Appendix E: Specialists Reports

Appendix E1: Ecological Baseline Assessment

ECOLOGICAL BASELINE ASSESSMENT

FOR

PROPOSED BENTONITE AND ZEOLITE MINING RIGHT APPLICATION

ON

ERVEN 1401, 1199 & 2924 HEIDELBERG, WESTERN CAPE

Prepared for: Imerys Refractory Minerals South Africa (Pty) Ltd
Trading as - Cape Bentonite Mine
Tel: 028 722 2011
Email: helmut.gemurr@imerys.com

Prepared by: Mr N Hanekom
Eco Impact Legal Consulting (Pty) Ltd
P.O. Box 45070
Claremont
South Africa
7735
Tel: 021 671 1660/9976
Email: admin@ecoimpact.co.za

Date: June 2018

TABLE OF CONTENTS

1. INTRODUCTION AND BACKGROUND

Eco Impact Legal Consulting (Pty) Ltd (Eco Impact) has been appointed by the Imerys Refractory Mineral SA to assess the biodiversity and freshwater ecosystems impacts proposed bentonite and zeolite mining activities on the erven 1401, 1199 and 2924 near Heidelberg in the Western Cape.

Imerys Refractory Minerals South Africa (Pty) Ltd t/a Cape Bentonite Mine is an existing Bentonite and Zeolite mining company operating on various farms in close proximity to the towns of Heidelberg and Riversdale that fall within the Hessequa Local Municipality and Eden District Municipality in the Western Cape Province.

Cape Bentonite Mines proposes to apply for a mining right to mine for bentonite and zeolite on the erven 1401, 1199 and 2924 near the town of Heidelberg in the Western Cape.

Mining is conducted "in-house" by means of excavators, front-end loaders and 15T dumper trucks. The mining and method comprise relatively shallow opencast quarrying. The topsoil and overburden are removed and stockpiled separately adjacent to the mining area. The bentonite as it is being mined is trucked to the processing plant at the head offices on Erf 1412, Heidelberg.

The mine provides direct employment for at least 43 local persons and compensation to the landowner. The operation further creates indirect employment opportunities in equipment supply industries, transport and bentonite mining, and the mining environment.

Cape Bentonite Mine provided Eco Impact with a map of the properties to be assessed on which mining is proposed and a total area of approximately 135ha was surveyed for this assessment. (Refer to Map 4)

Sensitive environmental features that were identified on the properties include natural and near natural indigenous vegetation remnants which exists throughout the properties and consists of Critically Endangered - Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial Vegetation also identified as Terrestrial Critical Biodiversity Areas ("CBA") as according to the Western Cape Biodiversity Plan ("WCDP") 2017. These remnants of indigenous vegetation areas are also associated with secondary and primary non-perennial drainage lines and man-made dams with associated wetland characteristics, also classified as Aquatic Critical Biodiversity and Ecological Support Areas ("ESA and National Freshwater Ecosystems Priority Areas ("NFEPA"). Refer to Maps 4-5.

Some of the proposed mining activities areas as assessed partially fall within mapped drainage line/aquatic Ecological Support Areas (Res) *Category 1: ESA 2 Restore from other land use*. The mapped ESA 2 areas are not essential for meeting biodiversity targets, but play an important role in supporting the functioning of the CBAs and are important in maintaining ecosystem services i.e. drainage systems. The objectives for these areas are to restore and/or manage to minimise impacts on ecological processes. The mining activities are however only proposed on completely transformed and annually cultivated agricultural land and the restorations of ESA 2 areas which have been mapped on these areas will therefore not be feasible or reasonable as cultivation of these areas will in any case proceed as is after the proposed mining activities have been completed. With the implementation of proper buffer and stormwater management measures as proposed the mining activities will not have a significant detrimental impact on the current ecological processes as associated with the mapped ESAs, CBAs and NFEPAS.

Alien vegetation encroachment on site is mainly limited to weeds associated with cultivated lands.

Potential significant direct impacts occur primarily during the mining excavation stage, and the nature of these impacts is temporary loss of agricultural land and potential erosion of proposed mining areas and surrounds. The extent in this case is local. Indirect impacts

occur mostly during the rehabilitation phase and in this case the nature would vary from the introduction of alien vegetation to partial disruption of ecological processes due to the effects of the alien species. The extent of the indirect impact in this case is local.

Site specific stormwater management measure must be designed and implemented for each proposed quarry area to prevent accumulation of stormwater in the quarries and allow current stormwater run-off conditions to continue as is. Where no existing gravel roads exists as buffer areas an 8m buffer area in-between any excavations and the edge of indigenous vegetation areas as present along the existing edge of the cultivated agricultural lands is proposed to ensure protection and maintain current ecological functioning of associated runoff areas/drainage lines. The only activities allowed within the proposed 8m buffer areas, as measured from the edge of the indigenous vegetation areas along the edge of the cultivated lands, are continued use as informal gravel roads or for placement of storm water berms (no excavations or trenching allowed).

No disturbance i.e. no new roads, clearance, edge effects within any remaining indigenous vegetation areas may occur during the proposed mining activities and all mining activities to take place on transformed cultivated agricultural land, all remaining indigenous vegetation areas also associated with the secondary and primary non-perennial drainage lines must be demarcated as no-go areas throughout the mining activities lifespan.

From the survey conducted it was concluded that if the proposed mining activities are to be located on completely transformed and cultivated agricultural land, previously and continually impacted upon by cultivation and heavy livestock grazing, and if specialist recommendations as provided within this report are incorporated into the Mine Environmental Management Plan it will not have a significant negative environmental impact if recommendations are effectively implemented.

No fatal flaws were identified during the assessment that will lead to unacceptable environmental degradation during the proposed mining activities.

IMPORTANT NOTE: Proposed mining activities as referred to throughout the report include all activities associated with the proposed bentonite and zeolite mining development such as any explorations required, site establishment, demarcations, any excavations, any vehicular movements, any access and internal road construction, topsoil and overburden storage, implementation of rehabilitation measures etc.

2. METHODOLOGY, ASSUMPTIONS AND LIMITATIONS OF THE STUDY

Input into this report was informed by a combination of desktop assessments of existing biodiversity and freshwater ecosystem information for the study area and catchment, as well as by a more detailed assessment of the freshwater features at the site.

The site was visited on 15 May 2018. During the field visit, the characterisation and integrity assessments of the ecological features were undertaken. Mapping of the features was undertaken using Google Maps with GPS tracker. The features were mapped while doing the field survey. The SANBI Biodiversity GIS website was also consulted to identify any constraints in terms of fine-scale biodiversity conservation mapping as well as possible freshwater features mapped in the Freshwater Ecosystem Priority Areas maps. This information/data was used to inform the resource protection related recommendations.

The basic terms of reference (TOR) for this study were the Cape Nature recommended TOR for biodiversity specialists, and are as follows:

- Produce a baseline analysis of the botanical attributes of the study area as a whole.
- This report should clearly indicate any constraints that would need to be taken into account in considering the development proposals further.
- The baseline report must include a map of the identified sensitive areas as well as

indications of important constraints on the property. It must also:

- Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering viability etc.

In terms of biodiversity pattern, identify or describe:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighbouring types, soil or topography;
- The types of plant communities that occur in the vicinity of the site
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, etc.*)

Species level

- Red Data Book species of conservation concern (RDBSCC) - (provide location)
- The viability of and estimated population size of the RDBSCC that are present (include degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High = 70-100% confident, Medium 40-70% confident, Low 0-40% confident)
- The likelihood of other RDBSCC species occurring within the vicinity (include degree of confidence)

Other pattern issues

Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.

- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying
- The condition of the site in terms of current or previous land uses

In terms of biodiversity process, identify or describe:

- The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
- Any mapped spatial component of an ecological process that may occur at the site or in the vicinity i.e. watercourses, biome boundaries, migration routes etc.
- Any possible changes in key processes e.g. increase fire frequency or drainage/artificial recharge of aquatic systems.

- Describe what is the significance of the potential impact of the proposed project – with and without mitigation – on biodiversity pattern and process at the site, landscape, and regional scales.

- Recommend actions that should be taken to prevent or mitigate impacts. Indicated how these should be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.

- Indicate limitations and assumptions, particularly in relation to seasonality.

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of freshwater ecosystems. The following techniques and methodologies were utilized to undertake this study as/if required:

- The ecological importance and sensitivity assessment as associated with aquatic systems was conducted according to the guidelines as developed by DWAF (1999).
- Recommendations are made with respect to the adoption of buffer zones within the development site, based on the wetlands functioning and site characteristics.

The level of aquatic assessment undertaken was considered to be adequate for this study.

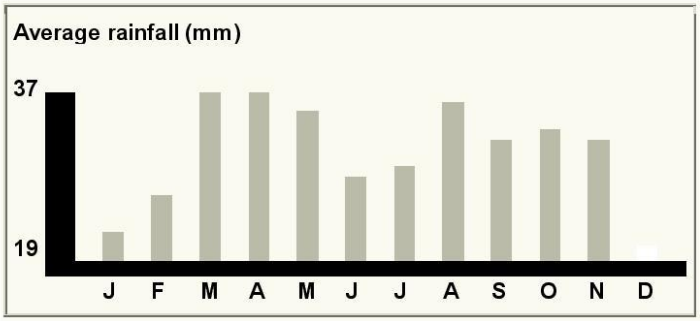
3. BROAD ECOLOGICA CHARACTERISTICS OF THE SITE AND SURROUNDS

3.1. TOPOGRAPHY

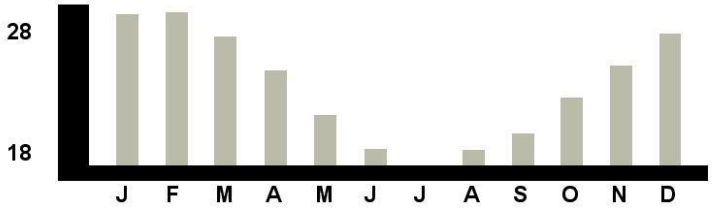
The farm is characterised by its undulating landscape with associated steep slopes, drainage lines and gorges which limits the extent of cultivation to moderate slopes and flat lying areas.

3.2. CLIMATE

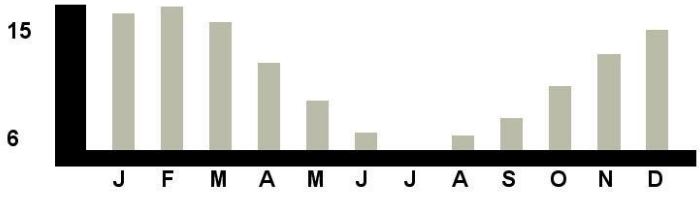
Heidelberg (WC) normally receives about 366mm of rain per year, with rainfall occurring throughout the year. The chart below (lower left) shows the average rainfall values for Heidelberg (WC) per month. It receives the lowest rainfall (19mm) in December and the highest (37mm) in March. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Heidelberg (wc) range from 18°C in July to 27.5°C in February. The region is the coldest during July when the mercury drops to 5.8°C on average during the night. Consult the chart below (lower right) for an indication of the monthly variation of average minimum daily temperatures.



Average midday temperature (°C)



Average night-time temperature (°C)



3.3 GEOLOGY

On a regional level the site geology is derived from the Bokkeveld group as part of Worcester Normal Fault of the Cape Fold Belt Area.

On a local level the site geology consists mainly of volcanic sedimentary deposit in the early Cretaceous layers composed of continental layers from Alluvial to Siltstones and Lacustine.

3.4 VEGETATION AT A NATIONAL AND REGIONAL CONTEXT

The study area is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The study area lies within the East Coast Renosterveld bioregion (Mucina & Rutherford 2006). This bioregion has a moderately distinct flora, and high numbers of plant Species of Conservation Concern, with the main pressures being extensive habitat loss, due mainly to agriculture, followed by alien invasive vegetation, quarrying and urbanisation, and habitat modification due to lack of appropriate fire regimes. Critically Endangered - Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial also identified as Terrestrial Critical Biodiversity Areas ("CBA") as according to the Western Cape Biodiversity Plan ("WCDP") 2017, are the indigenous vegetation types remaining within the area.

The study area falls within the planning domain of the Hessequa Municipality Fine Scale Conservation Plan (Pence 2008) and the WCDP (2017). These conservation plans have identified Critical Biodiversity Areas (CBAs) which aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. It serves as the common reference for all multi-sectoral planning procedures, advising which areas can be lost to development, and which areas of critical biodiversity value and their support zones should be protected against any impacts. The CBAs and ESAs as mapped for the relevant property is shown in Maps 4 and 5. The primary reason for selection of these areas as terrestrial and/or aquatic CBAs and/or ESAs is that it helps meet the national conservation target for threatened vegetation types, and ancillary reasons are that it offers opportunities for continuation of ecological connectivity especially related to the hydrological connectivity of the drainage lines.

3.5 FRESHWATER ECOLOGICAL FEATURES

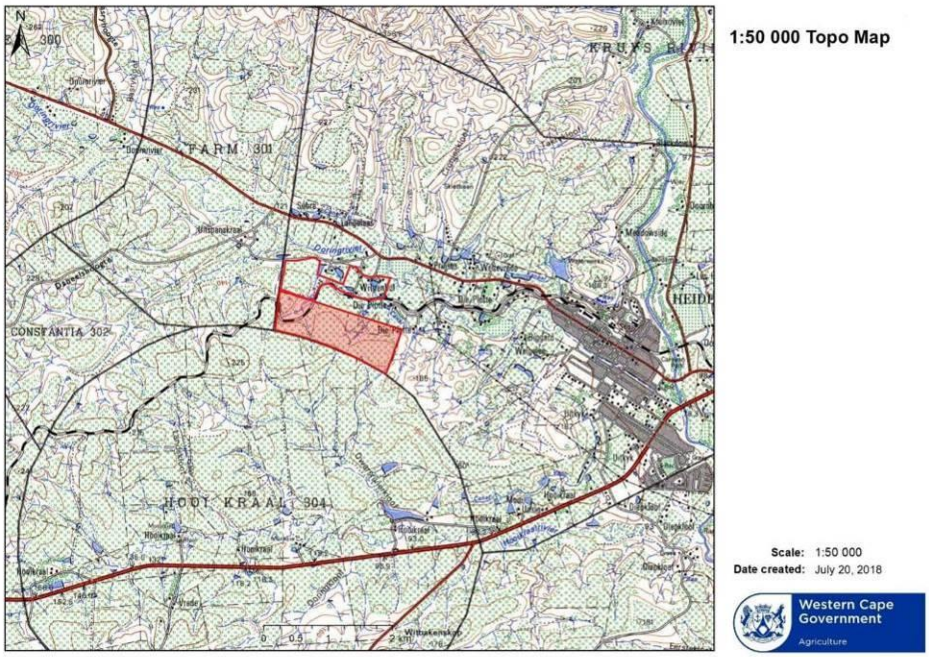
Several non-perennial secondary drainage lines are located throughout the property due to the undulating nature of the topography.

Most of the drainage lines with their associated wetland characteristics are in a moderate to good condition as they are located within the "klowe" too steep to plough and surrounded by indigenous vegetation remnants which also remains because the areas are too steep to plough for cultivation.

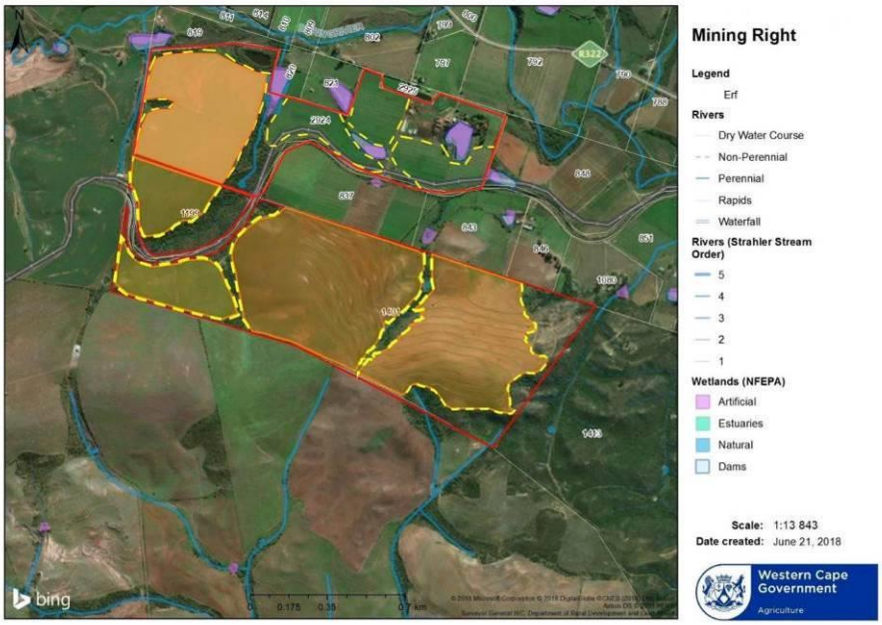
3.6 MAPS

Map 1: Locality of Heidelberg and Riversdale in the Western Cape.

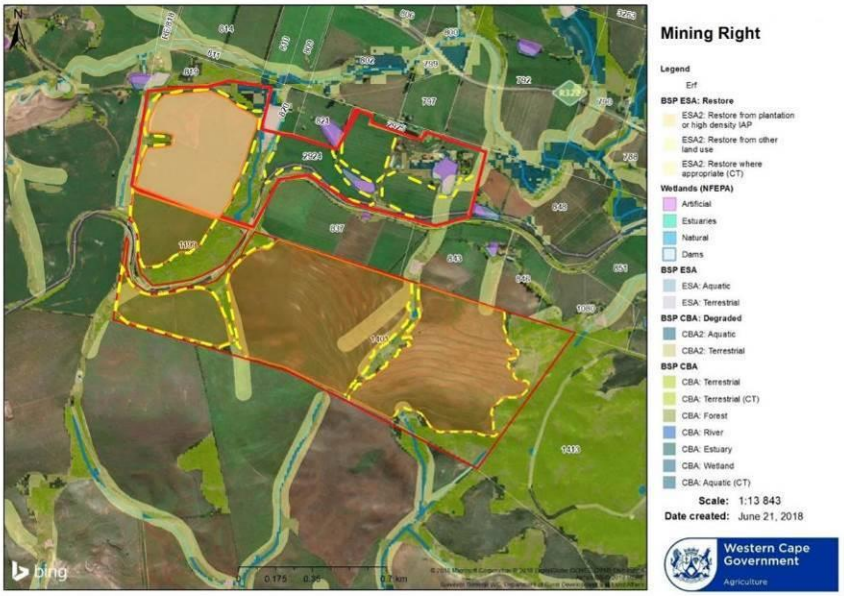
Map 2: Locality of the Erven 1401, 1199 and 2924 near Heidelberg in the Western Cape.
GPS co-ordinate for "middle" of surveyed site - 34° 05' 14.32"S
20° 55' 02.96"E



Map 3: The 1 in 50 000 topographical map for the study area – Erven 1401, 1199 and 2924



Map 4: Proposed mining activities areas of ± 135ha as surveyed (outlined in orange line and yellow dash). Artificial/man-made and Natural National Freshwater Ecosystem Priority Areas ("NFEPA") on the site and surrounds. Yellow dash lines also indicate boundaries of no-go areas.



Map 5: Biodiversity GIS ("BGIS") land use map indicating mapped terrestrial and aquatic Critical Biodiversity Areas ("CBA"), Ecological Support Areas ("ESA") and associated buffer areas as according to WCDP (2017) in relation to the proposed mining activities areas on transformed cultivated agricultural land (as outlined in orange line and yellow dash). Yellow dash lines also indicate boundaries of no-go areas.

.

4. OBSERVATIONS AND FINDINGS RELATIVE TO THE TERMS OF REFERENCE

4.1 THE MAIN VEGETATION TYPE/S AND PLANT COMMUNITIES THAT OCCUR ON AND OR/IN THE VICINITY OF THE SITE

Critically Endangered - Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial Vegetation as according to the Western Cape Biodiversity Plan ("WCDP") 2017, is the indigenous vegetation types within the immediate area.

Observations and Findings:
All proposed mining activities areas as delineated in orange and yellow dash lines on Maps 4 and 5 have been completely transformed due to agricultural cultivation and there are no remaining indigenous vegetation species on these areas.

The remaining Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial Vegetation remnants are located in-between the transformed cultivated areas, along the drainage line areas associated with steep slopes which could not be ploughed for cultivation.

From the site survey conducted and most recent google earth map images it is evident that all of the proposed mining activities areas have been ploughed and cultivated within the last year 2017-2018. No natural, near natural or rehabilitating indigenous vegetation remnants are located on the proposed mining activities areas.

4.2 FUANA AND AVIFAUNA COMMUNITIES THAT OCCUR ON AND OR/IN THE VICINITY OF THE SITE

Fish

Observations and Findings:
Neither fish species nor their associated habitats are present on the proposed mining activities areas.

Invertebrates

Observations and Findings:
It is expected that the area has a rich and diverse invertebrate life especially within the remaining indigenous vegetation areas. The proposed mining activities, if restricted to recommended areas, will not have significant detrimental impact on invertebrate species within the sensitive indigenous vegetation and drainage line areas as identified on the property.

Birds (Avifauna)

Approximately 164 species are known to occur in the bigger area (Hockey et al 2006).

Observations and Findings:
No bird species of conservation concern ("SCC") or their associated habitats were observed on the proposed mining activities areas at the time of the survey.

If recommendations as provided in this report are adhered to it is not expected that the proposed mining activities will have a significant detrimental impact on any bird SCC or their habitat due to extensive undeveloped areas that will remain as is adjacent to proposed mining areas.

Mammals

As reported in Smithers (1983) small buck e.g. common duiker, steenbok and grysbok, bushbuck, rodents such as mole rats, field mice and hares, as well as carnivores such as

genets, mongoose and caracal are likely to inhabit the area.

Some 70 mammal species are known to occur in the bigger area (Smithers 1983).

Observations and Findings:
No mammal SCC or their associated habitats were observed on the proposed mining areas at the time of the survey.

If recommendations as provided in this report are adhered to it is not expected that the proposed activities will have a significant detrimental impact on any mammal SCC concern or their habitat due to extensive undeveloped areas that will remain as is adjacent to proposed mining areas.

Amphibians and Reptiles (Herpetofauna)

With respect to amphibians, Minter et al (2004) state that "habitat loss or modification as a result of agriculture and other forms of human activity remains the most important single threat to the survival of amphibian populations. The scale of these changes and their relative permanence are the major cause. At greatest risk are species that have limited distributions."

As reported in Alexander et al (2007) 26 reptile species are likely to inhabit the area.

Observations and Findings:
No amphibian or reptile SCC or their associated habitats were observed on the proposed mining areas at the time of the survey.

If recommendations as provided in this report are adhered to it is not expected that the proposed mining activities will have a significant detrimental impact on any amphibian or reptile SCC concern or their habitats due to extensive undeveloped areas that will remain as is adjacent to proposed mining areas.

Before and during clearing activities, search and rescue of tortoises must be conducted on site. All tortoises collected must be released on the adjacent areas that will not be impacted upon.

4.3 IN TERMS OF BIODIVERSITY PATTERN, IDENTIFY OR DESCRIBE, AT SPECIES LEVEL - THE VIABILITY OF, AND ESTIMATED POPULATION SIZE OF THE TOPS AND RDB SPECIES OF CONSERVATION CONCERN THAT ARE PRESENT

Red Data Listed or species listed under TOPS regulation (Vegetation)

The original natural vegetation types on the greater property and surrounds have been mapped as Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial Vegetation both Critically Endangered.

Observations and Findings:
(High 100% confident):
It is expected that several vegetation SCC are located within the remaining natural to near natural areas on the property however all proposed mining activities areas as delineated in orange and yellow dash lines on Maps 4 and 5 have been completely transformed due to agricultural cultivation and there are no remaining indigenous vegetation species on these areas.

Red Data Listed or species listed under TOPS regulation (Reptiles and Amphibians)

Observation and Findings:
(High 100% confident):
As the proposed mining activities areas are to be located on annually cultivated agricultural

land no SCC amphibian or reptile species are known and expected to occur within these areas and no rare or localized species were recorded at the time of the survey.

Red Data Listed or species listed under TOPS regulation (Mammals)

The following table lists the Red Data mammal species (including their status) which are predicted, or confirmed to occur in the general area and possibly within the study area (Friedman & Daly, 2004):

RED DATA MAMMAL SPECIES				
	COMMON NAME	**SCIENTIFIC NAME**	**RED DATA CATEGORY**	**PREDICTED OCCURENCE**
1	Lesueur's Wing-gland Bat	Cistugo lesueuri	Near threatened	Unlikely
2	Long-tailed Serotine Bat	*Eptesicus hottentotus*	Least Concern	Unlikely
3	Schreibers' Long-fingered Bat	*Miniopterus schreibersii*	Near Threatened	Possible
4	Temminck's Hairy Bat	*Myotis tricolor*	Near Threatened	Possible
5	Cape Serotine Bat	*Neoromicia capensis*	Least Concern	Possible
6	Egyptian Split Faced Bat	*Nycteris thebaica*	Near threatened	Possible
7	Cape horseshoe bat	*Rhinolophus capensis*	Near threatened	Possible
8	Geoffroy's horseshoe bat	*Rhinolophus clivosus*	Near threatened	Possible
9	Egyptian Fruit Bat	*Rousettus aegyptiacus*	Least Concern	Possible
10	Egyptian Free-tailed Bat	*Tadarida aegyptiaca*	Least Concern	Possible
11	Rock Hyrax	*Procavia capensis*	Least Concern	Unlikely
12	Cape Clawless Otter	*Aonyx capensis*	Least Concern	Unlikely
13	Water Mongoose	*Atilax paludinosus*	Least Concern	Possible
14	Black-backed Jackal	*Canis mesomelas*	Least Concern	Unlikely
15	Caracal	*Caracal caracal*	Least Concern	Likely
16	Yellow Mongoose	*Cynictis penicillata*	Least Concern	Possible
17	African Wild Cat	*Felis silvestris*	Least Concern	Unlikely
18	Small Grey Mongoose	*Galerella pulverulenta*	Least Concern	Possible
19	Small-spotted Genet	*Genetta genetta*	Least Concern	Unlikely
20	Large-spotted Genet	*Genetta tigrina*	Least Concern	Unlikely
21	Large Grey Mongoose	*Herpestes ichneumon*	Least Concern	Possible
22	Striped Polecat	*Ictonyx striatus*	Least Concern	Unlikely
23	Honey badger	*Mellivora capensis*	Near	Unlikely

			threatened	
24	Bat-eared Fox	*Otocyon megalotis*	Least Concern	Likely
25	Leopard	*Panthera pardus*	Least Concern	Unlikely
26	African Weasel	*Poecilogale albinucha*	Data deficient	Unlikely
27	Aardwolf	*Proteles cristatus*	Least Concern	Unlikely
28	Cape Fox	*Vulpes chama*	Least Concern	Unlikely
29	Red Hartebeest	*Alcelaphus buselaphus*	Least Concern	Unlikely
30	Springbok	*Antidorcas marsupialis*	Least Concern	Unlikely
31	Klipspringer	*Oreotragus oreotragus*	Least Concern	Unlikely
32	Grey Rhebok	*Palea capreolus*	Least Concern	Unlikely
33	Steenbok	*Raphicerus campestris*	Least Concern	Likely
34	Cape Grysbok	*Raphicerus melanotis*	Least Concern	Unlikely
35	Common Duiker	*Sylvicapra grimmia*	Least Concern	Possible
36	Eland	*Taurotragus oryx*	Least Concern	Unlikely
37	Bushbuck	*Tragelaphus scriptus*	Least Concern	Possibe
38	Fynbos golden mole	*Amblysomus corriae*	Near threatened	Possible
39	Cape golden mole	*Chrysochloris asiatica*	Data deficient	Possible
40	Reddish-grey Musk Shrew	*Crocidura cyanea*	Data Deficient	Unlikely
41	Greater Musk Shrew	*Crocidura flavescens*	Data Deficient	Unlikely
42	Forest shrew	*Myosorex varius*	Data deficient	Unlikely
43	Lesser Dwarf Shrew	*Suncus varilla*	Data Deficient	Unlikely
44	Cape Hare	*Lepus capensis*	Least Concern	Likely
45	Scrub Hare	*Lepus saxatilis*	Least Concern	Possible
46	Chacma Baboon	*Papio ursinus*	Least Concern	Unlikely
47	Cape Spiny Mouse	*Acomys subspinosus*	Least Threatened	Possible
48	Namaqua Rock Mouse	*Aethomys namaquensis*	Least Threatened	Unlikely
49	Cape Dune Mole Rat	*Bathyergus suillus*	Least Concern	Possible
50	Common Mole Rat	*Cryptomys hottentotus*	Least Concern	Possible
51	Grey Climbing Mouse	*Dendromus melanotis*	Least Concern	Possible
52	Brant's Climbing Mouse	*Dendromus mesomelas*	Least Concern	Unlikely
53	Short-tailed Gerbil	*Desmodillus*	Least	Possible

		auricularis	Concern	
54	Cape Mole Rat	*Georychus capensis*	Least Concern	Unlikely
55	Hairy Footed Gerbil	*Gerbillurus paeba*	Least Concern	Possible
56	Spectacled Dormouse	*Graphiurus ocularis*	Least Concern	Possible
57	Porcupine	*Hystrix africaeaustralis*	Least Concern	Likely
58	Pygmy Mouse	*Mus minutoides*	Least Concern	Unlikely
59	Verreaux's Mouse	*Myomyscus verreauxi*	Least Concern	Unlikely
60	White-Tailed Rat	*Mystromys albicaudatus*	Endangered	Unlikely
61	Vlei Rat	*Otomys irroratus*	Least Concern	Unlikely
62	Laminate Vlei Rat	*Otomys laminatus*	Least Concern	Unlikely
63	Saunders Vlei Rat	*Otomys saundersiae*	Least Concern	Unlikely
64	Karoo Bush Rat	*Otomys unisulcatus*	Least Concern	Unlikely
65	Striped Mouse	*Rhabdomys pumilio*	Least Concern	Likely
66	Pouched Mouse	*Saccostomus campestris*	Least Concern	Unlikely
67	Kreb's Fat Mouse	*Steatomys krebsii*	Least Concern	Possible
68	Cape Gerbil	*Tatera afra*	Least Concern	Possible
69	Cape Rock Elephant-shrew	*Elephantulus edwardii*	Least Concern	Unlikely
70	Aardvark	*Orycteropus afer*	Least Concern	Unlikely

Observations and Findings:
(High 90% confident):
No SCC mammal species as listed were observed during the survey of the proposed mining activities areas at the time of the survey and if they are present on the property they are expected to only occasionally visit the proposed mining activities areas.

Red Data Listed or species listed under TOPS regulation (Avifauna)

The only avifauna species of special significance likely to occur within the vicinity of the site are:

- Giant Eagle Owl *Bubo lacteus* (vulnerable and vagrant species)
- Stanley's Bustard *Neotis denhami* (Vulnerable)
- Blue Crane *Anthropoides paradiscus* (Vulnerable)
- Chestnut Banded Plover *Charadrius pallidus* (Near Threatened)
- Cape Vulture *Gyps coprotheres* (vulnerable)
- African Marsh Harrier *Circus ranivorus* (Vulnerable)
- Black Harrier *Circus maurus* (Near Threatened)
- Martial Eagle *Polemaetus bellicosus* (Vulnerable)
- Lesser Kestrel *Falco naumanni* (Vulnerable)
- Lanner Falcon *Falco biarmicus* (Near Threatened)
- Peregrine falcon *Falco peregrinus* (Near Threatened)

(Barnes 2000)

Observations and Findings:
(High 90% confident):
None of the above species were observed on or near site the proposed mining areas during the survey and are more likely to only occasionally visit the proposed mining areas and do not breed there.

4.4 ANY SIGNIFICANT LANDSCAPE FEATURES OR RARE OR IMPORTANT VEGETATION/FAUNAL ASSOCIATIONS SUCH AS SEASONAL WETLANDS, ALLUVIUM, SEEPS, QUARTZ PATCHES OR SALT MARSHES IN THE VICINITY:

Other sensitive environmental and landscape features identified on the property include secondary and primary non-perennial drainage lines, man-made and natural dams with associated wetland characteristics mostly connected to remaining indigenous remnants, also classified as Aquatic Critical Biodiversity and Ecological Support Areas ("ESA"), associated buffer areas and National Freshwater Ecosystems Priority Areas ("NFEPA"). Refer to Maps 4-5.

The proposed mining activities will however not have any significant detrimental impacts on these sensitive environmental and landscape features as it is recommended that all mining activities are restricted to the completely transformed cultivated agricultural areas in-between and adjacent to these features as identified and delineated in this report.

4.5 THE EXTENT OF ALIEN PLANT COVER ON THE SITE AND SURROUNDS:

The only significant woody invasive alien vegetation in the study area is *Acacia mearnsii* (black wattle), which occurs mostly along the drainage lines, where it is locally common. Numerous alien herbs and grasses also occur, mainly on the cultivated agricultural lands.

4.6 THE CONDITION OF THE SITE IN TERMS OF CURRENT OR PREVIOUS LAND USES:

From the site survey conducted and most recent google earth map images it is evident that all of the proposed mining activities areas as indicated on Maps 4-5 have been ploughed and cultivated within the last year 2017-2018. No natural, near natural or rehabilitating indigenous vegetation remnants or drainage lines are located on the proposed mining areas and no other sensitive environmental and landscape features as identified on the property will be impacted upon by the proposed activities if recommendations as provided in this report are adhered to.

4.7 THE KEY ECOLOGICAL "DRIVERS" AND/OR ENVIRONMENTAL GRADIENTS OF ECOSYSTEMS ON THE SITE AND IN THE VICINITY

Key ecological drivers identified on the property are the non-perennial secondary and primary drainage lines and man-made and natural dams with associated wetland characteristics, as well as the existing indigenous vegetation remnants for which fire is a key ecological driver.

Key environmental gradients present on the site are associated with the variable slopes and elevation of the site which leads to a transition from terrestrial indigenous and aquatic indigenous vegetation associated with non-perennial drainage lines and dams along the ravines of the site.

4.8 ANY POSSIBLE CHANGES IN KEY PROCESSES E.G. INCREASED FIRE FREQUENCY OR DRAINAGE/ARTIFICIAL RECHARGE OF AQUATIC SYSTEMS

With the implementation of appropriate storm water management and erosion preventions measures, no significant changes in key processes are foreseen to occur on site or adjacent

to the site due to the proposed mining activities.

4.9 THE CONDITION AND FUNCTIONING OF RIVERS AND WETLANDS (IF PRESENT) IN TERMS OF POSSIBLE CHANGES TO THE CHANNEL, FLOW REGIME AND NATURALLY-OCCURRING RIPARIAN VEGETATION

Site specific stormwater management measure must be designed and implemented for each proposed quarry areas to prevent accumulation of stormwater in the quarries and allow current stormwater run-off conditions to continue as is. Where no existing gravel roads exists as buffer areas an 8m buffer area in-between any excavations and the edge of indigenous vegetation areas as present along the existing edge of the cultivated agricultural lands is proposed to ensure protection and maintain current ecological functioning of associated runoff areas/drainage lines. The only activities allowed within the proposed 8m buffer areas, as measured from the edge of the indigenous vegetation areas along the edge of the cultivated lands, are continued use as informal gravel roads or for placement of storm water berms (no excavations or trenching allowed).

With the implementation of appropriate demarcation, storm water management and erosion preventions measures, the condition and functioning of the adjacent drainage lines and dams will not be impacted upon due to the proposed mining activities.

4.10 WOULD THE CONSERVATION OF THE SITE LEAD TO GREATER VIABILITY OF THE ADJACENT ECOSYSTEM BY SECURING ANY OF THE FUNCTIONAL FACTORS LISTED?

Conservation of the secondary and primary drainage lines and remaining indigenous vegetation areas are important in terms of securing ecological functioning of the site and surrounds, however mining activities are not proposed on any of the significant environmental and landscape features as identified on the property and will therefore not have an detrimental impact on the functional environmental factors of the site and surrounds.

4.11 DOES THE SITE OR NEIGHBOURING PROPERTIES POTENTIALLY CONTRIBUTE TO MEETING REGIONAL CONSERVATION TARGETS FOR BOTH BIODIVERSITY PATTERN AND ECOLOGICAL PROCESSES?

Yes, conservation of indigenous vegetation remnants on the property will potentially contribute to meeting regional conservation targets, but none of these remnants are present on or will be impacted by the mining activities as proposed on transformed cultivated agricultural land.

4.12 IS THIS A POTENTIAL CANDIDATE SITE FOR CONSERVATION STEWARDSHIP?

The viable indigenous vegetation remnants remaining on the property is a potential candidate for conservation stewardship if the landowner should wish to pursue such a matter, but the mining areas as proposed on transformed cultivated agricultural land are not.

5. IMPACT ASSESSMENT WITH ASSOCIATED MITIGATION AND REHABILITATION MEASURES TO BE IMPLEMENTED

Ecological impacts may be both direct and indirect, with the former occurring mostly at the mining excavation stage and the latter mostly at the rehabilitation stage. All potential environmental impacts identified are however expected to be of a short term and temporary nature.

Significant direct impacts potentially associated with the mining excavation phase are direct loss of indigenous terrestrial and aquatic vegetation and disturbance of soil which may lead to partial disruption of ecological processes due to fragmentation of habitat and erosion. The extent in this case would be local. Indirect impacts would occur mostly during the rehabilitation phase and in this case the nature would vary from the introduction of alien

vegetation to partial disruption of ecological processes due to the effects of the alien species encroachment and/or erosion. The extent of the potential indirect impacts in this case would be local.

For purposes of this assessment "mining" is assumed to mean all mining related activities, and the No-Go/No-Development alternative is assumed to be a continuation of the status quo, which in this case means annual cultivation and heavy livestock grazing. It is assumed that the post mining landuse in the study area will be ongoing cultivation and/or livestock grazing.

The No-Go/No-Development alternative will result in the site remaining as is which will therefore have no further ecological impact and current status quo will persist.

(See Appendix B attached for Impact Assessment Methodology used)

Mining Operational Phase:

Nature of potential impact: Impact of proposed mining activities on terrestrial indigenous vegetation areas as associated with mapped terrestrial CBAs, ESAs and associated buffer areas
Discussion: Indigenous vegetation remnants are present throughout the surrounding areas and adjacent to the mining activities areas as proposed on transformed cultivated agricultural land. To prevent any potential direct or indirect detrimental impacts on these remnants mitigation measures as listed must be implemented throughout the proposed mining activities.
Cumulative impacts: Erosion, loss of conservation worthy species and natural vegetation habitat during mining activities.
Mitigation: • Clearly demarcate the 8m wide buffer areas proposed as measured from the edge of all remaining indigenous vegetation areas and undertake mining activities only in identified and specifically demarcated areas as proposed on completely transformed and cultivated areas. Demarcation method to be approved by an Environmental Control Officer (ECO). The proposed buffer areas to be located within existing cultivated land may only be used as roads and for stormwater management and no other activities associated with the proposed mining of the site may occur within the buffer areas. • Remove and conserve topsoil layer and overburden material for rehabilitation after mining activities have ceased • No disturbance should be allowed within the remaining indigenous vegetation areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance. No natural vegetation areas edges may be cleared or impacted upon by the proposed mining activities. • Implement site specific erosion and storm water runoff management measures as according to EMP requirements to prevent (or if prevention is not possible limit) any erosion from occurring on the mining activity areas and surrounds.

Criteria	Without Mitigation	With Mitigation
Extent	2	1
Duration	5	1
Magnitude	10	2
Probability	5	2
Significance	85 - High	8 - Low
Status	High Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable	2-Partial loss of resources	1 – Resource will not be

loss of resources	but can be rehabilitated	lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

Nature of potential impact:
Impact of proposed mining activities on secondary drainage lines and dams with associated wetland characteristics and aquatic vegetation as associated with mapped aquatic CBAs, ESAs, NFEPAs and associated buffer areas

Discussion:
To prevent potential edge effects a buffer area of at least 8m as measured from the edge of the sensitive environmental and landscape features and located on completely transformed cultivated land must be maintained throughout the mining activities phase. The proposed buffer areas may only be used as roads and for stormwater management and no other activities associated with the proposed prospecting of the site may occur within the buffer areas.

If recommended buffer areas are incorporated into the proposed layout and all excavations and trenching mining activities are therefore restricted to the area outside of the buffer areas then mining activities will not have a potential significant negative impact on the identified drainage lines and hydrological processes.

Cumulative impacts:
Disturbance and transformation of drainage lines or wetland areas during prospecting activities.

Mitigation:
- Undertake mining activities only in identified and specifically demarcated areas as proposed on completely transformed and cultivated areas at least 8m from the edge of the any drainage lines, indigenous vegetation and dams with associated wetland characteristics and aquatic vegetation.
- No disturbance should be allowed within the drainage line or wetland areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance.
- No drainage line or wetland areas edges may be disturbed or impacted upon by the proposed mining activities.
- Storm water and erosion control measures to be implemented as per an EMP must be conducted and monitored to prevent siltation or erosion of sensitive environmental and landscape features as identified on site.
- No mining activities may occur within 100m from any drainage line or wetland without determining requirement for water use authorisation from Department of Water and Sanitation or the Breede Gouritz Catchment Management Agency

Criteria	**Without Mitigation**	**With Mitigation**
Extent	2	1
Duration	5	1
Magnitude	10	2
Probability	5	2
Significance	85 - High	8 - Low
Status	High Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact	1 – Can be completely mitigated	

can be mitigated	

Nature of potential impact:
Potential erosion and accumulation of stormwater due to proposed mining activities along steep slopes

Discussion:
Proposed mining activities may cause erosion on the site and surrounds due to excavation of agricultural land, topsoil and overburden storage etc. which in turn may lead to increase in surface water runoff speed. The establishment of quarries may also lead to accumulation of stormwater. Therefore site specific storm water management measures must be incorporated into the proposed mining activities layout, to direct storm water runoff away from the proposed quarry; topsoil and overburden stockpiles but still draining into adjacent non-perennial drainage lines as according to current status quo.

Cumulative impacts:
Erosion of the excavation areas, topsoil and overburden storage areas, roads and surrounding environments.

Mitigation:
- Undertake mining activities only in identified and specifically demarcated areas as proposed
- Implement site specific erosion and storm water runoff management measures as according to EMP requirements to prevent (or if prevention is not possible limit) any erosion or stormwater accumulation from occurring on the mining activity areas and surrounds.

Criteria	**Without Mitigation**	**With Mitigation**
Extent	2	1
Duration	3	1
Magnitude	6	2
Probability	4	2
Significance	44 – Medium	8 - Low
Status	Medium Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

Rehabilitation Phase:

Nature of potential impact:
Introduction of alien and weed plant species during rehabilitation

Discussion:
Indirect impacts occur mostly during the rehabilitation phase and in this case the nature would vary from the introduction of alien and weed vegetation, to partial disruption of ecological processes due to the effects of the alien and weed species. The extent of the indirect impact in this case will be local.

Cumulative impacts:
Disturbance of the site due to proposed mining activities may lead to introduction of alien and weed vegetation encroachment during rehabilitation, which may in turn lead to infestation of surrounding remaining natural areas and drainage lines resulting in disruption and destruction of ecological processes.

Mitigation:

- Only use topsoil and excavated material as derived and conserved from the proposed mining site to backfill and rehabilitate impacted areas.
- Alien invasive and weed vegetation monitoring and removal must be undertaken for at least a year after mining activities have ceased and the site has been rehabilitated or until the landowner starts with the annual cultivation activities on the affected land. This must be done by the applicant, landowner or their appointed contractor, using CapeNature approved methodology depending on the contract agreement that the applicant has with the landowner.

Criteria	Without Mitigation	With Mitigation
Extent	3	1
Duration	5	1
Magnitude	6	2
Probability	4	2
Significance	56 - Medium	8 - Low
Status	Medium Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

Nature of potential impact:
Potential erosion of the site and surrounds during rehabilitation phase

Discussion:
Soil erosion can occur due to wind (wind erosion cause dust pollution); and due to overland storm water flow should heavy rains fall on disturbed and rehabilitated areas.

Cumulative impacts:
Exposing and disturbing soil may lead to erosion of site and surrounds if not mitigated.

Mitigation:

- Infill and topsoil material as removed during mining excavation must be replaced and existing agricultural land contour structures must be reinstated immediately after mining activities completion.
- Implement erosion and storm water runoff management measures as according to EMP requirements to prevent (or if prevention is not possible limit) any erosion from occurring on the rehabilitated mining areas and surrounds until the landowner starts with the annual cultivation activities on the affected land.

Criteria	Without Mitigation	With Mitigation
Extent	2	1
Duration	3	1
Magnitude	6	2
Probability	4	2
Significance	44 – Medium	8 - Low
Status	Medium Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost

Degree to which impact can be mitigated	1 – Can be completely mitigated

6. CONCLUDING REMARKS AND SUMMARY OF IMPACT MITIGATION AND REHABILITATION MEASURES PROPOSED BEFORE, DURING AND AFTER MINING ACTIVITIES

If strict adherence is kept to the recommendations as set out in this report and incorporated into the Environmental Management Programme, the proposed development will not have a significant impact on any listed flora, fauna or avifauna species of conservation concern, their habitats or any sensitive environment and landscape features as identified on the site and surrounds.

- All proposed mining activities to be located on completely transformed and cultivated agricultural areas as identified on Maps 4 and 5 of this report.

- Clearly demarcate the 8m wide buffer areas proposed as measured from the edge of all remaining indigenous vegetation areas and undertake mining activities only in identified and specifically demarcated areas as proposed on completely transformed and cultivated areas. Demarcation method to be approved by an Environmental Control Officer (ECO). The proposed buffer areas to be located within existing cultivated land may only be used as roads and for stormwater management and no other activities associated with the proposed mining of the site may occur within the buffer areas.

- Compile and implement a site specific stormwater management plan which aims to prevent (and if prevention is not possible to mitigate and rehabilitate) erosion of the site and surrounds and accumulation of stormwater in excavation areas. Site specific storm water management measures must be incorporated into the proposed mining activities layout, to direct storm water runoff away from the proposed quarry; topsoil and overburden stockpiles but still draining into adjacent non-perennial drainage lines as according to current status quo.

- No disturbance should be allowed within the remaining indigenous vegetation, drainage lines and wetland areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance.

- No natural vegetation, drainage lines or wetland areas edges may be cleared or impacted upon by the proposed mining activities.

- Topsoil and overburden materials must be removed and stored separately adjacent to the mining areas on transformed agricultural land with effective storm water runoff and erosion prevention measures to be implemented in order to protect the materials for use during rehabilitation phase.

- As the excavation of the quarry advances the stored overburden material must be replaced to backfill the excavations. The backfilled area must then be contoured according to existing surrounding contours of the cultivated land to prevent erosion. After contouring has been completed the stored topsoil material must be spread over the backfilled area. Only use topsoil as derived and conserved from the proposed mining area to be rehabilitated after mining activities have ceased on the property. The topsoil must not be compacted after spreading to allow the disturbed area to be restored. The site must be monitored regularly during the mining operational/excavation phase (at least 3 monthly and after heavy rains) for signs of erosion which if detected must be immediately rectified and alien vegetation removed to prevent potential siltation, erosion and alien encroachment

of the site and surrounds.

- No mining activities may occur within 100m from any drainage line or wetland without determining requirement for water use authorisation from Department of Water and Sanitation or the Breede Gouritz Catchment Management Agency.

- Alien invasive and weed vegetation monitoring and removal must be undertaken for at least a year after mining activities have ceased and the site has been rehabilitated or until the landowner starts with the annual cultivation activities on the affected land. This must be done by the applicant, landowner or their appointed contractor, using CapeNature approved methodology depending on the contract agreement that the applicant has with the landowner.

- The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions, including the recommendations as provided in this report and only proceed under supervision of a competent and diligent Environmental Control Officer, both during the operational/excavation and rehabilitation phases.

Eco Impact is of the opinion, and based on the survey and desk study done, that if the proposed mining activities remains on the completely transformed cultivated agricultural areas of the site as indicated on Maps 6.1 and 6.2 of this report and the specialist recommendations as listed in this report are adhered to and incorporated into the mining EMP that the proposed mining activities will not have any significant detrimental environmental impacts on any of the sensitive environmental and landscape features as identified on the site and surrounds.

7. REFERENCES

Dallas HF (2007). River Health Programme: South African Scoring System (SASS) Data Interpretation Guidelines. Department of Water Affairs and Forestry, South Africa.

Department of Water Affairs and Forestry (1999). Resource Directed Measures for Protection of Water Resources. Volume 3: River Ecosystems Version 1.0. Resource Directed Measures for Protection of Water Resources, Pretoria, South Africa.

Department of Water Affairs and Forestry (2007). River Ecoclassification: Manual for EcoStatus Determination (Version 2). Water Research Commission Report Number KV 168/05. Pretoria.

Driver, Nel, Snaddon, Murray, Roux, Hill (2011). Implementation Manual for Freshwater Ecosystem Priority Areas. Draft Report for the Water Research Commission.

Patricia Holmes & Amalia Pugnalin, Environmental Resource Management Department (ERMD), City of Cape Town, June 2016. The Biodiversity Network for the Cape Town Municipal Area C-PLAN & MARXAN ANALYSIS: 2016 METHODS & RESULTS.

Kemper N (1999). R4: Intermediate Habitat Integrity Assessment for use in the Rapid and Intermediate Assessments (Version 1). Department of Water Affairs and Forestry, South Africa.

Kleynhans CJ, Thirion C and Moolman J (2005). A Level I River Ecoregion classification System for South Africa, Lesotho and Swaziland. Report No. N/0000/00/REQ0104. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria, South Africa.

Kleynhans CJ, Louw MD, Graham M (2008). Module G: EcoClassification and EcoStatus determination in River EcoClassification: Index of Habitat Integrity (Section 1, Technical manual) Joint Water Research Commission and Department of Water Affairs and Forestry

report. WRC Report No. TT 377-08.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.S. & Collins, N.B. 2004. Wetland – Assess. A rapid assessment procedure for describing wetland benefits. First Draft. Mondi Wetlands Project.

KOTZE, D.C., MARNEWECK, G.C., BATCHELOR, A.L., LINDLEY, D.S. AND COLLINS, N.B. 2005. Wet-Esoservices: A technique for rapidly assessing ecosystem services supplied by wetlands. May 2005. Mondi Wetlands Project.

Mucina L and Rutherford M. C (eds.) (2004) Vegetation map of South Africa, Lesotho and Swaziland. Strelitzia 18. South African National Biodiversity Institute, Pretoria.

River Health Programme. State of Rivers Report for the Gouritz Water Management Area 2007.

Rossouw L, Avenant MF, Seaman MT, King JM, Barker CH, du Preez PJ, Pelser AJ, Roos JC, van Staden JJ, van Tonder GJ and Watson M (2005). Environmental Water Requirements in Non-Perennial System. WRC Report No. 1414/1/05.

SANBI Biodiversity GIS 2016. http://bgis.sanbi.org/WCBF14/additional.asp

APPENDIX A: ABBREVIATED CURRICULUM VITAE AND DECLARATION OF INDEPENDENCE OF FRESHWATER SPECIALIST

BACKGROUND AND QUALIFICATIONS OF SPECIALIST CONSULTANT

Full Name: Nicolaas Hanekom
Year of Birth: 1967
Nationality: South African
Profession: Environmental Scientist and Environmental Assessment Practitioner
Years in Profession: Since 1989

This Freshwater Impact Assessment was conducted by Nicolaas Hanekom who has 26 years' experience working as an ecologist in the field of nature conservation. He has extensive field experience, knowledge of freshwater ecology, knows the region in which he is working and exercises sound and unbiased scientific and professional judgment. He has received training on the basics of freshwater ecosystems impact assessment during his career in nature conservation. He is a qualified Environmental Assessment Practitioner who holds a M. Tech, Nature Conservation from the Cape Peninsula University of Technology and a registered Professional Natural Scientist (Ecologist) with the South African Council for Natural Scientific Professions ("SACNASP").

Summary of Experience:

- Assistance Reserve Manage at Gariep Dam Nature Reserve (1993-1998)
- Reserve Manager, Conservation Services Manager for Western Cape Nature Conservation Board (1998-2001)
- Part time external Lecturer at Cape Peninsula University of Technology (2003-2005)
- Director: Environmental Management at Cape Lowlands Environmental Services (2006-2010)
- Environmental Impact Assessment Practitioner at Eco Impact (Pty) Ltd (2010 to date)
- Safety Health & Environmental System consulting

Mr Hanekom meets the legal requirements to act as a specialist on this project in terms of Regulation 13 of the Environmental Impact Assessment Regulations, 2014 that took effect on 8 December 2014, which regulates the general requirements for Environmental Assessment Practitioners ("EAP"s) and specialists. The regulation states that:

An EAP and a specialist, appointed in terms of regulation 12(1) or 12(2), must –

(1)(a) be independent;
(b) have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity;
(c) ensure compliance with these Regulations;
(d) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
(e) take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; and
(f) disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing-
(i) any decision to be taken with respect to the application by the competent authority in terms of these Regulations; or
(ii) the objectivity of any report, plan or document to be prepared by the EAP or specialist, in terms of these Regulations for submission to the competent authority; unless access to that information is protected by law, in which case it must be indicated that such protected information exists and is only provided to the competent authority.

(2) In the event where the EAP or specialist does not comply with sub regulation (1) (a), the proponent or applicant must, prior to conducting public participation as contemplated in chapter 5 of these Regulations, appoint another EAP or specialist to externally review all work undertaken by the EAP or specialist, at the applicant's cost.

THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS

I Nicolaas Willem Hanekom, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of NEMA, the Environmental Impact Assessment Regulations, 2014.

Signature of the specialist

Eco Impact Legal Consulting (Pty) Ltd
Name of company

20 June 2018
Date

APPENDIX B: Impact Assessment Methodology

Below is the assessment methodology utilized in determining the significance of the potential mining impacts on the biophysical environment, and where applicable the possible alternatives. The methodology is broadly consistent with that described in the Department of Environmental Affairs' Guideline Document on the EIA Regulations (1998) and as provided by the Shangoni Management Services.

For each potential impact, the significance is determined by specified factors as in Table 1. Significance is described prior to mitigation as well as with the most effective mitigation measure(s) in place.

The mitigation described in the document represents the full range of plausible and pragmatic measures that must be implemented.

Despite the attempts at providing a completely objective and impartial assessment of the environmental implications of proposed activities, the specialist can never completely escape the subjectivity inherent in attempting to define significance.

Recognising this, potential subjectivity in the current process is addressed as follows:

- Be clear about the difficulty of being completely objective in the determination of significance;
- Develop an explicit methodology for assigning significance to impacts and outlining this methodology in detail. Having an explicit methodology not only forces the assessor to come to terms with the various facets contributing toward determination of significance, thereby avoiding arbitrary assignment, but also provides the reader of the report with a clear summary of how the assessor derived the assigned significance; and
- Wherever possible, differentiating between the likely significance of potential environmental impacts as experienced by the various affected parties.

Although these measures may not totally eliminate subjectivity, they do provide an explicit context within which to review the assessment of impacts.

Table 1: Assessment criteria for the evaluation of impacts

Criteria	Description		
Nature	a description of what causes the effect, what will be affected, and how it will be affected.		
	Type	**Score**	**Description**
Extent (E)	None (No)	1	Footprint
	Site (S)	2	On site or within 100 m of the site
	Local (L)	3	Within a 20 km radius of the centre of the site
	Regional (R)	4	Beyond a 20 km radius of the site
	National (Na)	5	Crossing provincial boundaries or on a national / land wide scale
Duration (D)	Short term (S)	1	0 – 1 years
	Short to medium (S-M)	2	2 – 5 years
	Medium term (M)	3	5 – 15 years
	Long term (L)	4	> 15 years
	Permanent(P)	5	Will not cease
Magnitude (M)	Small (S)	0	will have no effect on the environment
	Minor (Mi)	2	will not result in an impact on processes
	Low (L)	4	will cause a slight impact on processes
	Moderate (Mo)	6	processes continuing but in a modified way
	High (H)	8	processes are altered to the extent that they temporarily cease
	Very high (VH)	10	results in complete destruction of patterns and permanent cessation of processes.
Probability (P) the likelihood of the impact actually occurring. Probability	Very improbable (VP)	1	probably will not happen
	Improbable (I)	2	some possibility, but low likelihood
	Probable (P)	3	distinct possibility

Criteria	Description		
is estimated on a scale, and a score assigned	Highly probable (HP)	4	most likely
	Definite (D)	5	impact will occur regardless of any prevention measures
Significance (S)	Determined through a synthesis of the characteristics described above: **S = (E+D+M) x P** Significance can be assessed as low, medium or high		
Low: < 30 points:	The impact would not have a direct influence on the decision to develop in the area		
Medium: 30 – 60 points:	The impact could influence the decision to develop in the area unless it is effectively mitigated		
High: < 60 points:	The impact must have an influence on the decision process to develop in the area		
No significance	When no impact will occur or the impact will not affect the environment		
Status	Positive (+)		Negative (-)
The degree to which the impact can be reversed	Completely reversible (R)	90-100%	The impact can be mostly to completely reversed with the implementation of the correct mitigation and rehabilitation measures.
	Partly reversible (PR)	6-89%	The impact can be partly reversed providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Irreversible (IR)	0-5%	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact may cause irreplaceable loss of resources	Resource will not be lost (R)	1	The resource will not be lost or destroyed provided that mitigation and rehabilitation measures as stipulated in the EMP are implemented
	Resource may be partly destroyed (PR)	2	Partial loss or destruction of the resources will occur even though all management and mitigation measures as stipulated in the EMP are implemented
	Resource cannot be replaced (IR)	3	The resource cannot be replaced no matter which management or mitigation measures are implemented.
The degree to which the impact can be mitigated	Completely mitigatible (CM)	1	The impact can be completely mitigated providing that all management and mitigation measures as stipulated in the EMP are implemented
	Partly mitigatible (PM)	2	The impact cannot be completely mitigated even though all management and mitigation measures as stipulated in the EMP are implemented. Implementation of these measures will provide a measure of mitigatibility
	Un-mitigatible (UM)	3	The impact cannot be mitigated no matter which management or mitigation measures are implemented.

APPENDIX C: Relevant Environmental Legislation Considered

Agricultural Pests Act 36 of 1983
Atmospheric Pollution Prevention Act 45 of 1965 (regulations only)
Conservation of Agricultural Resources Act 43 of 1983
Constitution of the Republic of South Africa 1996
Environment Conservation Act 73 of 1989
Fencing Act 31 of 1963
Fertilizers Farm Feeds Agricultural Remedies and Stock Remedies Act 36 of 1947
Mineral and Petroleum Resources Development Act 28 of 2002
National Environmental Management Act 107 of 1998
National Environmental Management: Air Quality Act 39 of 2004
National Environmental Management: Biodiversity Act 10 of 2004
National Environmental Management: Protected Areas Act 57 of 2003
National Environmental Management: Waste Act 59 of 2008
National Forests Act 84 of 1998
National Veld and Forrest Fire Act 101 of 1998
National Water Act 36 of 1998

Hessequa local municipality air pollution control by-law
Hessequa local municipality fences and fencing by-law
Hessequa local municipality storm water management by-laws
Hessequa local municipality solid waste disposal by-law
Hessequa local municipality by-law relating to water supply, sanitation services and industrial effluent
Hessequa local municipality by-law relating to roads and streets
Hessequa local municipality by-law relating to the prevention of public nuisances and nuisances arising from the keeping of animals

Eden district municipality air quality management by-law
Eden district municipality municipal health by-laws

APPENDIX D: Site photos of proposed mining activities area on cultivated agricultural land on Erven 1401, 1199 and 2924

Site Photo 1: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

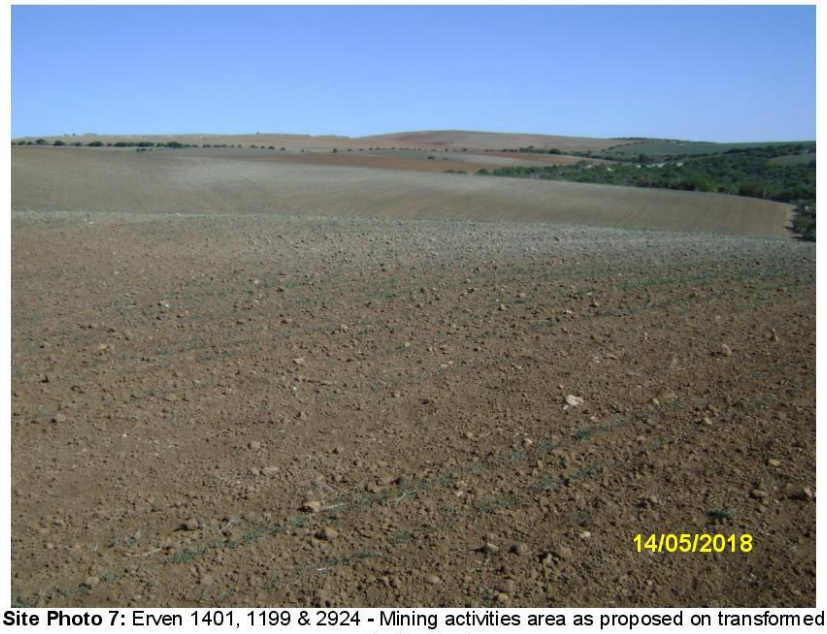
Site Photo 2: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

Site Photo 3: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

Site Photo 4: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

Site Photo 5: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

Site Photo 6: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land..



Site Photo 7: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land..

Site Photo 8: Erven 1401, 1199 and 2924 - Mining activities area as proposed on transformed cultivated land.

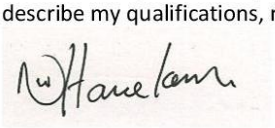
Name:	Nicolaas Willem Hanekom (Pri.Sci.Nat)
Profession:	Ecological Scientist
Nationality:	South African
Years experience	26 Years
Academic Qualifications	• National Diploma, Nature Conservation (Cape Technikon) • B. Tech Degree in Nature Conservation (Cape Technikon) • M.Tech in Nature Conservation (Cape Peninsula University of Technology) • Completed various Environmental Management Courses • Qualified Environmental Management System ISO 14001: 2004 Audit: Internal Auditor Course Based on ISO 19011:2002 (Centre for Environmental Management North West University)
Areas of specialisation:	• Ecosystem (terrestrial and aquatic) monitoring and assessments • Design of monitoring programmes for ecosystems (terrestrial and aquatic) • Environmental Impact Assessments • River classification and environmental water requirements • Wetlands Delineation • River and Wetlands management • Water Use Authorization Applications • Water quality management • River Health Assessments
Countries of Work Experience:	South Africa (Northern Cape, Western Cape, Free State, Mpumalanga, Gauteng)
Employment Record	• Student at Bontebok National Park (1992) • Assistant Reserve Manager at Gariep Dam Nature Reserve, Free State (1993 - 1998) • Reserve Manager, Conservation Services Manager for Western Cape Nature Conservation Board (1998 - 2006) • External Lecturer at Cape Peninsula University of Technology (2003 - 2005) • Director: Environmental Management at Cape Lowlands Environmental Services (2006 – 2010) • Director, Environmental Management and lead Environmental Impact Assessment Practitioner at Eco Impact (Pty) Ltd (2010 – to date)
Professional membership, accreditations and courses	• South African Council for Natural Scientists Professions Pri.Sci.Nat (Ecological Science) • SASS5 Aquatic Biomonitoring Training Course. 2 to 5 September 2013. Ground Truth Water and Environmental Engineering consultancy in partnership with the Department of Water Affairs. • Workshop on "Section 21(c) and (i) Water Use Training: Understanding Watercourses and Managing Impacts to their Characteristics". 10 May 2017. Presented by Dr Wietsche Roets of

	the Department of Water and Sanitation (Sub-Directorate: Instream Water Use).
Summary of experience	1992: South African National Parks. Student at Bontebok National Park with management and monitoring actions related to the Breede River. 1993 -1998: Free State Nature Conservation. Ecological management and monitoring actions related to the Gariep Dam, Orange and Caledon Rivers. 1998 -2006: CapeNature. Ecological management and monitoring actions related to the Berg River Estuary, Verloren Vlei, Lamberts bay's Jackalsvlei, Wadrift Soutpanne, Oliphant's River mouth, Rocherpan Nature Reserve, etc. Review and assessment of EIA applications, inclusive of Freshwater ecology. Did some site visits with Department of Water Affairs and Forestry (Hester Lyons) to confirm the presence of aquatic ecological features during EIA water use registration applications. 2006 to date: Cape Lowland Environmental Services and Eco Impact Legal Consultant. Ecological (Freshwater and aquatic) Specialist input, assessment, monitoring and reports.
Publications and assessment reports	Just to name a few. Was involved in many Ecological Assessments, monitoring and inputs in EIA applications. • Elandskloof Farm 475 Citrusdal Biodiversity Baseline Survey. August 2010. This Biodiversity Assessment Covering Terrestrial and Aquatic Aspects to Inform Decisions Regarding The Proposed Elandskloof Weir Flood Damage Project On Farm 475, In The Citrusdal Area. • Cape Solar Energy Electricity Generation Facility. Farm 187/3 & 187/13 Kenhardt. Biodiversity And Ecological Baseline Survey. January 2011. (Included Terrestrial and aquatic ecological assessments and water use authorization applications) • Prieska Photvoltaic Power Generation Project. Prieska Commonage Northern Cape. Biodiversity And Ecological Baseline Survey. July 2011. (Included Terrestrial and aquatic ecological assessments and water use authorization applications) • Witteklip Erf 123 Extension, Vredenburg. Biodiversity Baseline Survey. Updated - October 2012 (Included Terrestrial and aquatic ecological assessments and water use authorization applications) • Baseline Biodiversity Survey And Wetland Delineation for ECCA Holdings: Cape Bentonite Mine on Erf 1412 Near Heidelberg. Prepared for: Shangoni Management Services Pry (Ltd). October 2014. • Freshwater Impact Assessment Laingsburg Flood Damage Repairs & Storm Water Infrastructure. 18 February 2016. • Ecological Assessment for Swartland Municipality - Upgrades To Voortrekker/Bokomo Road And Voortrekker/Rozenburg Road

	Intersections and Upgrade to the Diep River Bridge, Malmesbury on A Portion Of Erf 327, Malmesbury (Road) Erf 1530, Diep River Bridge Crossing, and Erf 1528, Property South of Diep River where Road Widening and Turning Circle Will Be Constructed. March 2016. (Freswater Ecology Inputs and Water Use Registration) • Freshwater Impact Assessment. McGregor Bridge, Robertson Bridge and Willem Nels River Maintenance Management Plan. 24 June 2016. (Freshwater Ecology assessment and input as well as Water Use Registration) • Water Use Authorization Application Risk Matrix. Orange Grove Trust Vegetation Clearing and Agricultural Development on Portion 4 of Farm Glen Heatlie No 316, Worcester. 12 June 2017. (Freshwater ecological inputs in EIA process and Water Use Registration). • Water Use Authorization Application Risk Matrix Prepared For: Witzenberg Municipality Sand Mine Farm 1 Prince Alfred Hamlet. 28 March 2017. (Freshwater ecological inputs in EIA process and Water Use Registration). • Proposed Hartmanshoop Agri Vegetation Clearing Project and Irrigation on Erf 686, Laingsburg. 12 August 2017. (Freshwater ecological inputs in Water Use Registration). • County Fair: Hocroft Abattoir And Rendering Facility Waste Water Treatment Works "CF Hocroft WWTW" Mosselbank River Second Quarter 2018 Biomonitoring Report. June 2018. (Done quarterly biomonitoring for the last three years)

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experience, and me.



Nicolaas Hanekom
Pri.Sci.Nat (Ecology) 400274/11

Appendix E2: Heritage Western Cape Notice of Intent to Develop and HWC Record of Decision

iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

NOTIFICATION OF INTENT TO DEVELOP

Completion of this form is required by Heritage Western Cape for the initiation of all impact assessment processes under Section 38(1) & (8) of the National Heritage Resources Act (NHRA).

Whilst it is not a requirement, it may expedite processes and in particular avoid calls for additional information if certain of the information required in this form is provided by a heritage specialist/s with the necessary qualifications, skills and experience.

A. APPLICABILITY OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

HWC Case Number:	DEADP Reference Number: NA DEA&DP is not the decision making authority for this EA application the Department of Mineral Resources is.
NOTE 1:	An HWC case number must be obtained and application fee paid in advance of submission of this form.
NOTE 2:	A DEADP (W Cape Dept. Environment Affairs & Development Planning) reference number must be included in all NHRA Section 38(8) processes where DEADP is the decision making authority under NEMA. The effect of this requirement is that the NEMA process must be initiated with DEADP prior to the NHRA process with HWC.
If a DEADP reference number is not entered above please check one of the following boxes:	
☒	This application is made in terms of Section 38(8) of the NHRA and an application under NEMA has been made to the following authority: Department of Mineral Resources -Application Title - Bentonite and Zeolite Mining Right Application for Erven 1401, 1199 & 2924, Heidelberg, Western Cape
☐	This development will not require a NEMA application.
NOTE 3:	Making an incorrect statement or providing incorrect information in this part of the form may result in all or part of the application having to be reconsidered by HWC in the future, or submission of a new application.

B. BASIC DETAILS

PROPERTY DETAILS:

Name of property: Erven 1401, 1199 & 2924	
Street address or location (eg: off R44): The erven are located approximately 3km northwest from the town of Heidelberg and can be accessed via a gravel road off the R322 towards Barrydale	
Erf or farm number/s: Erven 1401, 1199 & 2924	Coordinates: 34 05' 14.32"S 20 55' 02.96"E (A logical centre point. Format based on WGS84.)
Town or District: Heidelberg	Responsible Municipality: Hessequa Municipality
Extent of property: Erf 1401 - 75.5ha; Erf 1199-6ha; Erf 2924 - 47.2ha	Current use: Agricultural/Farming
Predominant land use/s of surrounding properties: Cultivated agricultural land	

REGISTERED OWNER OF PROPERTY:

Name JAA Lazenby		
Address Plaas Wilgenhof PO Box 66 Heidelberg 6665		
Telephone -	Cell	E-mail -

By the submission of this form and all material submitted in support of this notification (ie: 'the material'), all applicant parties acknowledge that they are aware that the material and/or parts thereof will be put to the following uses and consent to such use being made: filing as a public record; presentations to committees, etc; inclusion in databases; inclusion on and downloading from websites; distribution to committee members and other stakeholders and any other use required in terms of powers, functions, duties and responsibilities allocated to Heritage Western Cape under the terms of the National Heritage Resources Act. Should restrictions on such use apply or if it is not possible to copy or lift information from any part of the digital version of the material, the material will be returned unprocessed.

I confirm that I enclose with this form four hardcopies of all material submitted together with a CD ROM containing digital versions of all of the same.

Signature of owner or authorised agent
(Agents must attach copy of power of attorney to this form.)

Date / / 20

DEVELOPMENT DETAILS:

Please indicate below which of the following Sections of the National Heritage Resources Act, or other legislation has triggered the need for notification of intent to develop.

☐ S38(1)(a) Construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier over 300m in length.	S38(1)(c) Any development or activity that will change the character of a site -
☐ S38(1)(b) Construction of a bridge or similar structure exceeding 50m in length.	☒ (i) exceeding 5 000m^2 in extent;
☐ S38(1)(d) Rezoning of a site exceeding 10 000m^2 in extent.	☐ (ii) involving three or more existing erven or subdivisions thereof;
☒ Other triggers, eg: in terms of other legislation, (ie: National Environment Management Act, etc.) Please set out details: Environmenatl Authorisation in terms of National Environmental Management Act, 1998 (Act No. 107 of 1998)	☐ (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years. If you have checked any of the three boxes above, describe how the proposed development will change the character of the site: Bentonite and Zeolite mining activities as propsoed on completely transformed and cultivated agricultural land of 80ha (quarry size = 15.6ha).

If an impact assessment process has also been / will be initiated in terms of other legislation please provide the following information:

Authority / government department (ie: consenting authority) to which information has been /will be submitted for final decision: Department of Mineral Resources AND Department of Water and Sanitation/Breede-Gouritz Catchment Management Agency

Present phase at which the process with that authority stands: Application for EIA Environmental Authorisation AND Water Use Authorisation to be submitted.

Provide a full description of the nature and extent of the proposed development or activity including its potential impacts (eg: changes in land use, envisaged timeframes, provision of additional bulk services, excavations, landscaping, total floor area, height of development, etc. etc.): Imerys Refractory Minerals South Africa t/a Cape Bentonite Mine is an existing Bentonite and Zeolite mining company operating on various farms in close proximity to the towns of Heidelberg and Riversdale that fall within the Hessequa Local Municipality and Eden District Municipality in the Western Cape Province.

Imerys Refractory Minerals South Africa proposes to mine bentonite and zeolite deposits on cultivated agricultural land on erven 1401, 1199 and 2924 near Heidelberg in the Western Cape. The mining activities areas are proposed on completely transforemd agricultural land.

Erf 1401:
- Property size – 75.5ha
- Proposed mining activities areas size (located on transformed cultivated lands – 57ha)
- Phase 1 Quarry – 4.6ha
- Phase 2 Quarry – 4.33ha
- Phase 3 Quarry – 1.05ha
- Phase 6 Quarry – 1.24ha

Erf 1199 :
- Property size – 11.5ha
- Proposed mining activities areas size (located on transformed cultivated lands – 6ha)

Erf 2924:
- Property size – 47.2ha
- Proposed mining activities areas size (located on transformed cultivated lands – 17ha)
- Phase 4 Quarry – 3.68ha
- Phase 5 Quarry – 1.94ha

TOTALS:
- Total properties size – 135ha
- Total mining activities area on completely transformed agricultural lands – 80ha
- Total quarries size – 15.6ha

Mining is conducted "in-house" by means of excavators, front-end loaders and 15T dumper trucks. The mining and method comprise relatively shallow opencast quarrying. The topsoil and overburden are removed and stockpiled separately adjacent to the mining area. The bentonite as it is being mined is trucked to the processing plant at the head offices on Erf 1412, Heidelberg.

The mine provides direct employment for at least 43 local persons and compensation to the landowner. The operation further creates indirect employment opportunities in equipment supply industries, transport and bentonite mining, and the mining environment.

Cape Bentonite Mine provided Eco Impact with a map of the proposed mining areas and a total area of approximately 135ha was surveyed for this assessment.

Sensitive environmental features that were identified on the properties include natural and near natural indigenous vegetation remnants which exists throughout the properties and consists of Critically Endangered - Eastern Ruens Shale Renosterveld and Cape Lowland Alluvial Vegetation also identified as Terrestrial Critical Biodiversity Areas ("CBA") as according to the Western Cape Biodiversity Plan ("WCDP") 2017. These remnants of indigenous vegetation areas are also associated with secondary and primary non-perennial drainage lines and man-made dams with associated wetland characteristics, also classified as Aquatic Critical Biodiversity and Ecological Support Areas ("ESA and National Freshwater Ecosystems Priority Areas ("NFEPA").

Some of the proposed mining activities areas as assessed partially fall within mapped drainage line/aquatic Ecological Support Areas (Res) Category 1: ESA 2 Restore from other land use. The mapped ESA 2 areas are not essential for meeting biodiversity targets, but play an important role in supporting the functioning of the CBAs and are important in maintaining ecosystem services i.e. drainage systems. The objectives for these areas are to restore and/or manage to minimise impacts on ecological processes. The mining activities are however only proposed on completely transformed and annually cultivated agricultural land and the restorations of ESA 2 areas which have been mapped on these areas will therefore not be feasible or reasonable as cultivation of these areas will in any case proceed as is after the proposed mining activities have been completed. With the implementation of proper buffer and stormwater management measures as proposed the mining activities will not have a significant detrimental impact on the current ecological processes as associated with the mapped ESAs, CBAs and NFEPAS

Alien vegetation encroachment on site is mainly limited to weeds associated with cultivated lands.

Potential significant direct impacts occur primarily during the mining excavation stage, and the nature of these impacts is temporary loss of agricultural land and potential erosion of proposed mining areas and surrounds. The extent in this case is local. Indirect impacts occur mostly during the rehabilitation phase and in this case the nature would vary from the introduction of alien vegetation to partial disruption of ecological processes due to the effects of the alien species. The extent of the indirect impact in this case is local.

Site specific stormwater management measure must be designed and implemented for each proposed quarry area to prevent accumulation of stormwater in the quarries and allow current stormwater run-off conditions to continue as is. Where no existing gravel roads exists as buffer areas an 8m buffer area in-between any excavations and the edge of indigenous vegetation areas as present along the existing edge of the cultivated agricultural lands is proposed to ensure protection and maintain current ecological functioning of associated runoff areas/drainage lines. The only activities allowed within the proposed 8m buffer areas, as measured from the edge of the indigenous vegetation areas along the edge of the cultivated lands, are continued use as informal gravel roads or for placement of storm water berms (no excavations or trenching allowed).

No disturbance i.e. no new roads, clearance, edge effects within any remaining indigenous vegetation areas may occur during the proposed mining activities and all mining activities to take place on transformed cultivated agricultural land, all remaining indigenous vegetation areas also associated with the secondary and primary non-perennial drainage lines must be demarcated as no-go areas throughout the mining activities lifespan.

From the survey conducted it was concluded that if the proposed mining activities are to be located on completely transformed and cultivated agricultural land, previously and continually impacted upon by cultivation and heavy livestock grazing, and if specialist recommendations as provided within this report are incorporated into the Mine Environmental Management Plan it will not have a significant negative environmental impact if recommendations are effectively implemented.

No fatal flaws were identified during the assessment that will lead to unacceptable environmental

degradation during the proposed mining activities.

(Reference: N Hanekom and J Piennar. June 2018.Ecological Baseline Assessment for Proposed Mining Right on Erven 1401, 1199 & 2924 Heidelberg, Western Cape)

C. HERITAGE RESOURCES AND IMPACTS THEREUPON

Section 3 of the National Heritage Resources Act sets out the following categories of heritage resource as forming part of the national estate. Please indicate the known presence of any of these by checking the box alongside and then providing a description of each occurrence, including nature, location, size, type

Failure to provide sufficient detail or to anticipate the likely presence of heritage resources on the site may lead to a request for more detailed specialist information.

(The assistance of relevant heritage professionals is particularly relevant in completing this section.)

Provide a short history of the site and its environs (Include sources where available): The farm is characterised by its undulating landscape with associated steep slopes, drainage lines and gorges which limits the extent of cultivation to moderate slopes and flat lying areas.

Several non-perennial drainage lines with associated man-made and natural dams occurs throughout the property which drains mainly towards the R322 in the middle of the property and which eventually feeds the Duiwenhoks tributary within Heidelberg.

The Heidelberg/Riversdale area is dominated by the Enon Conglomerate formation of the Bokkeveld Group. The Bokkeveld Group consists of sandstone, shale, siltstone and mudstone. The Enon Conglomerate consists of large boulders of Cape Sandstone originally in a matrix with lenses of mudstone and siltstone.

Bentonite occurs as three main horizons in the area, each horizon comprising several layers in the Kirkwood Formation, overlain by conglomerate and sandstone of the Buffelskloof Formation. The Grahamstone Formation silcrete occurs at the top of the sequence in some places, whereas the Enon conglomerate forms the floor.

The study area lies within the East Coast Renosterveld bioregion (Mucina & Rutherford 2006). This bioregion has a moderately distinct flora, and high numbers of plant Species of Conservation Concern, with the main pressures being extensive habitat loss, due mainly to agriculture, followed by alien invasive vegetation, quarrying and urbanisation, and habitat modification due to lack of appropriate fire regimes.

The study area falls within the planning domain of the Hessequa Municipality. The Western Cape Biodiversity Spatial Plans has identified Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) for the Western Cape which aims to guide sustainable development by providing a synthesis of biodiversity information to decision makers. It serves as the common reference for all multi-sectoral planning procedures, advising which areas can be lost to development, and which areas of critical biodiversity value and their support zones should be protected against any impacts. The primary reason for selection of these areas as terrestrial and/or aquatic CBAs and/or ESAs is that it helps meet the national conservation target for threatened vegetation types, and ancillary reasons are that it offers opportunities for continuation of ecological connectivity especially related to the hydrological connectivity of the drainage lines.

As according to Mucina and Rutherford (2006) the remnants of natural vegetation occurring on this property are classified as Eastern Ruens Shale Renosterveld (Critically Endangered) and Cape Lowland Alluvial Vegetation (Critically Endangered) as part of the Fynbos biome.

Most of the indigenous vegetation remnants associated with the non-perennial drainage lines along the steep slopes and gorges surrounding the proposed mining area as surveyed have been identified as terrestrial and aquatic Critical Biodiversity Areas. The proposed mining activities will not have an impact on any of these CBAs and no indigenous vegetation remains on the proposed mining activities areas.

Some of the proposed mining activities areas fall within mapped Ecological Support Areas (Res) Category 1: ESA 2 Restore from other land use. These ESAs are not essential for meeting biodiversity targets, but play an important role in supporting the functioning of the CBAs and are important in maintaining ecosystem services i.e. drainage systems. The objectives for these areas are to restore and/or manage to minimise impacts on ecological processes. Due to these areas already being historical and ongoing cultivated agricultural lands restoration will not be feasible or reasonable, but the areas must and can be managed to maintain current ecological processes. With the implementation of proper buffer and stormwater management measures as proposed the mining activities will not have a significant detrimental impact on these ESAs and surrounding CBAs.

Eco Impact is of the opinion, and based on the survey and desk study done, that if the proposed mining activities remains on the completely transformed cultivated agricultural areas of the site as proposed and the specialist recommendations as listed in this report are adhered to and incorporated into the mining EMP that the proposed mining activities will not have any significant detrimental environmental impacts on any of the sensitive environmental and landscape features as identified on the site and surrounds.

(Reference: N Hanekom and J Piennar. June 2018.Ecological Baseline Assessment for Proposed Mining Right on Erven 1401, 1199 & 2924 Heidelberg, Western Cape)

Please indicate which heritage resources exist on the site and in its environs, describe them and indicate the nature of any impact upon them:

☐	**Places, buildings, structures and equipment of cultural significance** Description of resource: Description of impact on heritage resource:
☐	**Places to which oral traditions are attached or which are associated with living heritage** Description of resource: Description of impact on heritage resource:
☐	**Historical settlements and townscapes** Description of resource: Description of impact on heritage resource:
☒	**Landscapes and natural features of cultural significance** Description of resource: Indigenous vegetation areas and drainage lines Description of impact on heritage resource: All potential direct and indirect impacts as associated with proposed mining activities can be mitigated to such a extent that it will not cause significant ditremental environmental impacts. Significant direct impacts potentially associated with the mining phase are direct loss of indigenous terrestrial and aquatic vegetation and disturbance of soil which may lead to partial disruption of ecological processes due to fragmentation of habitat and erosion. The extent in this case would be local. Indirect impacts would occur mostly during the rehabilitation phase and in this case the nature would vary from the introduction of alien vegetation to partial disruption of ecological processes due to the effects of the alien species encroachment and/or

	erosion. The extent of the potential indirect impacts in this case would be local. The following impact mitigation and management measures must be implemented: • All proposed mining activities to be located on completely transformed and cultivated agricultural areas as indicated. • Clearly demarcate the 8m wide buffer areas proposed as measured from the edge of all remaining indigenous vegetation areas and undertake mining activities only in identified and specifically demarcated areas as proposed on completely transformed and cultivated areas. Demarcation method to be approved by an Environmental Control Officer (ECO). The proposed buffer areas to be located within existing cultivated land may only be used as roads and for stormwater management and no other activities associated with the proposed mining of the site may occur within the buffer areas. • Compile and implement a site specific stormwater management plan which aims to prevent (and if prevention is not possible to mitigate and rehabilitate) erosion of the site and surrounds and accumulation of stormwater in excavation areas. Site specific storm water management measures must be incorporated into the proposed mining activities layout, to direct storm water runoff away from the proposed quarry; topsoil and overburden stockpiles but still draining into adjacent non-perennial drainage lines as according to current status quo. • No disturbance should be allowed within the remaining indigenous vegetation, drainage lines and wetland areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance. • No natural vegetation, drainage lines or wetland areas edges may be cleared or impacted upon by the proposed mining activities. • Topsoil and overburden materials must be removed and stored separately adjacent to the mining areas on transformed agricultural land with effective storm water runoff and erosion prevention measures to be implemented in order to protect the materials for use during rehabilitation phase. • As the excavation of the quarry advances the stored overburden material must be replaced to backfill the excavations. The backfilled area must then be contoured according to existing surrounding contours of the cultivated land to prevent erosion. After contouring has been completed the stored topsoil material must be spread over the backfilled area. Only use topsoil as derived and conserved from the proposed mining area to be rehabilitated after mining activities have ceased on the property. The topsoil must not be compacted after spreading to allow the disturbed area to be restored. The site must be monitored regularly during the mining operational/excavation phase (at least 3 monthly and after heavy rains) for signs of erosion which if detected must be immediately rectified and alien vegetation removed to prevent potential siltation, erosion and alien encroachment of the site and surrounds. • No mining activities may occur within 100m from any drainage line or wetland without determining requirement for water use authorisation from Department of Water and Sanitation or the Breede Gouritz Catchment Management Agency. • Alien invasive and weed vegetation monitoring and removal must be undertaken for at least a year after mining activities have ceased and the site has been rehabilitated or until the landowner starts with the annual cultivation activities on the affected land. This must be done by the applicant, landowner or their appointed contractor, using CapeNature approved methodology depending on the contract agreement that the applicant has with the landowner.

	• The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions, including the recommendations as provided in this report and only proceed under supervision of a competent and diligent Environmental Control Officer, both during the operational/excavation and rehabilitation phases. The ecological baseline assessment concluded that if the proposed mining activities remains on the completely transformed cultivated agricultural areas of the property and the specialist recommendations are adhered to that the proposed mining activities will not have any significant detrimental environmental impacts on any of the sensitive environmental and landscape features as present on the site and surrounds. An ecological baseline assessment has been conducted in this regard
☐	**Geological resources of scientific or cultural importance** Description of resource: Description of impact on heritage resource:
☐	**Archaeological resources** (Including archaeological sites and material, rock art, battlefields & wrecks)**:** Description of resource: Description of impact on heritage resource:
☐	**Palaeontological resources** (ie: fossils)**:** Description of resource: Description of impact on heritage resource:
☐	**Graves and burial grounds** (eg: ancestral graves, graves of victims of conflict, historical graves & cemeteries)**:** Description of Resource: Description of Impact on Heritage Resource:
☐	**Other human remains:** Description of resource: Description of impact on heritage resource:
☐	**Sites of significance relating to the history of slavery in South Africa:** Description of resource: Description of impact on heritage resource:
☐	**Other heritage resources:** Description of resource: Description of impact on heritage resource:

Describe elements in the environs of the site that could be deemed to be heritage resources: Listed above Description of impacts on heritage resources in the environs of the site: Impacts on possible heritge resource as listed above.

Summary of anticipated impacts on heritage resources: Listed above.

ILLUSTRATIVE MATERIAL (This form will not be processed unless the following are included):

Attach to this form a minimum A4 sized locality plan showing the boundaries of the area affected by the proposed development, its environs, property boundaries and a scale. The plan must be of a scale and size that is appropriate to creating a clear understanding of the development.
Attach also other relevant graphic material such as maps, site plans, satellite photographs and photographs of the site and the heritage resources on it and in its environs. These are essential to the processing of this notification.
Please provide all graphic material on paper of appropriate size and on CD ROM in JPEG format. It is essential that graphic material be annotated via titles on the photographs, map names and numbers, names of files and/or provision of a numbered list describing what is visible in each image.

D. RECOMMENDATION

In your opinion do you believe that a heritage impact assessment is required? ☐ Yes ☒ No
Recommendation made by: Name Johmandie Pienaar Capacity Environmental Assessment Practitioner
PLEASE NOTE: No Heritage Impact Assessment should be submitted with this form or conducted until Heritage Western Cape has expressed its opinion on the need for such and the nature thereof.

E. INFORMATION TO BE PROVIDED AND STUDIES TO BE CONDUCTED AS PART OF THE HERITAGE IMPACT ASSESSMENT (HIA)

If it is recommended that an HIA is required please complete this section of the form.

DETAILS OF HERITAGE PRACTITIONERS AND SPECIALISTS INTENDING TO CONDUCT THE HIA:

1.	Name of individual: Name of Practice: Area of specialisation: Qualifications: Experience: Standing in heritage resource management: E-mail Address: Telephone: Cell:
2.	Name of individual: Name of Practice: Area of specialisation: Qualifications: Experience: Standing in heritage resource management: E-mail Address: Telephone: Cell:

3.	Name of individual: Name of Practice: Area of specialisation: Qualifications: Experience: Standing in heritage resource management: E-mail Address: Telephone: Cell:
4.	Name of individual: Name of Practice: Area of specialisation: Qualifications: Experience: Standing in heritage resource management: E-mail Address: Telephone: Cell:
5.	Name of individual: Name of Practice: Area of specialisation: Qualifications: Experience: Standing in heritage resource management: E-mail Address: Telephone: Cell:

If this submission is made in terms of Section 38(8) of the National Heritage Resources Act indicate below the particulars of the principle environmental consultant on the project.

Name of individual: Johmandie Pienaar Name of Practice: Eco Impact Legal Consulting Area of specialisation: Environmental Assessment Practitioner and Biodiversity Specialist

E-mail Address: johmandie@ecoimpact.co.za & admin@ecoimpact.co.za Telephone: 021 671 1660 Fax: 021 671 9976 Cell: 072 240 3092

Postal Address: PO Box 45070 Claremont South Africa 7735

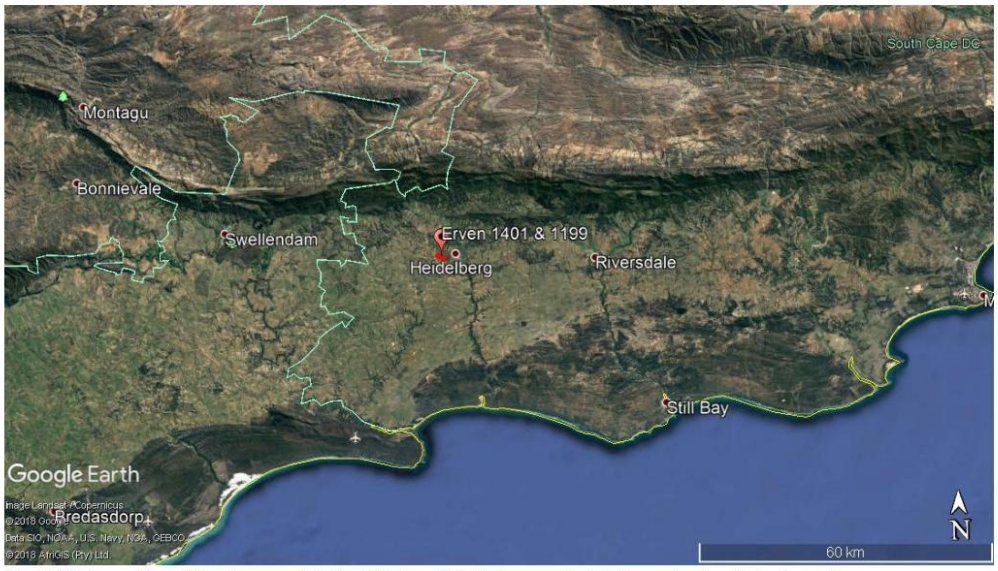
DETAILS OF STUDIES TO BE CONDUCTED IN THE INTENDED HIA

In addition to the requirements set out in Section 38(3) of the NHRA, indicate envisaged studies:	
☐	Heritage resource-related guidelines and policies.
☐	Local authority planning and other laws and policies.
☐	Details of parties, communities, etc. to be consulted.
☐	Specialist studies, eg: archaeology, palaeontology, architecture, townscape, visual impact, etc. Provide details:
☐	Other. Provide details:

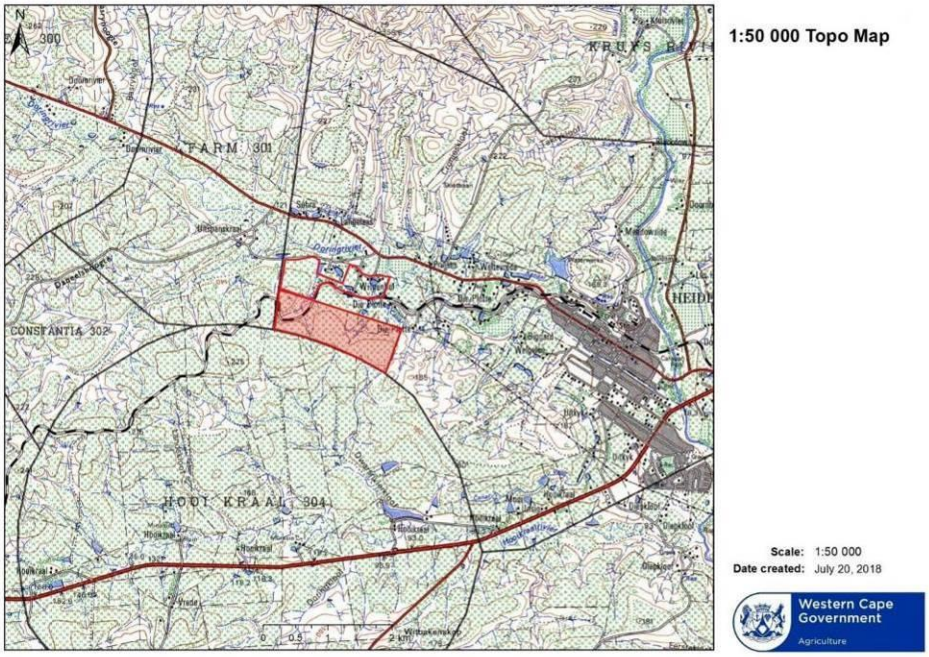
PLEASE NOTE: Any further studies which Heritage Western Cape may resolve should be submitted must be in the form of a single, consolidated report with a single set of recommendations. Specialist studies must be incorporated in full, either as chapters of the report, or as annexures thereto.

MAPS

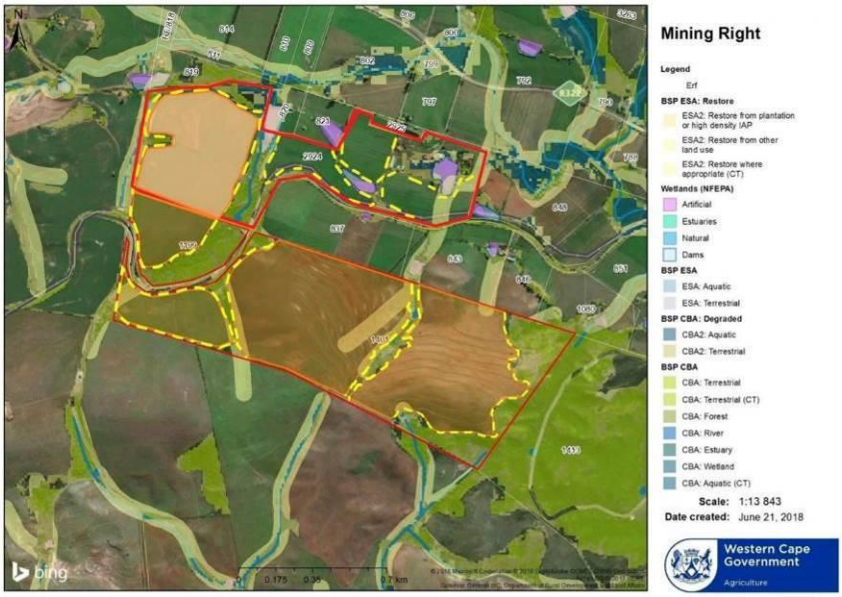
Map 1: Locality of Heidelberg in the Western Cape.



Map 2: Locality of the Erven 1401, 1199 and 2924 near Heidelberg in the Western Cape.
GPS co-ordinate for "middle" of surveyed site - 34° 05' 14.32"S
20° 55' 02.96"E



Map 3: The 1:50 000 topographical map for the study area near Heidelberg– Erven 1401, 1199 and 2924



Map 4: Biodiversity GIS ("BGIS") land use map indicating mapped terrestrial and aquatic Critical Biodiversity Areas ("CBA"), Ecological Support Areas ("ESA") and associated buffer areas as according to WCDP (2017) in relation to the proposed mining activities areas on transformed cultivated agricultural land (as outlined in orange line and yellow dash). Yellow dash lines also indicate boundaries of no-go areas.

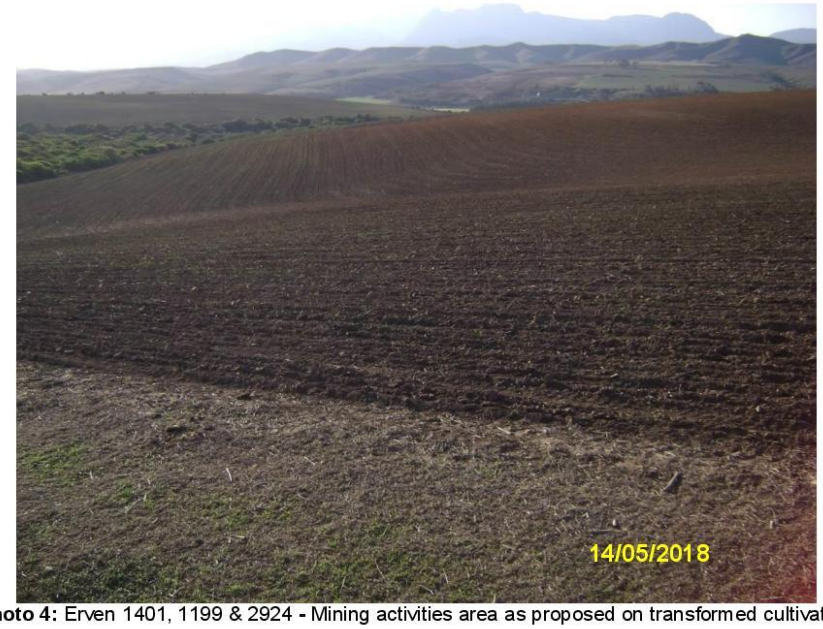
Map 5: Proposed mining layout plan on Erven 1401, 1199 & 2924.

SITE PHOTOS

Site Photo 1: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

Site Photo 2: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

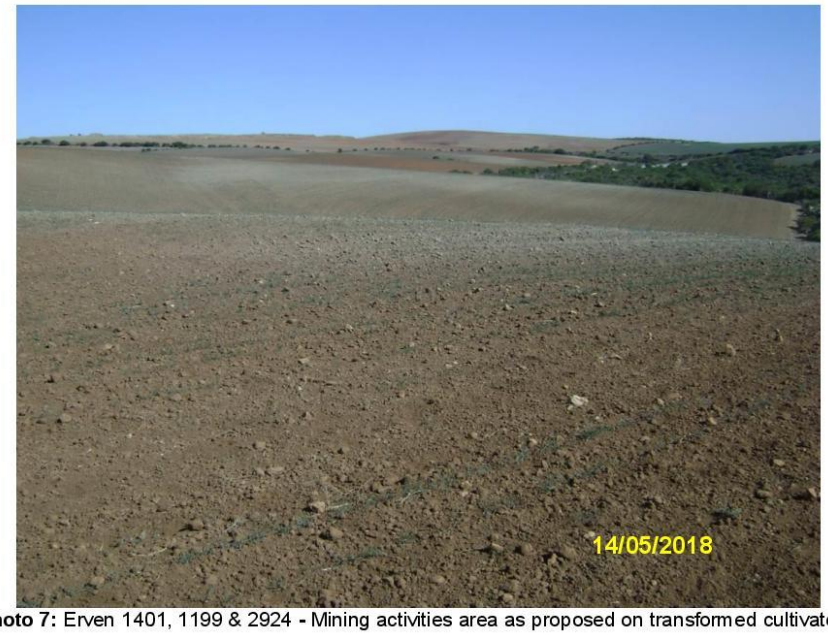
Site Photo 3: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.



Site Photo 4: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land.

Site Photo 5: Erven 1401, 1199 & 2924 **-** Mining activities area as proposed on transformed cultivated land.

Site Photo 6: Erven 1401, 1199 & 2924 **-** Mining activities area as proposed on transformed cultivated land..



Site Photo 7: Erven 1401, 1199 & 2924 - Mining activities area as proposed on transformed cultivated land..

Site Photo 8: Erven 1401, 1199 7 2924 - Mining activities area as proposed on transformed cultivated land.

ILifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

Our Ref: HM/HESSEQUA/HEIDELBERG/ERVEN 1401, 1199 & 2924
Case No.: 18113001AS1130E
Enquiries: Andrew September
E-mail: andrew.september@westerncape.gov.za
Tel 021 483 9543
Date: 19 December 2018

Yolandie Hensock
PO Box 45070
Claremont
7735

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: FINAL
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED BENTONITE AND ZEOLITE MINE ON ERVEN 1401, 1199 & 2924, HEIDELBERG, HESSEQUA, SUBMITTED IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

CASE NUMBER: 18113001AS1130E

The matter above has reference.

Heritage Western Cape is in receipt of your application for the above matter received on 30 November 2018. This matter was discussed at the Heritage Officers meeting held on 13 December 2018.

You are hereby notified that, since there is no reason to believe that the proposed mine will impact on heritage resources, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required.

However, should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities above, all works must be stopped immediately and Heritage Western Cape must be notified without delay.

This letter does not exonerate the applicant from obtaining any necessary approval from any other applicable statutory authority.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

Yours faithfully

pp .....
Dr Mxolisi Dlamuka
Chief Executive Officer, Heritage Western Cape

Street Address: Protea Assurance Building, Green Market Square, Cape Town, 8000 • **Postal Address:** Private Bag X9067, Cape Town, 800
• **Tel:** +27 (0)21 483 5959 • **E-mail:** ceoheritage@westerncape.gov.za

Straatadres: Protea Assuransie-gebou, Groentemarkplein, Kaapstad, 8000 • **Posadres:** Privaatsak X9067, Kaapstad, 8001
• **Tel:** +27 (0)21 483 5959 • **E-pos:** ceoheritage@westerncape.gov.za