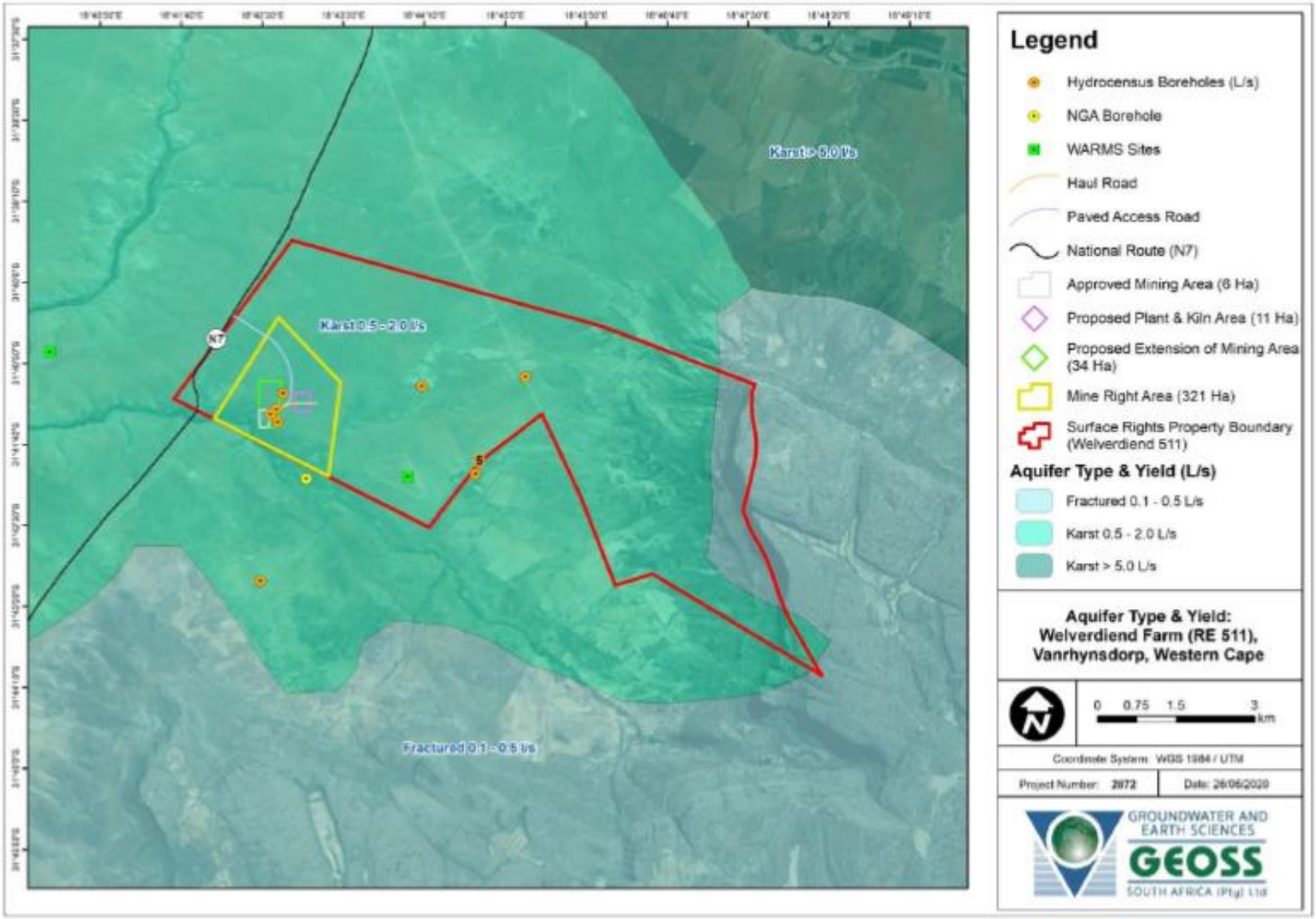


Figure 54: Regional aquifer yield from the 1:500 000 scale groundwater map (3318 –Cape Town) (DWAF, 2005)

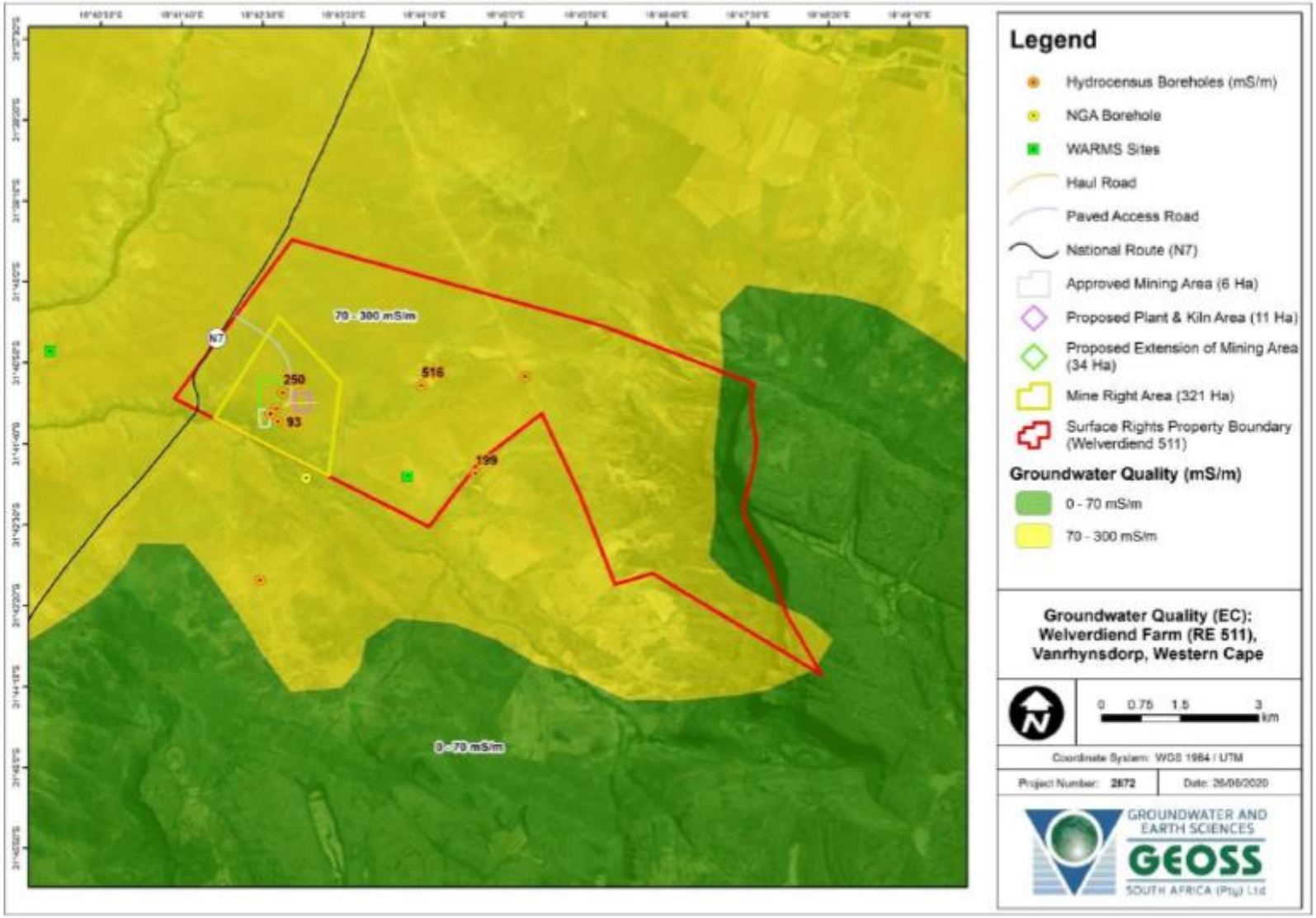


Figure 55: Regional groundwater quality (EC in mS/m) from (DWAF, 2005), showing production borehole, NGA boreholes, WARMS sites and hydrocensus boreholes.

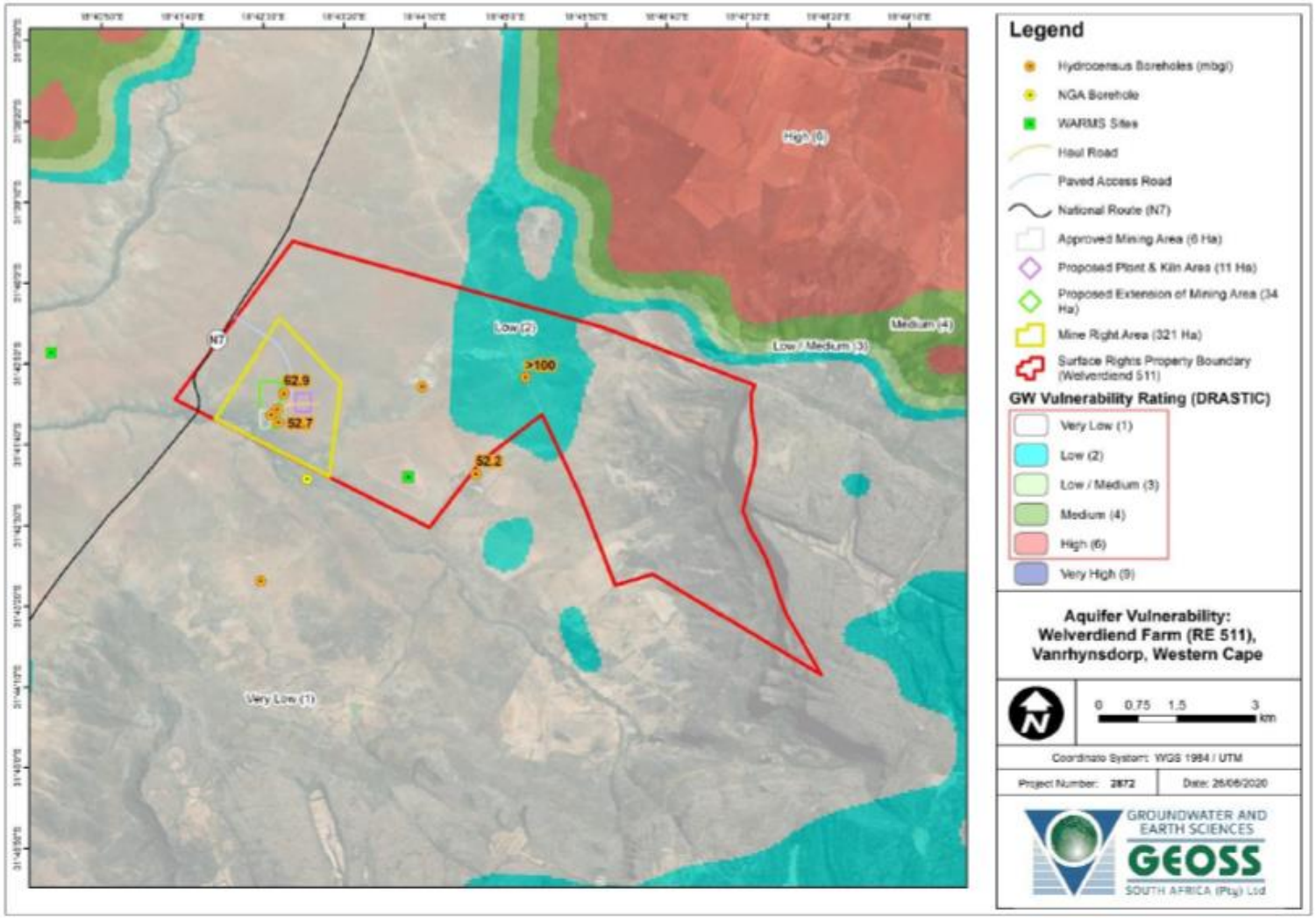


Figure 56: Regional groundwater vulnerability for the study area (DWAF, 2005), showing production

Table 14:Summary of NGA boreholes details

Site ID	Latitude (DD, WGS84)	Longitude (DD, WGS84)	Elevation (mamsl)	RWL (mbgl)	RWL (mamsl)	pH	Temp (°C)	EC (mS/m)	Salinity (mg/L)	RP (mV)	Comments
3118DA00008	-31.70032	18.71588	91	-	-	-	-	-	-	-	NGA borehole - not accessible. Not found.
Marble_Quarry _BH (OD00249)	-31.68448	18.73571	119	-	-	7.65	11.2	568	2 980	-68	Base plate closed. Production borehole (equipped). Database indicates high yielding 27.78 L/s Site visit indicates a lower yield possibly 5 L/s
Maskam_BH1	-31.69948	18.74495	130	57.225	72.775	6.79	22.4	244	1 228	-27	Borehole not equipped. Weld shut with steel plate. Small square hole in steel plate. sample using bailer. Rain water in borehole because of opening.
Wind pump	-31.71785	18.70799	139	-	-		-	-	-	-	Old wind pump, broken. Bees in hole.
ZC-32	-31.69063	18.71102	119	52.72	66.280	7.29	22.1	127.6	627	-51	Exploration hole. Opened cover. Bailer sample. Limestone in water (cement). Grey colour.
ZC-36	-31.68929	18.7098	115	-		-	-	-	-	-	Exploration hole. Borehole closed with cover. Unable to open. Bees in cover.
ZC-46	-31.68842	18.71086	126	Dry		-	-	-	-	-	Within 2 km. Exploration hole. Opened cover. Dip meter dry. No water.

The information obtained for the NGA sites and the previous assessment indicated that there is minimal groundwater use. Three samples were submitted for chemical analysis discussed in succeeding sections in this report

There are 2 registered boreholes (WARMS sites) located within a few kilometres from the property boundary, that are also indicated on the detailed maps in Figure 44 and Figure 45 above. The information for this is summarised in Table 13.

Table 15: Summary of WARMS borehole details.

WARMS no.	Latitude (DD, WGS84)	Longitude (DD, WGS84)	Registered Volume (m^3/a)	Use
22004082	-31.678600	18.671900	90 000	Agriculture: Irrigation
22034576	-31.700000	18.733330	600 000	Mining

Groundwater users are Existing Lawful Uses (ELU) registered for both agricultural use and mining. The total registered groundwater use in the area is 6900000 m^3/a.

Site visit and hydrocensus.

A site visit was completed on the 25th of May 2020 comprising of a site walkover and hydrocensus. Most of the borehole identified during the initial assessment in 2014 were revisited along with new sites. During the site visit there was no evidence of springs or seepage whatsoever. No new groundwater users have been identified within a 2-kilometre radius of the site. Details pertaining sites identified during the hydrocensus are summarised in Table 4 and shown spatially in Figure 3

Table 16: Hydrocensus boreholes and field chemistry

Site ID	Alternative_Name	Latitude (DD, WGS 84)	Longitude (DD, WGS84)	Elevation (mamsl)	RWL (mbgl)	RWL (mamsl)	Temp (°C)	EC	Comments
HBH1	ZC-46	-31.68839	18.71084	122					Could not access, lid locked with bolt rusted
HBH2		-31.68571	18.71192	128	62.95	65.05	24.4	250	Quality measured with TLC dipmeter (calibrated)
HBH3	ZC-36	-31.68930	18.70977	117					EOH 57 mbgl. Did not intersect groundwater.
HBH4	Marble_Quarry_BH (OD00249)	-31.68448	18.73571	119				516	Could not measure water level. Old Quarry borehole.
HBH5		-31.68288	18.75350	152	>100				Borehole drilled for road building purposes. Could not measure water level as it was >100 mbgl
HBH6	Maskam BH	-31.69948	18.74495	130	52.2	77.8		199	Site visit indicates a lower yield possibly 5 L/s
HBH7	ZC-32	-31.69063	18.71102	121	52.72	68.28		93	From previous assessment
HBH8	Wind pump	-31.71785	18.70799	139					> 2 km away. Old wind pump, broken. Bees in hole. Could not access during 2020

Groundwater Quality

A groundwater sample was collected and submitted for inorganic chemical analysis to a SANAS accredited laboratory (Bemlab) in Somerset West, Western Cape. The chemistry results obtained have been classified according to the SANS241-1: 2015 standards for domestic water. Table 17 enables an evaluation of the water quality with regards to the various limits. Table 18 presents the water chemistry analysis results, colour coded according to the SANS241-1: 2015 drinking water assessment standards.

Table 17: Classification table for specific limits (SANS241-1:2015)

Acute Health
Aesthetic
Chronic health
Operational
Acceptable

Table 18: Table 6: Production borehole results classified according the SANS241-1: 2015

Analyses	**Maskam BH1**	**Marble Quarry BH (OD00249)**	**ZC-32 BH**
pH (at 25 ºC)	7.0	7.5	7.5
Conductivity (mS/m) (at 25 ºC)	199.0	516.0	93.0
Total Dissolved Solids (mg/L)	1192.0	3100.0	561.0
Sodium (mg/L as Na)	288.8	756.6	96.3
Potassium (mg/L as K)	3.8	9.4	1.4
Magnesium (mg/L as Mg)	40.2	105.0	24.4
Calcium (mg/L as Ca)	121.4	168.0	126.3
Chloride (mg/L as Cl)	570.4	1443.9	187.0
Sulphate (mg/L as SO4)	103.66	329.56	194.59
Total Alkalinity (mg/L as CaCO3)	350.40	648.08	362.44

The chemistry results obtained have been classified according to the DWAF (1998) standards for domestic water. Table 20 enables an evaluation of the water quality with regards to the various parameters measured (DWAF, 1998). Table 21 presents the water chemistry analysis results, colour coded according to the DWAF drinking water assessment standards.

Table 19: Classification table for the localised groundwater results (DWAF, 1998)

Blue	(Class 0)	**Ideal water quality** - suitable for lifetime use.
Green	(Class I)	**Good water quality** - suitable for use, rare instances of negative effects.
Yellow	(Class II)	**Marginal water quality** - conditionally acceptable. Negative effects may occur.
Red	(Class III)	**Poor water quality** - unsuitable for use without treatment. Chronic effects may occur.
Purple	(Class IV)	**Dangerous water quality** - totally unsuitable for use. Acute effects may occur.

Table 20: water chemistry analysis results

Sample Marked :	**Maskam BH1**	**Marble Quarry BH (OD00249)**	**ZC-32 BH**	**DWA (1998) Drinking Water Assessment Guide**				
				Class 0	Class I	Class II	Class III	Class IV
pH	7.8	7.5	7.5	5-9.5	4.5-5 & 9.5-10	4-4.5 & 10-10.5	3-4 & 10.5-11	< 3 & >11
Conductivity (mS/m)	199.0	516.0	93.0	<70	70-150	150-370	370-520	>520
Total Dissolved Solids	1192.0	3100.0	561.0	<450	450-1000	1000-2400	2400-3400	>3400
Sodium (as Na)	288.8	756.6	96.3	<100	100-200	200-400	400-1000	>1000
Potassium (as K)	3.8	9.4	1.4	<25	25-50	50-100	100-500	>500
Magnesium (as Mg)	40.2	105.0	24.4	<70	70-100	100-200	200-400	>400
Calcium (as Ca)	121.4	168.0	126.3	<80	80-150	150-300	>300	
Chloride (as Cl)	570.4	1443.9	187.0	<100	100-200	200-600	600-1200	>1200
Sulphate (as SO4)	103.7	329.6	194.6	<200	200-400	400-600	600-1000	>1000

From the chemical results presented in Table 20 and Table 21 it is clear that the groundwater quality is highly variable across the study area in terms of dissolved minerals. Where Maskam BH1 has an EC of 199 mS/m, OD00249 with an EC of 516 mS/m and the is of ZC-32BH was measured at 93 mS/m. The EC of a single borehole on site was measured on site at 250 mS/m using a TLC dipmeter. The dissolved sodium and chloride concentrations along with total dissolved solids (TDS) are elevated in boreholes located towards the east and northeast of the site, and within acceptable range concentrations on site. The pH of all groundwater samples taken are relatively neutral, measuring between 7 – 7.5.

A number of chemical diagrams have been plotted for the groundwater sample and these are useful for chemical characterisation of the water. The chemistry of the sample has been plotted on a trilinear diagram known as a Piper Diagram. This diagram indicates the distribution of cations and anions in separate triangles and then a combination of the chemistry in the central diamond. From Figure 57 (central diamond) the borehole groundwater sample is classified as sodium and chloride hydrofacies.

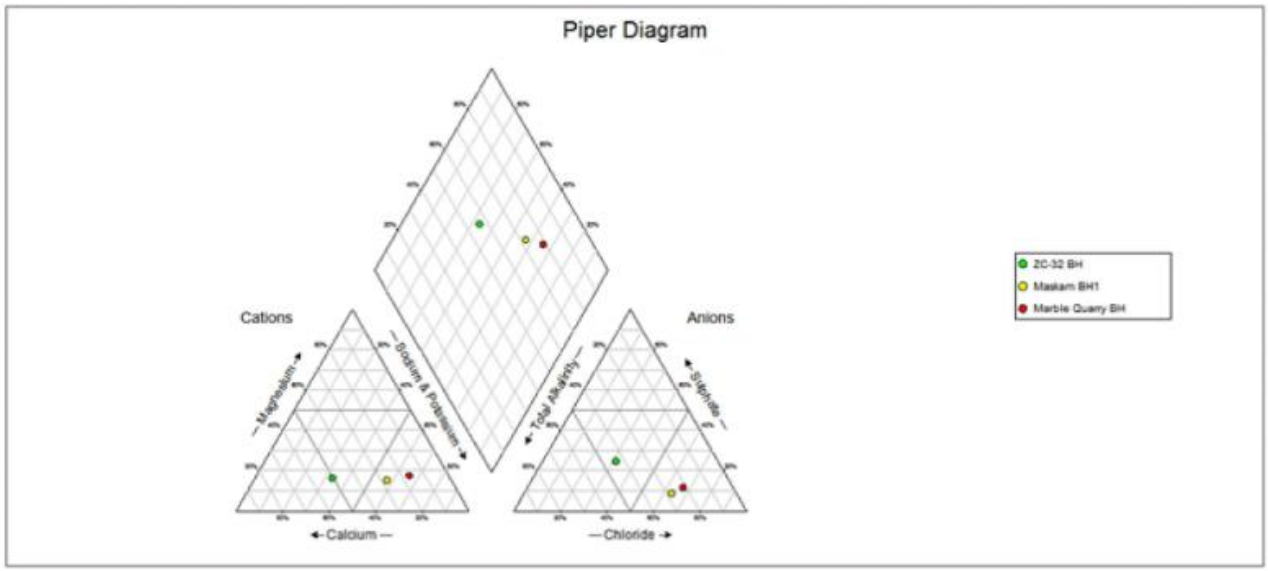


Figure 57: Piper Diagram of the production borehole groundwater sample

The Stiff Diagram is a graphical representation of the relative concentrations of the cations (positive ions) and anions (negative ions). This diagram shows concentrations of cations and anions relative to each other (not as a percentage as with Piper) and direct reference can be made to specific salts in the water. The Stiff Diagram for the sample from the borehole is shown in **Figure 59**. A distinct profile is observed from the sample taken from the production borehole. The borehole is primarily dominated by sodium, potassium and chloride.

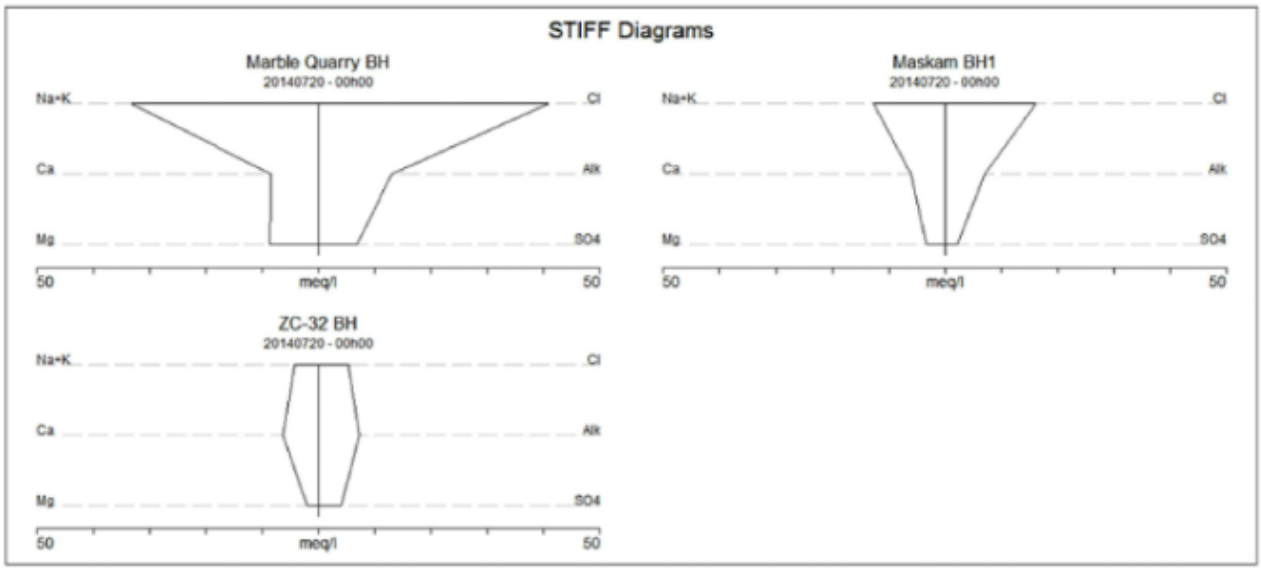


Figure 58: Stiff Diagram for the production borehole groundwater sample

b. **Description of the current land uses.**

The site is almost entirely undeveloped natural veld and is currently zoned for agriculture (Agriculture I). The surrounding area is mostly untransformed and used for grazing (sheep farming).There are no communities that exists within the close vicinity of the proposed site. The only dwellings within the 5 km radius are two farm houses ±3km east of the proposed mining area and south of the centre of the property, approximately 4.5km due east of the N7of the mine (see **Figure 60** below).

The nearest town is Vanrhynsdorp, approximately 8.5 km north of the mine. **Figure 61** below shows the land cover of the proposed site and its surroundings.

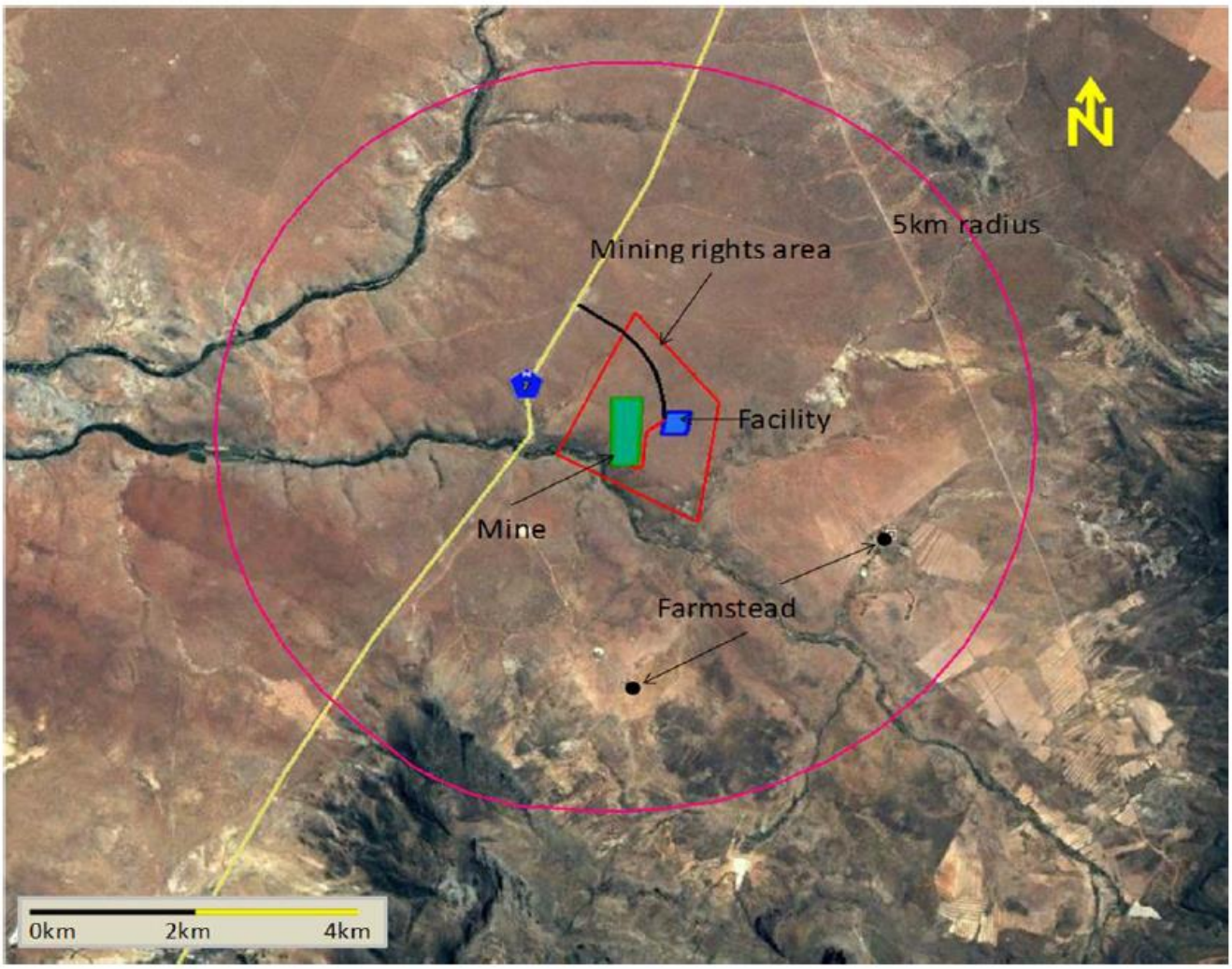


Figure 59: Figure 8: Picture showing the land cover of the proposed site and its surroundings within a 5km radius of the site

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

No infrastructure exist within the boundaries of the mining area that could be impacted by the proposed activity. The existing roads will be used to gain access to the mining area. Continuous maintenance of the surfaced access road will be done by the applicant for the duration of the operational phase.

d. Environmental and current land use map. (Show all environmental, and current land use features)

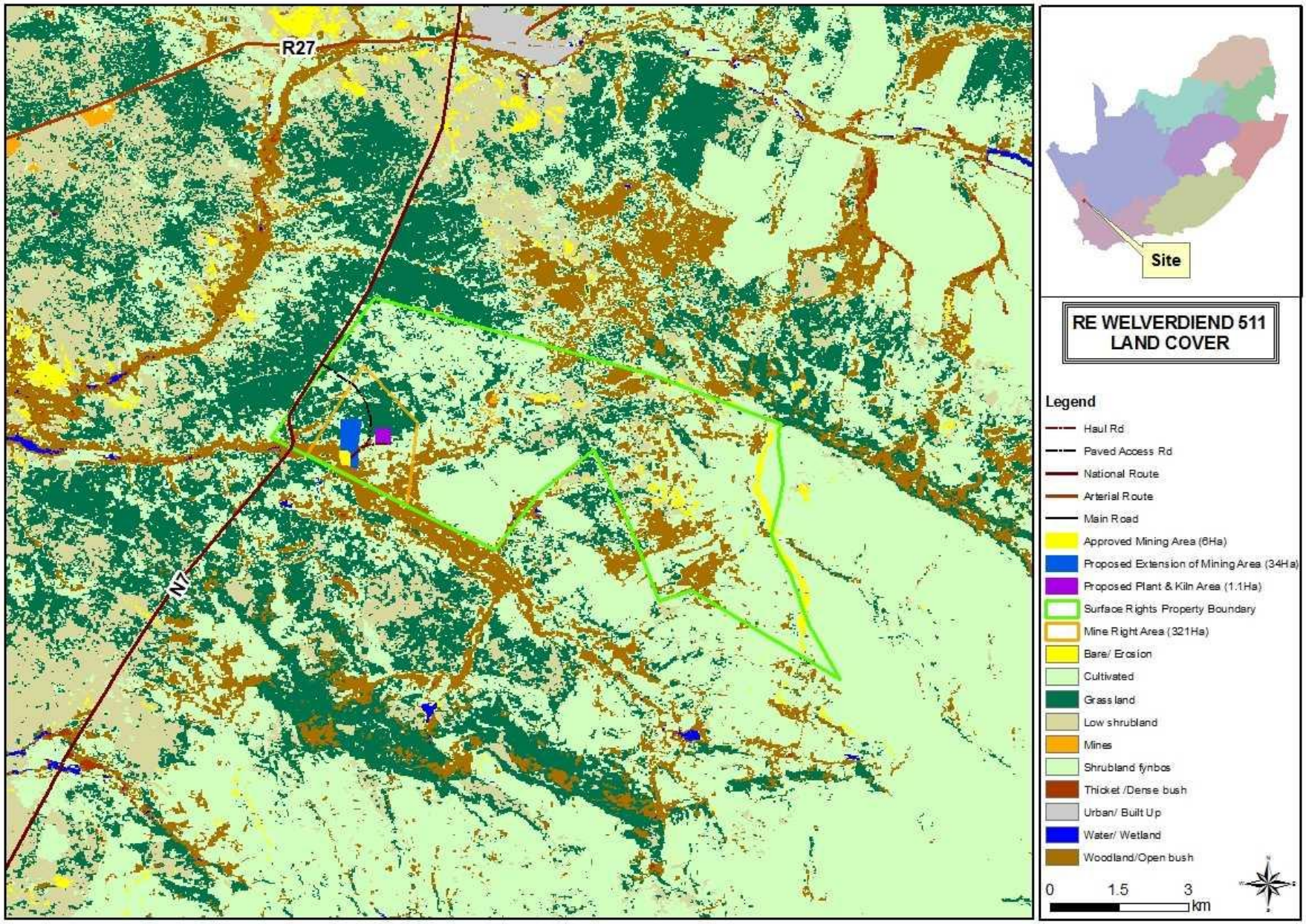


Figure 60: Welverdiend Land Cover Map

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

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

Potential impacts for the proposed dolomitic limestone mine expansion are anticipated to take place during the construction, operation and decommissioning phase.

Construction Phase

The construction phase of the project is anticipated to last for 12 months. The working hours will be 9 hours a day, 5 days a week. The construction phase will comprise site preparation and construction of all mine-related infrastructures. A construction camp, which includes an office complex, workshops, storage, etc., will be established during the construction phase.

Key activities that will be undertaken during the construction phase include:

- Construction of an access road;
- Pre-stripping;
- Site clearance;
- Earthmoving, grading, compaction, terracing;
- Construction of bulk services facilities (i.e. power infrastructure, waste facilities, storm water control and water supply system);
- Construction of civil works (including all mine infrastructures and facilities);
- Construction of structures;
- Installation of equipment; and
- Commissioning.

Large equipment expected to be utilised during the construction are:

- Cranes;
- Excavators;
- Trucks;
- Front-end Loaders;
- Bulldozers; and
- Graders.

Operational Phase

The operational phase activities of the proposed mine include excavations to open up the surface, drilling and blasting, the aggregate handling and storage piles, the operations of the excavators, graders, truck loading and offloading and etc.

Ecology

Impact on vegetation type

The proposed mining site is located inside a largely untransformed, but severely degraded or overgrazed shrubland, classified as Knersvlakte Dolomite Vygieveld and Vanrhynsdorp Gannabosveld. The largest portion of the mining site intrudes into the latter, while a quarter (or less) intrudes into Knersvlakte Dolomite Vygieveld. None of the vegetation types are currently considered as threatened. Being well represented and not threatened, the impact on vegetation type per se will be of low significance, with mitigation. The impact is expected to be long term to permanent, depending on rehabilitation success after the completion of mining activities. In the long term, the mining site will require a sustained management effort to control the aliens and allow indigenous species to re-establish during the rehabilitation phase.

Impact on biological linkage and CBA's

The southern portion of the proposed mining site, being located inside Knersvlakte Dolomite Vygieveld and encroaching onto the Wiedou River, poses the greatest impact as this area is more species rich and potentially more sensitive to erosion (steeper). This area should rather be excluded from mining in order to avoid species loss and minimising erosion. The impact on biological linkage is also likely to have some significance, due to the mining area extending into a CBA associated with the Wiedou River. This can however be avoided or minimised by moving mining activities slightly further away (northwards) from the Wiedou River. However, extensive areas of shrubland around the site are still intact maintaining the east-west ecological corridor along the Wiedou River. There will be no impact on known Species of Conservation Concern.

Impact on fauna

As an indirect impact, soil disturbance caused by opencast mining activities will provide ideal conditions for the establishment of alien invasive vegetation. However, it is unlikely that any woody aliens, such as *Prosopis glandulosa*, will become problematic. *Prosopis glandulosa* and *Nerium oleander* are confined to the Wiedou River streambed and will not spread into the mining area. Weedy pioneer species, such as *Atriplex* species, *Stipa capensis* and *Bromus pectinatus*, will probably be the first to establish and prevail. These will be difficult to control, but the impact is not considered significant, given the degraded condition of the veld.

Impact on fauna will be of low to medium significance, without mitigation. Since the Wiedou River will not be directly affected by mining activities, mammals visiting the

river will not be interfered with. Residing mammals on the proposed mining site, such as aardvark and porcupines, will be directly affected. It must be noted that sheep farming has probably displaced most of the indigenous mammal fauna. One can expect that all large fauna will move away with the commencement of mining activities. Insect fauna, such as termite and cocktail ant nests, will be eliminated. It is uncertain (unlikely) whether rehabilitation of the mining site will create a suitable habitat for indigenous fauna post mining.

Archaeological resources

The majority of the remains recorded during the study have been graded as having *low* (Grade 3C) archaeological significance. This is due to the eroded and superficial context in which they were found.

However, sites in the proposed Plant Area have been graded as having potentially medium (Grade 3B) because of the context in which the finds were made (i. e. stone tool production areas). These in situ sites are mostly associated with heuweltjies, on older land surface that are dotted around the proposed logistical facility.

Although large numbers of archaeological resources (i. e. stone tools) were encountered throughout the study area, they are of limited importance due to their poor context. The resources are consistent with the distribution of surface remains in the Knersvlakte region, where most of the occurrences encountered appear to be dominated by implements of mixed age, on eroded surfaces below the top soils.

While the study has captured a good record of the archaeological record present on the proposed development site, no occupation or settlement sites were recorded and the majority of the remains most likely represent flakes and flakes debris.

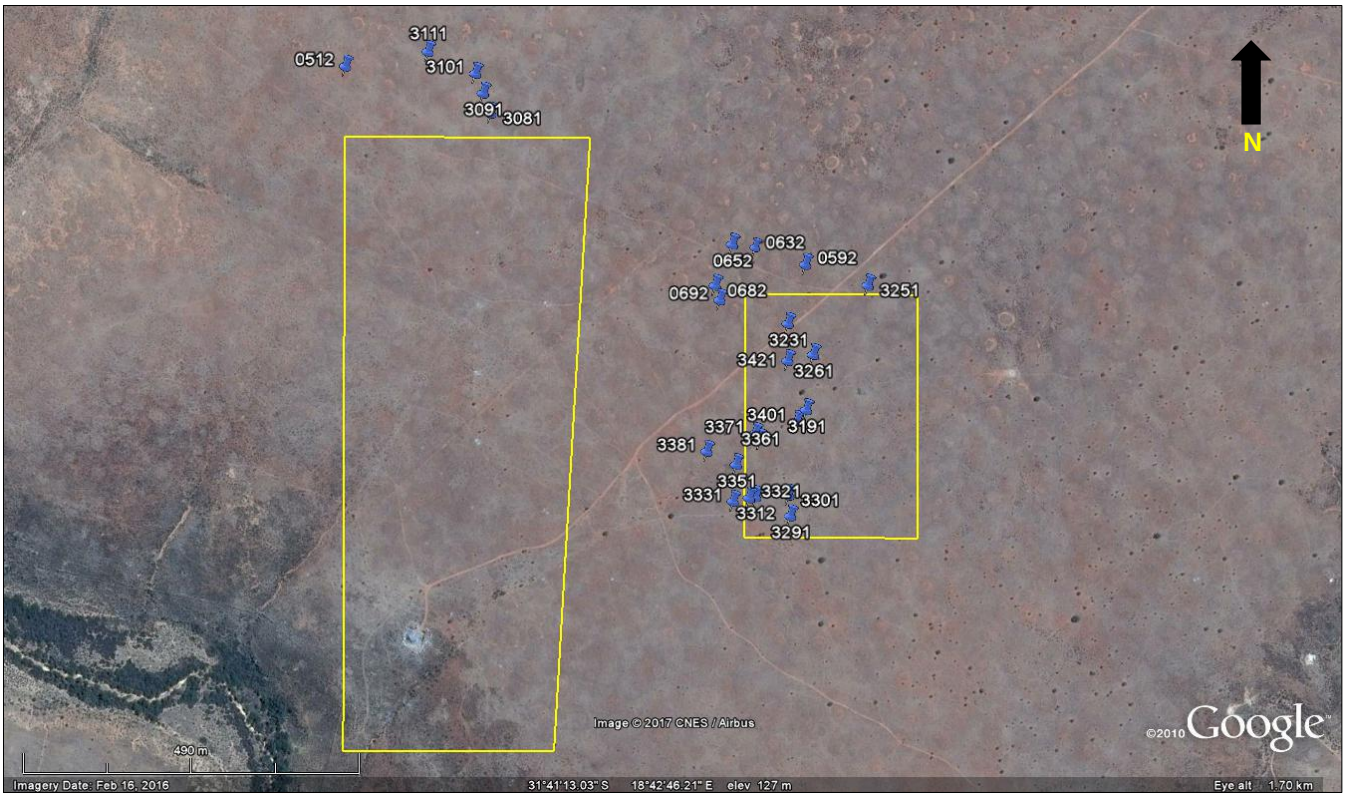


Figure 61: Sites rated as having medium (Grade 3B) significance

Palaeontology

The results from the PIA study indicate there are no palaeontological risks associated with the proposed development. According to Almond (2017:18), `the overall impact significance of the proposed mining development is inferred to be LOW' because most of the study area is mantled by superficial sediments of low palaeontological sensitivity.

`No further specialist studies or mitigation regarding fossil heritage are therefore considered necessary for this project'.

Groundwater

Depletion of the Groundwater Resource as a Result of Mining Operation:

The proposed mining area will not intersect any groundwater as it will take place by means of surface drilling and blasting up to a maximum depth of 60 mbgl. No groundwater abstraction will take place on the mining site at this stage, hence impact on other groundwater users due to abstraction. The depletion of the groundwater resource as a result of the abstraction is thus highly improbable to occur.

Groundwater Quality Deterioration as intersecting groundwater and point and

non-point source pollution:

Intersecting of groundwater during excavations and point source pollution can potentially result in the deterioration of groundwater quality and lowering of pH conditions in groundwater which might also impact the Karst aquifer resulting in dissolution cavities. The groundwater quality as indicated by DWAF (2000) for the area is marginal (70 – 300 mS/m). The groundwater quality for boreholes on site are within this range of the regional classification. The proposed mining operations and associated activities are highly improbable to impact the groundwater and groundwater quality if proper mitigation measures are in place and if the applicant adheres to the recommendations.

Groundwater monitoring is recommended to ensure that mining operation does not negatively impact groundwater levels, hence intersecting groundwater or cause deterioration of groundwater quality. The monitoring will also indicate if the groundwater resource is impacted and mitigation measures can be instituted before long term impacts occur. Mitigation includes not deviating from the original planned excavation depth and having mitigation measures in place preventing point source pollution.

Agricultural Impact

A study conducted BlaPau Management Consulting by explains that it is inevitable that the proposed material extraction process will permanently impact on the site, not only during the life of the mine, but also after the closure of the mine as extracted material is removed from the site for processing. Due to extremely shallow nature of the topsoil there is surplus material available for topdressing mined areas. This is an inherent component of any opencast mining operation, particularly in areas without readily available topsoil.

The social offset in this instance is not only the creation of employment at the site but also downstream employment in transport, kilns, administration and marketing. The economic offset is a contribution to Gross Domestic Product (GDP) from land that previously contributed nothing.

Ecological damage to the Surface Working Area (SWA) of the site in the form of offices, accommodation, roads and material storage can be repaired once the life of mine has expired.

Apart from nuisance dust, the material extraction process and activities in the SWA will have no impact, either positive or negative on the remainder of the Maskam property or the adjoining land parcels.

Blasting

Operational Phase

Afrimat's contractor currently on site has indicated that blasting at depths as expected for the Welverdiend Project, will have no damaging surface impacts. Seismic monitoring and independent assessments have shown that blasting in the Welverdiend area does not result in surface vibrations significant enough to cause damage. Results from previous blasts have been attached to this report as Appendix D8.

Environmental Noise

Operation Phase

It is anticipated that the general operating processes of crushing and screening would result in noise impacts to the surrounding area. The facility is expected to operate from 7H00am to 17H00pm hours per day. The potential impact can be mitigated by enclosing noisy equipment such as generators, fitting efficient silencers on the crushing and screening plant, enclosing engine compartments of vehicles and equipment, and maintaining vehicles and equipment conscientiously. The noise impact of the mine is however deemed to be of low for the surrounding area as the closest residence to the mining area is a homestead located ±3.2 km east of the proposed mining area, and another homestead (occasionally occupied) on a neighbouring property ±3 km south of the site.

Operation activities resulting in an increase in ambient noise levels at sensitive receptors adjacent to the Welverdiend Quarry (i.e. the residents of the neighbouring homesteads) have a Medium significance rating prior to, and a Low significance rating after, the implementation of the recommended mitigation measures.

Geohydrological Impact

The proposed mining area is located in an extremely sparsely populated area. No groundwater use occurs within a 2 km radius of the proposed site. The nearest production borehole is located 3 km from the site. Thus, within the region groundwater is not deemed a major source of water for socio-economic purposes. In general, groundwater levels are deep in the area (>66 mbgl) and considering the hydrogeological setting groundwater will not be impacted by any surface-based activities.

The groundwater quality in the vicinity of the proposed mine is classified as "marginal" and all standard measures must be taken to protect the groundwater quality. This means there are to be no oil leaks from vehicles, generators and heavy machinery. Storage of fuels and lubricants must be on a hardened surface, as well as where the vehicles are filled with fuel. When vehicles/machinery is serviced the old oil must be correctly disposed of.

Socio-economic

New and existing mines across South Africa continue to attract job seekers into the areas in which they operate. More often than not, this results in the development of informal settlements in the vicinity of these mines It is anticipated that 26 people will be employed at the commencement of operations and this will be a combination of permanent skilled operators and local workers will be employed at the site. The workforce will increase as each kiln is required to be brought into production. Mining and crushing will involve 10 employees. The first kiln will require 16 employees and each additional kiln 12 per kiln. Maintenance, laboratory, sales and weighbridge and management will be 16 employees. In full production a total of 78 employees is envisaged. Workers will be sourced from the nearest local community/town should the need arise during the operational phase.

The mine will contribute numerous positive impacts to the community with regard to socio-economic aspects through the effective implementation of the Social Labour Plan (SLP) Human Resources Development (HRD) Programme such as:

(a) Work opportunities to 26 workers;
(b) Provision of bursaries and learner ships to those in need;
(c) Skills development plan for employees;
(d) Local economic development plan that entails a skill development training programme for the community in an effort to boost the socio-economic status of the area,
(e) Contribution to the construction industry that is an important economic sector in the Vanrhynsdorp and surrounding areas.

This impact is expected to have a High Positive significance rating prior to and after the implementation of the recommended measures.

Impacts of visual intrusion on the landscape character due to the infrastructure (specifically crushing and screening plant) and visual nuisance of lighting at night at the mine may result in nuisance impacts on surrounding sensitive receptors.

Dust generating activities at Welverdiend may result in a decrease in ambient air quality and the subsequent nuisance impacts and health impacts. These are detailed in the air quality impact assessment.

Noise generating activities at Welverdiend may result in an increase in ambient noise levels and nuisance impacts at adjacent sensitive receptors, as detailed in the noise impact assessment.

Air Quality

Construction Phase

Depending on the daily-specific construction activities, dust emissions during the construction phase may vary significantly from day to day. Since the sequence and level of activities during construction are not known at this stage of the project, the emissions and impact will be assessed qualitatively.

In general, it is known that the emissions from the construction phase are normally much lower than those during the operational phase. The construction phase emission impact is expected to be short-term and localised to the working face and access road.

Operational Phase

The main fugitive emissions during the operational phase are dust and suspended particulate matter emitted from the vehicle movements on paved and unpaved roads, the aggregate handling and storage piles, the operations of the excavators, graders, truck loading and offloading, as well as wind erosion of exposed areas.

The emissions from the mining and ore processing operations are often estimated with emission factors that are available internationally.

Crushing and Screening

Crushing operations, if uncontrolled, may be significant dust-generating sources. Dust fallout in the vicinity of crushers also gives rise to the potential for the re-entrainment of dust emitted by vehicles or by the wind. The large percentage of fines in this dustfall material enhances the potential for it to become airborne. The emission factors for lime

Aggregate Handling and Storage Piles

The particulate emissions from the stockpiles can result from the following activities:

- Loading of aggregate onto storage piles (batch or continuous drop operations);
- Equipment traffic in the storage area;
- Wind erosion of pile surfaces and ground areas around piles;
- Loadout of aggregate for backfilling.

Unpaved Road Emissions

When a vehicle travels an unpaved road, the force of the wheels on the road surface causes particles to be lifted and dropped from the rolling wheels. The road surface is exposed to strong air currents in turbulent shear with the surface, as well as the air wake behind the vehicle. The quantity of dust emissions from a given segment of the unpaved road varies linearly with the volume of traffic.

Wind Erosion

The emission factor for wind erosion of an exposed area is given as 0.85 Mg of TSP

per hectare per year (USEPA). The estimated exposed area of 2 hectares was used in the calculation of emissions due to wind erosion. There is no PM_{10} emission factor specified for wind erosion. However, it is assumed that 40% of the TSP emission is in the PM_{10} range.

Atmospheric Dispersion Model

The AERMOD View from Lakes Environmental, Version 9.4 was utilised for the air pollution dispersion modelling. The AERMOD View is an air dispersion modelling system, which incorporates the popular USEPA models AERMOD, ISCST3 and ISC-PRIME into one interface.

The expected air quality impacts of the proposed mine was quantified via dispersion modelling. Based on the dispersion modelling results, the daily dust deposition, as well as the ambient concentrations of PM_{10}, NO_2 and CO, were well within their respective guidelines. Therefore, based on the above-mentioned methodology, the extent of the impact is considered ***local***. The duration of the impact and the impact phase will be ***long-term***. The ambient air quality is likely to be *negatively* affected, with **low consequence.** The probability of the impact occurring was considered ***probable***. Based on the provided methodology rating system, the resulting overall impact rating is ***Low***.

- **Dust Deposition**

  The dust deposition due to the mining activities can be seen in **Figure 63**. The daily dust deposition was calculated from the modelled maximum monthly dust deposition. The maximum dust fallout level occurred only within the quarry and reached the industrial limit of 1200 mg/m^2/day. For areas away from the mining face, the dust deposition off-site dropped below the residential guideline of 600 mg/m^2/day. The farmsteads near the mine are expected to have minimal dust impact, as the dust deposition outside the mining rights area was predicted to be below 10 mg/m^2/day.

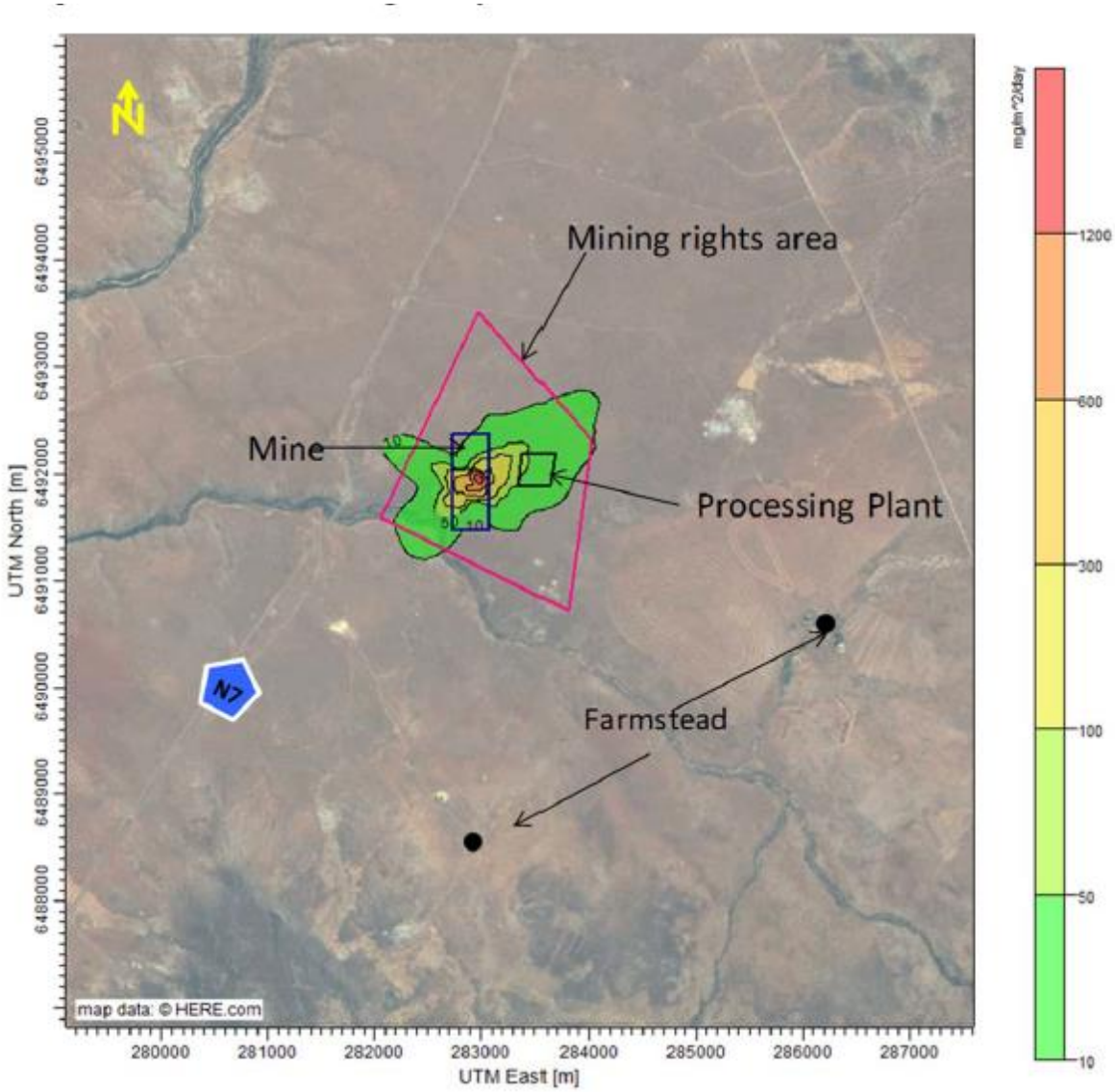


Figure 62: Dust Daily Deposition (Guideline: 600 mg/m^2/day)

➢ **PM_{10} Concentrations**

The PM_{10} ambient concentrations due to emissions from the mining activities and the calcination stack were modelled. The resulting modelled 24-hr (99th percentile) and the annual maximum concentrations contours for PM_{10} are shown in **Figure 64** and **Figure 65**. As can be seen, the 24-hr PM_{10} concentrations reached the guideline level of 75 µg/m^3 at approximately 500m – 800m to the southwest and southeast of the quarry. The 24-hr PM_{10} concentrations were below the guideline at areas 1km away.

The maximum annual concentrations reached 40 µg/m^3 at and within the immediate areas of the quarry. However, the concentrations reduced rapidly and dropped to 10 µg/m^3 at about 500m away.

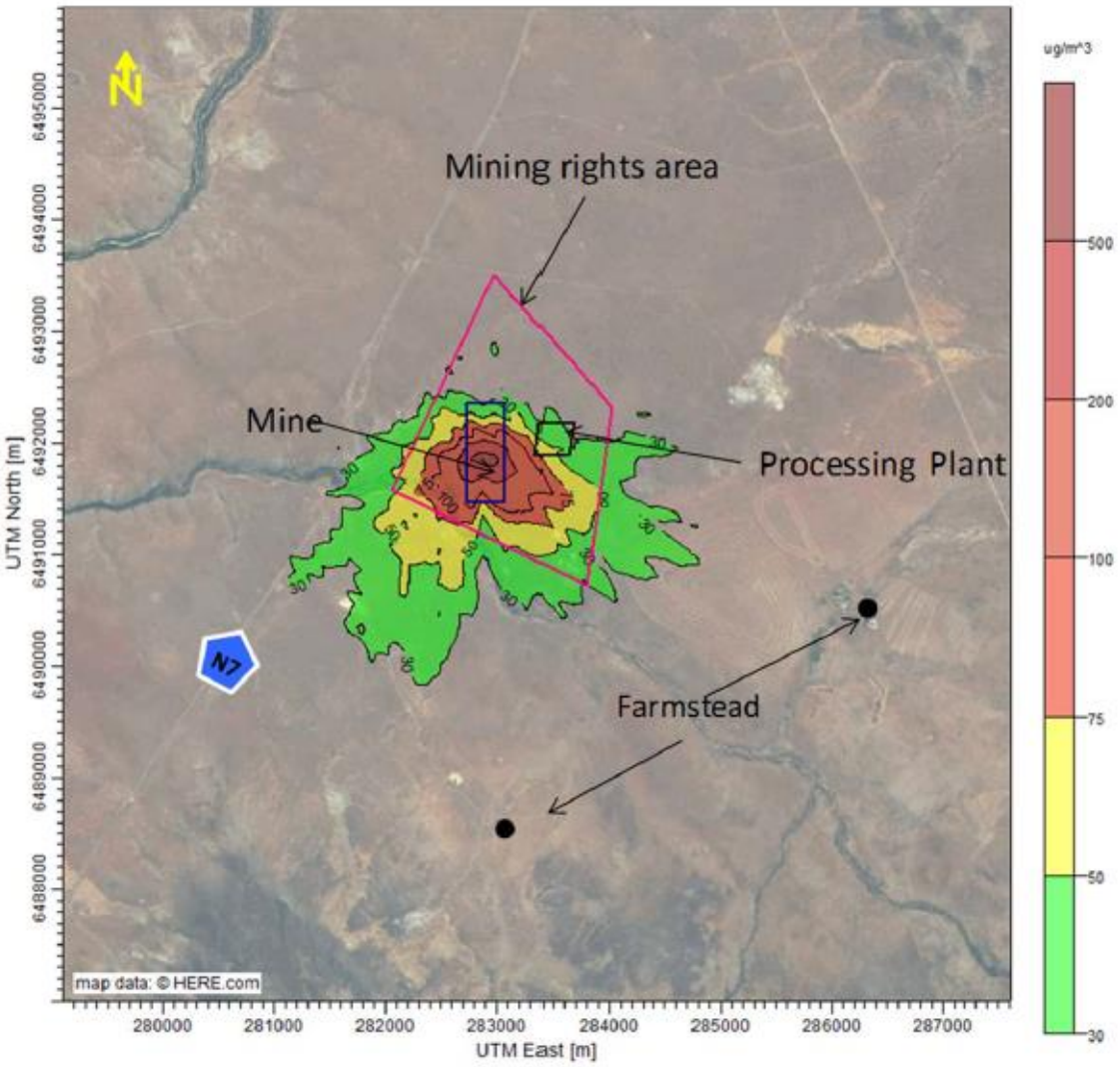


Figure 63: Maximum 24-Hour PM_{10} Concentrations (Guideline: 75 µg/m^3)

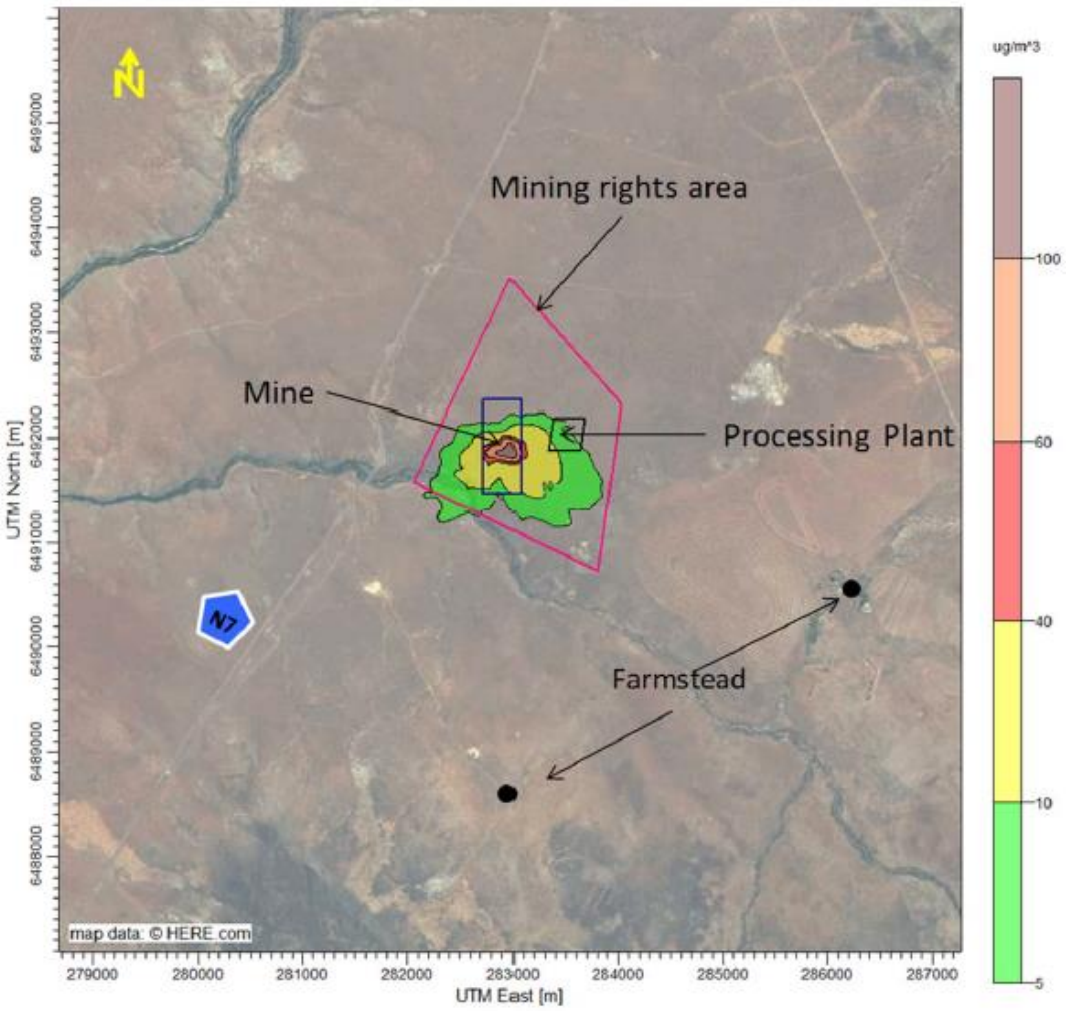


Figure 64: Maximum Annual PM_{10} Concentrations (Guideline: 40 µg/m^3)

➢ **Nitrogen Dioxide concentrations**

The nitrogen oxides emissions from the calcination stack were modelled using the Tier 1: Total Conversion Method. As such, a total conversion of the NO to NO_2 was assumed as the worst case scenario.

The modelled 1-hr (99th percentile) and maximum annual concentrations for NO_2 are shown in **Figure 66** and **Figure 67** below. The 1-hr NO_2 concentrations were well below the guideline of 200 µg/m^3. As can be seen, the 1-hr NO_2 concentrations in areas 500 m away were below 10 µg/m^3.

The annual NO_2 concentrations were very low and well within the guideline of 40 µg/m^3.

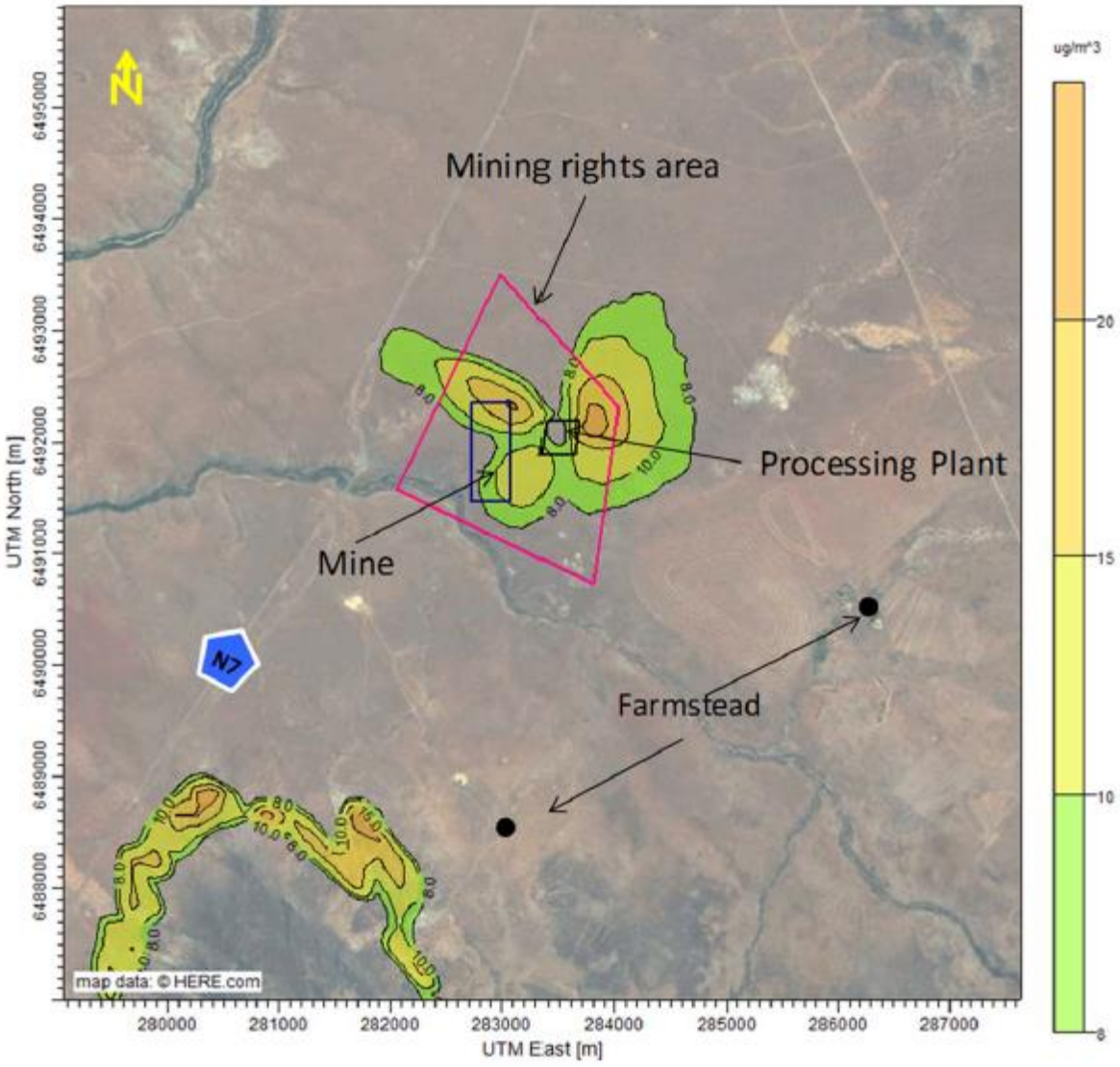


Figure 65: NO_2 1-hr Concentrations 99th Percentile (Guideline: 200 µg/m^3)

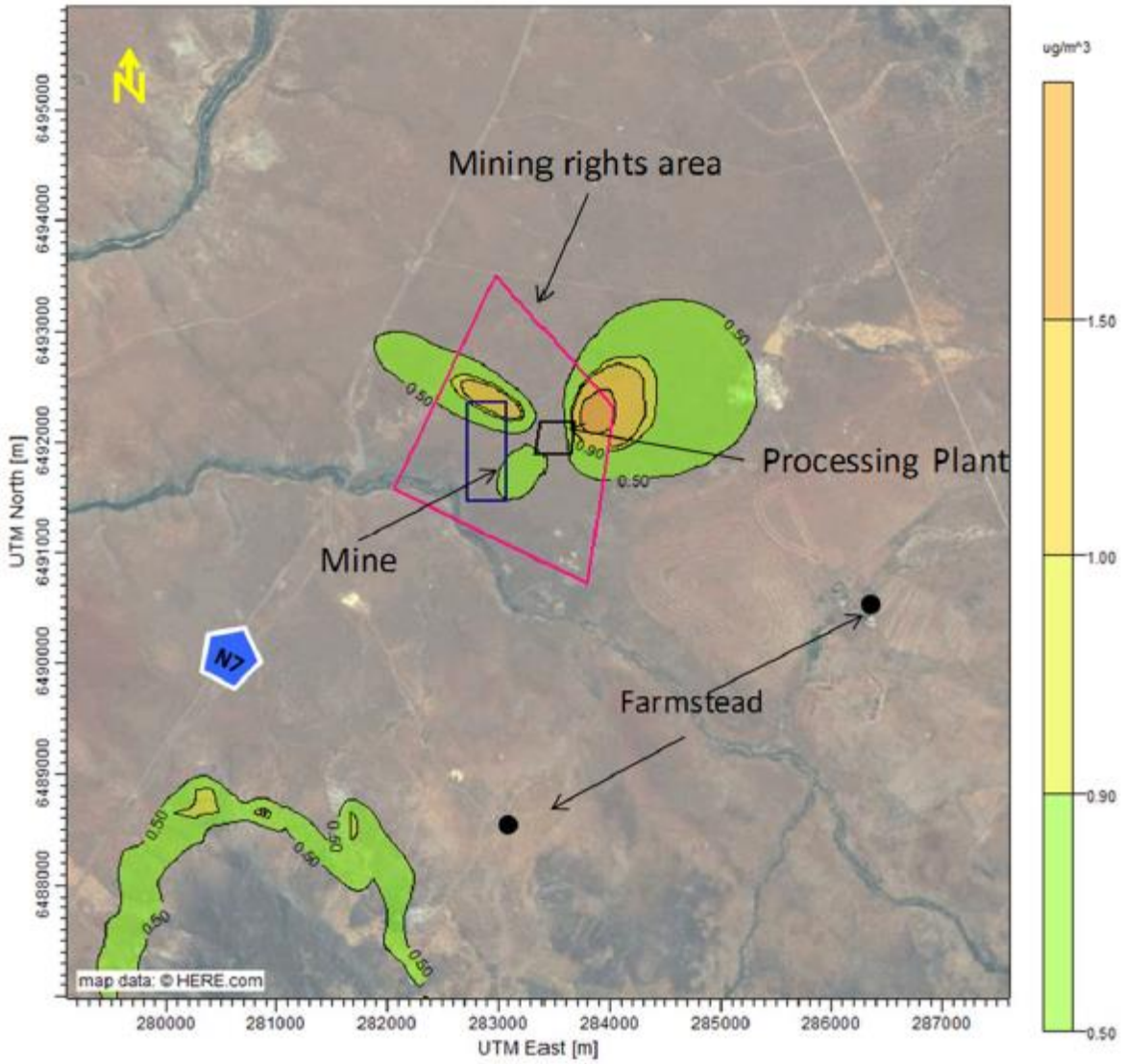


Figure 66: NO_2 Annual Concentrations (Guideline: 40 µg/m³)

- **Carbon Monoxide**

The carbon monoxide emissions from the calcination stack were modelled as well, despite its low emission level. Figure 68 below shows the maximum 1-hr concentration isopleths of CO. As can be seen, the modelled CO concentrations were well below the guideline of 30,000 µg/m³.

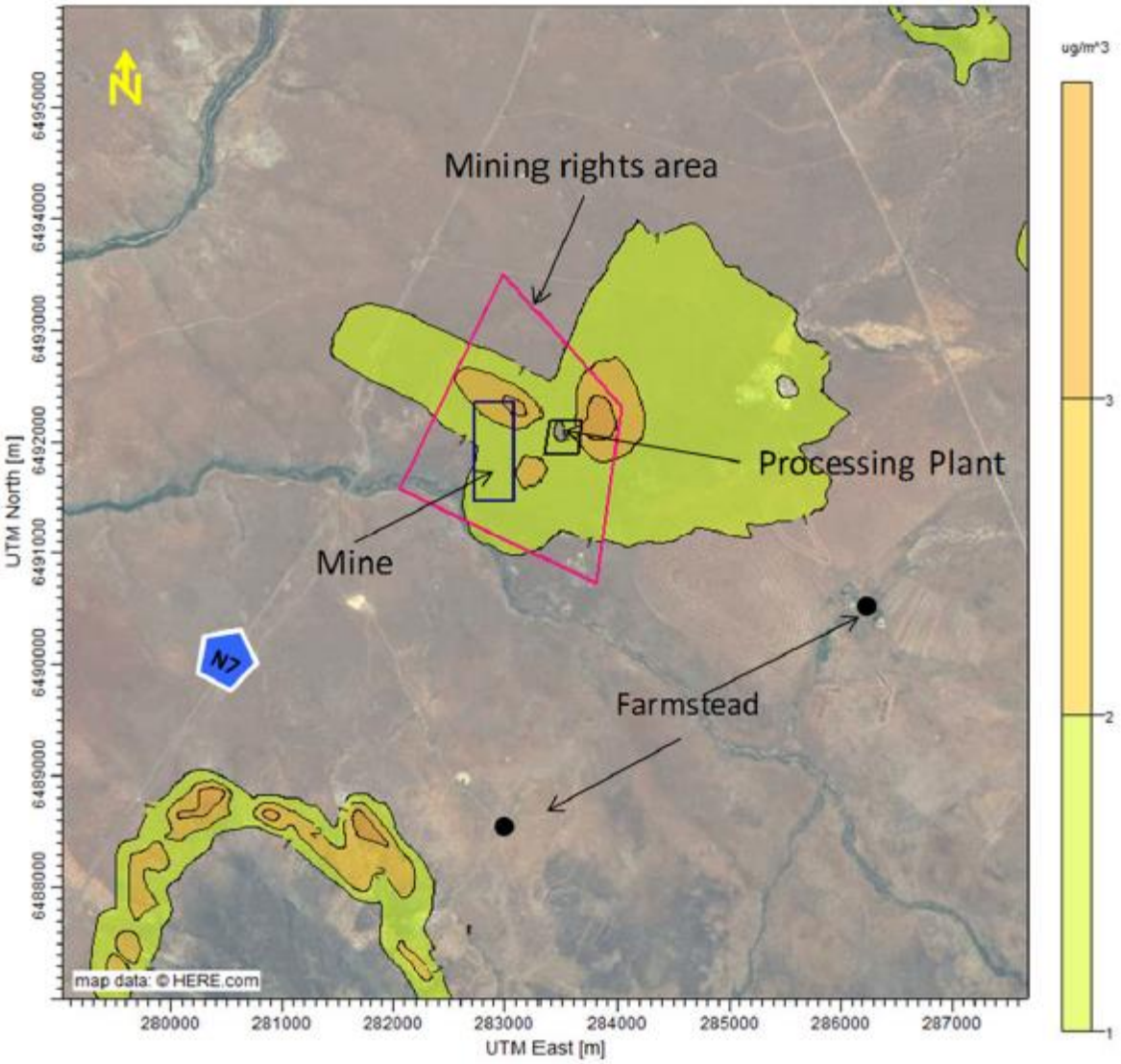


Figure 67: CO 1-hr Maximum Concentrations (Guideline 30,000 µg/m^3)

Cumulative Impacts

Noise

Cumulative impacts should be considered for the overall improvement of ambient noise levels. The proposed project is considered a causative source of noise pollution of a minor significance that may contribute to the increase of the ambient noise levels in the area.

Air quality

The mining activities will result in dust nuisance caused by blasting, crushing and screening of dolomite

Socio-economic

Cumulative socio-economic impacts are as per the impacts listed for air quality, noise, soil erosion and, as these affect the sensitive receptors identified for the environmental

aspects.

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

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

Specialist studies identified key issues and impacts that required thorough investigation. All identified potential impacts and risks were assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria for the description and assessment of environmental impacts were drawn from the EIA Regulations 2014. The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

The significance of both positive and negative potential impacts were determined through the evaluation of impact consequence and likelihood of occurrence. The significance of potential impacts that may result from the proposed project was determined in order to assist decision- makers

The significance of both positive and negative potential impacts were determined through the evaluation of impact consequence and likelihood of occurrence.

The significance of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The following risk assessment model has been used for determination of the significance of impacts.

SIGNIFICANCE = CONSEQUENCE X PROBABILITY

WHERE Consequence = Extent + Intensity + Duration

The criteria used to determine impact consequence are presented on the table below. Each rating has been allocated a score weighting

Table 1: Criteria used to determine the Consequence of the Impact

Rating	Definition of Rating	Score
A. *Extent - the area over which the impact will be experienced*		
Local	limited to the immediate area(s) around the project site -	1
Regional	extends over a larger area that would include a major portion of an area or province	2
National/International	nationally or beyond	3

Rating	Definition of Rating	Score
B. *Intensity - the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration– the lifetime of the impact, that is measured in relation to the lifetime of the proposed development and its reversibility		
Short-term	(0 to 3 years)	1
Medium-term	(3 to 10 years) confined to the construction period	2
Long-term	(more than 10 years)	3
Permanent	beyond the anticipated lifetime of the project	4

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 2: Method used to determine the Consequence Score

Combined Score (A+B+C)	3 – 4	5	6	7	8 - 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence was derived, the probability of the impact occurring was considered. Probability of impact occurrence - this describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time

- Improbable (very low to low likelihood).
- Possible (likely).
- Probable (distinct possibility).
- Definite (the impact would occur regardless of prevention or mitigation measures)

The probability of the impact using is presented in the table below.

Table 3: Probability Classification

Probability– the likelihood of the impact occurring	
Improbable	1
Possible	2
Probable	3
Definite	4

The overall significance of impacts was determined by considering consequence and probability using the rating system prescribed below

Table3: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	INSIGNIFICANT	INSIGNIFICANT	VERY LOW	VERY LOW
	Low	VERY LOW	VERY LOW	LOW	LOW
	Medium	LOW	LOW	MEDIUM	MEDIUM
	High	MEDIUM	MEDIUM	HIGH	HIGH
	Very High	HIGH	HIGH	VERY HIGH	VERY HIGH

Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of mitigation and optimisation measures.

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** the proposed activity should only be approved under special circumstances

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

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

Specialist studies assessed the site based on the current/existing layout of the site which is considered as the final layout. The proposed project layout is preferred from the environmental perspective as the mining occurs within a heavily transformed and disturbed area. In general, the proposed mine is not located in a sensitive environment, no direct impact on fauna and flora is expected.

Refer to Section V above for the positive and negative impacts that the proposed Welverdiend Project (final layout) may have on the biophysical and socio-economic environment.

v. **The possible mitigation measures that could be applied and the level of risk.**

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

The I&APs highlighted the following proposal to be considered during the operation of the mine:

vi. **Motivation where no alternative sites were considered.**

The proposed Welverdiend Mine is required in order to support Cape Lime's limestone mining operations and is dictated by the locality of the limestone reserve. The proposed extension will take place in a land that has been authorized for mining activities and a mining right has been granted by DMR.

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

As mentioned above, the proposed dolomitic extension is required in order to support Cape Lime's limestone mining operations and is dictated by the locality of the limestone reserve. The final layout of the site was guided by the existing biophysical perspective of the site. The existing surface infrastructure has not been placed on sensitive areas at all and the proposed infrastructure required for the operation of the mine will not be placed on sensitive environment.

f) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity. (Including (i) a description of all environmental issues and risks that erer identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

The process utilised to identify the impacts of the proposed activity included:

- Observations based on site visits;
- Input from the specialist baseline assessments and recommendations;
- Input from public participation;
- Consultation and discussions with the project team and Applicant;
- Application of previous knowledge and experience by the EAP for these types of projects in ; and
- Knowledge and experience in the implementation of the EIA Regulations (2014). `

In terms of accessing and ranking the impacts, the EAP identified all environmental activities, aspects and impacts pertinent to the area and activity. This was supported by the identification of receptors and resources, which allowed for an understanding of the impact pathway and an assessment of the sensitivity to change. The identification and degree of assessment was based on the understanding of the following:

- An **activity** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are controlled by an organisation;
- An **environmental aspect** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact;
- **Environmental risks / impacts** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity;
- **Receptors** comprise but are not limited to people or man-made structures;
- **Resources** include components of the biophysical environment;

The significance of the impact was then assessed by rating each variable according to defined criteria provide is Section (iv) above. The purpose of the rating was to develop a clear understanding of influences and processes associated with each impact, both with and without mitigation.

g) Assessment of each identified potentially significant impact and risk

Table 21: Assessment of identified potentially significant impacts and risk

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**SIGNIFICANCE** if not mitigated	**MITIGATION TYPE** **(modify, remedy, control, or stop) through** **(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** **Modify through alternative method.** **Control through noise control** **Control through management and monitoring through rehabilitation..**	**SIGNIFICANCE** if mitigated
Demarcation of the mining area	Disturbance outside the mining area	Land outside the mining area	Before Construction commence and throughout Operation	Medium - High	• Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control by maintaining a buffer area of 250 to 300 meters between the Wiedou River and mining activities at all times • The area of the site that protrudes into the CBA must be excluded as an offset for conservation purposes.	Low

					The area must be properly demarcated and regarded as no-go area in terms of mining operations.	
Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Dust generation	Air quality	Construction and operation	Moderate	• Control through dust suppression • Control through limiting the speed of vehicle movement to a maximum speed of 40km/h • Control through monitoring of dustfall to determine if measures are effective • Progressive rehabilitation will be implemented to minimise exposed areas on mining areas and haul roads • Covered conveyors will be used for transporting the crusher ROM and calcination plant feed • The irrigation system will be utilised at the outlet of the product (agricultural lime). • Calcination stack emissions - Several bag filter units will be installed to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License	Low
Clearance of land for establishment of infrastructure (processing plant and construction kilns)	Soil erosion, compaction And contamination	Soil	Construction and Operation	High/Moderate	• Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilisable soil and storage of the same • Control through implementation of storm • Prevent through establishment of runoff cut-off trenches and detention ponds on the down-slope side of mine. • Progressive rehabilitation will be implemented to minimise exposed areas	Moderate/Low

Clearance of land for establishment of infrastructure (processing plant and construction kilns)	Invasion by alien invasive species	Vegetation	Construction and Operation Construction and operation	Moderate	• Control though alien invasive eradication programme	Low
	Impact on vegetation type, habitat and CBA's			Construction	• Avoid or minimise by moving mining activities slightly further away (northwards) from the Wiedou River. A buffer of 250-300 m between the river and mining activities should be maintained. • Manage through search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the vygieveld adjacent to the mining site, a safe distance away from the mining area. Search, rescue, and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season.	

Clearance of land for establishment of infrastructure (processing plant and construction kilns)	Visual impact	Visual receptors		High	• Avoid/prevent leaving any building material or waste on site • Proper upkeep and maintenance of the site must be done. • Vegetation cover should be maintained at the periphery to reduce the visual impact. • Where necessary, vegetated areas should not be disturbed until existing quarried areas are exhausted. • Use overburden to create berms to reduce impact of excavations in the pit • Avoid using shiny material on the kilns	High/Moderate
	Destruction of Heritage Resources	Archaeological or heritage features	Construction and operation	Medium	• Prevent through establishing buffer zones around potentially significant archaeological remains that occur outside the footprint of the proposed Mine Area and the proposed Plant Area • Prevent through reporting of substantial fossil remains (e.g. vertebrate teeth, bones, petrified wood, stromatolites, shells, trace fossils) be exposed during mining, the ECO should safeguard these, preferably in situ, and alert Heritage Western Cape (Mr Andrew September 021 483 9543) as soon as possible so that appropriate action (e.g. recording, sampling or collection) can be taken by a professional palaeontologist at the developer's expense	Low

	Destruction of Heritage Resources	Archaeological or heritage features	Construction and operation	Medium	• If during the construction/mining, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • The senior on-site Manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing SAHRA/PHRA. • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency exhumation permit may be issued by SAHRA for an archaeologist to exhume the remains.	

Stripping and stockpiling of topsoil	Soil erosion	Top soil	Operational	Medium	• Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Soil stripping should forbidden on areas not required for mining work • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order	Low

	Stormwater run-off	Soil	Construction and Operational		• Adequate storm water drainage system must be designed and maintained to adequately control the volume, speed, location of runoff, to avoid soil erosion and siltation. • All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; • Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. • Manage drainage and runoff from dumps using clean and dirty water system • A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off water if applicable • Ensure that the haul road verges are allowed to vegetate to ensure that erosion of these is minimised • Construct any necessary erosion protection works in the mining pit and overburden Gabions, reno mattresses or other stabilising structures and materials could be considered • Avoid development in drainage zones by staying outside of demarcated buffer zones.	

Hauling and Transportation material from mining area to clients	• Dust pollution • Pedestrian safety on site	Air quality	Construction and Operational	Medium	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation of excess dust by limiting speed limit to 40km/h • Monitor by equipping mine vehicles with silencers • Mineral transportation shall be carried out through covered trucks only and vehicles carrying the mined material must not be overloaded. • It is recommended that a wheel washing facility be installed and used. • Control through minimisation of vehicle movement • Control by monitoring trucks that collect material to ensure that they are covered	Low
Coal storage	Soil contamination	Soil	Operational	Medium	• Control by storing coal on a concrete floor and contained storage pad with storm water collection.	Low
Traffic	Congestion of vehicles and impact on pedestrians	Traffic	Construction and Operational	Medium	• Turning lanes into and out of the site have been created on the N7 • The additional traffic that will be generated by the constructional and the operational activities of the proposed mine expansion and kilns will have a minimal impact on the traffic on N7 and the pedestrians as none were observed on the surrounding network. The additional traffic volumes will not create any conflict. • Limit or reduce traffic congestions for road users when transporting abnormal loads must be ensured	Low

Placement of mobile ablution facility/ies within the boundaries of the site	Contamination of soil and groundwater resources	Leakage of the toilet	Construction	Medium	• Control through regular servicing/emptying chemical toilets. Proof of this must be obtained and kept on record. • Ensure that all septic tanks or any ablution facility are located outside of the 1:100 year flood line.	Low
Noise generation	Noise pollution to surrounding neighborhood	Sensitive receptors working on site and those outside the site	Construction, operation and Decommissioning	Medium	• Limit operation time to daylight hours between 07h00 and 18h00. • Regular servicing of mining equipment to ensure noise suppression mechanisms are effective e.g. install exhaust mufflers • Switching off equipment when not in use • Employees be obliged to use individual protective equipment against exaggerated noise in the work environment • Conduct high level noise activities during the day to avoid the inconvenience caused by noise during the night in locations occupied by humans, or sensitive to noise.	Low
Drilling and Blasting	• Dust resulting from blasting • Fly rock • Noise resulting from blasting	• Air Quality • Ambient noise levels	Operation	Medium	• Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest • Conduct Seismograph calibration tests to ensure that blasting standards are met • Control by limiting blasting operations to daylight hours when ambient noise levels are highest	Low

Waste generation, storage and disposal	• Land pollution • Hazardous Leachate • Illegal dumping	Land pollution	Construction, Operation and Decommissioning	Medium	• Ensure segregation of hazardous wastes from non-hazardous. • During the construction phase, temporary storage of construction waste to be stored in a bunded designated area. • No burning of refuse wastes are on the premises or on surrounding premises • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • Sealable bins and containers must be made available for the storage of all streams of waste throughout the site. • Waste bins must be emptied on a regular basis as to ensure bins do not overflow. • No littering will not be permitted on site and general housekeeping should be enforced • Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof. • Separate waste skips/ bins for the different waste streams must be available on site • Do not dump waste of any nature, or any foreign material into any drainage line or stream • All waste to be disposed off at a suitably registered waste disposal facility • A suitable and registered waste service provider must remove all waste materials off site. • Proof of disposal to be obtained and kept on record	Low

Employment of Workers, skills training and procurement of construction materials	Job creation	Job creation	Construction & Operational	Positive impact	• During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations. • Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made. • Maximise and monitor local recruitment where required. • Promote employment of women and youth. • Train locally recruited construction workers for longer-term employment where possible. • Support economic diversification through development of alternative markets.	Positive impact
Abstraction of groundwater from a borehole	Depletion of groundwater resources	Groundwater resources	Operational	Moderate	• Prevent restricting abstraction to proposed 25-meter excavation depth • Regularly monitor groundwater levels • Regularly assess monitored information monthly in summer • Appoint a hydrogeologist to assess and provide mitigation should there be fluctuations in groundwater levels or there is an increase of 25% in electrical conductivity	Low
	Groundwater deterioration					

Fuel and oil storage	• Soil and groundwater contamination	Soil and ground water pollution	Operational and Decommissioning	Medium	• Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Oil spill kit must be kept on a clearly visible area • Oil spills to be cleaned immediately and affected ground/soil to be uplifted and bagged for removal off site to approved dump facility for hydro carbons or treat affected soil accordingly • All personnel must wear issued PPE at all times as indicated by safety signs. • Fuel storage facilities must be inspected on a regular basis. • Spill prevention measures to be implemented at all times. • Fire fighting equipment such as fire extinguishers must be made available and be inspected on a regular basis. • A spill kit must be made available at all time. • All spills to be cleaned immediately. • Storage facilities must be inspected on a regular basis. • All leaks to be repaired immediately • Chemical storage must be designed with a 110% capacity of the stored fuel to reduce the possibility of soil and water contamination. Alternatively, if portable fuel tanks are used, drip trays must be used when refueling and the integrity of such tanks must be maintained	Low

Rehabilitation	Soil erosion	Soil	Operational and Closure		• Prevent through restricting the disturbed area	
	Establishment of alien invasive vegetation	Alien invasive plant	Operational and Closure		• Control though ongoing alien invasive eradication programme • Prevent through restricting the disturbed area • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Regular follow up clearing of alien invasive species would be required in order to obtain successful rehabilitation • Mining should be phased, starting at the lowest point (closest point to the Wiedou River). • Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • The primary means of rehabilitation should involve the replacement of topsoil and hydro-seeding with an indigenous grass seed mixture at the start of the rainfall season (June). A suitably experienced landscaping contractor should be appointed to undertake rehabilitation. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels • Phased restoration reclamation and rehabilitation of the land affected by mining must be completed prior to the final decommissioning of the mine	

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

h) Summary of specialist reports.

Table 22: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Heritage Impact Assessment Study	**Archaeology** The proposed mining of the ± 34ha dolomitic ore reserve on Farm Welverdiend No. 511, as well as construction and operation of a large plant facility, will impact negatively on archaeological heritage that will result in the irreversible loss and destruction of archaeological resources. **Palaeontology** According to Almond (2017:18), `the overall impact significance of the proposed mining development is inferred to be LOW because most of the study area is mantled by superficial sediments of low palaeontological sensitivity and the Precambrian bedrocks are almost certainly unfossiliferous. No further specialist studies or mitigation regarding fossil heritage are considered necessary for this project'. Mining of the 34ha ore reserve should be allowed to proceed, subject to the following conditions, which must be approved by Heritage Western Cape. • Buffer zones must be established around potentially significant archaeological remains in the proposed Plant Area, once the final layout of the logistical facility has been established.	X	Section 14 of the Heritage Impact Assessment Report attached as Appendix D1.

	• A targeted collection of archaeological resources (i. e. Sites 3191, 3231, 3251, 3261, 3291, 3301, 3312, 3321, 3331, 3351, 3361, 3371, 3381, 3401 & 3421), must be undertaken in the Plant Area if buffer zones are not practical or feasible. • Buffer zones must be established around potentially significant archaeological remains that occur outside the footprint of the proposed Mine Area (i. e. Sites 0512 & Sites 3018-3111), and the proposed Plant Area (i.e. Sites 0592, 0632, 0652, 0682 & 0692). • A Development Heritage Management Plan (DHMP) must be implemented to manage the activities and phases of the development that may impact heritage resources within and outside, the mine application area. This will ensure no accidental or indirect impacts occur during all phases of the proposed development. • In order to ensure that heritage resources are not negatively impacted by mining operations and operation of the mine plant area, ongoing management and monitoring must be undertaken. • Should any unmarked human remains or ostrich eggshell caches be exposed or uncovered during prospecting, or trenching activities, these must immediately be reported to the contracted archaeologist (J Kaplan 082 321 0172), or Heritage Western Cape (Mr Andrew September 021 483 9543). Burials must not be disturbed until inspected by the archaeologist, or the Heritage Officer.		

Ecological Impact Assessment Study	The proposed mining site is located inside a largely untransformed, but severely degraded or overgrazed shrubland, classified as Knersvlakte Dolomite Vygieveld and Vanrhynsdorp Gannabosveld. The largest portion of the mining site lies inside the latter. None of the vegetation types are currently considered as threatened. Being well represented and not threatened, the impact on vegetation type will be of low significance, with mitigation. The southern portion of the proposed mining site, being located inside Knersvlakte Dolomite Vygieveld and encroaching onto the Wiedou River, poses the greatest impact as this area is more species rich and potentially more sensitive to erosion. This area should rather be avoided. The impact on biological linkage is also likely to have some significance, due to the mining area extending into a CBA associated with the Wiedou River. Alien infestation and the impact on indigenous fauna will be of a lesser concern. The impact is expected to be long term to permanent, depending on rehabilitation success after the completion of mining activities. It is recommended that the mining application be approved if the following mitigation options are adhered to: • The impact on Knersvlakte Dolomite Vygieveld, the Wiedou River and associated CBA can be avoided or minimised by moving mining activities slightly further away (northwards) from the Wiedou River. A buffer of 250-300 m between the river and mining activities should be	X	Ecological Impact Assessment Report has been attached as Appendix D3:

Archaeological Mitigation	This mitigation project has clarified the challenges encountered by the first researcher during Phase 1. The observation that the sites and lithic scatters were mixed up during tillage is very significant in terms of the subsequent approach to the study, as well as the significant assessment. The majority of the studied are predominantly MSA in character but ESA and LSA material are also represented. The presence of chunks (cores) at several sites intimates that some of the sites were production centres but the subsequent farming activities have robbed these potential IIIB sites of their significance. In their current state, none of the studied sites are particularly special, even though the material still has some teaching value. The mitigation project has re-visited the proposed development area, re-surveyed and re-mapped the sites based on informed observations, and sampled surface collections from the sites in order to clear the area for the proposed limestone mining and kiln construction. While the area is now deemed to be clear of significant archaeological resources, and it is recommended that mining can proceed, if any human remains or accumulations of archaeological material are discovered during construction or mining activities, work should stop immediately and the finds must be reported to HWC. The procedure for reporting chance finding must be clearly followed.	X	Archaeological Mitigation Assessment Report has been attached as Appendix D2

Agricultural Impact Assessment	With the exception of one small area of a few hundred m2, the entire site is covered by shallow, non arable stony soils of the Mispah Soil Form. Topsoil depth ranged from a nominal 50 mm to 250 mm. The soils are shallow sandy gravel and stone chips over solid rock, which precludes them from being used as arable land. The proposed development will have no effect on the physical or chemical properties of the soils. Rehabilitation of similar soils has been successfully carried out in other parts of the Karroo, the closest being at nearby Nieuwoudtville. The assessment concurs with the Agricultural Theme Sensitivity Map provided by the DEA website. This map reflects the proposed mining site and link road as falling into a low sensitivity area, numerically defined as land having a score of between 1 and 5. The empirical evidence gathered at site suggests that the appropriate numerical sensitivity rating for the study is between 1 and 2. There is no agronomic or agribusiness reason why the mining operation should not be approved Annotated photographs illustrating the Mispah Soil Form as present at the site appears in Picture Galleries under Appendix 11.14 of the Agricultural Report. A table providing the physical properties of each profile examined constitutes Appendix 11.7 hereto.	X	Agricultural Impact Assessment Report has been attached as Appendix D6

Air Quality Impact Assessment Study	Based on the dispersion modelling results, the daily dust deposition, as well as the ambient concentrations of PM_{10}, NO_2 and CO, were well within their respective guidelines. Therefore, based on the assessment, the extent of the impact is considered local. The duration of the impact and the impact phase will be long-term. The ambient air quality is likely to be negatively affected, with low consequence. The probability of the impact occurring was considered probable. Based on the provided methodology rating system, the resulting overall impact rating is Low. Based on the modelling results, no additional mitigation measures are considered necessary, other than those indicated The planned air quality management interventions include the following: ➢ Mining Area and Haul Roads: • Progressive rehabilitation will be implemented to minimise exposed areas. The proposed mining method for the project is strip mining. This approach enables pit spoiling to start within the two years of commencement of mining. • Water trucks and water cannons will be used only when it's absolutely necessary. ➢ Wind Erosion of Stockpiles: • Covered conveyors will be used for transporting the crusher ROM and calcination plant feed. • The irrigation system will be utilised at the outlet of the product (agricultural lime). The control efficiency of for the above control measures is 95%. ➢ Calcination stack emissions: Several bag filter units will be installed to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License. Also, the stack will also be monitored daily, and the bag filters are regularly inspected to make sure it is in good working condition. Taking the above mentioned into consideration the control	X	Air Quality Impact Assessment Report as attached Appendix D3

	efficiency of up to 99 % can be achieved.		

i) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

This Environmental Impact Assessment illustrates that there are various potential negative and positive impacts that may arise as a result of the extension of limestone mine at the Welverdiend Mine which will have an effect on the following environmental components:

- Terrestrial ecology;
- Air quality;
- Heritage;
- Soils and land capability
- Social environment; and
- Visual aesthetics.

However, no impacts which could cause detrimental harm to the environment were identified as part of this assessment, should the prescribed mitigation measures proposed as part of this report, as well as in the attached Impact Assessment and Environmental Management Programme (EMPr) be implemented.

The proposed extension of the mine and construction of associated infrastructure of the Welverdiend mining operation will be established in an area that has already site is located inside a largely untransformed, but severely degraded or overgrazed shrubland, classified as Knersvlakte Dolomite Vygieveld and Vanrhynsdorp Gannabosveld. None of the vegetation types are currently considered as threatened. Being well represented and not threatened, the impact on vegetation type will be of low significance, with mitigation

Given the location of the existing quarry in an agricultural area with limited receptors, the significance of the operation of the kilns and crushing plant is considered to be low. The only high impact identified is considered to be positive and that relates to the employment opportunities that will be created by the operation of the mine. Potential candidates for employment will be sourced from the nearby local communities.

Further, assuming all phases of the project adhere to the conditions stated in the EMPr (Part B of this report) it is believed that the noise and air quality impacts associated with the proposed extension of the mine and associated infrastructure will have low significant, adverse environmental impact on the surrounding environment. The location of the crushing plant have been graded as having potentially *medium* (Grade 3B) because of the context in which the finds were made (i. e. stone tool production areas). These *in situ* sites are mostly associated with heuweltjies, on older land surface that are dotted around the proposed logistical facility which need to be considered during construction and operation. The activity is also considered to be sustainable given the presence of limestone evident within the quarry, the existing Mining Right under which current mining area that is being extended occur and the market demand for the limestone

produced.

(ii) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers .Attach as **Appendix A4**

The composite plan for the project area, indicating sensitive areas, heritage resources watercourse buffers, is included as Appendix A4.

(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

A number of significant impacts associated to the proposed activities have been identified in previous section in this report as part of the EIA process. In the review of the specialist assessment reports highlighted in section j) specific environmental and social sensitive receptors were identified. The table below summarises the high significant potential impacts associated to the proposed limestone mine extension.

Table 23: Summary of positive and negative impacts

Activity	Potential Impact
CONSTRUCTION PHASE	
Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Dust pollution
	Soil erosion, compaction and contamination
	Invasion by alien invasive species
	Impact on vegetation type, habitat and CBA's
	Visual Impact
	Noise impact
	Destruction of Heritage Resources
Stripping and stockpiling of topsoil	Soil erosion
Social impacts	Employments opportunities
	Health, Safety and Security issues
Placement of mobile ablution facility/ies within the boundaries of the site	Leakage of the toilet chemical into the soil
Waste management	Land pollution
	Hazardous Leachate

OPERATIONAL PHASE	
Topsoil and subsoil stripping & stockpiling for mining operation area	Erosion
	Destruction of heritage resources
	Vegetation and habitat loss
	Alteration of the visual environment and topography
Operations of the kilns	Emission of noxious fumes
Fuel storage	Hydrocarbon Contamination
	Contamination of water Resources
	Chemical Fires
	Degradation of soil resources
Coal storage	Soil contamination
Drilling and Blasting	Dust resulting from blasting
	Fly rock
	Noise resulting from blasting
Transport material from mining area to clients	Dust pollution
	Pedestrian safety on site
Social Impacts	Employment opportunities
	Health, Safety and Security issues
Waste management	Land pollution
	Soil contamination
DECOMMISSIONING PHASE	
Demolition / removal of portable and related infrastructure	Erosion
	General Waste generation and Littering
Rehabilitation of the lay down, stockpile and mining areas	Erosion

	Influx of alien invasive vegetation
	Degradation of soil resources
Demolition of workshops, waste storage facilities, fuel storage facilities etc.	Hydrocarbon contamination
	Degradation of soil resources
	General waste generation & Littering

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

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

The purpose of the EMPr is to provide relevant management measures to conduct activities with due care and diligence, as well as avoid / limit any adverse impacts of the operation. The EMPr is compiled to help control impacts that may occur to meet acceptable standards, both as a legal and social responsibility to the environment within which the activity takes place. The purpose of the EMPr is to provide relevant management measures to conduct activities with due care and diligence, as well as avoid / limit any adverse impacts of the operation. The EMPr is compiled to help control impacts that may occur to meet acceptable standards, both as a legal and social responsibility to the environment within which the activity takes place.

The objectives for the EMPr are:

- To develop, implement and maintain effective management systems for the environmental aspects of the mine extension;
- To document details of environmental protection infrastructure and controls so that they are able to provide long term protection for the natural environment;
- Ensuring compliance to legislation, regulations, and national standards throughout the life cycle of the project;
- Ensure that activities are carried out so as to aid rehabilitation;
- All Environmental Management considerations are implemented during the construction, operational and decommissioning phases of the project

The following socio–economic objectives should be attained during the entire life cycle of the proposed activities:

- Adhere to an open and transparent communication procedure with stakeholders at all times.
- Ensure that accurate and regular information is communicated to I&APs in a manner which is understandable and accessible.
- Mitigate negative impacts.
- Enhance Project benefits and minimise negative impacts through intensive consultation with stakeholders.
- Assemble adequate, accurate, appropriate, and relevant socio-economic information relating to the context of the operation.
- Ensure that recruitment strategies for the mine, prioritise the sourcing of local labour, and share in gender equality.
- Ensure an atmosphere of equality and non-discrimination among the workforce.
- Contribute to the development of functional literacy and numeracy among employees.
- Empower the workforce to develop skills that will equip them to obtain employment in other sectors of the economy.

- Contribute to the development of a self-reliant (not dependent on the mine) community surrounding the area of operation.
- Ensure that decommissioning and retrenchments take place in a legally compliant and humane manner.

k) Final proposed alternatives.

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

As discussed in the previous sections no alternatives where considered regarding the properties proposed for the activities.

Specialists assessed the potential impacts of the preferred final layout and from the findings of the assessments no further alternatives assessed during the EIA phase were assessed. The findings indicated that the preferred final layout adopted from the existing mine layout would not result in any fatal flaws in terms of environmental and socio-economic impacts as all of the impacts can be fully mitigated and managed, and where possible prevented.

l) Aspects for inclusion as conditions of Authorisation.

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

The conditions for authorisation are recommended to include the following:

- All mitigation measures and management of identified impacts recommended by the Specialists as part of this report and EMPr must be adhered to and implemented during the con and operational phases of the project;
- Alien vegetation eradication and monitoring plans need to be instituted to address and control existing alien vegetation on the property
- A land use application to be lodged an approved by Matzikama Municipality prior to commencement of any mining and/or construction activities on the site
- Obtain other permits and authorisations as may be required, including, but not limited to, water use license, air emission license, Conservation of Agricultural Resources Act, 1983 (ACT NO 43 OF 1983) (CARA) application for clearing or removal of topsoil and land-use zoning;
- Conditions stipulated in all other permits or authorisations must be implemented;
- In terms of NEMBA, alien eradication and monitoring plans need to be compiled to address existing alien vegetation on the property and to control invasive species on the whole mining right area;
- A dust monitoring system is to be established and managed by the Applicant to determine the dust fallout generated on site by activities;
- Identify other dust suppression mechanisms since the project area has been declared as a water crisis region;
- Search and rescue must be conducted by experienced botanical specialists or horticulturists. Plants can be kept for rehabilitation if they are likely to survive, otherwise they must be planted in nearby areas of similar habitat which are preferably protected or at least not likely

to be disturbed by mining or ploughing. Suitable receiving areas should be identified by the botanical specialist before clearing commences;

- The Wiedou River ecological corridor is considered a macro corridor that should be protected to help mitigate the impacts of climate change and a minimum of a 300m buffer on the north side of the river should be protected from further development;
- Every effort should still be made to rehabilitate the mining area however and a rehabilitation specialist should be contracted to provide advice on the best rehabilitation methods for the site;
- Maintain lines of communication with the neighbours of properties close to the mine;
- Undertake continual closure and rehabilitation concurrently with active mining;
- Revise closure cost assessment on annual basis as required by NEMA;
- Conditions stipulated in the final EMPr and closure plan must be adhered to;
- The design and operation on the proposed dolomitic lime: kilns must comply with the Minimum Emission Standards identified in section 21 of the NEM:AQA, listed under Category 4 (Subcategory 4.1) and Category 5 (Subcategory 5.6) of GN No. 893 of 22 November 2013. The manner in which the measurement of minimum emissions standards must be carried out as required by section 21(3)(a)(ii) of the NEM:AQA. must be in accordance with the sampling and analysis methods listed in "Annexure A" of the GN No. 893 of 22 November 2013;
- In terms of monitoring, it is recommended that an independent Environmental Control Officer (ECO) audit the activity against the EMPr annually for the first three to five years of operation and once every two years thereafter until the existing Mining Right expires. Should the EMPr be audited by the applicant then an independent EAP must be appointed to review the report as per Regulation 13 (2) of the NEMA EIA Regulations 2014; and
- All mitigation measures provided in this report must be implemented. Should the mitigation measures be deemed impractical, ineffective or cost prohibitive, Cape Lime may apply to the DMR to alter such mitigation measures accordingly. The competent authority must approve any change in mitigation measures.

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

(Which relate to the assessment and mitigation measures proposed)

The main assumptions and limitations for the air quality study are:

- Since the mine is still in the proposal phase, the emissions from the kilns' stack were based on stack emissions monitoring from similar kilns at the existing mine.
- In the calculations of the fugitive dust emissions, two mitigation measures were considered, i.e. water spraying at the primary crusher and dust extraction (using fabric filters) at the secondary crusher.
- The proposed project is situated in a rural area, and the mine is considered an isolated facility, due to the fact that there are no other significant emission sources in close proximity. Therefore, the existing ambient concentration levels of the various pollutants examined in the present air quality impact study are considered to be extremely low or negligible.

Therefore, when assessing compliance with the NAAQS, the background levels were considered negligible.

- Air pollutants released from vehicle exhausts and blastings, such as SO_2, NO_x and CO, were not included in the detailed calculations, as they will be presented in relatively very small quantities and will only have a limited and localised impact.

Limitation of the Ecological Study

Since fieldwork was carried out at the end of the spring season, flowering plants that only flower at other times of the year (e.g. early winter to spring) may have been missed, especially bulbs. The findings are supplemented by the findings of other botanical studies undertaken in the area for previous mining applications. The overall confidence in the completeness and accuracy of the botanical findings is therefore considered moderate to good.

All conclusions, findings, and recommendation were made on the assumption that information provided by the applicant to the appointed EAP and specialists were accurate. With reference to the development of the Welverdiend mine extension, closure and liability plan (**Appendix E**) the following assumptions, uncertainties, and gaps were highlighted:

- The applicant and the EIA specialist reports supplied the areas and components included in the current assessment to the EAP at the time of this report.
- In the absence of exact measurements of infrastructure and proposed mining activity footprints, these were determined roughly from Google-Earth imagery.
- For future annual reviews, all infrastructure and mining footprint drawings will be updated to reflect the current onsite situation, as well as reference all infrastructure and photograph where deemed necessary by the reviewers to be able to provide more detailed reference maps and compilations of a bill of quantities.
- The Rehabilitation and Closure Plan is considered a 'living document' that will be reviewed and updated annually to ensure that all new insights and developments are adequately covered.
- It is assumed that upon a premature closure of the mine, the same liability will arise as at Life of Mine Closure, but at that stage, total area affected and hence cost may be reduced.
- Life of Mine Closure operations also include the necessary monitoring and mitigation of possible residual and/or latent impacts post mining closure operations.

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

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

Although the expansion of the Welverdiend mine will result in unavoidable adverse environmental impacts, no fatal flaws in the project have been identified thus far through the EIA process. However,

as the mine is located in area that is not considered particularly sensitive or vulnerable, none of these adverse impacts are considered unacceptably significant and all can be managed to tolerable levels through the effective implementation of the recommended mitigation measures.

The EAP believes that specialist studies have shown that the mining is generally acceptable. The Environmental Impact Assessment Study has outlined key environmental and social issues associated with the proposed project, and described the potential environmental and social benefits and impacts, described mitigation measures, outlined the final layout and provided the environmental impact statement.

The EAP together with the EIA Team are of the opinion that a thorough and due environmental process, as outlined in Government Notices R982 and R984, promulgated under National Environmental Management Act (NEMA, Act 107 of 1998) as amended, was followed in undertaking the Environmental Impact Assessment and associated Public Participation Process. The analysis of key environmental impacts assessed during both the Scoping and EIA phases has shown that there are no negative impacts that can be classified as fatal flaws. Therefore, based on the above-mentioned factors, it is recommended that the proposed for Environmental Impact Assessment Authorisation for the extension of the limestone in Welverdiend be authorised.

ii) Conditions that must be included in the authorisation

(1) Specific conditions to be included into the compilation and approval of EMPr

The following conditions should form part of the environmental authorisation:

- All mitigation measures and management of identified impacts recommended by the Specialists as part of this report and EMPr must be adhered to and implemented during the construction and operational phases of the project;
- Alien vegetation eradication and monitoring plans need to be instituted to address and control existing alien vegetation on the property
- A land use application to be lodged an approved by Matzikama Municipality prior to commencement of any mining and/or construction activities on the site
- Obtain other permits and authorisations as may be required, including, but not limited to, water use license, air emission license, Conservation of Agricultural Resources Act, 1983 (ACT NO 43 OF 1983) (CARA) application for clearing or removal of topsoil and land-use zoning;
- Conditions stipulated in all other permits or authorisations must be implemented;
- In terms of NEMBA, alien eradication and monitoring plans need to be compiled to address existing alien vegetation on the property and to control invasive species on the whole mining right area;

- A dust monitoring system is to be established and managed by the Applicant to determine the dust fallout generated on site by activities;
- Identify other dust suppression mechanisms since the project area has been declared as a water crisis region;
- Search and rescue must be conducted by experienced botanical specialists or horticulturists. Plants can be kept for rehabilitation if they are likely to survive, otherwise they must be planted in nearby areas of similar habitat which are preferably protected or at least not likely to be disturbed by mining or ploughing. Suitable receiving areas should be identified by the botanical specialist before clearing commences;
- The Wiedou River ecological corridor is considered a macro corridor that should be protected to help mitigate the impacts of climate change and a minimum of a 300m buffer on the north side of the river should be protected from further development;
- Every effort should still be made to rehabilitate the mining area however and a rehabilitation specialist should be contracted to provide advice on the best rehabilitation methods for the site;
- Maintain lines of communication with the neighbours of properties close to the mine;
- Undertake continual closure and rehabilitation concurrently with active mining;
- Revise closure cost assessment on annual basis as required by NEMA;
- Conditions stipulated in the final EMPr and closure plan must be adhered to;
- The design and operation on the proposed dolomitic lime: kilns must comply with the Minimum Emission Standards identified in section 21 of the NEM:AQA, listed under Category 4 (Subcategory 4.1) and Category 5 (Subcategory 5.6) of GN No. 893 of 22 November 2013. The manner in which the measurement of minimum emissions standards must be carried out as required by section 21(3)(a)(ii) of the NEM:AQA. must be in accordance with the sampling and analysis methods listed in "Annexure A" of the GN No. 893 of 22 November 2013;
- In terms of monitoring, it is recommended that an independent Environmental Control Officer (ECO) audit the activity against the EMPr annually for the first three to five years of operation and once every two years thereafter until the existing Mining Right expires. Should the EMPr be audited by the applicant then an independent EAP must be appointed to review the report as per Regulation 13 (2) of the NEMA EIA Regulations 2014; and
- All mitigation measures provided in this report must be implemented. Should the mitigation measures be deemed impractical, ineffective or cost prohibitive, Cape Lime may apply to the DMR to alter such mitigation measures accordingly. The competent authority must approve any change in mitigation measures.

(2) Rehabilitation requirements

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

- Ensure adherence to all statutory and other legal requirements;
- Re-establishment of the pre-mining land capability to allow for suitable post mining land use;

- Ensure that closure supports productive uses considering pre-mining conditions;
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas; requiring minimum maintenance to facilitate a walk away situation; and
- To in-fill and slope ramps and voids to be free draining.

o) Period for which the Environmental Authorisation is required.

The Department of Mineral Resources (DMR) in terms of Section 22 of the Mineral and Petroleum Resources Development Act 2002 has awarded a mining Right Cape Lime in June 2012 for the proposed mining activity. The Mining Right has been granted for a period of thirty (30) years. The extension of the dolomitic limestone mine is required for the duration of the current Mining Right.

p) Undertaking

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

The EAP undertakes that the information provided in PART A is correct, and that the comments and inputs from stakeholders and IAPs have been correctly recorded in the report. This is only applicable to the Environmental Impacts Assessment Report and EMPr as a Basic Assessment Process has not been undertaken.

Refer to PART B: Section 2 for the EAP's signed undertaking.

q) Financial Provision

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

The Financial Provision for the removal of the extension of the dolomitic limestone in Welverdiend Mine has been determined at a value of **R 380308.73** (Incl. VAT).

i) Explain how the aforesaid amount was derived.

The Financial Provision was determined utilising the Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (2006). Please refer to calculations as provided below. The assumption was made that the area already affected by mining activities does not exceed and area of 0.5ha.

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

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

Cape Lime will provide a bank guarantee to ensure the financial provision.

r) Deviations from the approved scoping report and plan of study.

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

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

The methodology to rate the impacts and risks or the plan of study associated with the proposed extension of dolomitic mine and construction of lime kilns detailed in this Environmental Impact Assessment Report / EMPr have not deviated from those described in the Scoping Report.

ii) Motivation for the deviation.

No deviations have been made from the approved scoping report.

s) Other Information required by the competent Authority

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

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

The socio-economic impacts of the proposed development relate to the creation of 78 when in full production. It is anticipated that 26 people will be employed at the commencement of operations and this will be a combination of permanent skilled operators and local workers will be employed at the site. The workforce will increase as each kiln is required to be brought into production. Mining and crushing will involve 10 employees. The first kiln will require 16 employees and each additional kiln 12 per kiln. Maintenance, laboratory, sales and weighbridge and management will be 16 employees.

Further, the product from the mining activity will feed into the greater socio-economy of the surrounding area and South Africa as whole in terms of supplying of high quality white lime products to potential new projects in South Africa, for which Cape Lime does not have the current production capacity as well as providing raw materials to the construction industry, which is currently experiencing positive growth and is improving employment prospects. The markets currently served with calcinised limestone are:

- Water treatment (potable and effluent)
- Glass Industry (Flat glass and container glass)
- Aggregates

- Chemical Industries (Calcium Mineral Fillers
- hypochlorite, mineral separation processes and tanneries)

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

Archaeology

The proposed mining of the ± 34ha dolomitic ore reserve on Farm Welverdiend No. 511, as well as construction and operation of a large plant facility, will impact negatively on archaeological heritage that will result in the irreversible loss and destruction of archaeological resources.

The majority of the archaeological resources documented during the study have been rated as having low (Grade 3C) significance, but Sites in the proposed Plant Area have been graded as having potentially medium (Grade 3B) because of the context in which the finds were made (i. e. stone tool production areas). These *in situ* sites are mostly associated with heuweltjies, on older land surface that are dotted around the proposed logistical facility. Measures to ensure the protection and conservation of potential Grade 3B archaeological heritage remains associated with heuweltjies areas are proposed.

Palaeontology

According to Almond (2017:18), `the overall impact significance of the proposed mining development is inferred to be LOW because most of the study area is mantled by superficial sediments of low palaeontological sensitivity and the Precambrian bedrocks are almost certainly unfossiliferous. No further specialist studies or mitigation regarding fossil heritage are considered necessary for this project

The Scoping acceptance letter received on 29 May 2017 requested the following additional information:

- Public participation must be conducted in accordance to Chapter 6 of the 2014 Environmental Impact Assessment Regulations
    - All public participation process is detailed in Section g (i) above
- Ensure that comments from all relevant stakeholders are submitted to the departments with the Environmental Impact Assessment Report (EIAR). This includes but is not limited to the Provincial Heritage Resource Authority, Cape Nature, Department of Environmental Affairs and Development Planning (DEA&DP), Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the local municipality. Proof of correspondence with the various stakeholders must be included in the EIAR. Comments received from all the interested and affected parties (including state organs) must be presented in a tabular format that includes the EAP's responses to all issues raised. All the issues that were not sufficiently addressed during scoping phase must be addressed adequately during EIA phase. Should you

be unable to obtain comments, proof of attempts that were made to obtain comments must be enclosed in the EIAR to be submitted to the department

- In terms of Regulation 7(2) *"the competent authority or EAP must consult with every organ of state that administers a law relating to a matter affecting the environment relevant to that application for an environmental authorisation when such competent authority considers the application and unless agreement to the contrary has been reached the EAP will be responsible for such consultation"*
    - All organ of state have been consulted during the scoping phase and their written comments have been captured on the table in Section g (iii) above. Comments for the EIA Report (this report) will also be captured on the same section above.
- The EAP is therefore requested to consult environmental impact report inclusive of any specialist reports, and an EMPr with every organ of state that administers a law relating to a matter affecting the environment as stipulated on regulation 7(2) of 2014 EIA Regulations and notify the Department of Mineral Resources of such consultation with organ of state
- In addition, the following information was requested:
    - Details of the future land use for the site and infrastructure after decommissioning
    - A clear process flow diagram of proposed fluid bed lime calciners (kilns) must be included
      This information is provided in section d (ii) above
    - Mine layout plan with the mining area subdivided into blocks or benches
    - Cape Nature and Department of Agriculture, Forestry and Fisheries comments are not complete, ensure that the complete comments are included the Final Environmental Impact Assessment Report
      All comments from the Cape Nature and DAFF are fully captured on the table in Section g (iii) above
    - Assessment and details of alternatives for the proposed project
      See Section g (i)
    - Closure plan in accordance to appendix 5 of NEMA EIA Regulations 2014
      Closure plan attached as Appendix G of this report
    - Should a Water Use License be required, proof of application for license must be submitted
      The Water Use License application process is underway, an application has been lodged with DWS on the e-WULAAS on 16 November 2018
    - The total footprint of the mining area should be included
      See section 3 d) i) (Listed and specified activities)
    - Possible impact impacts and effects of the development on the surrounding environment
      Table in Section h (i) summarises all associated impacts and aspects.
    - Information on services required on the site during mining activities, e.g. sewage, refuse removal, water and electricity. Who will supply these services and has agreement and confirmation capacity been obtained?
      Cape Lime currently gets service supplied by the Matzikama Local Municipality in its current operation. The company will liaise with the municipality in due course
    - A construction and operational phase EMPr to include mitigation and monitoring measure
      See Part B of this document.

Should be blasting be required, the frequency and appropriate mitigation measures should be provided.

See Part B of this document.

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

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

As discussed in previous sections in this report, no alternatives were considered. The proposed dolomitic limestone extension is located within the Cape Lime (Pty) Ltd ‘s mining right area and the surrounding area is almost vacant and used for livestock grazing.

Information regarding the baseline and potential impacts for the project are based on the information available, comments and discussions with stakeholders, specialists, the Applicant and discussions with authorities. The EAP has included all identified impacts, based on the current scope, in this report and has assigned appropriate management measures to reduce and manage each identified impact, which are included in the EMPr provided as per Part B of this report.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

The purpose of this section is to provide a baseline Environmental Management Programme (EMPr) to essentially form part of the Welverdiend Mine Environmental Management System (EMS). The information provided in this section describes guidelines, operating procedures and rehabilitation/pollution control requirements. The EMPr is a legally binding document that the holder of the Environmental Authorisaton is responsible for implementing.

The recommendations and procedures stipulated in the EMPr are based on the findings discussed in Part A of this report. It is therefore essential that this portion be carefully studied, understood, implemented and adhered to at all times.

Part B of this report should be considered as a “living” document, to be reviewed and amended as deemed necessary.

The reasons for review and/or amendments may be the following:

- Failure to identify certain risk or impacts during the initial EIA process; and
- The inability of the EMPr to sufficiently provide for the avoidance, management, and mitigation of environmental impacts associated with the undertaking of authorised activities.

In the event that additional activities, not specified in the EIR and EMPr, are to take place, the impacts associated to those activities must be assessed according to the requirements stipulated by GN R. 982. Therefore this EMPr is only applicable to the listed activities stipulated in **Part A section d)i)** and/or those authorised in terms of the Environmental Authorisation.

1) Draft environmental management programme.

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

The details and expertise of the EAP are detailed in PART A: 3 (a) (i) and (ii) above.

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

The details of aspects of the activity covered by the EMPr are detailed in Part A, Section 5 on Table 6.

c) Composite Map

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

Refer to **Appendix A4** for the Welverdiend layout with all sensitivities and buffers identified.

d) Description of Impact management objectives including management statements

Throughout Part A and Part B of this report, a number of possible environmental and social impacts/risks have been identified. The sections to follow will provide the management approach related to each potential impact/risk by defining management and outcome based objectives.

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

In compliance to GN R. 1147 of 20 November 2015, a number of closure objectives have been determined. The closure objectives, identified in the extension Welverdiend dolomitic limestone and construction of lime kilns, Closure and Liability plan (Appendix E), which will drive the closure criteria and which have been developed to support the closure vision are:

- Ensure adherence to all statutory and other legal requirements;
- Re-establishment of the pre-mining land capability to allow for suitable post mining land use;
- Ensure that closure supports productive uses considering pre-mining conditions;
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation;
- To in-fill and slope ramps and voids to be free draining;
- Remove mine infrastructure that cannot be used by the applicant or a third party. Where buildings can be used by a third party, arrangements will be made to ensure their long term sustainable use; and
- Ensure that community safety is not adversely impacted (i.e. the pit area is adequately fenced off to restrict entry by humans and animals).

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

This section describes the approach taken by the EAP in preparation of Part B of this report.

Environmental Management Approach

Globally, there are a number of tools or guideline documents available to assist or describe

environmental management. The purpose of an EMPr (Part B of this report) is to describe the process for managing the identified potential environmental impacts or risks described in Part A of this report (EIR) throughout the entire life cycle (from design, to implement, operation, and decommissioning) of the Welverdiend Mine. The IEM (Integrated Environmental Management) tool used for managing the identified environmental impacts by the EAP in this document is the Environmental Management System (EMS). This approach will assist the Spitsvale Mine to achieve continual improvement in environmental performance.

The EMPr in essence will be adopting the approach of the internationally recognised ISO 14001 Environmental Management System (EMS) standard that is essentially based on the Deming Cycle rationale which is a simplified continuous improvement model consisting of four main iterative steps.

These steps are described as follows:

- Plan – Establish objectives and processes necessary to deliver results in accordance with the developed organisational environmental policy.
- Do – Implement the process.
- Check – Monitor and measure processes against environmental policy, objectives legal and other requirements and report the results.
- Act – Take action to continually improve environmental performance.

Continual improvement is achieved by periodically monitoring and reviewing the EMPr and implementing corrective actions when required. Therefore, this document should be considered as a living document that must be continuously updated and possibly improved.
This approach taken in the development of the EMPr (Part B of this report) is in line with the requirements stipulated in GN R. 982 (2014 EIA regulations).

Legislative compliance
Throughout the development of management measures, all legislative and other requirements associated to the proposed Welverdiend Mine activities were considered and highlighted.

Specialist recommendations
A number of specialist investigations formed part of the EIA process and resulted in a number of findings and recommendations (Part A section 1)j) summarises the findings). These reports provided specific mitigation and management measures as a recommendation. These findings have been considered throughout the development of the EMPr.

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

The mine activities do not pose any risks to the occurrence of acid mine drainage, as the mining process does not use water, which can react with rocks. There is limited risk to acid mine drainage given that the material being mined is limestone.

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

Based on the result described above, no further steps were taken to investigate, assess, and evaluate the impact of acid mine drainage, as this potential risk is not foreseen as part of dolomitic limestone related mining activities and the construction of 4 Fluid Bed Lime Calciners.

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

Due to the nature of the project as indicated above, there is a low probability of acid mine drainage occurring, therefore it is unlikely that design solutions to avoid or remedy acid mine drainage will be required.

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

Not a potential risk.

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

It is anticipated that that $10m^3$ per day will be sufficient for the operation and this extracted water will be stored in 10 cubic meter tanks. However, permitted volume and rate of water use required for the mining and lime kilns operations will be confirmed in the Water Use License.

The water consumption will depend heavily on the degree of beneficiation of the lime to be produced. If lime is to be sold as quicklime (which is the expectation at this stage), no process water will be needed. The water requirements will thus be for dust suppression and human consumption only. The detailed water balance is described below.

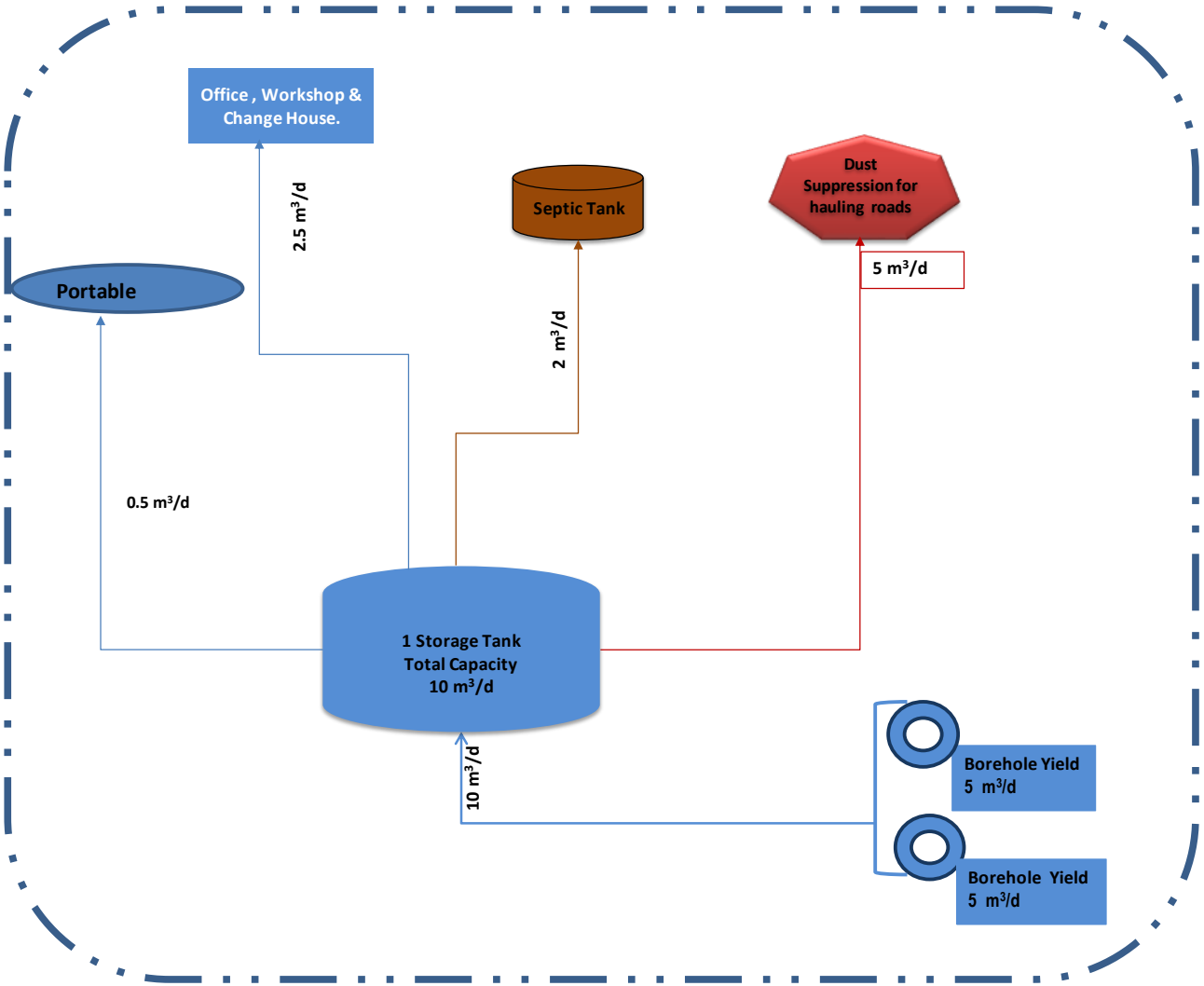


Figure 68: Proposed Welverdiend Water Balance Flow Chart

WATER BALANCE FOR A YEAR ON AVERAGE (m3/a)						
IN(Amount of Water in M³ Per Annum)				OUT(Amount of Water in M³ per year)		
Borehole 1	1 825	m³/a	1Storage Tanks	Dust Suppresion		m³/a
Borehole 2	1 825	m³/a		Abblution Facility (1 Septic Tanks). Collected by Municipality Periodically.		m³/a
				Office WorkShop & Change House		m³/a
Bowser		M³/a		Portable Water		M³/a
Rainfall		M³/a		Evaporation		m³/a
TOTAL	**3 650**	**m3/year**		**TOTAL**	**0**	**m3/year**
				Surplus	**3 650**	**m3/year**

Figure 69: Welverdiend water balance – year estimates

viii) **Has a water use license has been applied for?**

An integrated application approach has been taken by Cape Lime. Therefore, an application for a water use license has been submitted to the Western Cape Department of Water Affairs and sanitation on 16 November 2018 on the e-WULAAS.

The following water uses are have been applied for:

- Section 21 (a) - taking water from a water resource (water will be sourced via a borehole);
- Section 21 (c) - Impeding or diverting the flow of water in a watercourse
- Section 21 (g) - disposing of waste in a manner which may detrimentally impact on a water resource

A Replacement of General Authorisation (GA) in term of Section 39 of the National Water Act, 1998 (Act 36 of 1998) has been granted for the site in 05/10/2015 for the following water use activities:

- Section 21 (i) - altering the bed, banks, course or characteristics of a watercourse
- Section 21 (j) - removing, discharging, or disposing of water found underground if it is necessary for efficient continuation of an activity or for the safety of people

Therefore, the two water activities were not included for the integrated water use license application.

e) Impacts to be mitigated in their respective phases

Table 24: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES (as listed in 2.11.1)	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**SIZE AND SCALE of disturbance** (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Demarcation of mining area	Before Construction commences	42 ha	• Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control by maintaining a buffer area of 250 to 300 meters between the Wiedou River and mining activities at all times • The area of the site that protrudes into the CBA must be excluded as an offset for conservation purposes	Mining is only allowed within the boundaries of the approved mining area: compliance with the MHSA 1996 and OHSA 1993	Before construction activities commences and throughout operation

Clearance of land for the expansion of the pit (GNR 984, Listing Notice 2, Activity 15) as amended	Construction and Operational	11ha	• It is recommended that a search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the Vygieveld adjacent to the mining site, a safe distance away from the mining area. Search and rescue and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season. An experienced contractor should be appointed to undertake search and rescue. • Topsoil salvage and replacement would be critical for rehabilitation. Where possible, topsoil, containing indigenous plant seeds, should be pushed aside and protected from compacting/trampling. Topsoil stockpiles must not exceed 0.5 m in height • Control by keeping the area to be disturbed to a minimum	National Environmental Management: Biodiversity Act No. 10 of 2004	Mitigation can cease upon cessation of the individual activity (clearing of land and excavations)
Stripping and stockpiling of topsoil clients (GNR 984, Listing Notice 2, Activity 17) as amended	Construction and Operational	±42ha (pit and infrastructure area	• Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Control keeping topsoil separate for use on disturbed land • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Soil stripping should forbidden on areas not required for mining work or on areas of retained vegetation • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order	National Environmental Management Act 1998 as amended and meet rehabilitation standards/ objectives	During construction and throughout operational phase

Calcination stack emissions GNR 984, Listing Notice 2, Activity 6 as amended	Operational	undetermined	• Install bag filter units to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License. • Monitor stack emission daily, and the bag filters are regularly inspected to make sure it is in good working condition. • • NB: Taking the above mentioned into consideration the control efficiency of up to 99 % can be achieved.	Dust generated must fall below the threshold as per the The National Dust Control Regulations, no R827 dated 1 November 2013	During construction; mitigation can cease at cessation of individual activity (construction)
Clearance of more than 300 square metres for the purposes of mining limestone deposits GNR 985, Listing Notice 3, Activity 12 (a) ii. as amended	Construction	±6ha	• Avoid or minimise by moving mining activities slightly further away (northwards) from the Wiedou River. A buffer of 250-300 m between the river and mining activities should be maintained. • Manage through search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the Vygieveld adjacent to the mining site, a safe distance away from the mining area. Search, rescue, and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season.	National Environmental Management: Biodiversity Act No. 10 of 2004	During construction

Replace topsoil over mined-out area and Final rehabilitation of entire major area GNR 983, Listing Notice 1, Activity 22 as amended	Operational and decommissioning	42ha	• Prevent through restricting the disturbed area • Control though ongoing alien invasive eradication programme • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Mining should be phased, starting at the lowest point. Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels • Regular follow up clearing of alien invasive species would be required in order to obtain successful rehabilitation	Meet rehabilitation standards objectives	During operation and decommissioning
Placement of mobile ablution facility/ies within the boundaries of the site	Leakage of the toilet		• Control through cleaning and servicing the toilet regularly	National Water Act No. 36 of 1998	During construction phase

f) Impact Management Outcomes

Table 25: A description of impact management outcomes, identifying the standard of impact management required for the aspects identified

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance,fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation..**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Demarcation of the mining area	Disturbance outside the mining area	Land outside the mining area	Before Construction commence and throughout Operation	• Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control by maintaining a buffer area of 250 to 300 meters between the Wiedou River and mining activities at all times • The area of the site that protrudes into the CBA must be excluded as an offset for conservation purposes be properly demarcated and regarded as no-go area in terms of mining	Avoiding mining within unauthorised boundaries Maintain natural vegetation

Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Dust generation	Air quality	Construction and operation	• Control through dust suppression • Control through limiting the speed of vehicle movement to a maximum speed of 40km/h • Control through monitoring of dustfall to determine if measures are effective • Progressive rehabilitation will be implemented to minimise exposed areas on mining areas and haul roads • Covered conveyors will be used for transporting the crusher ROM and calcination plant feed • The irrigation system will be utilised at the outlet of the product (agricultural lime). • Calcination stack emissions - Several bag filter units will be installed to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License	Avoid creating health impact by reducing dust levels
Clearance of land for establishment of infrastructure (processing plant and construction kilns)	Soil erosion, compaction and contamination	Soil	Construction and Operation	• Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilisable soil and storage of the same • Control through implementation of storm • Prevent through establishment of runoff cut-off trenches and detention ponds on the down-slope side of mine. • Progressive rehabilitation will be implemented to minimise exposed areas • Protect all areas susceptible to erosion by preventing storm water. • Develop procedures to minimize surface water run-off and soil erosion • Use berms to in order to divert run-off water from other land or to restrict the run-off speed of running-off water	Correct topsoil replacement should be implemented to ensure effective rehabilitation of the area.

	Invasion by alien invasive species	Indigenous Vegetation	Construction and Operation	• Control though alien invasive eradication programme	Reduce colonization by alien invasive species
Clearance of land for establishment of infrastructure (processing plant and construction kilns)	Impact on vegetation type, habitat and CBA's	Indigenous Vegetation	Construction and Operation	• Avoid or minimise by moving mining activities slightly further away (northwards) from the Wiedou River. A buffer of 250-300 m between the river and mining activities should be maintained. • Manage through search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the vygieveld adjacent to the mining site, a safe distance away from the mining area. Search, rescue, and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season.	Maintain natural state of vegetation on site
	Visual impact	Visual receptors	Construction and operation	• Avoid/prevent leaving any building material or waste on site • Proper upkeep and maintenance of the site must be done. • Vegetation cover should be maintained at the periphery to reduce the visual impact. • Where necessary, vegetated areas should not be disturbed until existing quarried areas are exhausted. • Use overburden to create berms to reduce impact of excavations in the pit • Avoid using shiny material on the kilns	Reduce the negative visual impact on receptors

	Destruction of Heritage Resources	Archaeological or heritage features	Construction and operation	• Prevent through establishing buffer zones around potentially significant archaeological remains that occur outside the footprint of the proposed Mine Area and the proposed Plant Area • Prevent through reporting of substantial fossil remains (e.g. vertebrate teeth, bones, petrified wood, stromatolites, shells, trace fossils) be exposed during mining, the ECO should safeguard these, preferably in situ, and alert Heritage Western Cape (Mr Andrew September 021 483 9543) as soon as possible so that appropriate action (e.g. recording, sampling or collection) can be taken by a professional palaeontologist at the developer's expense • If during the construction/mining, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • The senior on-site Manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing SAHRA/PHRA. • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency exhumation permit may be issued by SAHRA for an archaeologist to exhume the remains.	Protection of archaeological and heritage resources occurring on site

Stripping and stockpiling of topsoil	Soil erosion	Top soil	Operational	• Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Soil stripping should forbidden on areas not required for mining work • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order	Correct topsoil replacement should be implemented to ensure effective rehabilitation of the area

	Stormwater run-off	Soil	Construction and Operational	• Adequate storm water drainage system must be designed and maintained to adequately control the volume, speed, location of runoff, to avoid soil erosion and siltation. • All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; • Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. • Manage drainage and runoff from dumps using clean and dirty water system • A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off water if applicable • Ensure that the haul road verges are allowed to vegetate to ensure that erosion of these is minimised • Construct any necessary erosion protection works in the mining pit and overburden Gabions, reno mattresses or other stabilising	Prevent loss of fertile top and subsoils through run-off
				structures and materials could be considered • Avoid development in drainage zones by staying outside of demarcated buffer zones.	

Hauling and Transportation material from mining area to clients	• Dust pollution • Pedestrian safety on site	Air quality	Construction and Operational	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation of excess dust by limiting speed limit to 40km/h • Monitor by equipping mine vehicles with silencers • Mineral transportation shall be carried out through covered trucks only and vehicles carrying the mined material must not be overloaded. • It is recommended that a wheel washing facility be installed and used. • Control through minimisation of vehicle movement • Control by monitoring trucks that collect material to ensure that they are covered	Dust generated must fall below the threshold as per the NEM:AQA National Dust Control Standards for industrial areas
Coal storage	Soil contamination	Soil	Operational	• Control by storing coal on a concrete floor and contained storage pad with storm water collection.	Avoid soil and groundwater contamination
Traffic	Congestion of vehicles and impact on pedestrians	Traffic	Construction and Operational	• Turning lanes into and out of the site have been created on the N7 • The additional traffic that will be generated by the constructional and the operational activities of the proposed mine expansion and kilns will have a minimal impact on the traffic on N7 and the pedestrians as none were observed on the surrounding network. The additional traffic volumes will not create any conflict. • Limit or reduce traffic congestions for road users when transporting abnormal loads must be ensured.	Prevent accidents and congestion on the N7
Placement of mobile ablution facility/ies within the boundaries of the site	Contamination of soil and groundwater resources	Leakage of the toilet	Construction	• Control through regular servicing/emptying chemical toilets. Proof of this must be obtained and kept on record.	Avoid soil and groundwater contamination

Noise generation	Noise pollution to surrounding neighborhood	Sensitive receptors working on site and those outside the site	Construction, operation and Decommissioning	• Limit operation time to daylight hours between 07h00 and 18h00. • Regular servicing of mining equipment to ensure noise suppression mechanisms are effective e.g. install exhaust mufflers • Switching off equipment when not in use • Employees be obliged to use individual protective equipment against exaggerated noise in the work environment • Conduct high level noise activities during the day to avoid the inconvenience caused by noise during the night in locations occupied by humans, or sensitive to noise.	Minimise noise level and ensure safety of staff and community
Drilling and Blasting	• Dust resulting from blasting • Fly rock • Noise resulting from blasting	• Air Quality • Ambient noise levels	Operation	• Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest • Conduct Seismograph calibration tests to ensure that blasting standards are met • Control by limiting blasting operations to daylight hours when ambient noise levels are highest	

Waste generation, storage and disposal	• Land pollution • Hazardous Leachate • Illegal dumping	Land pollution	Construction, Operation and Decommissioning	• Ensure segregation of hazardous wastes from non-hazardous. • During the construction phase, temporary storage of construction waste to be stored in a bunded designated area. • No burning of refuse wastes are on the premises or on surrounding premises • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • Sealable bins and containers must be made available for the storage of all streams of waste throughout the site. • Waste bins must be emptied on a regular basis as to ensure bins do not overflow. • No littering will not be permitted on site and general housekeeping should be enforced • Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof. • Separate waste skips/ bins for the different waste streams must be available on site • DO not dump waste of any nature, or any foreign material into any drainage line or stream • All waste to be disposed off at a suitably registered waste disposal facility • A suitable and registered waste service provider must remove all waste materials off site. • Proof of disposal to be obtained and kept on record	To avoid land and contamination of ground water resources

Employment of Workers, skills training and procurement of construction materials	Job creation	Job creation	Construction and Operational	• During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations. • Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made. • Maximise and monitor local recruitment where required. • Promote employment of women and youth. • Train locally recruited construction workers for longer-term employment where possible. • Support economic diversification through development of alternative markets.	• Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area. • Promotion of social and economic development and improvement in the overall well-being of the community

Health, Safety and Security	Crime and Illnesses of employees	Health, Safety and Security	Construction, Operational and Decommissioning phases	• Security fence is to be inspected continuously to ensure no illegal entry points are created. • Ensure that PPE is always worn on site. • Opened trenches and pits must remain demarcated to avoid injuries to employees • Ensure the contacts details of the police or Security Company, fire fighters, ambulance services are available on the site. • Limit access to the construction crew camp only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Emergency contact details for the police, Security Company, ambulance and fire department must be readily available onsite • Emergency facilities must be available and adequately supplied for use by staff and customers • Ensure that only suitably qualified personnel use vehicles and machineries	Maintain good health and safety of employees, customers, visitors and the general public

				• Ensure that the handling of equipment and materials is supervised and adequately instructed. • Security fence is to be inspected continuously to ensure no illegal entry points are created. • Limit access to the site only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Appropriate notification signs must be erected, warning the residents and visitors about the hazards around the site and presence of heavy vehicles. • Ensure that employees are regularly checked for illnesses.	•

Fuel and oil storage	• Soil and groundwater contamination	Soil and ground water pollution	Operational and Decommissioning	• Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Oil spill kit must be kept on a clearly visible area • Oil spills to be cleaned immediately and affected ground/soil to be uplifted and bagged for removal off site to approved dump facility for hydro carbons or treat affected soil accordingly • All personnel must wear issued PPE at all times as indicated by safety signs. • Fuel storage facilities must be inspected on a regular basis. • Spill prevention measures to be implemented at all times. • Fire fighting equipment such as fire extinguishers must be made available and be inspected on a regular basis. • A spill kit must be made available at all time.	Avoid soil and groundwater contamination
				• All spills to be cleaned immediately. • Storage facilities must be inspected on a regular basis. • All leaks to be repaired immediately • Chemical storage must be designed with a 110% capacity of the stored fuel to reduce the possibility of soil and water contamination. Alternatively, if portable fuel tanks are used, drip trays must be used when refueling and the integrity of such tanks must be maintained	•
Rehabilitation	Soil erosion	Soil	Operational and Closure	• Prevent through restricting the disturbed area • The flow pattern of run-off water, the topography and the slope shall, depending on the volume of material exploited or removed, be restored as closely as possible to the original condition.	Rehabilitation standards/ objectives

				• Use berms protect rehabilitated the land against excessive soil loss through the action of water or wind or in order to collect sediment from run-off water • Monitoring and evaluation procedures (pictures) should be put in place to determine rehabilitation process	
	Establishment of alien invasive vegetation	Alien invasive plant	Operational and Closure	• Control though ongoing alien invasive eradication programme • Prevent through restricting the disturbed area • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Regular follow up clearing of alien invasive species would be required in order to obtain successful rehabilitation • Mining should be phased, starting at the lowest point (closest point to the Wiedou River). • Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels • Phased restoration reclamation and rehabilitation of the land affected by mining must be completed prior to the final decommissioning of the mine • Replacement of topsoil and hydro-seeding with an indigenous grass seed mixture at the start of the rainfall season (June) by suitably	

				experienced landscaping contractor should be appointed to undertake rehabilitation. • Methods of controlling alien plants are as follows: o Uprooting; felling; cutting or burning o Treatment with a weed killer is registered for use in connection with such plants in accordance with the directions for use of such o Biological control carried out in accordance with the stipulations of the Agricultural Pests Act, (Act no 36 of 1983)	
	Vegetation management			• Use suitable/native vegetation on disturbed land in order to expedite the restoration • Demaracte/fence off vegetated areas until vegetation has fully grown	
				•	

g) Impact Management Actions

Table 26: A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through** **(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Demarcation of mining area	Disturbance outside the mining area	• Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control through management and monitoring of coloured steel droppers or wooden stakes throughout mining • Control by maintaining a buffer area of 250 to 300 meters between the Wiedou River and mining activities at all times • The area of the site that protrudes into the CBA must be excluded as an offset for conservation purposes	Construction and Operational Phase	Mining is only allowed within the boundaries of the approved mining area: National Environmental Management: Biodiversity Act No. 10 of 2004

Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Dust resulting in a decrease in ambient air	• Control through dust suppression • Control through limiting the speed of vehicle movement to a maximum speed of 40km/h • Control through monitoring of dustfall to determine if measures are effective • Progressive rehabilitation will be implemented to minimise exposed	Construction and Operational Phase	Compliance with the MHSA 1996 and OHSA 1993
		• areas on mining areas and haul roads • Covered conveyors will be used for transporting the crusher ROM and calcination plant feed • The irrigation system will be utilised at the outlet of the product (agricultural lime). • Calcination stack emissions - Several bag filter units will be installed to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License		

Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Destruction of natural vegetation including plant species of conservation concern	• Control by keeping the area to be disturbed to a minimum • Control by searching and rescuing indigenous plants should be undertaken ahead of mining • Control by properly storing indigenous plants in bags and then transplant in rehabilitation areas or taken to a nursery for later replanting • Search and rescue of Aloe species should be undertaken ahead of mining activities. These plants must be properly bagged and transplanted at a safe distance away from the disturbance area. An experienced contractor should be appointed to undertake search and rescue. • Where possible, topsoil containing indigenous seeds should be transferred immediately to rehabilitation areas rather than being stockpiled as stockpiling kills important fungi, microbes, seeds and soil fauna. Topsoil stockpiles must not exceed a height of 0.5m and must not be compacted. • Control by keeping the area to be disturbed to a minimum • Control through monitoring of alien plants during the life of the mine and within the decommissioned area for at least 2 years after construction or until an effective cover of indigenous perennial plants has been established.	Construction and Operational Phase	National Environmental Management: Biodiversity Act No. 10 of 2004

Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities)	Impact on vegetation type, habitat and CBA's	• Avoid or minimise by moving mining activities slightly further away (northwards) from the Wiedou River. A buffer of 250-300 m between the river and mining activities should be maintained. • Manage through search and rescue of succulents and bulbs be undertaken ahead of mining activities. These plants must be properly bagged and transplanted in the vygieveld adjacent to the mining site, a safe distance away from the mining area. Search, rescue, and relocation of the bulbs should be undertaken early in spring at the beginning of the flowering season.	Construction and Operational	National Environmental Management: Biodiversity Act No. 10 of 2004
	Soil erosion, compaction and contamination	• Prevent through restricting the disturbed area • Prevent through restricting spillage from haulage vehicles • Control through removal of all utilisable soil and storage of the same • Control through implementation of storm • Prevent through establishment of runoff cut-off trenches and detention ponds on the down-slope side of mine. • Progressive rehabilitation will be implemented to minimise exposed areas		National Environmental Management Act 1998 as amended
	Aesthetics	• Avoid/prevent leaving any building material or waste on site • Proper upkeep and maintenance of the site must be done. • Vegetation cover should be maintained at the periphery to reduce the visual impact.		National Environmental Management Act 1998 (as amended)

		• Where necessary, vegetated areas should not be disturbed until existing quarried areas are exhausted. • Use overburden to create berms to reduce impact of excavations in the pit • Avoid using shiny material on the kilns		
	Employment Opportunities and income	• Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area. • Promotion of social and economic development and improvement in the overall well-being of the community	Construction and Operational	Matzikama IDP and Planning policies to create conducive environment for sustainable economic growth and empowerment for the business and broader communities
	Destruction of Heritage Resources	• Prevent through establishing buffer zones around potentially significant archaeological remains that occur outside the footprint of the proposed Mine Area and the proposed Plant Area • Prevent through reporting of substantial fossil remains (e.g. vertebrate teeth, bones, petrified wood, stromatolites, shells, trace fossils) be exposed during mining, the ECO should safeguard these, preferably in situ, and alert Heritage Western Cape (Mr Andrew September 021 483 9543) as soon as possible so that appropriate action (e.g. recording, sampling or collection) can be taken by a professional palaeontologist at the developer's expense • If during the construction/mining, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries,	Construction and Operational	Compliance with the National Heritage Resources Act 25of 1999 and South African Heritage Resource Agency

		contractors and subcontractors, or service provider, finds any artefact of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. • The senior on-site Manager must then make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area before informing SAHRA/PHRA. • If a human grave/burial is encountered, the remains must be left as undisturbed as possible before the local police and SAHRA or HWC are informed. If the burial is deemed to be over 60 years old and no foul play is suspected, an emergency exhumation permit may be issued by SAHRA for an archaeologist to exhume the remains.		
Stripping and stockpiling of topsoil	Soil erosion	• Control through restricting the footprint to be used • Prevent through restricting the disturbed area • Control through rehabilitation by replacing topsoil on the stripped land before the next strip is opened and mined. • Control by restricting topsoil stockpiles to 0.5m in height and must not be compacted • Control through implementation of storm water management measures • Soil stripping should forbidden on areas not required for mining work • Separately stockpiling subsoils and overburden to be returned for backfilling in the correct soil horizon order	Construction and Operational	National Environmental Management Act 1998 (as amended) and meet rehabilitation standards/ objectives

	Stormwater	• Adequate storm water drainage system must be designed and maintained to adequately control the volume, speed, location of runoff, to avoid soil erosion and siltation. • All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; • Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. • Manage drainage and runoff from dumps using clean and dirty water system • A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off water if applicable • Ensure that the haul road verges are allowed to vegetate to ensure that erosion of these is minimised • Construct any necessary erosion	Construction, Operational and Decomissioning	National Environmental Management Act 1998 as amended and meet rehabilitation standards/ objectives Conservation of Agricultural Resources Act, (CARA) 43 OF 1983
		protection works in the mining pit and overburden Gabions, reno mattresses or other stabilising structures and materials could be considered • Avoid development in drainage zones by staying outside of demarcated buffer zones		

Hauling and Transportation material from mining area to clients	Generation of dust	• Monitor dust by usage of appropriate dust suppression measures (i.e. spray unconsolidated areas with water/chemical stabilisers) • Control generation of excess dust by limiting speed limit to 40km/h • Monitor by equipping mine vehicles with silencers • Mineral transportation shall be carried out through covered trucks only and vehicles carrying the mined material must not be overloaded. • It is recommended that a wheel washing facility be installed and used. • Control through minimisation of vehicle movement • Control by monitoring trucks that collect material to ensure that they are covered	Throughout operational phase	Dust generated must fall below the threshold as per NEM:AQA National Dust Control Standards for industrial areas
Coal storage	Soil contamination	• Control by storing coal on a concrete floor and contained storage pad with storm water collection.	Operational Phase	Best standards of practice
Placement of mobile ablution facility/ies within the boundaries of the site	Contamination of soil and groundwater resources	• Control through regular servicing/emptying chemical toilets. Proof of this must be obtained and kept on record.	Construction Phase	National Water Act No. 36 of 1998

Traffic	Congestion of vehicles and impact on pedestrians	• Turning lanes into and out of the site have been created on the N7 • The additional traffic that will be generated by the constructional and the operational activities of the proposed mine expansion and kilns will have a minimal impact on the traffic on N7 and the pedestrians as none were observed on the surrounding network. The additional traffic volumes will not create any conflict. • Limit or reduce traffic congestions for road users when transporting abnormal loads must be ensured.	Construction and Operational Phase	National Roads Traffic Act (Act No. 93 of 1996)
Noise generation	Noise pollution to surrounding neighborhood	• Limit operation time to daylight hours between 07h00 and 18h00. • Regular servicing of mining equipment to ensure noise suppression mechanisms are effective e.g. install exhaust mufflers • Switching off equipment when not in use • Employees be obliged to use individual protective equipment against exaggerated noise in the work environment • Conduct high level noise activities during the day to avoid the inconvenience caused by noise during the night in locations occupied by humans, or sensitive to noise.	Construction and Operational Phase	South African National Standard SANS10103:2008: The measurement and rating of environmental noise with respect to annoyance and to speech communication

Drilling and Blasting	• Dust resulting from blasting • Fly rock • Noise resulting from blasting	• Maintaining good public relations with the surrounding communities, i.e warning the local communities in advance before blasts • Control by evacuating all persons within 500m of a blast site • Control by blasting during daylight hours when ambient noise levels are highest • Conduct Seismograph calibration tests to ensure that blasting standards are met • Control by limiting blasting operations to daylight hours when ambient noise levels are highest	Operational Phase	Compliance with the MHSA 1996 and OHSA 1993

Waste generation, storage and disposal	• Land pollution • Hazardous Leachate • Illegal dumping	• Ensure segregation of hazardous wastes from non-hazardous. • During the construction phase, temporary storage of construction waste to be stored in a bunded designated area. • No burning of refuse wastes are on the premises or on surrounding premises • All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site • Separate sealable waste skips/ bins for the different waste streams must be available on site • Waste bins must be emptied on a regular basis as to ensure bins do not overflow. • No littering will not be permitted on site and general housekeeping should be enforced • Site must be kept clean and free of rubbish that could potentially attract animal pests and that bins are scavenger proof. • Separate waste skips/ bins for the different waste streams must be available on site • Solid and chemical waste generated from construction and operational phases and the development must be kept away from drainage line • DO not dump waste of any nature, or any foreign material into any drainage line or stream • All waste to be disposed off at a suitably registered waste disposal facility • A suitable and registered waste service provider must remove all waste materials off site. • Proof of disposal to be obtained and kept on record	Operation and decommissioning	National Environmental Management: Waste Act No. 59 of 2008 as amended

Employment of Workers, skills training and procurement of construction materials	Job creation	• During community engagement/information dissemination, emphasis must be placed on the fact that permanent employment is directly related to the feasibility of the mine operations. • Strict adherence to Labour legislation (in terms of the employment of minors etc.) must at all times be made. • Maximise and monitor local recruitment where required. • Promote employment of women and youth. • Train locally recruited construction workers for longer-term employment where possible. • Support economic diversification through development of alternative markets.	Construction and Operational	Matzikama IDP and Planning policies to create conducive environment for sustainable economic growth and empowerment for the business and broader communities

Health, Safety and Security	Crime and Illnesses of employees	• Security fence is to be inspected continuously to ensure no illegal entry points are created. • Ensure that PPE is always worn on site. • Opened trenches and pits must remain demarcated to avoid injuries to employees • Ensure the contacts details of the police or Security Company, fire fighters, ambulance services are available on the site. • Limit access to the construction crew camp only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Emergency contact details for the police, Security Company, ambulance and fire department must be readily available onsite • Emergency facilities must be available and adequately supplied for use by staff and customers • Ensure that only suitably qualified personnel use vehicles and machineries • Ensure that the handling of equipment and materials is supervised and adequately instructed. • Security fence is to be inspected continuously to ensure no illegal entry points are created. • Limit access to the site only to the workforce. • Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence. • Appropriate notification signs must be erected, warning the residents and	Construction, Operational and Decommissioning phases	Mine Health and Safety Act No. 29 of 1996 (as amended)

		visitors about the hazards around the site and presence of heavy vehicles. • Ensure that employees are regularly checked for illnesses.		
Fuel and oil storage	Soil and groundwater contamination	• Store fuel in bunded tank with apron • Control by establishing a temporary waste storage facility with concreted floor, sloping concreted apron an oil trap • Maintenance/servicing of vehicle and machineries must be conducted on a concrete and roofed floor • Oil spill kit must be kept on a clearly visible area • Oil spills to be cleaned immediately and affected ground/soil to be uplifted and bagged for removal off site to approved dump facility for hydro carbons or treat affected soil accordingly • All personnel must wear issued PPE at all times as indicated by safety signs. • Fuel storage facilities must be inspected on a regular basis. • Spill prevention measures to be implemented at all times. • Fire fighting equipment such as fire extinguishers must be made available and be inspected on a regular basis. • A spill kit must be made available at all time. • All spills to be cleaned immediately. • Inspect storage facilities on a regular basis. • All leaks to be repaired immediately • Chemical storage must be designed with a 110% capacity of the stored fuel to reduce the possibility of soil and water contamination. Alternatively, use drip trays if portable fuel tanks are used when refueling & maintain tanks intergrity	Operation and decommissioning	• National Environmental Management Act 1998 as amended • Comply with South African National Standards, SANS 10131: Above-ground storage tanks for petroleum products

Rehabilitation	Soil erosion	• Prevent through restricting the disturbed area • Adequate storm water drainage system must be designed and maintained to adequately control the volume, speed, location of runoff, to avoid soil erosion and siltation. • All construction areas should be suitably top soiled and vegetated as soon as is possible after construction; • Disturbed surfaces to be rehabilitated must be ripped, and the area must be backfilled with topsoil or overburden. • Manage drainage and runoff from dumps using clean and dirty water system • A suitable soil conservation work shall be constructed and thereafter be maintained in order to divert run-off water from other land or to restrict the run-off water if applicable	Construction, Operational and decommissioning	• National Environmental Management Act 1998 as amended and meet rehabilitation standards/ objectives • Conservation of Agricultural Resources Act, (CARA) 43 OF 1983
	Establishment of alien invasive vegetation	• Control though ongoing alien invasive eradication programme • Prevent through restricting the disturbed area • Control by replacing topsoil on the stripped land should take place before the next strip is opened and mined • Prevent spraying of herbicides in the area as this also kills many adjacent non-target species • Regular follow up clearing of alien invasive species would be required in order to obtain successful rehabilitation • Mining should be phased, starting at the lowest point (closest point to the Wiedou River). • Backfilling and rehabilitation of a mined out area should be undertaken immediately after mining has been completed in that area. • The primary means of rehabilitation should involve the replacement of topsoil and hydro-seeding with an		

		indigenous grass seed mixture at the start of the rainfall season (June). A suitably experienced landscaping contractor should be appointed to undertake rehabilitation. • Manage by rehabilitating and backfilling all erosion damage, such as erosion channels and runnels • Phased restoration reclamation and rehabilitation of the land affected by mining must be completed prior to the final decommissioning of the mine		

h) Financial Provision

(1) Determination of the amount of Financial Provision.

As part of the extension of Welverdiend Mine and construction of lime kilns Rehabilitation closure and Liability plan **(attached as Appendix E**), the financial provision for the mining operations were determined based on information currently available. The cost estimate has been included for the current and future activities.

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

The closure of the mine is guided by the closure vision that was developed for the mine's conceptual closure plan, with the closure objectives and post closure strategy developed to support the vision. The closure objectives, identified in the extension Welverdiend dolomitic limestone and construction of lime kilns, Closure and Liability plan, which will drive the closure criteria and which have been developed to support the closure vision are:

- Ensure adherence to all statutory and other legal requirements;
- Re-establishment of the pre-mining land capability to allow for suitable post mining land use;
- Ensure that closure supports productive uses considering pre-mining conditions;
- Promote bio-diversity and biological sustainability to the maximum extent practicable
- To reinstate a self-sustaining system over the rehabilitated mined and infrastructure areas, requiring minimum maintenance to facilitate a walk away situation;
- To in-fill and slope ramps and voids to be free draining;
- Remove mine infrastructure that cannot be used by the applicant or a third party. Where buildings can be used by a third party, arrangements will be made to ensure their long term sustainable use; and
- Ensure that community safety is not adversely impacted (i.e. the pit area is adequately fenced off to restrict entry by humans and animals).

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

The above environmental objectives concerning closure and rehabilitation have been incorporated into this report and will be made available to the landowner and I&APs. The EIA and EMPr, and the Closure Plan are available during this EIA phase, for comment during the period 23 November 2018 and 015 January 2019. This information will also be made available to the landowner (in this the applicant) and all registered I&APs.

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

Find in **Appendix E**

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

Find in **Appendix E**

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

Section 24(P)(1) of NEMA states that an Applicant for an environmental authorisation relating to mining or related activities on a mining area must make the prescribed financial provision for the rehabilitation, management and closure of environmental impacts, before the Minister responsible for mineral resources issues the environmental authorisation.

In order to ensure that the Applicant provides sufficient funds for the total quantum to cover the rehabilitation, management and remediation of negative residual environmental impacts, the quantum for closure-related financial provision in terms of Regulation 4 of the NEMA Regulations on Financial Provision (GN940 of 2014) has been determined.

Determination of the financial provision (closure costing) has been undertaken, aligned to these requirements. The estimated closure cost for unscheduled closure as of 2018 is R 397.797.70 including Vat. The details of the closure costing can be found on the table below.

CALCULATION OF THE QUANTUM

Applicant :	**Maskam Cape Lime**		
Evaluator:	**Tali Tshikhovhokhovho**	**Location:**	**Vredendal**
Reference :	**WC 30/5/1/2/2/ (401) MR**	**Date:**	**Dec 2019**

Environmental Parameters

Risk Class	B
Area sensitivity	Low
Nature of terrain	Flat
Proximity to Urban Ara	Urban

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	0	R 15.15	1	1	R 0.00
2 (A)	Demolition of steel buildings and structures	m2	0	R 211.09	1	1	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	R 311.09	1	1	R 0.00
3	Rehabilitation of access roads	m2	3000	R 37.77	1	1	R 113 324.58
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	R 366.64	1	1	R 0.00
4 (B)	Demolition and rehabilitation of non-electrified railway lines	m	0	R 199.98	1	1	R 0.00
5	Demolition of housing and/or administration facilities	m2	0	R 422.19	1	1	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	0	R 214 872.28	0.04	1	R 0.00
7	Sealing of shafts adits and inclines	m3	0	R 113.32	1	1	R 0.00
8 (A)	Rehabilitation of overburden and spoils	ha	0.5	R 147 544.15	1	1	R 0.00
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0	R 183 763.58	1	1	R 0.00
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	0	R 533 736.53	0.55	1	R 0.00
9	Rehabilitation of subsided areas	ha	0.5	R 123 546.01	1	1	R 0.00
10	General surface rehabilitation	ha	1	R 116 879.86	1	1	R 116 879.86
11	River diversions	ha	0	R 116 879.86	1	1	R 0.00
12	Fencing	m	0	R 133.32	1	1	R 0.00
13	Water management	ha	0	R 44 441.01	0.41	1	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0	R 15 554.35	1	1	R 0.00
15 (A)	Specialist study	Sum	1	R 26 664.61	1	1	R 26 664.61
15 (B)	Specialist study	Sum	1	R 26 664.61	1	1	R 26 664.61
					Sub Total 1		R 283 533.64
1	Preliminary and General		R 34 024.04		**weighting factor 2** 1		R 34 024.04
2	Contingencies		R 28 353.36				R 28 353.36
					Subtotal 2		R 345 911.05
					VAT (15%)		R 51 886.66
					Grand Total		**R 397 797.70**

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

Cape Lime has the technical and financial ability to manage and rehabilitate the environment. The financial provision will be provided by means of a bank guarantee.

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

a) Monitoring of Impact Management Actions

Cape Lime will implement an ongoing monitoring programme for its proposed operations as recommended, ensuring environmental requirements stipulated in this EMPr are complied with. Various monitoring mechanisms have been suggested and included in specialist studies and revolves around Soil erosion, Air quality, Alien invasive vegetation, socio-economic issues (job creation), Noise and determine the progress of rehabilitation.

b) Monitoring and reporting frequency

The monitoring of impacts and reporting frequency will be different for the various environmental aspects. Table 12 details the environmental aspects to be monitored, the component of the aspect and the frequency of data collection and reporting.

Frequency of monitoring will differ from Weekly to Annually. It should be noted that other required monitoring will be added for purposes of the water use license application and the air emission license.

c) Responsible persons

Cape Lime is a subsidiary of Afrimat which has its own Environmental Specialists and Officers as well as SHEQ Officers under the Sustainability Department. These officials serve as independent Environmental Control Officers to its subsidiaries. These officials will serve as an external auditor/s responsible for ensuring that all necessary environmental monitoring required for the Welverdiend project is undertaken as per the monitoring programmes. The site manager and other staff that will be allocated for certain monitoring activities will also assist in required monitoring on site.

d) Time period for implementing impact management actions

Impact Management will be undertaken in each respective phase in which it would be applicable. In terms of monitoring, each management action will be implemented immediately after the monitoring reporting has been undertaken.

e) Mechanism for monitoring compliance

Monitoring programmes to be developed

Table 27: Mechanisms for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Demarcation of the mining area	Disturbance outside the mining area	Land outside the mining area	Site Manager and Environmental Control Officer (ECO)	• Throughout the construction and Operational Phase • Bi-weekly compliance monitoring by site management • ECO Annual Environmental Audit Reports

Placement of ablution facility within the boundaries of the site Coal storage	Soil contamination	To ensure that the chemical toilet is working properly with no leakages to the soil	Site Supervisor and Environmental Control Officer (ECO)	During construction and operational phases

Clearance of land for establishment of infrastructure (processing plant, construction kilns, construction of haul roads, construction of mining office, i.e. operation of training centres, offices and kitchen facilities) Transport material from mining area to clients Drilling and Blasting	Dust generation	Dust buckets sampling, monitoring and analysis Calcination stack emissions - Several bag filter units will be installed to ensure the emissions released into the atmosphere meets the requirements set by Atmospheric Emissions License	ECO and appointed specialist service provider Environmental Control Officer/Environment al Officer/ SHEQ Officer	• Dust fallout monitoring and reporting must be undertaken monthly throughout the operation of the mine • Monthly monitoring of compliance with the NEMAQA regulations • Once-off registration on the online NAEIS systems thereafter reporting as specified • Daily monitoring daily of the stack, and the bag filters are regularly inspected to make sure it is in good working condition.

	Ecological degradation and biodiversity loss	Biodiversity monitoring to preserve the faunal and floral species of conservation concern Plant search and rescue management plan must be implemented for reinstating vegetation and ensuring rehabilitation objective is reached	ECO	• Rehabilitation monitoring and reporting to be conducted annually during the summer months for two years post-closure • ECO Annual Compliance Monitoring Reports • Annual or frequency stipulated by the competent authority compliance auditing with the Mine Rehabilitation and closure plan
	Degradation of soil resources	Listed activities must be monitored frequently to ensure compliance with the EMPr, EA, and closure plan.	Environmental Control Officer/Environment al Officer/ SHEQ Officer	Review of storm water management plan as or when required

Operations of the mine plant, fluid bed lime kilns	Generation of noise	Noise readings undertaken with a hand held monitoring device will be required A Noise monitoring programme to be developed and address Compliance with the National Noise Control Regulations and SANS10103:2008 guidelines and mitigation measures to prevent noise generation Vehicles/plant/equipments must be inspected on a regular basis Records to be kept of monitoring activities.	• Environmental Control Officer/Environmental Officer/ SHEQ Officer • Acoustical Consultant	• Baseline monitoring • Monthly reporting on compliance with the Noise quality standards • Review of vehicle/plan/equipment maintenance plan as or when required • Frequent inspections of vehicles/plant/equipment

Fuel and oil storage Waste management	Hydrocarbon contamination of soil and groundwater	Regular inspections of areas prone to hydrocarbon spills and contamination must be inspected on a regular basis. Contamination the affected environment will require remediation actions. ***Soil contamination*** After completion of remediation actions it is recommended that samples be taken to ensure the soil quality comply with the rehabilitation objectives. ***Water contamination*** Water samples must be taken to ensure compliance with legal thresholds and the baseline data. Records to be kept of monitoring activities.	All staff, Environmental Control Officer/Environmental Officer/ SHEQ Officer	• Annual review of the Emergency preparedness and response plan or review after occurrence of emergency incident • Review of vehicle/plan/equipment maintenance plan as or when required • The boreholes should be sampled quarterly throughout the life of the mine and post- closure. • Daily inspections of vehicles/plant/equipment • Weekly inspections of hazardous substances storage facilities • Weekly inspections of spill prevention equipment

Clearing of vegetation/disturbance of soil	Establishment of alien invasive species	• Regular follow-up clearing of aliens • No spraying of herbicides as it also kills many adjacent non-target species	Site Manager and appointed specialist service provider	• Bi-weekly inspection of site for the visible signs of alien species establishment • Alien invasive vegetation species monitoring and reporting to be conducted throughout the life of the mine and for two years after post-closure
	Visual alteration	• Alteration to be monitored and managed in accordance with the rehabilitation objectives.	Environmental Control Officer/Environmental Officer/ SHEQ Officer	• Annual compliance auditing • Review of the Annual rehabilitation plan as stipulated by GN R. 1142

Employment of workers and procurement of construction materials	Job Creation and Skills Training	• A grievance procedure to be developed and address at least the following: ○ Procedure for recoding and addressing all complaints received by mine employees, contractors, or sub-contractors and surrounding I&APs. • Frequent monitoring of compliance with the Social Labour plan	• Company Directors • Human Resource manager • SHEQ/ Health and Safety Manger	• Ongoing recording of complaints received by I&AP • Review of Social Labour plan as required by legislation and the competent authority
Drilling & Blasting	Damage to surrounding landowner properties	A drilling and blasting management plan must be developed and address at least the following: • Methods used for drilling and blasting • Safety requirements including • Monitoring requirements • Assessment of possible risks trough a risk assessment Records to be kept of monitoring activities.	• Blasting supervisor/officer. • Blasting engineer • Site Manager	• Frequent monitoring of areas affected by blasting activities

Rehabilitation	Ground water, air and Noise, alien invasive plants	• Rehabilitation of all mined out areas should be taken after mining in that area has been completed • Regular follow up on alien invasive species	• Environmental officer – external audits • Rehabilitation / financial auditors	• Rehabilitation monitoring and reporting to be conducted annual during the summer months for two years post-closure • ECO Annual Compliance Reports

j) Indicate the frequency of the submission of the performance assessment report.

Section 34 of GN R. 982 (published under the National Environmental Management Act (NEMA), Act 107 of 1998) stipulates requirements for auditing compliance with the Environmental Authorisation (EA), the Final EMPr, and the Rehabilitation plan.

It requires the holder of the authorisation, for the period during which the EA, EMPr, and closure plan (if applicable) are valid, to ensure compliance with all the conditions stipulated in these documents and that is be audited. This audit report must then be submitted to the competent authority.

The EMPr audit must be undertaken annually until the existing Mining Right expires. A report must be compiled and submitted to the competent authority.

The purpose of this audit report is defined as follows:

- On an ongoing basis, determine the ability of the EMPr (and where applicable the closure plan) to sufficiently provide for:
  - the avoidance;
  - management; and
  - mitigation of environmental impacts; and
- To determine the level of compliance with the provisions of:
  - Environmental Authorisation (EA);
  - EMPr; and
  - where applicable the closure plan.

In the event that findings of the environmental audit report indicate insufficient mitigation of environmental impacts of the activity or insufficient levels of compliance with the requirements, the holder of the EA must:

- Submit recommendations to amend the EMPr or closure plan in order to rectify the shortcomings identified in the audit report.
- Allow for a public participation process (which process has been agreed to by the competent authority and was appropriate) to access the proposed amendment to the EMPr (and where applicable the closure plan); and
- Allow for the potential and registered interested and affected parties (I&AP), including organs of state which have jurisdiction in respect of any aspect of the relevant activity and the competent authority, to comment on these changes.

Operational internal environmental inspections will need to be done once a month by the Applicant's Environmental Representative. All findings and data are to be recorded in an on-site Environmental File.

k) Environmental Awareness Plan

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

General environmental awareness must be promoted among everyone working on the Welverdiend Mine (including consultants and contractors) to encourage the implement environmentally sound practices throughout its duration.

This will ensure that environmental incidents are minimised and environmental compliance maximised.

The objectives of the Environmental Awareness Plan are as follows:

- To inform employees, contractors of any environmental risks which may result from their work;
- To inform employees and contractors of the relevant environmental procedures and actions required to be taken;
- To improve the knowledge of employees and provide the relevant training

Environmental requirements will be included in any operational contracts, thereby making employees aware of the potential environmental risks associated with the quarrying and limestone calcining activities and the necessity to prevent potential environmental incidences by the implementation of good housekeeping practices.

The environmental awareness plan must at least communicate the following:

- Importance of conformance with the environmental policy, procedures and other requirements of good environmental management;
- The significant environmental impacts and risks of an individual's work activities and the environmental benefits of improved performance;
- Individual's roles and responsibilities in achieving the aims and objectives of the environmental policy; and
- The potential consequences of not complying with environmental procedures.

All employees and contractors are to undergo induction, a part of which is environmental awareness training. At the end of this training, personnel will be required to sign a register noting their completion of the training and their understanding thereof.

All personnel performing tasks which can cause significant or major environmental impacts shall be competent on the basis of training, education and/or experience. This applies to, but is not limited to, supervisor level and above.

Environmental awareness training will include the identification of significant environmental impacts, actual or potential, which their work activities could result in, as well as mitigation and prevention

measures. Training is appropriate to the activity of individual employees. Monthly environmental topics will be generated to raise awareness of employees on environmental issues.

(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

The EMPr details commitments in order to avoid pollution or the degradation of the environment. Compliance to and implementation of the management and mitigation measures contained in the EMPr. Compliance with the EMPr commitments will form part of the daily operations of the mine, and a copy of the EMPr commitments will be provided to the contractors. Employees will also be briefed regarding the EMPr commitments prior to the commencement of operations. In addition to this, monitoring by internal Environmental Representative as well as by the external auditor.

Site Inductions

All employees are required to undergo environmental awareness induction training on appointment. All records of such training must be kept. Refresher induction training must periodically take place.

Toolbox talks

Regular meetings (recommended to be done daily, at least once a week) communicating the following is recommended:

- Findings of environmental performance reports;
- Awareness raising campaigns discussing environmental topics; and
- Information of any environmental risk which may result from employee's work.

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

Should, however, circumstances lead to unacceptable risks, emergency systems and procedures need to be designed and implemented in the case of an emergency to prevent or minimise the consequential environmental damage. The environmental emergency contingency plan must addresses any reasonably anticipated failure (most probable risk) for the entire mining area as well as the additional infrastructure that could cause environmental emergencies.

Emergencies and risks that should be listed here, as a minimum, include accidents, fires, spillages (hydrocarbon).

Communication is vital in an emergency and thus communication devices, such as mobile phones, radios, pagers or telephones, must be available around the site. A checklist of emergency response participants must be consulted and the relevant units notified. In this case, many of the emergency

services will be sourced from Vredendal and Vanrhynsdorp.

- Fire department;
- Police;
- Emergency health services such as ambulances, paramedic teams, poisons centres;
- Hospitals, both local and for evacuation for specialist care;
- Public health authorities; and
- Environmental agencies, especially DWS.

l) Specific information required by the Competent Authority

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

The Financial Provision will be reviewed on an annual basis. The Financial Provision assessment will be accompanied by an annual Performance Assessment Audit.

The WULA and AEL processes are underway and will be submitted to respective departments in due course.

2) UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports ☒

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

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

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

-END-