RONDAWEL KAOLIEN (PTY) LTD

MINING RIGHT APPLICATION FOR KAOLIN ON PORTION 1 OF FARM RONDAWEL 638, KAMIESBERG LOCAL MUNICIPALITY, NORTHERN CAPE

DMR REF.: NC 30/5/1/2/2/10178MR

Draft Environmental Impact Report

28 December 2020

green direction
sustainability consulting

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FOR THE APPLICANT BY:	*Green Direction Sustainability Consulting (Pty) Ltd*
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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND PROSPECTING.

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

NAME OF APPLICANT:	**RONDAWEL KAOLIEN (PTY) LTD**
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DMR REFERENCE NUMBER: NC 30/5/1/2/2/10178MR

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
(d) determine the—-
    (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    (ii) degree to which these impacts—
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources, and
        (cc) can be avoided, managed or mitigated;
(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
(g) identify suitable measures to manage, avoid or mitigate identified impacts; and
(h) identify residual risks that need to be managed and monitored.

Statement of Qualification and Independence

Green Direction Sustainability Consulting (Pty) Ltd (GDSC) has no interest in the outcome of this Report, nor does this company have any interest that could be reasonably regarded as being capable of affecting its independence.

The opinions expressed in this report have been based on the information supplied to GDSC by the Applicant. GDSC has exercised the necessary attention in reviewing the supplied information, with conclusions from the review being reliant on the accuracy and completeness of the supplied data. Professional environmental opinions presented in this report apply to the site conditions and features as they existed at the time of GDSC's investigations, and those realistically anticipated. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which GDSC had no prior knowledge nor had the opportunity to assess in the context of the Report. GDSC does not accept responsibility for any errors or omissions in the information provided and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

NAME	Jennifer Barnard
RESPONSIBIILTY ON PROJECT	Preparation of Environmental Impact Assessment
QUALIFICATIONS	M. Sc (Masters' Degree in Environmental Science)
PROFESSIONAL REGISTRATION	Registered as a Professional Natural Scientist with the South African Council of Natural Scientific Professions (SACNASP: Pr. Nat. Sci.) Registration number: 400197/09. Registered with Environmental Assessment Practioners' Association of South Africa (EAPASA): Reg. No.: 2020/2492. New Buildings AP Green Star SA. Confronting Climate Change Carbon Footprint Assessor.
EXPERIENCE (YEARS)	28 years
EXPERIENCE & EXPERTISE	Mrs. Barnard has been registered with the South African Council for Natural Scientific Professions since 2009 and was awarded certification as an Environmental Assessment Practioner by the Interim Certification Board of South Africa in 2010. She has worked on numerous Environmental Impact Assessments, both in South Africa and the United Kingdom and has considerable experience in the preparation and compilation of Environmental Impact Reports, Environmental Management Programmes, Closure Plans, Strategic Environmental Assessments, Environmental Management Frameworks, and Environmental Auditing. Refer to CV Summary attached at **Appendix A**.

DECLARATION OF INDEPENDENCE

I, Jennifer Anne Barnard, declare that –

- I act as the independent environmental assessment practitioner in this role as EAP;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I will perform the work relating to the role of EAP in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I will take into account, to the extent possible, the matters listed in Regulation 13 of the Regulations when preparing the reports comprising the Environmental Impact Assessment;
- I undertake to disclose to the applicant and the Competent Authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the Competent Authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the Competent Authority, unless access to that information is protected by law, in which case it will be indicated that such information exists and will be provided to the Competent Authority;
- I will perform all obligations as expected from an environmental assessment practitioner in terms of the Regulations; and,
- I am aware of what constitutes an offence in terms of Regulation 48 and that a person convicted of an offence in terms of Regulation 48(1) is liable to the penalties as contemplated in Section 49B of the Act.

Disclosure of Vested Interest (delete whichever is not applicable)

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations;
- ~~I have a vested interest in the proposed activity proceeding, such vested interest being:~~

Signature of the Environmental Assessment Practitioner
Name of Company: Green Direction Sustainability Consulting (Pty) Ltd
Date: 8 September 2020

EXECUTIVE SUMMARY

The applicant **Rondawel Kaolien (Pty) Ltd** commissioned a new exploration programme in the 2017 under cover of Prospecting Right NC 30/5/1/1/2/540 PR. The prospecting right covered a 2108.2603Ha portion of Portion 1 of the farm Rondawel No 638 situated in the Magisterial/Administrative District of Namaqualand. In addition, a Mining Permit for a 5Ha portion of the prospecting area was issued under NC30/5/1/3/2/10638MP on 2 November 2018.
A high-level financial analysis on the viability of the current small-scale mining operation has demonstrated a small profit on the operations. The current operation is targeting the marketing of the Kaolin to the ceramic market in Cape Town at a limited production of approximately 300 MT per month.
The company would like to expand the operation to produce a beneficiated product of approximately 3 000MT per month and to do so will require the expansion of the mining and processing operation. It will also require the establishment of a pellitisation plant to produce a product that can be marketed in South Africa and abroad. Initial financial analysis of such an expansion has demonstrated the economic viability of the operation. For this reason, an application for a Mining Right is now in progress. The Life of Mine (LoM) is given as 20 years.

Mining Process description
The orebody will be extracted initially down to a maximum depth from surface of approximately 20 metres in the first phase as part of the existing small-scale mining operation. All material meeting grade requirements will be placed on a Run of Mine (RoM) Stockpile adjacent to the plant. Post initial small-scale mining operation until depletion of the Kaolin resource, a brightness cut-off grade of 50% will be applied to the mining activities. The orebody will be extracted down to a maximum depth from surface of approximately 30 metres by the end of related mining activities.
Crude product is mildly crushed, sieved, milled in pug mills, heated and put through a dry air separation beneficiation process to produce a beneficiated product in the form of a dry powder in which most of the silica content and other impurities are removed. Product is packaged and transported in either closed 1-ton bulk bags or shipping containers.
Diagrams 6a and 6b provide the detailed Mine Site Layout for the mine indicating the mining footprint including infrastructure, services, open pit, Run of Mine (RoM) stockpiles, waste rock dumps, and access roads.
The process flow diagrams are provided in **Diagram 9a to Diagram 9e**, which provide information on the process flow components comprising the primary processing and beneficiation of the kaolin. Bulk services such as the mine bulk water and electricity are provided in **Diagrams 9f and 9g,** respectively.

The **policy and legislative context**, including the table of EIA and Waste listed activities is included in Section 4 followed by the section on the **need and desirability** of the proposed mining activities included in Section 5.

The **project alternatives** are described in Section 6, and the Preferred Alternative is summarised as the Mining and Primary Processing of Kaolin Ore within the Mining Right area demarcated in **Diagram 6a and 6b**.

- The preferred **location** alternative of the mining activity is on the earmarked sites shown on the Mine Site Plans.
  - The location of the mining logistics, processing components and associated infrastructure have been positioned in relation to the location of the mineral resource and the suitable topography of these sites for these structures, making us of existing infrastructure that is already in place and in use for the existing mining prospecting right and recently acquired mining permit.
- The preferred **activity** alternative is the mining of kaolin based on the mineral resources investigated during prospecting.
- The preferred **technology** alternative for the open pit mining, extraction, processing, waste and water management (**Diagram 9f**), and use of electricity powered by a diesel generator (**Diagram 9g**) are those described in Section 6.5.
- The preferred **operational** alternative is the primary processing of kaolin, including the applicants patented dry process for separating rock from kaolin, as illustrated in the Plant Process Flow Diagrams (**Diagrams 9a to 9e**).

The preferred alternatives described above have been included in the impact assessment table of impacts (**Appendix D**), together with the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

The **public participation process** chapter is described in Section 7, and the copy of the Notice of Commencement of the EIA Phase and availability of the DEOR for comment is included in Appendix B. The 30-day comment period begins on 6 January 2021 and ends on 4 February 2021. A hard copy of the Draft Environmental Impact Report (DEIR) was placed in the public library in Garies, and hand delivered to various adjacent neighbours. A copy has been made available for download off the Green Direction website, details of which were included in the project notice.

The **receiving environment** is described in Section 8 and provides a desk-top assessment using reference material and databases to identify the land uses, vegetation, water resources, Critical Biodiversity Areas (CBAs), and the socio-economic environment as referenced from the Kamiesberg Integrated Development Plan (IDP) and Namakwa District IDP. Project site photographs are included to illustrate the existing mining activities and infrastructure and vegetation type.

A Heritage Impact Assessment and Palaeontological Assessment was included in the Draft Scoping Report and again in this DEIR.

The following specialist assessments have been prepared and included in the DEIR.

- **Heritage Impact Assessment Appendix C1) and Palaeontology Impact Assessment (Appendix C2).**

No additional detailed specialist studies were identified.

All of the negative identified impacts will occur for a limited period and the extent of the negative impacts will be localised. All of the identified impacts can be suitably mitigated. The positive impacts are associated with employment creation and regional and local economic spin-offs. There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in the Impact Assessment Tables attached at **Appendix D.**

Details of the mitigation measures are provided in the EMPr, and the Impact Tables (**Appendix D**).

Significance Ratings of Impacts after Mitigation during Construction Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. SOIL EROSION AND COMPACTION: The clearing of areas for the mine footprint will result in the removal of existing vegetation and topsoil, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from ongoing repeated use of access tracks.	**Low / Insignificant Risk**	**N/A**
2. WATER RESOURCES: Potential for ground water pollution due to oil spills during routine maintenance of equipment. No surface water resources are in close proximity to the proposed mining site. The mining method makes use of a dry primary processing technique. No Water Use License is required.	**Very Low / Insignificant Risk**	**N/A**
2.IMPACT ON NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 2 (CBA 2): The mining footprint will be cleared and topsoil stockpiled for rehabilitation as required.	**Low / Insignificant Risk**	**N/A**
4.POTENTIAL FOR SOIL CONTAMINATION AND WASTE MANAGEMENT DURING CONSTRUCTION PHASE	**Low / Insignificant Risk**	**N/A**
5. VISUAL INTRUSION: Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The site is remote and rural in nature with very few receptors (people or nearby public roads).	**Very Low / Insignificant Risk**	**N/A**
6. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front-end loaders) and vehicles, which will emit Greenhouse Gases.	**Very low / Insignificant Risk**	**N/A**
7. HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS Refer to **Appendix C1.**	**Low / Insignificant Risk** **(Mine Pit area – all other areas require no mitigation and rating post mitigation is N/A)**	**N/A**
8. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

Significance Ratings of Impacts after Mitigation during Operational Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. SOIL EROSION, SOIL COMPACTION AND CHANGE IN GEOLOGICAL SEQUENCE: The mining of Kaolin will result in the removal of topsoil, and 1 metre of overburden and the sub-layers of Kaolin. Impacts are the potential for soil erosion by wind and loss of soil in the event of rainfall; soil compaction from repeated use of access tracks; and changes in the landscape and topography from overburden and waste dumps, stockpiles and the open pit.	**Low / Insignificant Risk**	**N/A**
2. WATER RESOURCES: Potential for ground water pollution due to oil spills during routine maintenance of equipment. No surface water resources are in close	**Low/ Insignificant Risk**	**N/A**

proximity to the proposed mining site. The mining method makes use of a dry primary processing technique. No Water Use License is required.		
3. IMPACT ON NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 2 (CBA 2): The proposed mining area footprint will be cleared, mined and rehabilitated with the topsoil from the site, resulting in a short-term impact on localised ecological functioning. Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The machinery and trucks will disturb local fauna however, the adjacent area is already being mined.	**Low / Insignificant Risk**	**N/A**
4. POTENTIAL FOR SOIL CONTAMINATION, AND WASTE MANAGEMENT DURING OPERATIONAL PHASE:	**Low / Insignificant Risk**	**N/A**
5. VISUAL INTRUSION: Caused by the machinery, topsoil and rock stockpiles, cleared areas, and movement of trucks on site. The site is, however, remote and rural in nature with no receptors (people) as it is located on private property.	**Very Low / Insignificant Risk**	**N/A**
6. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front end loaders) and vehicles, which will emit Greenhouse Gases.	**Low / Insignificant Risk**	**N/A**
7. HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS: Refer to **Appendix C1.**	**Low / Insignificant Risk** **(Mine Pit area – all other areas require no mitigation and rating post mitigation is N/A)**	**N/A**
9. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

It is the opinion of the EAP that the proposed kaolin mining right activity should be authorised. In reaching this conclusion the EAP has considered that:

- The "preferred alternative" takes into account location alternatives, activity alternatives, layout alternatives, technology alternatives and operational alternatives.
- The approach taken is that it is preferable to avoid significant negative environmental impacts, wherever possible. There are no significant environmental impacts associated with the proposed activity.
- Although the site is located in a Critical Biodiversity Area 2 (CBA2) and river FEPA sub-catchment, it is the opinion of the EAP that the underlying biodiversity objectives and ecological functioning will not be compromised, subject to the strict adherence to the EMPr and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**).
- ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.
- The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of kaolin for the local, and international market.
- Provided the recommended mitigation measures are implemented in an environmentally sound manner and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**), the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

DEFINITIONS

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –
i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.

Baseline - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.

Basic Assessment Process – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017)**.** These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).

Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.

Borehole - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.

Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.

Consultation - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.

Critical Biodiversity Area - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.

Cumulative Impacts - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.

Environment - The surroundings within which humans exist and that are made up of
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Authorisation (EA) – The authorisation by a competent authority of a listed activity.

Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.

Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.

Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.

Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.

Gross Domestic Product (GDP) by region - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.

Hazardous waste – means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical, or toxicological characteristics of the waste, have a detrimental impact on health and the environment.

Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.

Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Interested and Affected Party (I&AP) – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.

Municipality –

(a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or
(b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means
    (i) The district municipality, or
    (ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

No-Go Alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Tailings - Tailings are the materials left over after the process of separating the valuable fraction from the uneconomic fraction of an ore. Tailings are distinct from overburden, which is the waste rock or other material that overlies an ore or mineral body and is displaced during mining without being processed.

Visibility - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

Visual Character - The elements that make up the landscape including geology, vegetation and land-use of the area.

Visual Quality - The experience of the environment with its particular natural and cultural attributes.

Visual Receptors - Individuals, groups or communities who are subject to the visual influence of a particular project.

ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BGIS	Biodiversity Geographic Information Systems
mbgl	Metres below ground level
CBA	Critical Biodiversity Area
COB	Crest of Bench
DEIR	Draft Environmental Impact Report
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EStA	Early Stone Age
FoT	"Free on Truck" means there is no processing and that it's a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
Ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IWWMP	Integrated Water and Wastewater Management Plan
iWULA	Integrated Water Use License Application
km	Kilometres
km^2	Square kilometres
ktpm	Kilo ton per month
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
m^3	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSDS	Material Safety Data Sheet
MWP	Mining Works Programme
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
RoM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
SKEP	Succulent Karoo Ecosystem Programme
StatsSA	Statistics South Africa
WMA	Water Management Area
WML	Waste Management License

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1 CONTACT PERSON & CORRESPONDENCE ADDRESS

1.1 Details of the EAP

Name of The Practitioner: Jennifer Barnard (Green Direction Sustainability Consulting (Pty) Ltd)
Tel No.: 082 4444364
Fax No. : N/A
e-mail address: jenny@greendirection.co.za

1.2 Expertise of the EAP

The qualificationsd professional registrations of the Environmental Assessment Practioner (EAP)

- Master's in Environmental Science: University of KwaZulu-Natal, Durban
- SACNASP: Pr. Nat. Sci. (Professional Natural Scientist)
- EAPASA: Registered with Environmental Assessment Practioners Association of South Africa (EAPASA): Reg. No.: 2020/2492.

Refer to **Appendix A** for CV of EAP.

2 LOCATION OF THE ACTIVITY

Table 1: Location and Property Information

Farm Name:	Portion 1 of Farm Rondawel No. 638
Application area (Ha)	232Ha
Magisterial district:	NamakwalandKS
Distance and direction from nearest town	The mine is situated 32 kilometres south-west of Garies.
21-digit Surveyor General Code for each farm portion	C05300000000063800001

2.1 Location

The mine is situated 32 kilometres south-west of Garies and 22 kilometres from the west coast of Namaqualand on the Farm Rondawel 638 in the Northern Cape Province in South Africa.

Refer to the following plans:

- **Diagram 1a:** Locality Plan
- **Diagram 1b:** Adjacent Properties and Access Routes
- **Diagram 1c:** Locality Plan of Project Site showing Mine Layout and Co-ordinates

Diagram 1a: Locality Plan of Project Site Mining Licence Area

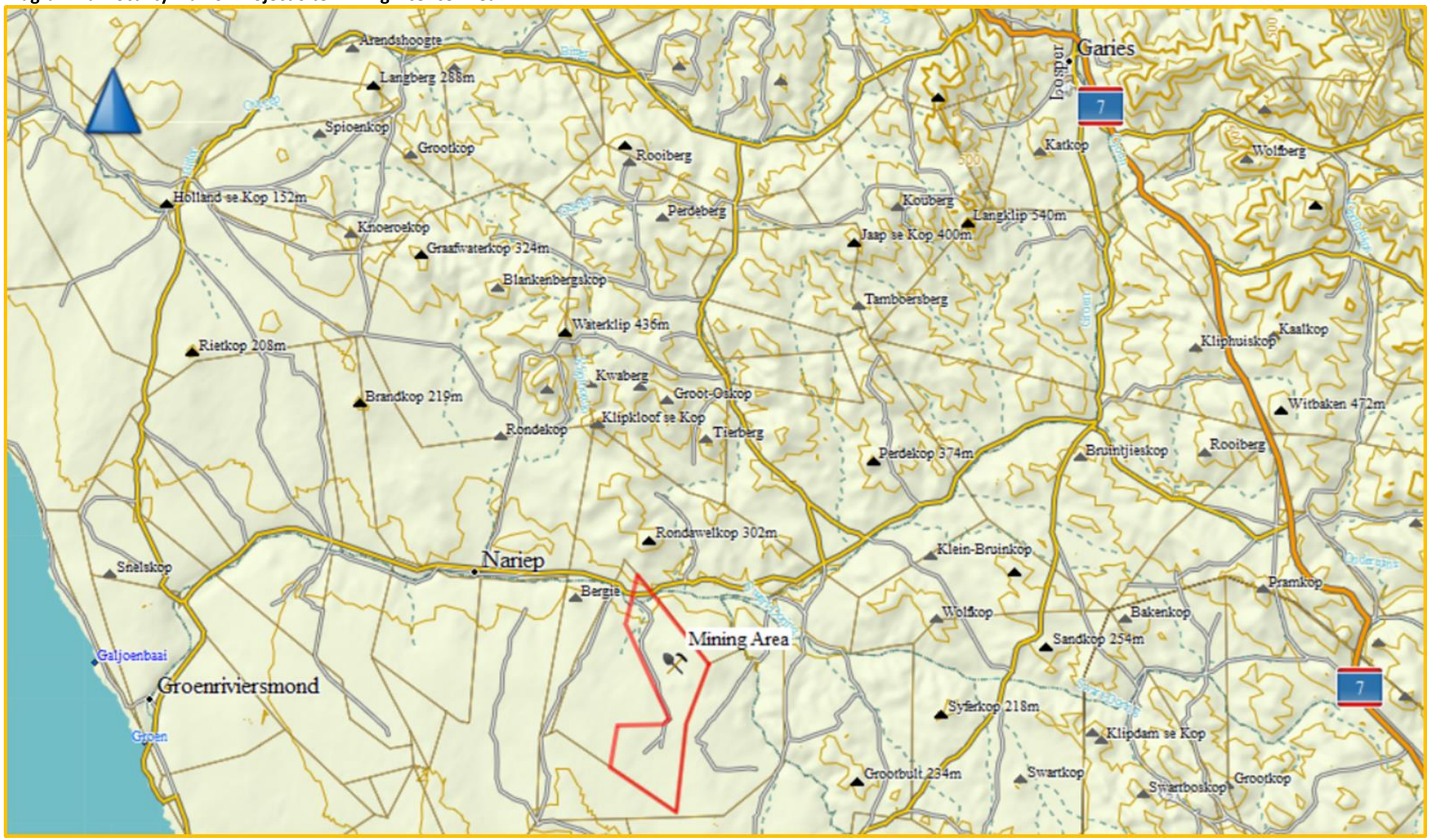


Diagram 1b: Locality Plan of Project Site showing adjacent properties and access routes

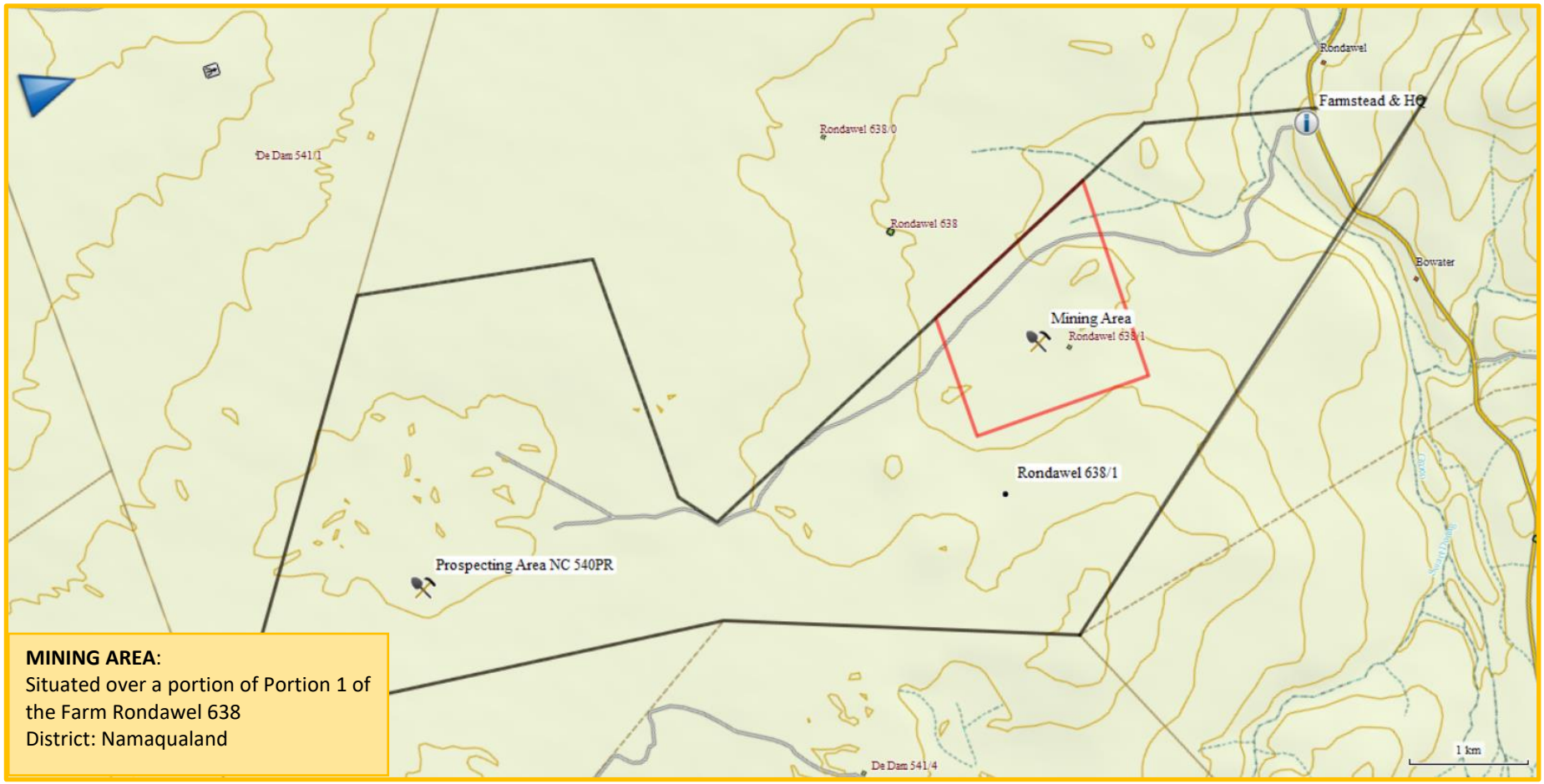
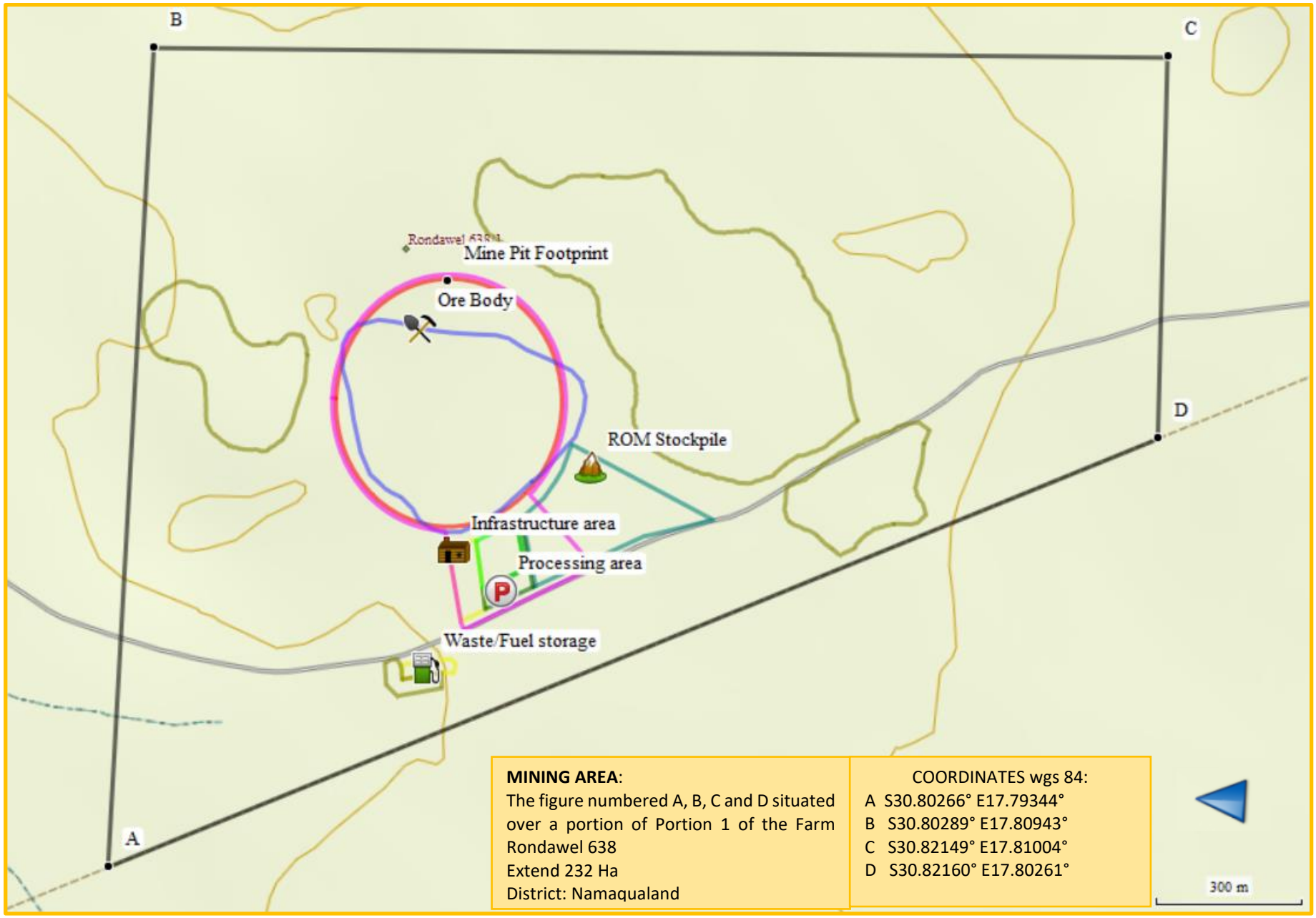


Diagram 1c: Locality Plan of Project Site showing Mine Layout and Co-ordinates



MINING AREA:
The figure numbered A, B, C and D situated over a portion of Portion 1 of the Farm Rondawel 638
Extend 232 Ha
District: Namaqualand

COORDINATES wgs 84:
A S30.80266° E17.79344°
B S30.80289° E17.80943°
C S30.82149° E17.81004°
D S30.82160° E17.80261°

3 DESCRIPTION OF THE PROPOSED ACTIVITIES

3.1 Introduction and Background

During the early 1970's a kaolin deposit was discovered on the farm Rondawel (638) when a borehole was drilled for water. Preliminary prospecting was undertaken by the landowner and an ore body of good quality kaolin was confirmed. At that time, mineral rights belonged to landowners and subsequently the owners of Rondawel secured a market for the kaolin and delivered their product to SAPPI for a period of eight years. The kaolin was mined on the farm, transported in its raw state by truck to the nearest railway station and delivered by rail to its final destination.

Kaolin in its natural form includes a certain percentage of rock but for it to be profitable it needs to be beneficiated to a refined form before being transported. Beneficiation of kaolin at the time could only be done by "washing" to remove the rock, but in a water scarce area like Namaqualand this was not a viable option in the long term. In addition, government rebates for the transport of this raw material were halted and it became too expensive for the landowner to transport material by rail. As a result, all activities on the mine ceased.

In the early 2000's the government changed the legislation and policy regarding minerals, which saw landowner's loose ownership of the mineral rights. The owner of the kaolin mine on Rondawel, however, applied for the relevant rights which were awarded, and through experimentation created and patented a dry beneficiation process for separating rock from the kaolin. This made it possible for kaolin to be extracted from the mine and sold commercially again.

The applicant **Rondawel Kaolien (Pty) Ltd** commissioned a new exploration programme in the second semester 2017 under cover of Prospecting Right NC 30/5/1/1/2/540 PR. The prospecting right covered a 2108.2603Ha portion of Portion 1 of the farm Rondawel No 638 situated in the Magisterial/Administrative District of Namaqualand.

With regard to the resource statement the information supplied in terms of regulation 11 (1) (d) was obtained and is supported by the exploration results obtained during the extensive exploration program. The exploration programme consisted of 26 RC borehole proving a Measured Resource of approximately 1.8 million MT. Measured Resource is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

On 2 November 2018 a mining permit for a 5Ha portion of the prospecting area was issued under NC30/5/1/3/2/10638MP. A high-level financial analysis on the viability of the current small-scale mining operation has demonstrated a small profit on the operations. The current operation is targeting the marketing of the Kaolin to the ceramic market in Cape Town at a limited production of approximately 300 MT per month.

The company would like to expand the operation to produce a beneficiated product of approximately 3 000MT per month. To do so will require the expansion of the mining and processing operation. It will also require the establishment of a pellitisation plant to produce a product that can be marketed in South Africa and abroad. Initial financial analysis of such an expansion has demonstrated the economic viability of the operation. For this reason, an application for a mining right is now submitted.

3.2 The Scope of the Proposed Activities

3.2.1 Basic overview of the Mining Method

Open-pit mining is appropriate when the ore is near the surface, particularly if the ore deposit is relatively large and there is little overburden. There are several important design considerations for open-pit mines. First, the

open-pit walls need to be constructed and angled so that they are strong enough to support a safe slope. Second, the depth to the ore will dictate how much waste overburden will need to be mined before production can begin. And third, the size of the first "bench" of any open-pit mine must be planned carefully, as each successive bench will be smaller than the last one and, consequently, the dimensions of the initial bench will dictate the depth of the final open-pit. Refer to the generic diagrams of open cast mining included in **Diagram 2.1 and 2.2** below.

Diagram 2a: Basic Overview to show removal of overburden, waste rock and ore and processing

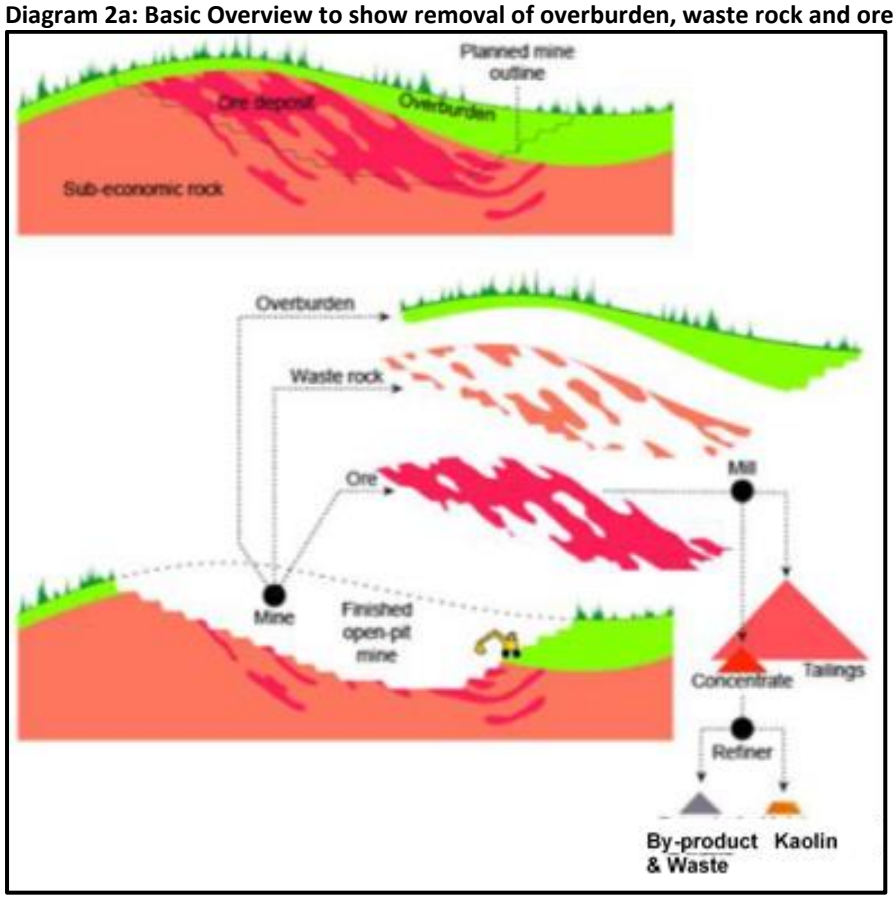
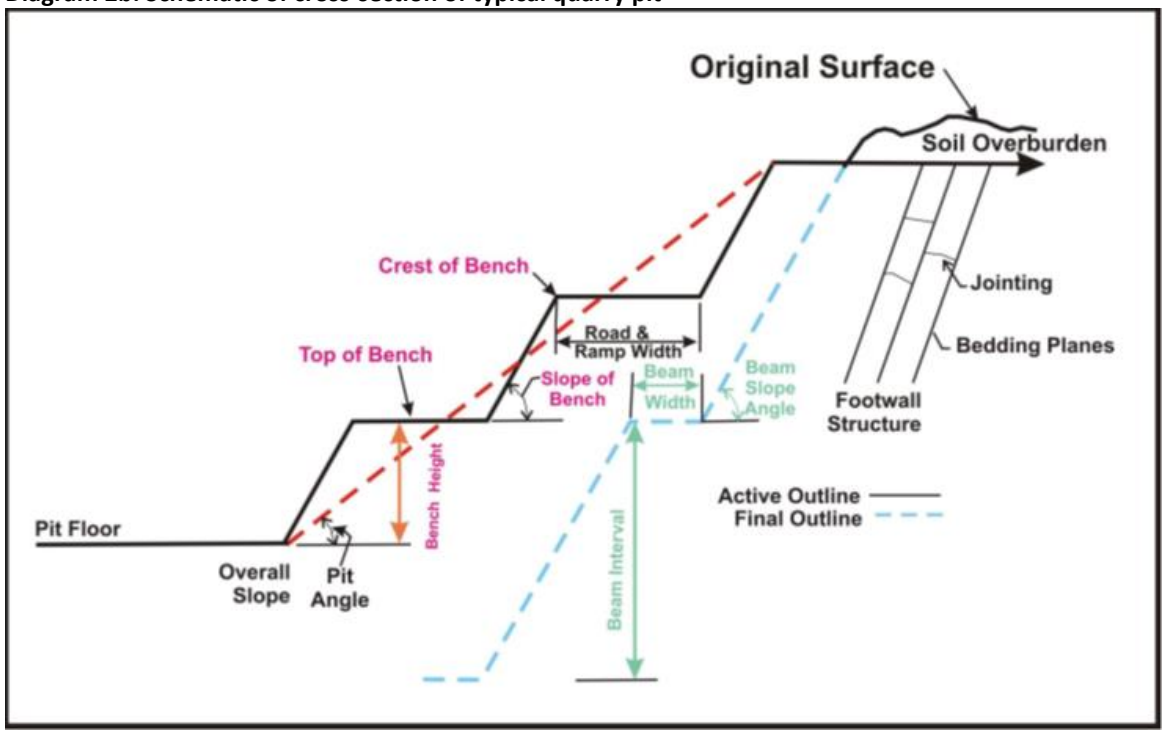


Diagram 2b: Schematic of cross-section of typical quarry pit



3.2.2 Mineral Resource Particulars

Table 2: Details of the Mineral Resources (MWP; 2019)

ITEM	DETAIL
Type of mineral	Kaolin
Locality (direction and distance from nearest town)	The mine is situated 32 kilometres south-west of Garies and 22 kilometres from the west coast of Namaqualand on the farm Rondawel 638 in the Northern Cape Province in South Africa. A gravel road from the N7 main tarred road at Garies that connects Springbok and Cape Town, allows access to the mining area. The mine lies remotely in the Namaqualand coastal plain away from towns as shown in **Diagram 1a**.
Extent of application	232 Ha portion of Portion 1 of the Farm Rondawel 638
Extent of area required for mining	• Mine pit 17Ha • RoM Stockpile 4.5Ha • Processing plant 0.8Ha • Processing and drying area 0.5Ha • Overburden and waste dumps 36.5Ha consisting of: − Dump 1a - 0.5Ha − Dump 1b - 7.0Ha − Dump 1c - 4.5Ha − Dump 2 - 24.5Ha Refer to **Diagram 6a and 6b.**
Extent of area required for infrastructure, roads, servitudes etc.	• Infrastructure and mine logistics 0.8Ha. • Waste and fuel storage and service and wash bay 0.3Ha • Access Road 3.37 km and 8.9 m • Haul Roads 1.9 km Refer **Diagram 6a and 6b.**
Depth of mineral below surface	The orebody extends between 3m and 33m below surface with a cut-off at 30m.
Geological information	The Namaqualand Metamorphic Complex includes metasedimentary, metavolcanic and intrusive rock units which are predominantly gneissic. It is divided into the pretectonic Orange River Group, Okiep Group, Bushmanland Group, Korannaland Sequence, Marydale Group and the Kaaien Group. The younger syntectonic intrusives are divided into the Koperberg, Spektakel, Keimoes, Hoogoor, Little Namaqualand, Gladkop and Vioolsdrif Suites. Large areas of the Namaqualand landscape are underlain by pretectonic leucocratic gneisses belonging to the Kamieskroon Gneiss Unit of the O'Kiep Group of rocks. At the mine, younger soil and subsoil units, including kaolin, overly these gneissic rocks. **Diagrams 10a and 10b** are geology maps of relevance.

3.2.3 Mineral Resource Map

The mineral resource map for the identified orebodies is provided in **Diagram 3** below.

Diagram 3: Mining Right Area Mineral Resource Map for Identified Orebody showing grades of ore body

3.2.4 Timeframes and Life of Mine

Refer to Table 3 below which illustrates the Life of Mine (LoM) extending over a 20-year period. Mining operations will continue from the current operations at 2614m³ RoM (Run of Mine) in the first year building up to 109581m³ at full production. The production will thereafter stay constant until the complete reserve has been mined.

Table 3: Life of Mine Forecast (referenced from Mine Works Programme (2019)

Life of Mine		
Year	Production (Sales)	Reserve 915348
1	7 880	907 468
2	11 978	895 491
3	16 693	878 798
4	22 884	855 914
5	32 787	823 127
6	56 232	766 896
7	56 232	710 664
8	56 232	654 433
9	56 232	598 201
10	56 232	541 970
11	56 232	485 738
12	56 232	429 507
13	56 232	373 275
14	56 232	317 044
15	56 232	260 812
16	56 232	204 581
17	56 232	148 349
18	56 232	92 118
19	56 232	35 886
20	35 886	-0

3.2.5 Open-pit Mining Technique and Method

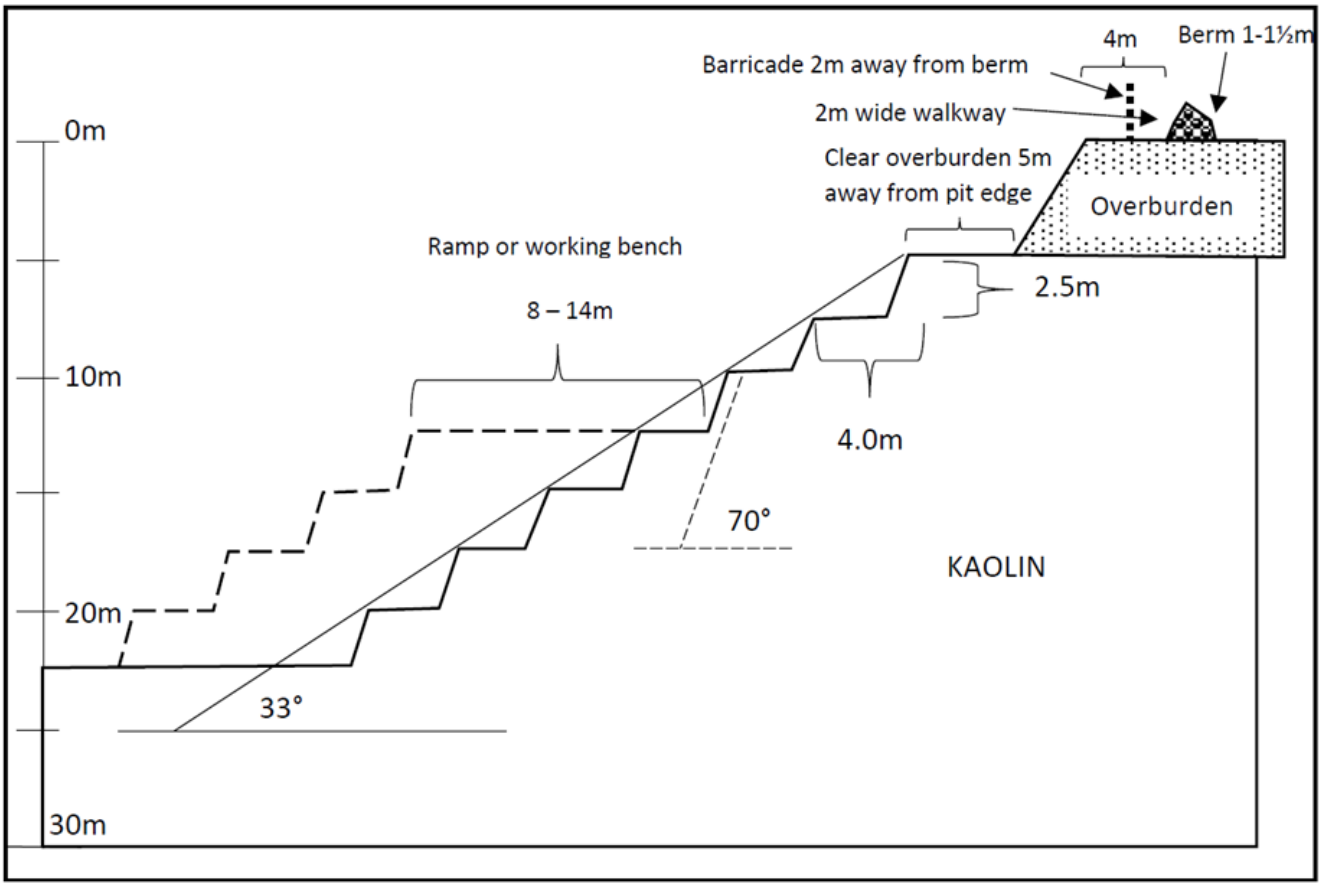
The specific mining method will be Open-pit (or Open-cut or Open-cast or quarry) mining. The various Pit Parameters were defined through independent studies as referenced in the Mine Works Programme. The parameters were defined for Overall Wall Slope Angle, Berm Width, Face (Batter) Angle and analysed potential slope failure and rock falls.

The following input parameters were utilised for the optimisation process (Diagram 4):

- Overall Slope Angle: 33 degrees
- Bench Height: 2.5 metres
- Batter (Face) Angle: 70 degrees
- Berm Width: 4.0 metres
- Road (Ramp) Width (Single Lane Traffic): 8.0 metres
- Road (Ramp) Width (Dual Lane Traffic): 14.0 metres
- Processing Recovery: 50%

The orebody will be extracted initially down to a maximum depth from surface of approximately 20 metres in the first phase as part of the existing small-scale mining operation. All material meeting grade requirements will be placed on a RoM Stockpile adjacent to the plant. Post initial small-scale mining operation until depletion of Kaolin resource a brightness cut-off grade of 50% will be applied to the mining activities. The orebody will be extracted down to a maximum depth from surface of approximately 30 metres by the end of related mining activities. The processing facility is capable of 500 tonnes per month at current small-scale operation and as part of full-scale mining it will increase to 10 000 tonnes per month refined product until resource depletion.

Diagram 4: The recommended slope design for the Open-pit up to depths of 30m



Open Pit Mining Method

Open pit mining is a mine working that is open to the surface. It is used when the orebody is near the surface and little overburden needs to be removed. A large hole exposes the ore body and waste (overburden) is removed. It often necessitates a large capital investment, but generally results in high productivity, low operating cost, and

good safety conditions. The open pit is a faunnel shaped hole in ground, with a ramp spiralling down along the sides, allows moderately deep ore to be reached.

The design issues are:
- Stripping overburden
- Location of haul roads
- Equipment - size of trucks and fleet
- Pit slope angle and stability

Open Pit Stability

The following are the key items affecting Open Pit Stability:

- **Pit slope**

- The slope of the pit wall is one of the major elements affecting the size and shape of the pit.
- The pit slope helps determine the amount of waste that must be moved to mine ore.
- The pit wall needs to remain stable as long as mining activity is in that area.
- The stability of the pit walls should be analysed as carefully as possible.
- Rock strength, faults, joints, presence of water, and other geologic information are key factors in the evaluation of the proper slope angle.
- Pit slopes are cut into benches to aid stability and contain any slope failures.
- The revenue from ore must pay for the cost of excavating waste from the pushback and for excavating the ore.
- The slope cannot exceed 45°and remain stable, so at some point it becomes impossible and/or uneconomic to continue mining.
- A proper slope evaluation will give the slope that allows the pit walls to remain stable.
- The pit walls should be set as steep as possible to minimize the strip ratio.
- The pit slope analysis determines the angle to be used between the roads in the pit.
- Slope stability is the function of the natural angle of repose, density, surface and subsurface water flow:-
  - Upward tracking of slopes slows sheet flow;
  - Eliminate points of concentrated flow using berms or using slope drains as outlets; and,
  - Difficult slopes may require riprap, gabions, or other measures for permanent stabilization.

- **Pit wall stability**

- Most orebodies are related to faulting in the earth's crust.
- Fault generates stresses in the host rock, rupturing it and causing faults in the rock.
- Faults are typically long linear features so that if a circular pit is used to mine an orebody, it is likely to intersect a fault at two points, which leads to instability in at least two parts of the pit slope.
- Apart from the overburden at the top, the mine pit comprises kaolinite ore. As a dry substance it will have a very low compressional strength and as a wet material is prone to be very ductile and can even flow slowly or creep into the pit at deeper elevations under stresses created by the overlying sedimentary loads.
- Being cohesive to some degree, the kaolin will rather dissolve or wash out during rainstorms and collapse when it dries out during prolong droughts and dry periods.
- To prevent its slopes from slumping and sliding, it is important to keep the overall slopes and safety benches as per the prescribed slope design of the COB (Crest of Bench) at 33° as shown in **Diagram 4** (and illustrated in **Diagram 2b**).

- **Rock Strength**

The region and mining area can be considered as aseismic. No mining induced seismic activity is associated with quarrying at the mine. The surrounding areas do not experience any mine induced seismological activity as there are no active deep mines in the area. The most recent earth tremor (magnitude 1.6) was recorded by the Council for Geoscience on 25 May 2010 in the Springbok and Garies regions. The location error for this event is several kilometres. It should be appreciated that this region is totally aseismic.

Ground control districts are sections or zones in a mine where similar geological conditions exist. They are associated with unique sets of identifiable rock related hazards, geological structures and discontinuities.

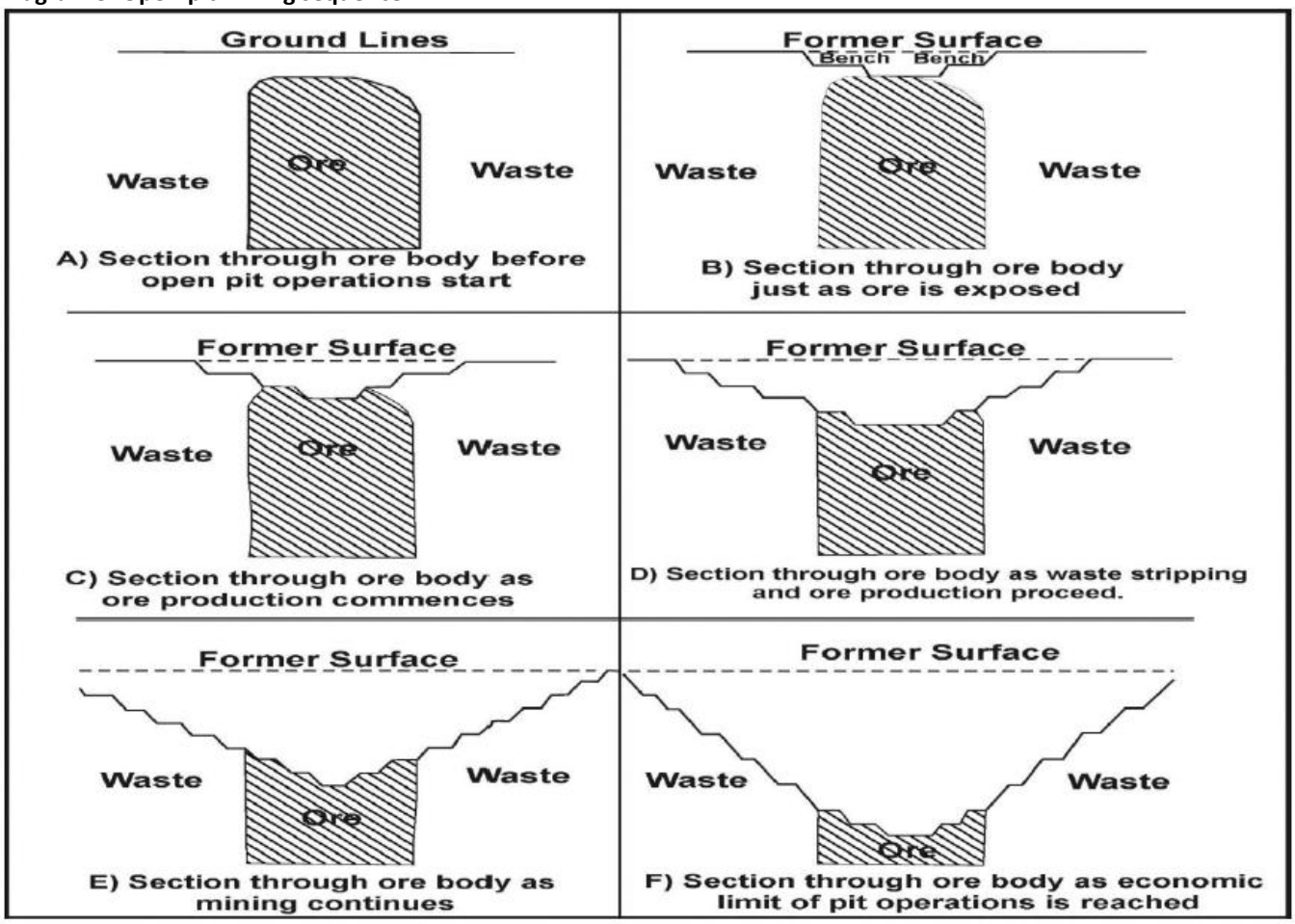
Currently, two main vertical ground control districts are identified. The first is the overburden which consists of layers of soft and more cohesive sands towards the top covering a thin zone of locally developed gravel and rocks. The kaolin ore body forms the second ground control district. A saprolite zone and solid gneiss below the kaolin will not be exposed in the pit.

- **Strip Ratio (SR)**

When speaking of an open pit mine, the term 'Stripping Ratio' (SR) is used describing the geometrical efficiency of a mining operation. Stripping ratio is defined as the ratio of the Overburden to the orebody and refers to the amount of waste that must be removed to release a given ore quantity. The results of a pit design will determine the tons of waste and ore that the pit contains and for this operation the SR is determined as 0.4.

- **Open-pit mining sequence**

Diagram 5: Open-pit mining sequence



3.3 Project Description

The Mine Site Layout showing the development areas and services are included in **Diagram 6a and 6b** below.

3.3.1 Proposed Road Access and Haul Routes

The N7 main tarred road, as well as gravel roads provide access to the mine as shown in Diagram 1a and 1b. Refer to **Diagrams 6a and 6b** which show the access roads and proposed haul routes. The existing farm road from the project Head Quarters (HQ) to the mine site will serve as access. Access control at the farmstead that will also serve as mine HQ will minimise travel of locals into the project area and inadvertent contact with large earth moving vehicles. This farm road is 3.37km in length and average 8m wide and is therefore sufficient to accommodate 2-way traffic. This road will remain as part of farm infrastructure but regular maintenance by the mining company would be required. Haul roads of 1.9Km and less than 8m in width will be constructed leading between the mine pit, stockpile area and waste dumps.

The roads at the mine are located on reasonably flat stable ground away from streams and rocky areas. The farm roads that serve as access road to the mine are on flat lying ground. Kaolin with abrasive quartz inclusions will be used for road surfaces on most of the farm service roads due to the sandy nature of the terrain. Erosion control and management measures will be put in place along the access road. There are no road cuttings to the mine, and no cuttings on the service roads at the mine.The ramp into the pit, accesses and exits of haul roads will be well protected from rock falls and flooding. Other road safety aspects such as berms, width, road and ramp inclines, dust control and road signage will be ensured.

Diagram 6a: Site Plan

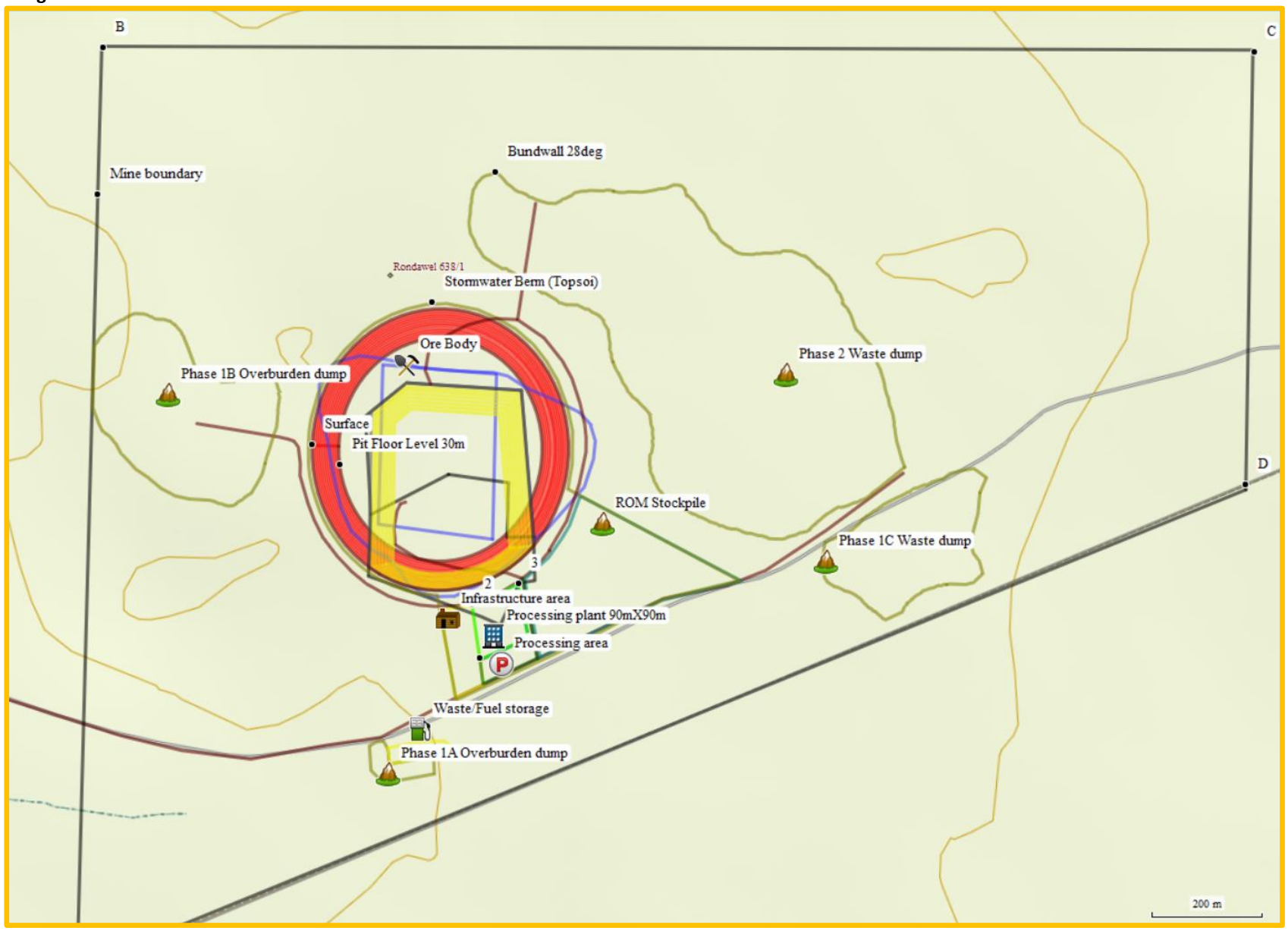
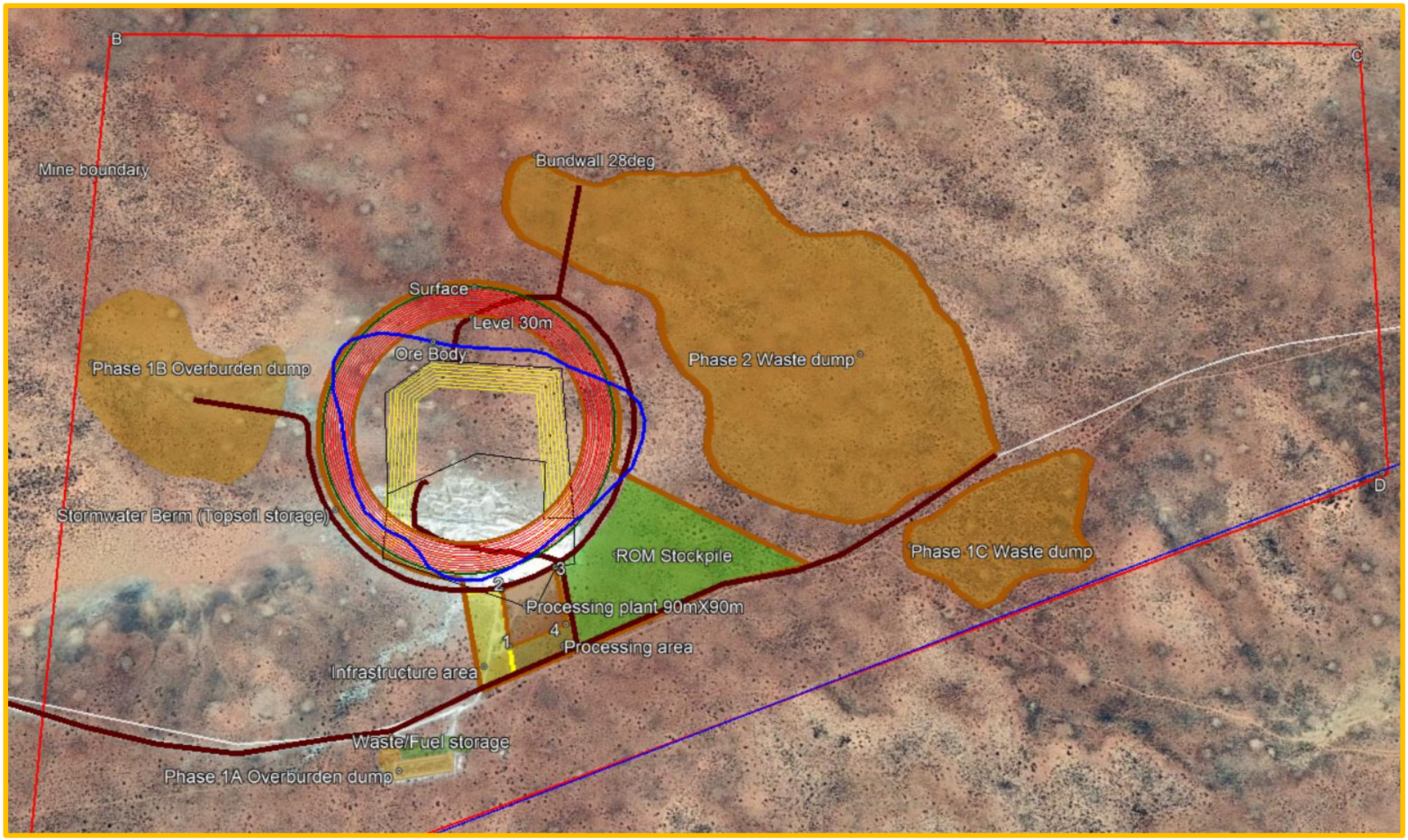


Diagram 6b: Site plan showing landscape



3.3.2 Water Supply

Processing will be a dry process and no water will be required. Service water requirements will be obtained from the farmstead and trucked onto the site and stored in 6 X 5 000 litre plastic tanks. This 30 000l storage will also provide for an emergency supply for the fire hydrants. Service water will also be made up from recycling the greywater in the closed loop sewage tank. The total allowance of 30 000l per month will be used as follows:

- Ablution and office block taking into account no sewage system will be required as dry system enviro loo system will be developed and no accommodation will be available on site. A total water allowance of 50 l/person/day has been made, this equates 750l/day for the 15 dayworkers or 16 500l per month (22 working days).
- Service water for mine site wash-bay and dust suppression – 2 000l/month obtained from greywater sump at ablutions (sewage tank).

The majority of the area relies on rainwater resources for potable water as the groundwater has a high salt content and is not suitable for human consumption. The limited volume of potable water will be obtained from rainwater collected from the mine infrastructure and stored in tanks or obtained from outside sources and trucked onto site. The total allowance of 10 000l per month will be used as follows:

- A total water allowance of 20 l/person/day has been made, this equates to 300l/day for the 15 dayworkers or 6 600 per month (22 working days).

The water table in the mining area is deeper than 40m below surface and therefore no dewatering will be required as the maximum depth of the mine pit will be 30 meters. Due to the low percolation through the kaolin clayey horizon, any water seeping into a deeper pit can be controlled sufficiently with adequate pumping methods if necessary, as the current semi-arid climate causes only occasional surface run-off from storm water after rains that can enter the pit. Any stormwater that collects in the pit will either drain very quickly or evaporate. In the 15 years that the mine has been operating no stormwater has collected in the deeper pit.

As Africa is a water scarce continent and mining activities often pose significant water pollution risk, it is of utmost importance to properly manage water usage and disposal on a mining operation. For this reason, all dirty rainfall run-off and grey water will be collected, stored and recycled as far as possible. All clean rainfall run-off should be diverted from dirty and contaminated areas to minimise the risk of environmental and water pollution. Trenches and/or berms will be constructed to divert clean storm water run-off to natural drainage channels and to collect dirty run-off and route dirty water to suitable evaporation dams.

3.3.3 Mine logistics, Security and Access Control

The mine logistics will be the area from where the mining contractor and relevant technical services personnel will manage the mine. The site will cover an area of 7,800 m². The mine site will be enclosed by a safety/stormwater berm of 3m (W) X 2m (H) that will also serve as topsoil storage. Access to the site will be controlled by security personnel posted at the access gates to the site.

The mine site will include offices, change houses, control room, first aid station, stores as well as an earth moving vehicle parking area. This area will be mainly constructed and established by the appointed mining contractor but services like water supply, power supply, water management and other services will be constructed by contractors appointed for the construction of the balance of infrastructure areas.

The secondary infrastructure area will accommodate the waste handling area, earth moving vehicle and engineering workshops, fuel storage facility and a wash bay.

No site perimeter fence around the Project Area and haul road will be required for safety and security purposes as the farm is already secured. Existing control measures as part of the current mining operations are in place to restrict access of livestock and other animals as well as prevent persons from any unauthorised access. Access to the area will be gained through a dedicated vehicle gate at the farm stead together with a security house that will serve as the main entrance to the mining area. Access to the complex by outside service providers will be strictly controlled, and where possible, limited to delivery at the main stores located at the processing plant.

3.3.4 Processing Plant Design

The processing plant of 90m x 90m will form part of the processing area. The site will be 130 m x 200 m and will be located adjacent to the Mine site and Infrastructure area as shown in **Diagram 6a and 6b**.

Once mined, kaolin requires processing before it can be used in a particular application. Processing can involve grinding, centrifuging, magnetic separation, drying/calcining and colour-beneficiating techniques.
Processing is conducted with two broad objectives in mind:

a) to remove impurities (such as quartz and feldspar) from the deposits; and
b) to refine the kaolin thus increasing its qualitative characteristics.

Crushing

a) Once mined, the crude kaolin is discharged onto a static grizzly to scalp off material particle sizes larger than 200mm. The oversize material will be returned to a separate stockpile where the front-end loader can be used to reduce the material sizes in order to be re-fed into the plant.
b) The undersize material is discharged into bin hopper which is equipped with a belt feeder to extract the material evenly.
c) The belt feeder feeds onto a closed conveyor belt which feeds the jaw crusher.
d) A second closed conveyor system feeds the milling / liberation plant.

Milling and Screening

e) Currently at the mine, a Backhoe actor is used to break down the kaolin into fine particles before it is sieved for the market. Refer to Photograph 3.
f) The plant will consist of a pug mill, that will be fed from the second conveyer (as per "d" above).
g) Oversize from the primary pug mill is collected and will be fed back into the system at a later stage. The product stream is sent to a trommel screen where -1mm product is sent to the refining area and -3mm is sent to the secondary pug mill. The product stream is sent to the secondary trommel or vibrating screen where -1mm is sent to the refining plant.
h) All the equipment has an oversize discharge which will discharge material into a bin where it can be re-processed in the plant.
i) Hot air will be inserted into the Pug mills to commence the drying process of the refined product.
j) All transfer of materials between the pugmills, trommel/vibrating screens and to the refining process are by means of the combination of screw and bucket conveyors. The equipment of the plant is kept enclosed to eliminate dust emissions and ensure minimum loss of valuable product.

Refining Process

k) The mine has a patented design on the dry separation of the kaolin from the silica. Traditionally a wet process is used to do the separation, but due to the lack of water resources, an effective and efficient dry separation of the material is required. This patented process enables the mine to produce product which is:
    - High quality
    - High grade
    - Increased yield
    - Less expensive than the wet separation process
l) -1mm Material from the trommel/vibrating screens are discharged by means of screw conveyors into the closed dry separation unit.
m) The outlet of the dry separation unit exits into a bag filter where the ultra-fines are captured, and clean air discharged.
n) Product is stored in an enclosed silo from where it is discharged into bulk bags for shipping. Refer to Photograph 3.

3.3.5 Stockpiles RoM and Topsoil

The RoM stockpile was sized to ensure sufficient supply to the plant for a minimum of 1 month (Table 4). The total footprint of the 4 stockpiles is 3.4Ha and the total area of the RoM stockpile area including movement areas is 4.5Ha (**Diagram 6a and 6b**).
Slopes of these stockpiles consisting of a kaolin, settle at a natural angle of 33°. Although mining is taking place during the dry summer months, work on the stockpiles carries on during the raining winter months when markets demand material. A general rule is to leave firm safety earthen berms at the edges on the top of the stockpiles, especially at the tipping points to prevent slopes collapsing from vehicles too close to the edges.

Ore from the stockpiles must not be loaded from the bottom but from the top, or by dozing the material with the front-end loader down to the floor below. It can then be loaded safely from the much lower thin pile (< 3m) at the bottom to prevent caving onto the loader.

Table 4: RoM Stockpile - Design Parameters

Description	Unit	Value	# Stockpiles	Total Volume
Height	m	2.5	*	*
Length	m	85	*	*
Width	m	50	*	*
Wall Gradient	h:v (x:1)	1.33	*	*
Wall slope	°	28-33	*	*
Stockpile Volume	m^3	6,498	8	51,948
Footprint Area	m^2	4,250	8	34,000
RoM stockpile tonnage	**t**	**17,500**	8	**140,000**

3.3.6 Dumps Topsoil, Overburden and Waste

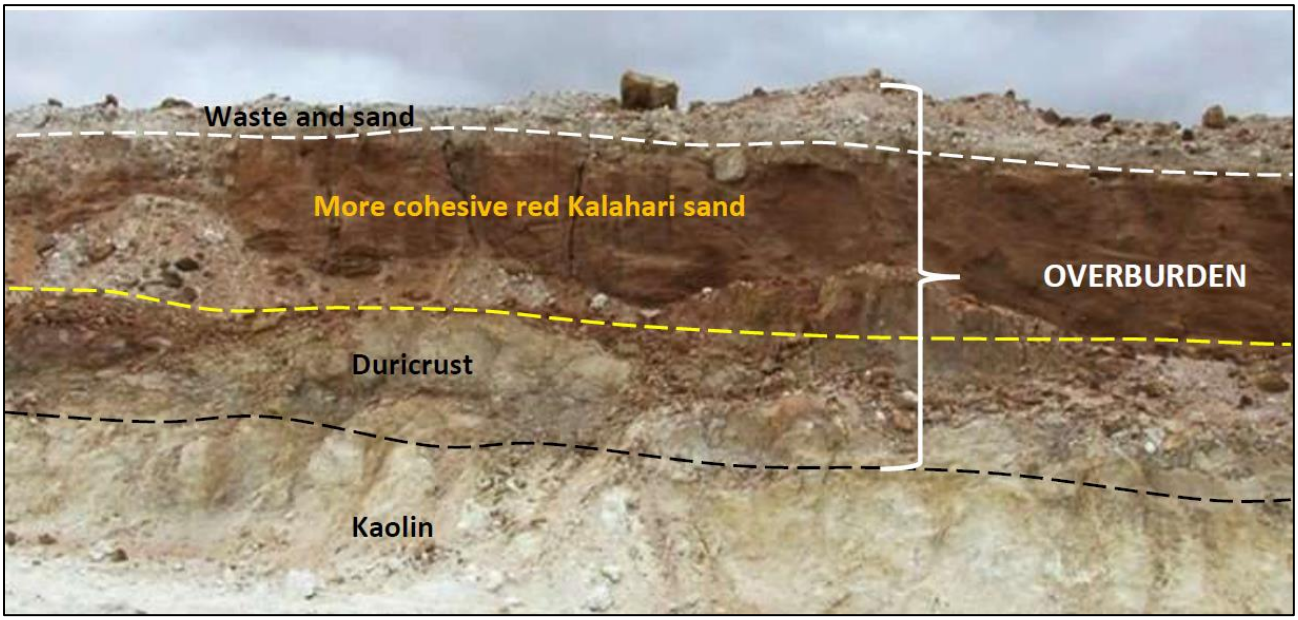
The overburden consists downwards of kaolinitic waste material, windblown sand, red Kalahari sand and a paleo-duricrust horizon at the bottom. The duricrust was already formed before the area was covered by the sand when the gneiss was still outcropping as solid rock and exposed to erosion and weathering. The duricrust became more resistant to weathering with the internal crystallization of secondary silica and iron minerals (hematite, limonite and goethite), which left a hard paleo-horizon, while the gneiss below continued to be transformed into kaolin with further intense weathering.

The upper windblown sand cover comprises a 10 – 50cm thick layer of loose windblown sand with humus and grass seed in its upper 10 cm that is considered as topsoil. A layer of topsoil ±50cm thick will be removed from the mine pit footprint as well as the RoM stockpile area.

For future mining operations, to prevent flood waters into the pit, an earthen berm wall of 2m high and 3m wide will be constructed 4m away from the cleared overburden edge of the pit. This berm will also serve as a safety barricade and form a walkway around the pit for safety inspections. This will prevent the destruction of the pit edges and keep persons way from the fragile pit edge.

Topsoil will be used to create this berm that will double up as topsoil storage. This berm will serve as a safety as well as storm-water diversion barrier around the mine pit, processing areas and waste dumps (**Diagram 6a and 6b**). The berm will be sloped at 28% and the top levelled. The remaining topsoil will be used to cover the dumps as they reach their final footprint.
The topsoil overlies a more cohesive medium grained red Kalahari sand that can be anything from 1 to 2 meters thick and the duricrust at the bottom of the succession is lensoid in shape and up to 1.5 meters. This sand and duricrust is regarded as overburden and will be removed in the first mine cut of 2.5m deep. Diagram shows the layered profile of the overburden in Photograph 1 below.

Photograph 1: Cross section of the layered profile of overburden over the Kaolin



The overburden will be dumped in two demarcated dumps and used to cover the waste dumps when it reaches its final footprint (**Diagram 6a and 6b**). The first step in designing a dump is the selection of a site or sites that will be suitable to handle the volume of waste to be removed during the mine's life.
Site selection will depend on a number of factors, the most important of which are:

- Pit location and size through time.
- Topography.
- Waste volumes by time and source.
- Property boundaries.
- Existing drainage routes.
- Reclamation requirements.
- Foundation conditions.
- Material handling equipment.

The overburden and waste dumps will be located close to the mine pit and cover a total area of approximately 35Ha and on completion will be about 6m high and shaped to blend in with the natural topography. Because some of the loose material can be washed away from the waste and overburden dumps and contaminate virgin areas, regular moving catchment berms will be installed at the base of the dumps as it grows. In most surface operations the amount of backfilling is restricted or totally impractical. Therefore, most of the reclamation effort is directed toward the waste stockpile that will be reclaimed and not moved and the final pit footprint will be left with little reclamation effort applied only safety requirements.
The overburden comprises weak loose and soft material which can cause slumping in the dump. The stability of the dumps will improve in the long-term due to consolidation, compaction and assuming a stable slope. The overall stability of mine waste dumps is dependent on a number of factors such as:

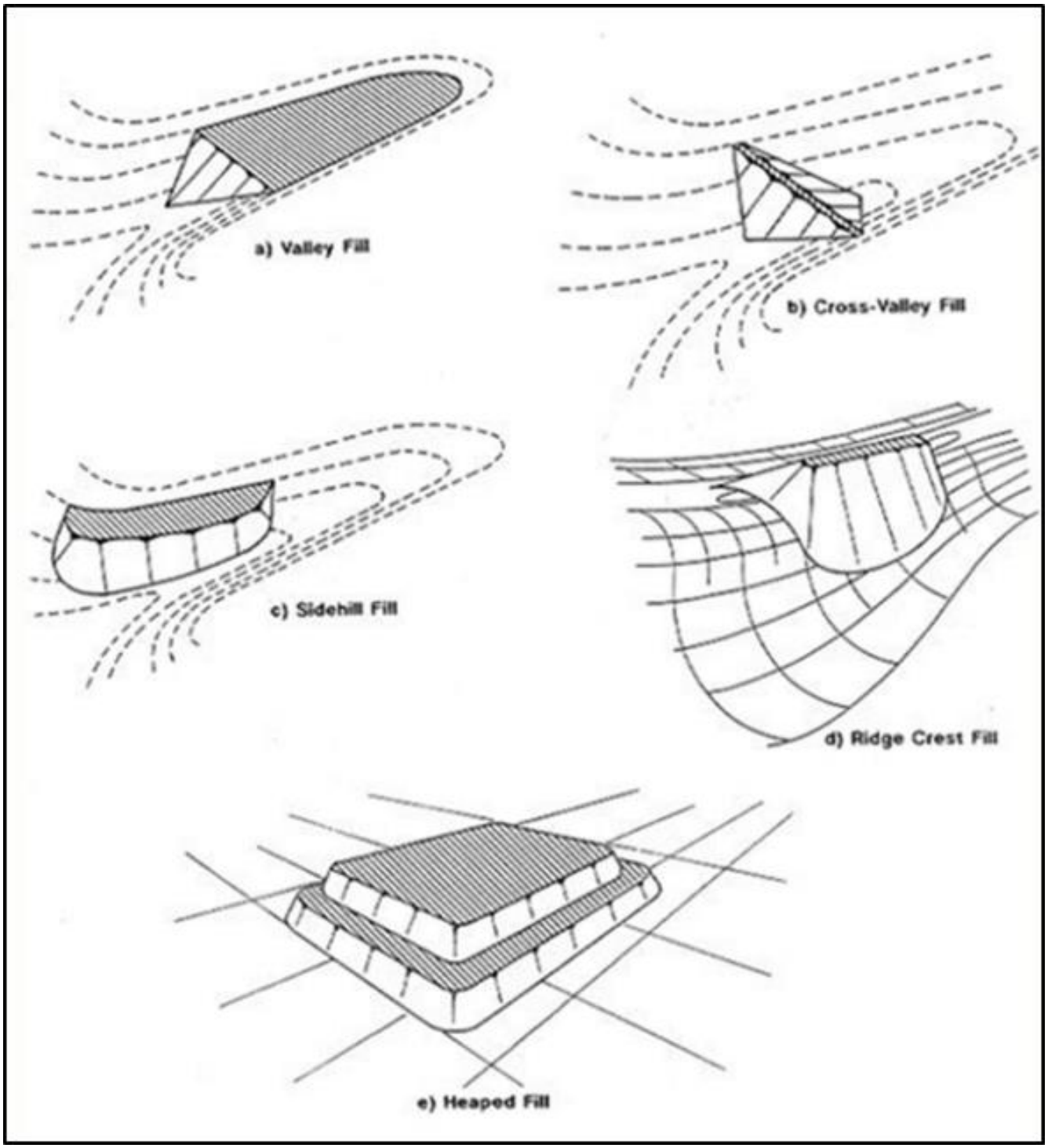
- Topography of the dumpsite.
- Method of construction.
- Geo-technical parameters of mine waste.
- Geo-technical parameters of the foundation materials.
- External forces acting on the dump.
- Rate of advance of the dump face.

All of these factors combine in various ways during the life of a mine waste dump to aid in the stability of the dump or to contribute to its instability. The overall slope of the dump face must be reduced to 28° to prevent erosion and to allow placement of topsoil and vegetation, therefore the dump design will include terracing to minimize the amount of material re-handling. A dump constructed using three terraces will have only one-ninth the re-handle dozing costs of a dump of similar height with no terracing. The dumps will be developed as 2 or 3 -

tier heaped filled waste dumps with tiers, an example of which is shown in **Diagram 7**. In order to facilitate reclamation efforts, a berm should be left on each terrace level. This will lower costs by providing easier access to the faces for equipment spreading topsoil and for re-vegetation efforts. The berms can also serve as erosion protection and drainage diversions, if necessary.

The main hazards to a reclamation project will be erosion and leakage of contaminated waters that will hamper re-vegetation or be hazardous to life. These problems will be corrected through proper drainage control and treatment. Drainage channels will need to be rock-lined if the channels are to remain in the same location without excessive bank erosion.

Diagram 7: Mine Dump Classification



3.3.7 Project Services

Owing to the remote nature of the Project Area a number of services will have to be supplied by personnel and infrastructure on site. These services will include the treatment of potable water, the treatment of sewage, basic medical and firefighting services, and waste handling and removal as well as information and communication services.

The limited volume of potable water will be obtained from rainwater collected from the mine infrastructure and stored in tanks. No sewage system will be required and a dry enviro loo system will be developed, an example of which is provided in **Diagram 8a** below.

Diagram 8a: Example of a dry enviro loo system

Diagram 8b: Example of a portable firefighting system

A first aid station will be available at the mine site for first response to any medical emergency on the mine. This facility will be equipped for the treatment of minor to medium severity medical emergency and will serve as a first response / stabilisation facility from major medical emergencies. Patients will be transported from here to the nearest hospital for further treatment should it be required.

A portable firefighting system will form part of the Project services vehicles and will be utilised to respond to fires on the Project Area. An example of which is shown in **Diagram 8b**.

A waste handling and dispatch facility will also from part of the mine site and will allow for the collection of all types of waste generated by the operation and transported to suitable disposal facilities in the area.

Lastly, IT and communication infrastructure will be installed at the mine site to allow for the effective capture and management of relevant information and ensure clear and effective communication across the Project site and with the outside world.

3.3.8 Rehabilitation, decommissioning and Mine Closure

The final Rehabilitation, Decommissioning and Closure Plan (**Appendix E**) will address the following measures:

- Removal of all structures and infrastructure not to be retained by the landowner in terms of section 44 of the MPRDA.
- All fixed assets that can be profitably removed will be removed for salvage or resale.
- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold and the remaining treated as waste and removed from site.
- All structures will be demolished and terracing, and foundations removed to the lesser of 500 mm below the original ground level.
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place
- All services related to the mining operation, water supply lines and storage on site will be demolished.
- The TSF and development areas will not exceed the planned footprint. Recommendations for the decommissioning, closure and rehabilitation of the residue stockpile are to be provided in the Specialist Report to be prepared in accordance with the "Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation" in GNR 632 of 24 July 2015 (in GG No. 39020).
- The post-mining pit stability and waste dump profile will be addressed as part of the operational processes and necessary remedial actions implemented prior to closure.

Diagram 9a: Process Flow Diagram

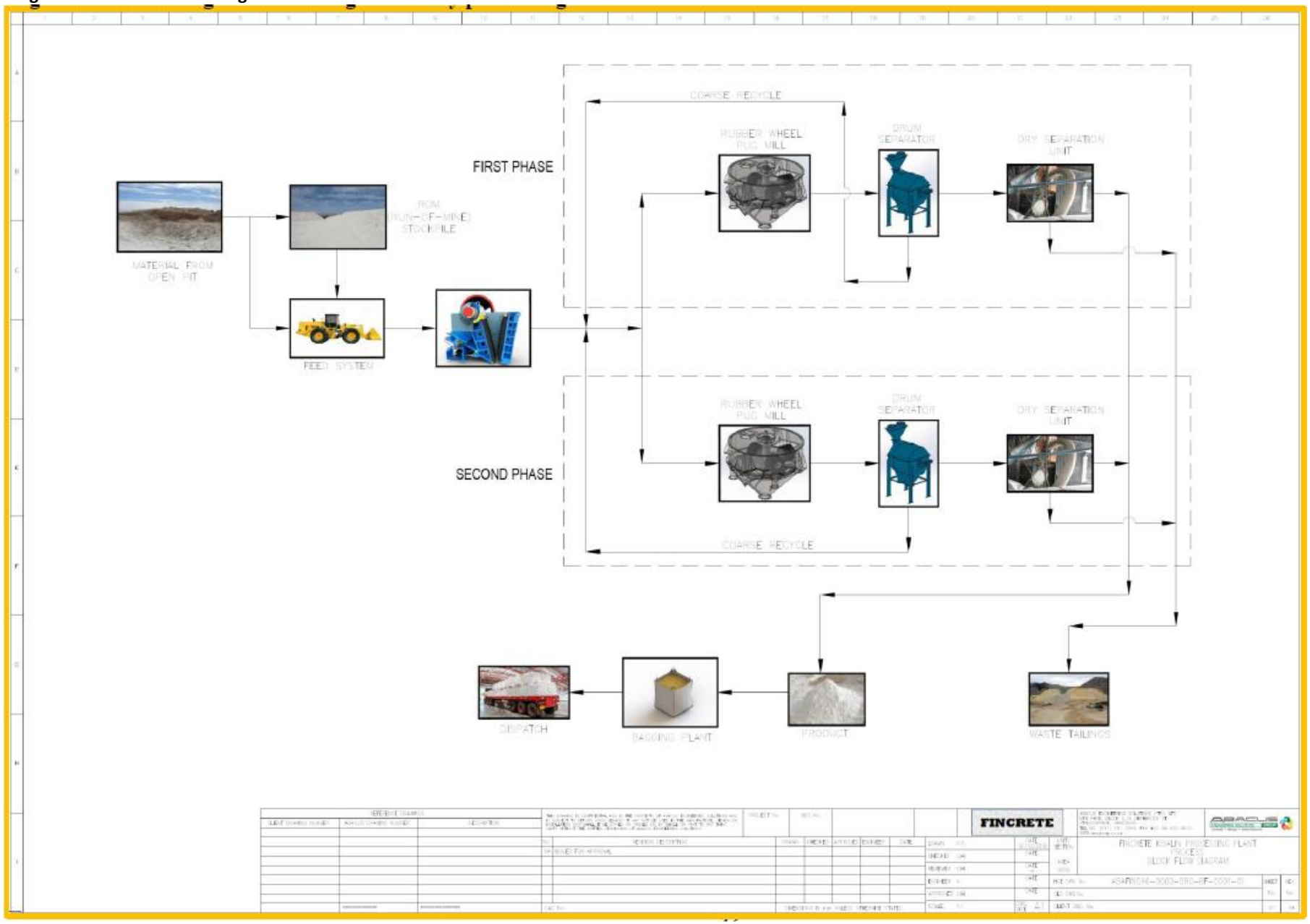
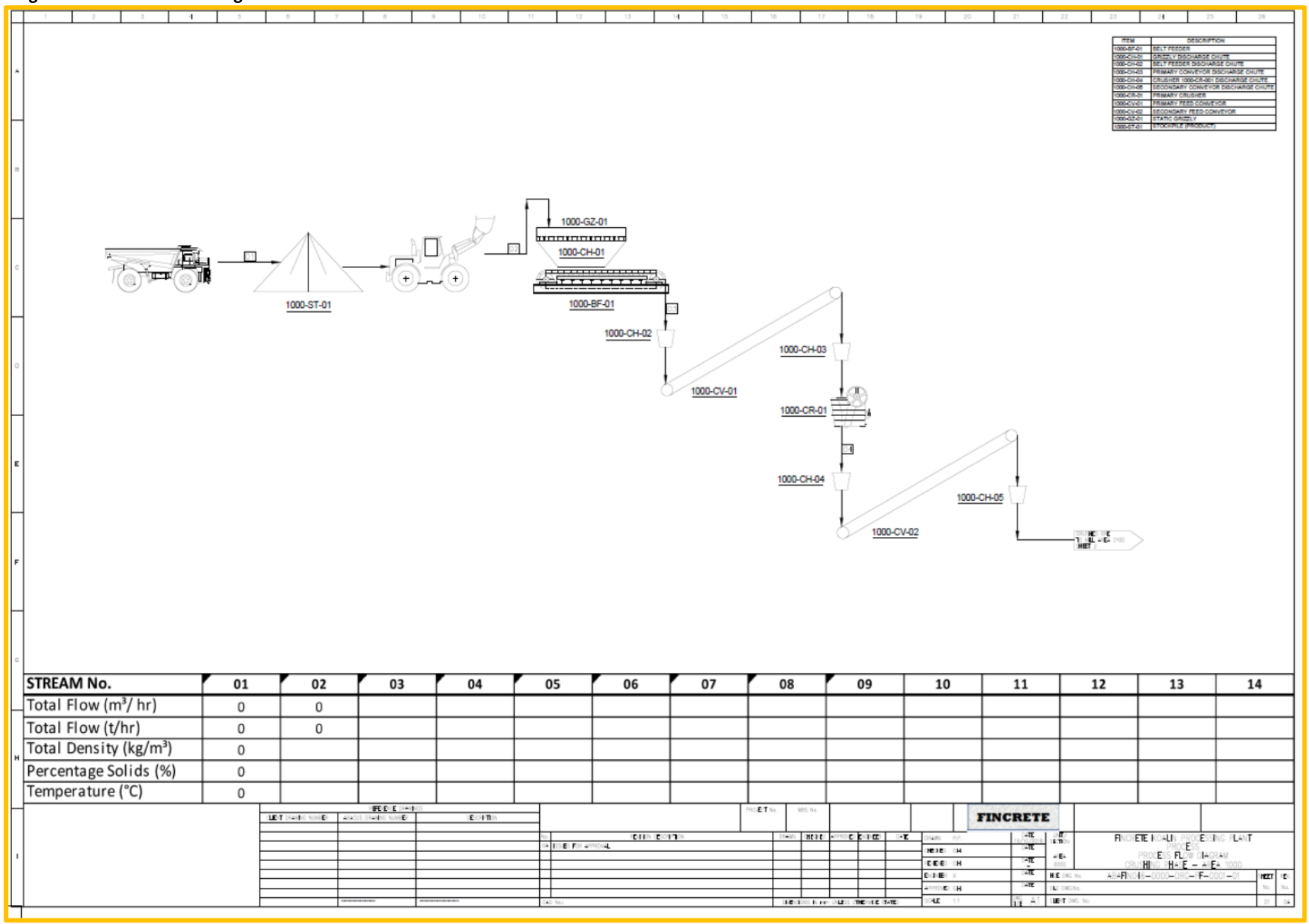
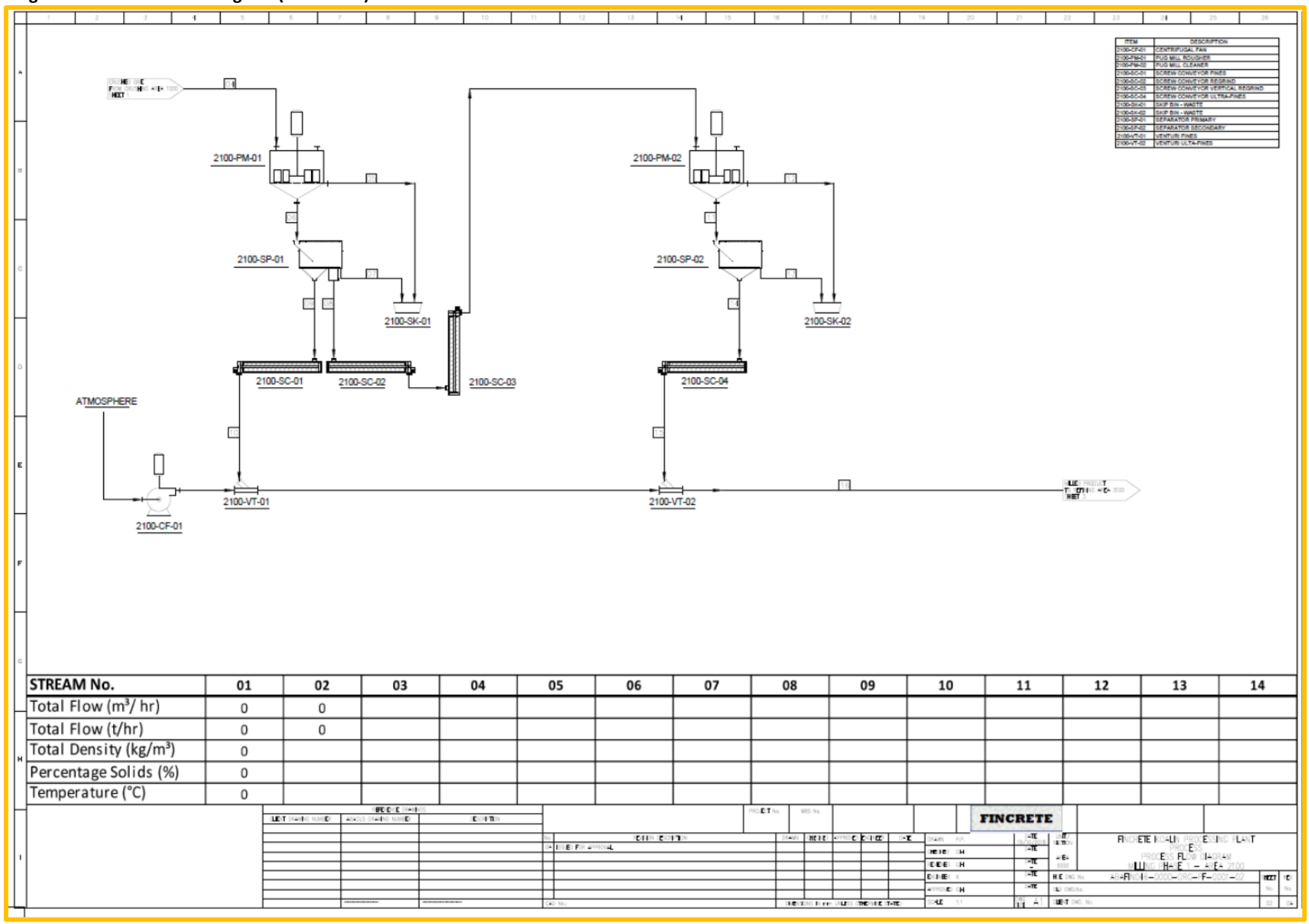


Diagram 9b: Process Flow Diagram



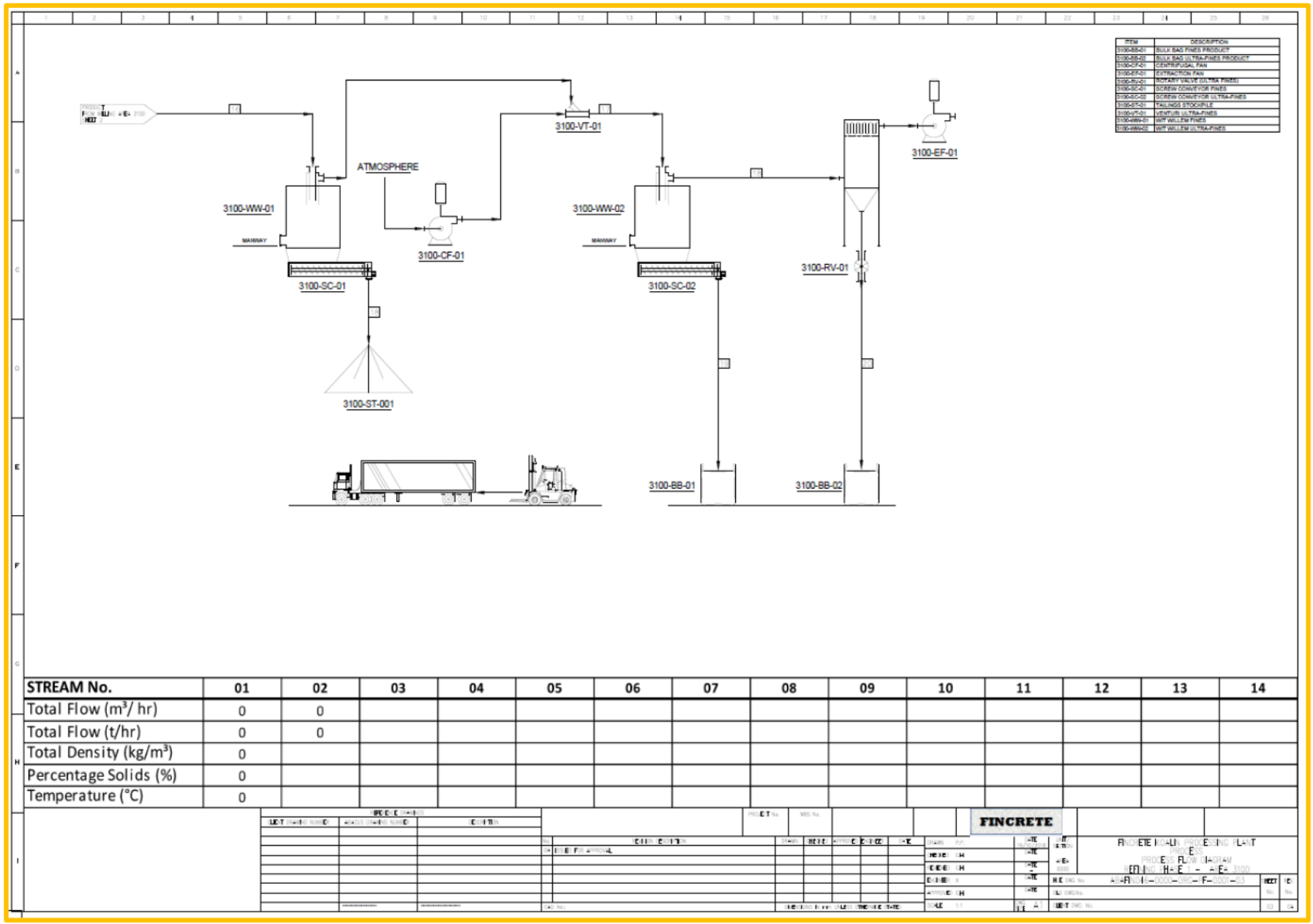
STREAM No.	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Total Flow (m^3/ hr)	0	0												
Total Flow (t/hr)	0	0												
Total Density (kg/m^3)	0													
Percentage Solids (%)	0													
Temperature (°C)	0													

Diagram 9c: Process Flow Diagram (continued)



STREAM No.	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Total Flow (m^3/ hr)	0	0												
Total Flow (t/hr)	0	0												
Total Density (kg/m^3)	0													
Percentage Solids (%)	0													
Temperature (°C)	0													

Diagram 9d: Process Flow Diagram (Continued)



STREAM No.	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Total Flow (m^3/ hr)	0	0												
Total Flow (t/hr)	0	0												
Total Density (kg/m^3)	0													
Percentage Solids (%)	0													
Temperature (°C)	0													

Diagram 9e: Process Flow Diagram (Continued)

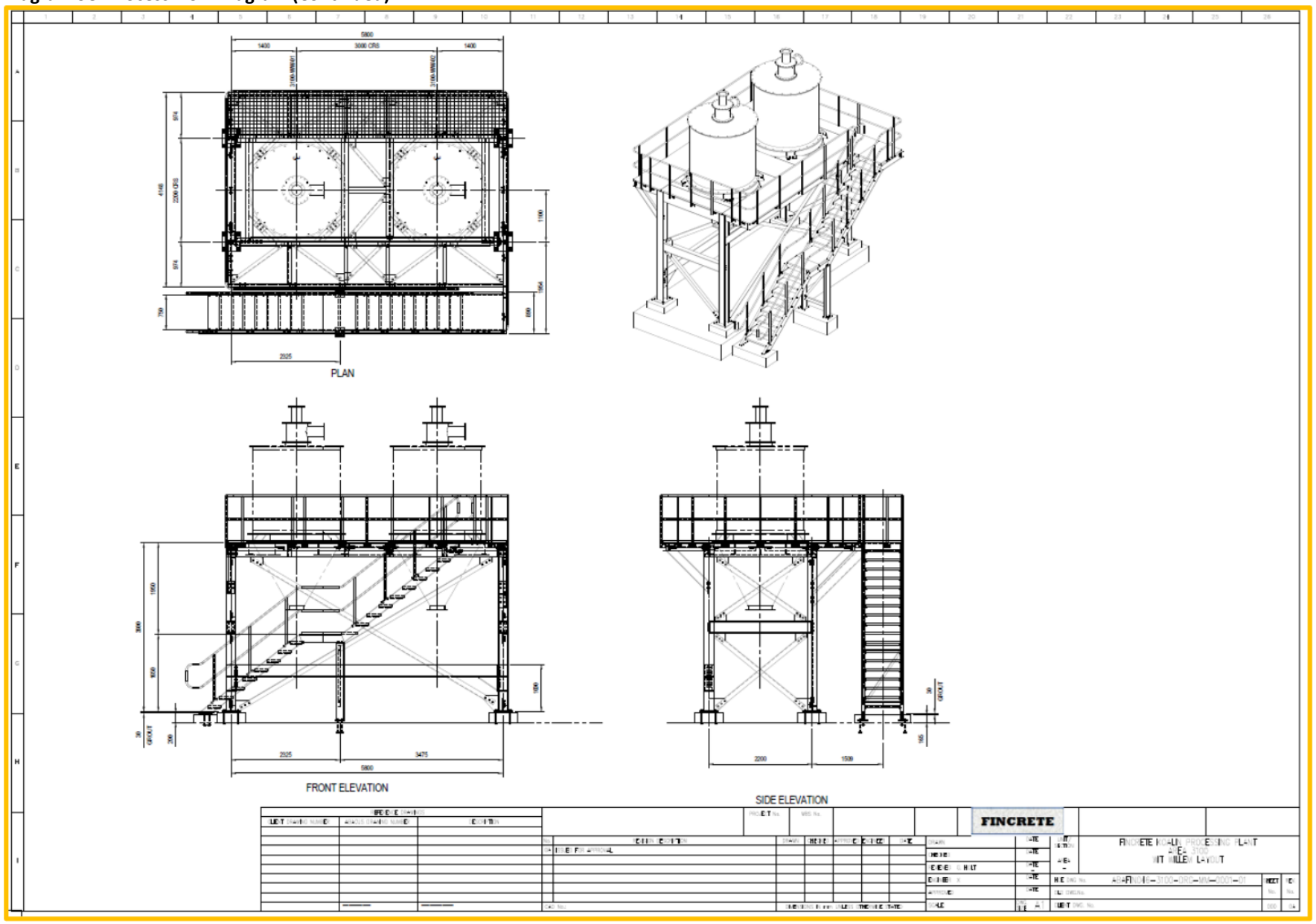


Diagram 9f: Mine Bulk Water Supply Services

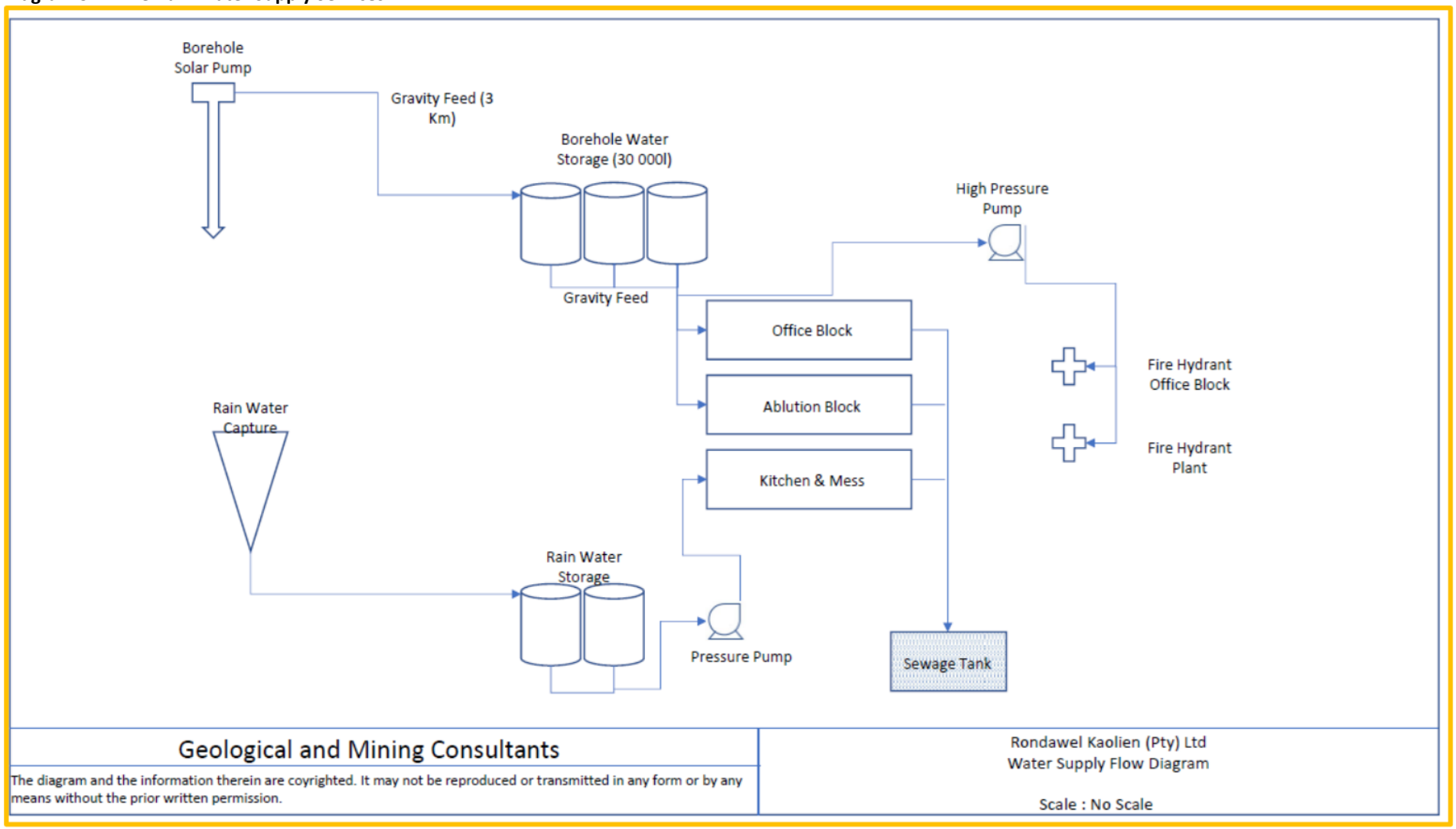
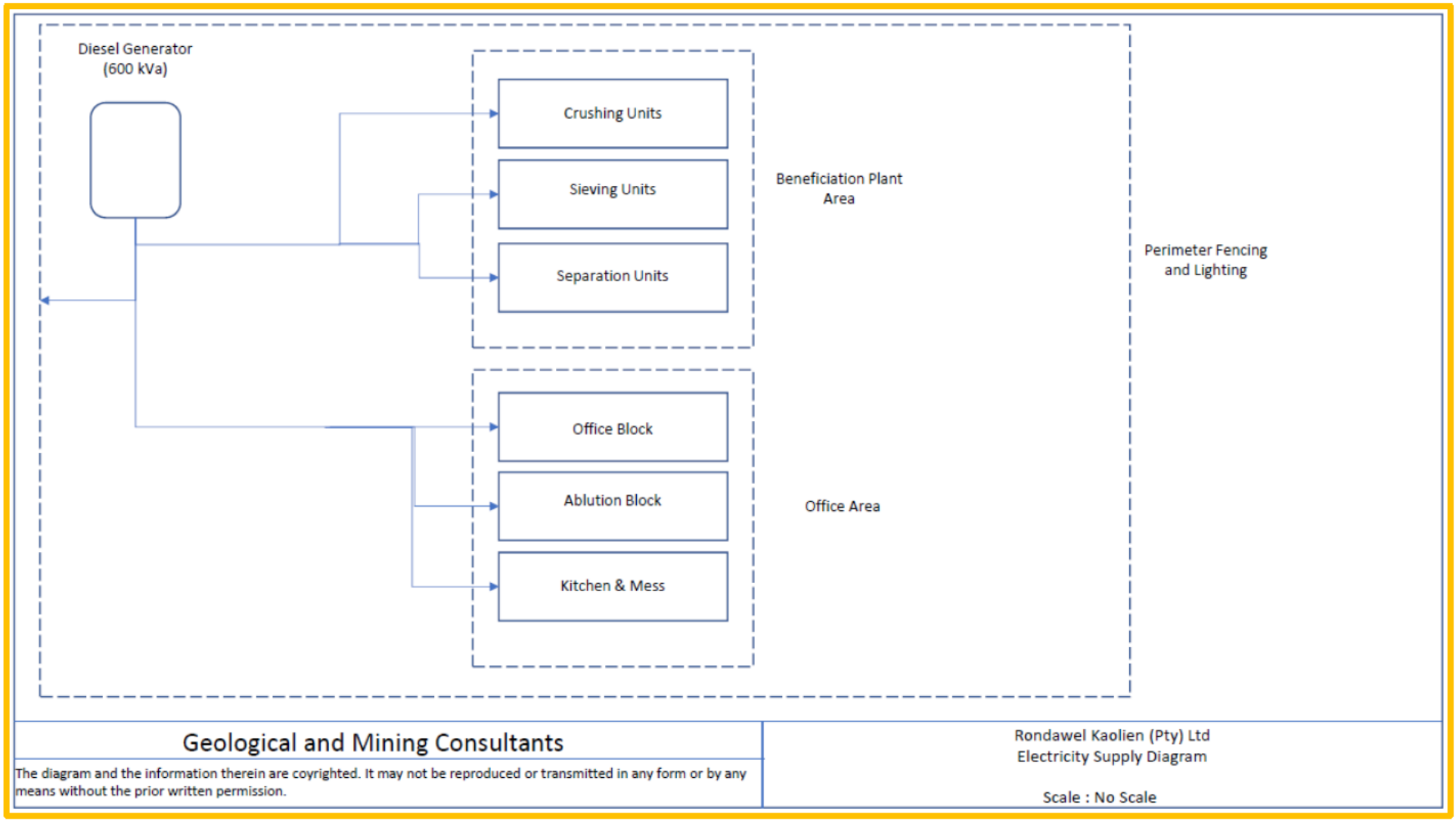


Diagram 9g: Mine Bulk Electricity Supply Services from a Diesel Generator



3.4 Description of the activities to be undertaken

The project is divided into three phases as listed below:

- **Construction:**
  - Including the construction of infrastructure; clearing of vegetation and topsoil from infrastructure footprints; construction of open pit, access ramps and haul roads, waste rock dump, product stockpiles, handling areas, water storage and reticulation, stormwater management structures, and electrical connections to the generator.
- **Operation:**
  - Open-pit mining, processing activities, operation of the logistics, and all mining infrastructure detailed in Section 3.3 above and described in 3.4.2 below.
- **Decommissioning and Closure:**
  - This phase addresses the scaling down of activities ahead of temporary or permanent closure, cessation of mining or production, implementation of the rehabilitation programme, monitoring and maintenance for prescribed period after cessation of operations; and closure, including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring or maintenance.

The methodology and technology to be employed in each phase is described in detail in Section 3.3 above and summarised below:

3.4.1 Construction Phase: Development of infrastructure and logistics

The mine is already in production as a small-scale mining operation with most of the infrastructure already in place. Minimal development will be required to expand the operation to meet the planned production rates. As such the new 10,000 tpm refined product (25,000 ROM tpm) primary processing plant will be constructed as part of the current mining operation and will be available when large scale production commences.

3.4.2 Operational Phase

The **primary processing activities** include:

- Crushing;
- Milling and Screening; and,
- Refining Process

Photograph 2: View of the Backhoe Actor that runs back and forth to crush the kaolin into a powder form.

Photograph 3: View of the Backhoe Actor loading a bag of kaolin onto the truck for hauling off site.

	
Photograph 4: View of the bunded area for the diesel bowser and parking area for the Front-End Loader.	**Photograph 5:** View of the materials storage area, neatly separated and bunded. Soil farm areas for spillages of hazardous substances are located closer to the diesel bowser bunded area.

3.4.3 Decommissioning Phase

A final rehabilitation, decommissioning and mine closure plan, and an environmental risk assessment report in terms of the Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (NEMA Financial Regulation) will be completed as part of the EIA process.
According to the NEMA Financial Provisioning Regulations the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the final rehabilitation, decommissioning and mine closure plan plans and environmental risk assessment report for a period of at least 3 years.

Planning for closure and restoration from the beginning of an operation makes the process easier; waste can be removed as it is created, excavation can be planned so that topography restoration is less complicated, and topsoil soil can be re-used at shorter intervals.

Activities undertaken during this final project phase include:

- Removal of all structures and infrastructure not to be retained by the landowner in terms of section 44 of the MPRDA.
- All fixed assets that can be profitably removed will be removed for salvage or resale.
- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold and the remaining treated as waste and removed from site.
- All structures will be demolished and terracing, and foundations removed to the lesser of 500 mm below the original ground level.
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place
- A hazardous disposal site will not be constructed, and all hazardous waste will be removed from site and transported to the nearest licensed facility.
- All services related to the mining operation, water supply lines and storage on site will be demolished.
- Existing tracks will be used, and no new roads will be developed during this phase.
- The post-mining pit stability and waste dump profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure.

4 POLICY AND LEGISLATIVE CONTEXT

4.1 Table of Applicable Legislation and Guidelines

Table 5: Applicable Legislation and Guidelines

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT
Constitution of South Africa, specifically everyone has a right; a. to an environment that is not harmful to their health or wellbeing; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevents pollution and ecological degradation; ii. promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Mining Right activities	The mining right activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Resources Development Act (No 28 of 2002) [MPRDA] Section 24 (as amended) **MPRDA Regulations as amended by GNR349 of 18 April 2011, and GNR420 of 27 March 2020.**	Application to the DMR for a mining right in terms of Section 22.	The conditions and requirements attached to the granting of the Mining Right will apply to the mining activities. DMR is the Competent Authority (CA) for this NEMA and NEM: WA application. Social Labour Plan attached at **Appendix F**.
National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA]	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations as amended by the 2017 EIA Regulations. Refer to Table 6 for list of activities.	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation (EA). The listed activities in Table 6 that are triggered determine the Environmental Authorisation (EA) application process to be followed, which is an EIA for this Mining Right. The appropriate EA must be obtained before proceeding with any mining activities in terms of the mining right application. The compilation of this Scoping Report and the Public Participation Process is required in terms of NEMA.
National Environmental Management Act, 1998 (Act No. 107 of 1998): Financial Provisions Regulations in GNR 1147 (dated 20/11/2015), as amended by GNR 991 (dated 21/09/2018)	The Final Rehabilitation, Decommissioning and Mine Closure Plan will be included in the DEIR	The purpose of these Regulations is to regulate the determination and making of financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. The Final Rehabilitation, Decommissioning and Mine Closure Plan will be included in the DEIR.

National Environmental Management: Waste Act, (Act 59 of 2008) [NEMWA] (as amended) **Waste listed activities in GNR 921 (dated 29/11/ 2013)** **Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015.** **GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits**	Refer to Table 6 for the listed waste activities.	The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed. The Application for Environmental Authorization has included for waste listed activities as shown in Table 6. Mitigation measures are included in Table 15 and in the EMPr (Part B).
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] **National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)**	Section 8.1.6 **Diagram 14**	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The Mining Right area is located within Critical Biodiversity Area 2 (CBA2) as shown in **Diagram 14.**
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)	Section 8.1.3	Alien invasive vegetation management will be included in the EMPr.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013	Section 8.1.7	Dust control measures are to be included in the EMPr
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 8.1.9 Appendix C1 Appendix C2	Both a Heritage Impact Assessment (Appendix C1) and a Palaeontological Impact Assessment (Appendix C2) have been prepared and referenced in this Final Scoping Report. These will be submitted to SAHRA for comment
National Water Act, 36 (Act 36 of 1998) and relevant Regulations: • **GN 704 of 1999 – Regulations on use of water for mining and related activities aimed at the protection of water resources.**	Section 8.1.5 for description of water resources in local area. Diagram 9f: Bulk Services and Diagram 13 for surface water resources.	The proposed mining activities will not require a water use license as water is not required in processing, and there are no water resources within 100m of the mining activities.
Hazardous Substances Act (Act No. 15 of 1973)	Storage and control of hazardous substances to be included in EMPr.	The objective of the Act is to provide for the control of substances which may cause injury or ill health to or death of human beings due to their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure. In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule. The chemicals typically found in petroleum products (for example) benzene, are regulated in terms of this Act. The fuel storage facility and refueling bay, with all appropriate controls in place, will not conflict with the Act. The EMPr will provide details in this regard.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA)	Safety precautions have been taken into account by the Project Team in the design of mine open pit as described in Section 3.2.5.	The objective of the Act is to cover all aspects relating to health and safety of employees and other persons on the mine property. The Act places the responsibility on the mine owner for ensuring that the mine is designed, constructed and equipped in a manner which allows for a safe and healthy working environment.

Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	Gives effect to section 33 of the Constitution that requires that "Everyone has the right to administrative action that is lawful, reasonable and procedurally fair". All administrative actions must be based on the relevant considerations
Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)	Comments required from the Kamiesberg Local Municipality.	Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.
Municipal Plans and Policies		
Kamiesberg Local Municipality Integrated Development Plan (Draft IDP 2018-2019)	Section 5.3	The Need & Desirability of the project is referenced in terms of the Kamiesberg Local Municipality IDP, specifically relating to enhancing the mining potential of the local municipality, employment creation, rehabilitation of mining areas, and adaption to climate change and sustainable resource utilisation. Relevant mitigation measures are included in the EMPr.
Namakwa District Municipality (Draft IDP 2017 2018)	Section 5.4	The Need and Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, and ensuring the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, which will be included in the EMPr
Northern Cape Provincial Spatial Development Framework (NCPSDF)	Section 5.5	Sustainable development is a key consideration as addressed in this impact assessment report.
Northern Cape Provincial Growth and Development Strategy 2004-2014 (NCPGDS)	Section 5.6	Sustainable development is a key consideration as addressed in this impact assessment report.
Standards, Guidelines and Spatial Tools		
Mining and Biodiversity Guideline: 2013 Mainstreaming biodiversity into the mining sector. Pretoria.	Section 5.1 & 8.1.6 & Diagram 15	The mitigation measures to address and mitigate the potential impacts of the mining will be included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5.7	Refer to Section 5.7
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7, Table 7; Table 11 for the Plan of Study of EIA; and **Appendix B**.	Refer to Section 7, Table7; Table 11; and **Appendix B.**
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	To be included in the EIR phase.
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	To be included in the EIR phase.
SANBI BGIS databases (www.bgis.sanbi.org)	Baseline environmental descriptions in Section 8.1 and **Diagrams 12a; 13; and 14**	Used during desktop research to identify sensitive environments within the mining right area.
CBA database for Northern Cape	Section 8.1.6 **Diagram 14**	Used during desktop research to identify sensitive environments within the mining right area.
SKEP database mapping only vegetation within the mining right area	Section 8.1.7 and **Diagram 12b**	Used during desktop research to identify sensitive environments within the mining right area.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants	Management and monitoring measures	Standard for dust fallout. Dust mitigation measures are to be included in the EMPr.

4.2 Listed Activities

Table 6: Listed and Specified Activities

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
Application for Mining Right	**Total extent is approximately 232 Ha**	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing. Refer to detailed activities listed below where applicable for the different phases.	**X** **See below for specific activities.**
1. POST-APPROVAL ACTIVITIES				
1.1. Demarcate mining areas as defined in Mine Plan and EMPr.	Refer to 2.2 below	**NA**	**NA**	**NA**
2. ESTABLISHMENT / CONSTRUCTION ACTIVITIES				
2.1. Conduct Environmental Induction training to staff	All staff members	**NA**	**NA**	**NA**
2.2 Safety & Security	No fence is required as the farm is already secured. Access to the site will be controlled by security personnel posted at the access gates to the site.	**NA**	**NA**	**NA**

2.3 Infrastructure and Logistics	**Combined footprint of extent of area required for mining exceeds 20Ha:** The mine logistics will be the area from where the mining contractor and relevant technical services personnel will manage the mine. The site will cover an area of 7,800 m² (130m x 50m) or approx. 0.8Ha The mine site will include offices, change houses, control room, first aid station, stores as well as an earth moving vehicle parking area. The secondary infrastructure area will accommodate the waste handling area, earth moving vehicle and engineering workshops, fuel storage facility and a wash bay with a footprint of 0.3Ha. The estimated fuel usage is about 1,500 litres per day for the mining machinery including the generators, which is approx. 45 000l/m or 45m³/month (below 80m³ threshold in LN:14)	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity (ii) maintenance purposes undertaken in accordance with a maintenance management plan. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.:** The clearance of an area of 300 square metres or more of indigenous vegetation **(g) in the Northern Cape;** iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**NA**
2.4 Mine Pit, Processing plant, processing and drying area	**Combined footprint of extent of area required for mining exceeds 20Ha:** The mine pit is 17Ha. The processing plant of 90m X 90m will form part of the processing area. The site will be 130m x 200 m and will be located adjacent to the Mine site and Infrastructure area. Processing plant size is 0.8Ha.	**X**		**NA**
2.5 Stockpiles RoM and Topsoil	**Combined footprint of extent of area required for mining exceeds 20Ha:** The Run of Mine (RoM) stockpile was sized to ensure sufficient supply to the plant for a minimum of 1 month. The total footprint of the 8 stockpiles is 3.4Ha and the total area of the RoM stockpile area including movement areas is 4.5Ha.	**X**		**NA**

2.6 Overburden and waste dumps	**Combined footprint of extent of area required for mining exceeds 20Ha:** The overburden and waste dumps will be located close to the mine pit and cover a total area of 36.5Ha and on completion will be about 6m high and shaped to blend in with the natural topography.	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing. **GNR 984 (dated 8/12/2014) LN2 Activity 15, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 15:** The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity (ii) maintenance purposes undertaken in accordance with a maintenance management plan. **GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.:** The clearance of an area of 300 square metres or more of indigenous vegetation **(g) in the Northern Cape;** iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**X** **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (8) The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 tons. **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (9) The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorized by or under other legislation. **GNR 921 (dated 29/11/ 2013) Category B: Construction of facilities and associated structures and infrastructure** (10) The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).

2.7 Upgrade existing access roads and construct new haul roads, with removal of vegetation and topsoil prior to construction.	Upgrading of existing unsurfaced road for length of 3.7km to accommodate heavy equipment and two-way traffic, with an 8m width. New haul roads will be 1.9km in length, less than 8m wide and located between the mine pit, stockpile and waste dumps.	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 28, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 28:** Commercial or industrial developments where such land was used for agriculture on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.:** The clearance of an area of 300 square metres or more of indigenous vegetation **(g) in the Northern Cape;** iv. on land where at the time of coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	**NA**

2.8 Power supply (included in 2.3 above)	Currently no power supply exists to the Project Area and power is supplied by generators. In order to establish power to the project site existing installations will be upgraded. The upgraded power supply will include a generator bay ancillary services, control room building, protection equipment, metering equipment, and power network control and communication systems for the power station. The on-site power supply infrastructure designs will be based on a maximum demand of 4.5 kVA to the Project Area.	**NA**	**NA**	**NA**
2.9 Water supply (included in 2.3 above)	Processing will be a dry process and no water will be required for processing. Service water requirements will be obtained from the farmstead and trucked onto the site and stored in 6 X 5 000 litre plastic tanks. This 30 000l storage will also provide for an emergency supply for the fire hydrants. Service water will also be from recycling the greywater in the closed loop sewage tank.	**NA**	**NA**	**NA**

3. OPERATIONAL PHASE ACTIVITIES				
3.1 Mining, processing activities, RoM stockpiles	Mine pit 17Ha RoM Stockpile 4.5Ha Processing plant 0.8Ha Processing and drying area 0.5Ha	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.	**NA**

3.2 Operation of Overburden & Waste Dumps	Overburden and waste dumps totaling 36.5Ha consisting of: • Dump 1a - 0.5Ha • Dump 1b - 7.0Ha • Dump 1c - 4.5Ha • Dump 2 - 24.5Ha	**X**	**GNR 984 (dated 8/12/2014) LN2 Activity 17, as amended by GNR 325 (dated 7/04/2017), LN2 Activity 17:** Any activity including the operation of that activity which requires a mining right as contemplated in S22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including - (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.	**GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (8) The disposal of general waste to land covering an area in excess of 200m² and with a total capacity exceeding 25 000 tons. **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (9) The disposal of inert waste to land in excess of 25 000 tons, excluding the disposal of such waste for the purposes of levelling and building which has been authorized by or under other legislation.

4. DECOMMISSIONING PHASE ACTIVITIES				
4.1. Cover waste dumps leading edge with topsoil removed prior to establishment.	Leading edge	**NA**	**NA**	**NA**
4.2. Secure mine pit & fence off all accesses securely	Included in total of 232Ha (extent of total area)	**NA**	**NA**	**NA**
4.3. Remove all structures, foundations and footings not required by landowner/s	Included in total of 232Ha (extent of total area)	**NA**	**NA**	**NA**
4.4. Rip all hardened areas and allow to revegetate naturally	Included in total of 232Ha	**NA**	**NA**	**NA**
4.5 Decommissioning of overburden and waste management facility – Waste dumps	Overburden and Waste dumps total is 36.5Ha	**NA**	**NA**	**GNR 921 (dated 29/11/ 2013) Category A: Decommissioning of facilities and associated structures and infrastructure** (14) The decommissioning of a facility for a waste management activity listed in Category A or B of this schedule.

5. AFTERCARE PERIOD				
5.1. Remove alien vegetation if present	Unknown	**NA**	**NA**	**NA**
5.2. Monitor revegetation success	Unknown	**NA**	**NA**	**NA**
5.3. Conduct final environmental audit	NA	**NA**	**NA**	**NA**
5.4. Lodge closure Application	232Ha	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 22, as amended by GNR 327 (dated 7/04/2017) Activity 22:** The decommissioning of any activity requiring (i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Only applies at time of final closure.	**NA**

5 NEED & DESIRABILITY OF THE PROPOSED ACTIVITIES

5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)[1] state that: "Sustainable development is enshrined in South Africa's Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa".

The Department of Mineral Resources (DMR), as custodian of South Africa's mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to "prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"[2].

The primary environmental objective of the MPRDA is to give effect to the "environmental right"[3] contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa's mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The categories of relevance to this Core Area 1 are: Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and "Category D: Moderate Biodiversity Importance" – moderate risk for mining.

Refer to **Diagram 15** below that shows that the project site is located in "Category D: Moderate Biodiversity Importance in terms as the "Mining and Biodiversity Guidelines" categories referenced from the SANBI BGIS map viewer from 2013. The latest conservation mapping (refer to **Diagram 14**) indicates that Category D is applicable to this mining right project as described in section 8.1.6. These categories basically require an environmental impact assessment process to address the issues of sustainability.

5.2 Kaolin Mineral Resources Supply and Employment Benefits

Kaolin is used in a multiplicity of industries because of unique physical and chemical properties. Shape, particle size, colour, softness, and non-abrasiveness are physical properties that are especially important. Chemical properties, such as comparatively low Base Exchange capacity, as well as other chemical properties of the kaolin surface, and relative insolubility, are governing its use in many uses.

Kaolin has a variety of other uses in products including cable insulation, specialty films and fertilizers, glass fiber, white cement and refractory insulation bricks. New uses are being frequently discovered ensuring that the mineral will remain in demand for a long time.

The following products will be produced for the market:

- Sieved Unwashed Kaolin for the Local Ceramics Market: Semi-beneficiated product – crude product is crushed mildly and then sieved through a 3mm mesh sieve and bagged in 1-ton bulk bags for delivery to:
  - Continental China;
  - The Clayman; and,
  - The Clay Café.
- Beneficiated Kaolin: Crude product is mildly crushed, sieved, milled in pug mills, heated and put through a dry air separation beneficiation process to produce a beneficiated product in the form of a dry powder in

[1] Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

[2] Constitution of the Republic of South Africa (No. 108 of 1996).

[3] Section 24 of the Constitution states that "everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

which most of the silica content and other impurities are removed. Product is packaged and transported in either closed 1-ton bulk bags or shipping containers for:

- The Local Plastics Market (The Kaolin Group);
- The International Market ("IMERYS Ceramics" company) that supplies minerals to a wide range of industries, including polymers, rubber, paint, paper and ceramics; and,
- The International Market ("Torrecid Group") that supplies minerals to a wide range of industries mainly ceramics and glass.

The mine will employ 15 permanent staff, 2 of which are for unskilled labour.

5.3 Kamiesberg Local Municipality 4th Generation Integrated Development Plan 2019: IDP 2017-2022

The IDP is a municipality's principal strategic planning instrument which deals with the most critical development needs and opportunities of the municipal area (external focus) as well as the most critical governance needs of the organisation (internal focus).
The vision of the Kamiesberg Local Municipality is: "The establishment of a climate change orientated and economically viable lifestyle through sustainable growth".
The mission is "To Provide Affordable Quality Services, Alleviate Poverty, and Facilitate Social and Local Economic Development through Comprehensive Rural Development of the Kamiesberg Municipality."
The Kamiesberg Local Municipality's 4'th generation Integrated Development Plan (IDP) provides a framework to guide the municipality's planning and budget over the course of a set legislative time frame. The IDP seeks to support sustainable development of the municipal area and its communities through integration and balancing of the economic, ecological and social factors which influence development.

The strategic objectives of the Kamiesberg Municipality are:

- Promotion of Local Economic Development with specific focus on shared growth.
- To create an enabling environment for economic growth in Kamiesberg that attracts investors, encourages innovation and facilitate pro-poor intervention.
- To ensure a municipality that is committed to an innovative approach, prudent investment of public funds, good governance, financial viability and optimal institutional transformation that accommodates diversity in service delivery.
- To develop socially integrated, safe and healthy communities.
- To ensure ecological integrity and climate response through sustainable practices.
- To develop progressive strategies to optimize the use of available human resources.
- To facilitate real opportunities for youth, women, and disabled and appropriate care for the aged.
- To provide and maintain superior decentralized consumer services (Water, sanitation, roads, storm water, waste management and electricity).
- Reduction of infrastructure backlogs i.e. human settlement, water, roads, electricity etc.
- To ensure compliance as prescribed by relevant legislation.

The Kamiesberg Municipality serves a geographical area of 11 742 km² and is divided into four municipal wards. The total population is estimated at over 10 187 (2011 count), the majority of whom are not economically active. The municipality provides services to the towns and settlements of Garies, Hondeklipbaai, Kamassies, Kamieskroon, Kharkams, Kheis, Klipfontein, Leliefontein, Lepelfontein, Nourivier, Paulshoek, Rooifontein, Soebatsfontein, Spoegrivier and Tweerivier. The nearest business centre is Springbok 120 km away. The municipality provides electricity to 86 farms within its area.

The Kamiesberg Local Municipality is divided into four municipal wards and provides services to the towns and settlements of Kamassies, Rooifontein, Nourivier, Leliefontein, Paulshoek, (Ward 4), Kheis, Kharkams, Tweerivier (Ward 3) Koiingnaas, Hondeklipbaai, Soebatsfontein, Spoegrivier, Kamieskroon (Ward 1) Garies, Lepelfontein and Klipfontein (Ward 2).

The project area is located with the Garies, Lepelfontein and Klipfontein Municipal Ward (Ward 2).
Ward 2 is the biggest ward of all 4 wards in the Kamiesberg area with a total population of 3 262 which represent 32% of the total population. The male population consists of 50.33% and female population is 49.63% of the total for Ward 2.

A strong focus on Local Economic Development is required to create local job opportunities and to create a conducive environment for investment.

The proposed kaolin mining project will provide job security, local employment, local skills transfer, economic upliftment and Kaolin material supply for various industrial and medical sectors, in a sustainable manner as ensured through this environmental impact assessment process and implementation of the Closure and Rehabilitation Plan. The mine does not require water for processing.
Changes in climate are predicted to result in the shifting of bioregions across South Africa. It is forecast that under different climate scenarios that the District Municipal area will get hotter and drier leading to a loss of Nama – Karoo and Fynbos biomes and an increase of the Desert biome, this change will lead to the consequent shift in related ecosystems and vegetation.

5.4 Namakwa District Municipality Draft IDP 2017 2018

The vision of the Namaqua District Municipality IDP is: "Namakwa District Municipality, a centre of excellence!"
The Mission Statement is:

- A government institution legislatively mandated to stimulate economic and social transformation within the jurisdiction of the Namakwa District Municipality;
- By fostering partnership with relevant institutions to ensure sustainable development;
- Proactively supporting and capacitating B-municipalities;
- Be a transparent and accountable centre of excellence; and,
- Provide local leadership on environmental sustainability and climate change response.

The Strategic Objectives are

- Ensuring the delivery of basic services which include water, sanitation, electricity and waste management
- Creation of a thousand job opportunities through the community public works programme, as part of 4,5 million EPWP jobs.
- Transformation of administrative and financial systems of NDM and relevant B-Municipalities, which includes supply chain management
- Ensure the filling of six critical posts (Municipal Manager, Chief Financial Officer (CFO), Town Planner, Town Engineer, Human Resource Manager, Communication Manager) in all municipalities in the District
- Clean audits for all Municipalities.
- Building municipal capacity to enable municipalities to collect their revenue.
- Ensure sustainable economic and social transformation in the District.
- A society with a renewed sense of identity and confident in their skills and knowledge.
- Bridging the digital divide.
- Ensure the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, across all sectors.

The Namakwa District Municipality adheres to the values contained in the Batho Pele Principles.
The effects of climate change, such as flood events, on the proposed mining project will be mitigated as per the measures to be contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles and machinery associated with the mining activities will be addressed in the EMPr and Closure and Rehabilitation Plan.

5.5 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF states that the: "Cape is not one of South Africa's richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state". The NCPSDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province.
The NCPSDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned."

The potential for job security, employment and skills transfer are identified as positive environmental impacts in this report. The potential negative environmental impacts can be mitigated through the implementation of the EMPr and the Closure and Rehabilitation Plan, to ensure a sustainable mining activity.

5.6 Northern Cape Provincial Growth and Development Strategy 2004 – 2014 (NCPGDS)

The NCPGDS has the following vision for the Province: "Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development." The strategy for the growth and development of the Province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;
- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;
- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

5.7 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines "evaluation" as "the process of ascertaining the relative importance or significance of information, in the light of people's values, preferences and judgements, in order to make a decision." In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, "need and desirability" must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering "need and desirability", it must also be informed by the sum of all the impacts considered holistically. In this regard "need and desirability" also becomes the impact summary with regard to the proposed activity. The impact summary will be included in the EIR. These Guidelines state that: "In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved".

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this scoping environmental assessment and will be applied in the EIR, EMPr and Closure Report, as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process will be undertaken in a transparent manner and all effort will be made to involve all the relevant stakeholders and Interested and Affected Parties. I.e. Public participation will be undertaken to obtain the issues / concerns / comments of the affected people for input into the process.
- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted has been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures were proposed to ensure that the impact is mitigated. i.e. this report along with the EMPr (Part B) proposes mitigation measures which will minimise the negative impacts of the proposal on the environment.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site is located within in an Ecological Support Area (ESA). The vegetation type found on site is not listed in the "National List of Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011.

Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the mining activities progress. This report together with the EMPr and Closure Plan proposes mitigation measures which will minimise the impacts of the proposal on the environment.

- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations to be detailed in the EIR and Environmental Management Programme Report (EMPr), and Closure Plan will ensure minimum environmental degradation.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted has been considered and investigated at a scoping level to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be detailed in the EIR, EMPr and Closure Plan to ensure that the impact is mitigated. For example, landscape disturbance impacts associated with the development such as the waste rock dump sites, erosion and dust have been identified and detailed mitigation measures will be included in the EMPr to minimise the impacts.
- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into the operational component of the project, and mitigation measures included in the EMPr.
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures will be detailed to minimise the impact of the proposal on the environment.
- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and Interested and Affected Parties (I&APs). The DSR was made available to all identified I&APs to obtain comments on the proposed development.
- **Access of information** – Registered Interested and Affected Parties were notified of the commencement of the EIA Phase and the availability of the DEIR for comment.
- **Promotion of community well-being and empowerment** – This process will be undertaken in a transparent manner and all effort will be made to involve all the relevant stakeholders and I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance positive impacts. Any mitigation measures from SAHRA will be included. Adequate and appropriate opportunity will be provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

6 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PREFFERED SITE, ACTIVITY & ALTERNATIVE

6.1 Process to Reach the Proposed Preferred Alternative

With reference to the Mine Site Plan provided as **Diagram 5** and the location of the individual activities on site, details are provided of the alternatives considered with respect to the:

(a) Property on which or location where it is proposed to undertake the activity;
(b) Type of activity to be undertaken;
(c) Design or layout of the activity;
(d) Technology to be used in the activity;
(e) Operational aspects of the activity; and
(f) Option of not implementing the activity.

Appendix 2 Section 2 (h)(i) of the EIA Regulations, 2014, requires that all S&EIR processes must identify and describe feasible and reasonable alternatives. Alternatives considered during the screening phases of the project are described below.

6.2 Location or Site Alternatives

This site was selected because it contains good quality kaolin deposit as confirmed through prospecting, located close to the surface and it is located in a convenient position close to the N7 National Road, 3km from Garies. It is located adjacent to an existing kaolin mine and will share the existing mine and farm infrastructure. The rural nature of the area effectively means that the proposed mining activities will not disturb any local communities. There are no reasonable or feasible location alternatives for further consideration.

6.3 Type of Activity

The Applicant is not the landowner, so it would not be realistic for this company to propose another type of activity, as their core business is the supply of Kaolin material. The holder of a mining permit is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use. The mining activity takes place over a relatively short time period, so the selection of the best post-mining long term land use is an important consideration. In the case of this application the best post-mining land use alternative is to return the site to its natural state. Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine Kaolin from the deposit located on a portion of Portion 1 of Farm Rondawel 638 as indicated.

The only other activity required to be assessed in terms of NEMA is the “do-nothing” or “no-go” alternative, as detailed further in section 6.7 below.

6.4 Design or Layout of Activity

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource as described in Section 6.2 above. Specialist Reports have been prepared to determine the deposit and how best to access this. The layout of the mine pit is based on the location of the resource

The significance of the environmental impacts associated with different possible design or layout alternatives would be very similar, therefore layout alternatives have not been assessed in the impact ratings table.

The layout of the Mine Site Plan is shown in **Diagrams 6a and 6b**.

The design is based on making use is to be made of the existing mine infrastructure developed during prospecting, and the existing farm tracks and farmhouse (to be used as the mine head office) on the property.

6.5 Technology Alternatives

The technology used in a mining project is determined by the type, shape, position and orientation of the mineral resource. The technology applied in each major component of the mine is the only reasonable and feasible alternative:

- Mine Pit technology as described in Section 3.2.5.
- Processing Plant Design is described in Section 3.3.4, where processing is comprised of crushing, milling and screening and refining. Processing is a dry patented method conducted with two broad objectives in

mind: a) to remove impurities (such as quartz and feldspar) from the deposits; and b) to refine the kaolin thus increasing its qualitative characteristics.

Electricity will be supplied by a diesel generator, as there is no Eskom supply to the mine site and solar power is too expensive.

6.6 Operational Alternatives

The proposed kaolin mining activities will take place during normal working hours from 07h30 to 17h00 on weekdays only. The hauling and transport of the kaolin will therefore also take place during these hours.
There are no operational alternatives for further consideration.

6.7 The No-go Alternative

The No-Go Alternative will mean that the existing copper and tungsten prospecting right will not be realised into a Mining Right. There will be no supply of kaolin for the local and international market, and no generation of employment opportunities.

6.8 Summary of Alternatives

The assessment of alternatives must include the "no-go" option as a baseline against which all other alternatives must be measured. The "no go" alternative has been further assessed together with the preferred and only alternative in the impact rating tables (**Appendix D**).

In summary therefore:
The site was selected as it contains good quality Kaolin based on the intensive prospecting undertaken. The layout and technology of this proposed kaolin mining project has been determined by the shape, position and orientation of the mineral resource, which is located approximately 1 metre below overburden where it is proposed to be mined to a depth of 30 metres. Refer to the Site Plan included as **Diagrams 6a and 6b**. Limited new infrastructure is required to be constructed as all the existing mining facilities on the adjacent mine will be utilised, and there are existing access roads that will be used.

- The preferred and only location of the kaolin mining activity is on the earmarked section of portion of Portion 1 of Farm Rondawel 638.
- The preferred and only activity is the mining of kaolin.
- The preferred and only technology is the use of an excavator, Front End Loader and Backhoe Actor to excavate the kaolin, transport it to the primary processing yard, and for trucks to transport the bagged Kaolin offsite to its destination.
- The preferred and only operational alternative is the mining, hauling and transport of kaolin during normal working hours.
- The Site Plan or layout of the activity on the site is shown in **Diagrams 6a and 6b** positioned over the kaolin deposit.

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

The preferred alternatives described above have been included the impact assessment tables (**Appendix D**), together with the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

7 PUBLIC PARTICIPATION PROCESS

7.1 Introduction

The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended). Full details of the public participation process conducted including copies of all supporting documents (e.g. the information provided to Interested & Affected Parties (I&APs) and the comments received) will be included in **Appendix B** in the Final Scoping Report.

7.2 Comment period on Draft Scoping Report

The project notification and availability of the Draft Scoping Report was distributed via email to relevant Government Departments, the landowner, adjacent neighbours and other Interested and/or Affected Parties (I&APs). Included in the Project Notification Letter was a Registration and Comment form a copy of which was included in **Appendix B** of the FSR. The commenting period of 30 days on this Draft Scoping Report was from 14 September 2020 to 14 October 2020. The DSR was made available on the Green Direction website.

No Organs of State or Interested and/or Affected Party requested a meeting to discuss the findings of the Draft Scoping Report. All scoping public consultation documents, such as a copy of the advertisement placed in a local newspaper; site notices placed on site; proof of project notification; and proof of delivery, were included in the Final Scoping Report in **Appendix B**.

7.3 Comment period on the Draft Environmental Impact Report

This Draft Environmental Impact Report (DEIR) is available for comment from 6th January 2021 to 4th February 2021. Registered I&Ps have been notified of the availability of the DEIR for this 30-day comment via email notice, and the letter of notice of commencement of the DEIR and availability of the DEIR for comment, a copy of which is included in **Appendix B**.

7.4 Summary of Issues Raised by I&APs

The comments received on the Draft Scoping Report are included below. Any comments received on the DEIR will be included in the table below, following the comment period which ends on the 4th February 2021.

Table 7: Summary of Issues Raised by I&APs during the Scoping Process

Interested and Affected Parties **List the names of persons consulted in this column, and** **Mark with an X where those who must be consulted were in fact consulted.**		**Date** **Comments** **Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner	**X**				
Mr. A.A. Nieuwoudt		NO COMMENTS RECEIVED			
Lawful occupier/s of the land					
NA					
Landowners or lawful occupiers on adjacent properties	**X**				
Ms JS Nieuwoudt		NO COMMENTS RECEIVED			
Ms MJ Kotze					
Mr GS Nieuwoudt					
Ms C Barkhuizen					
Ms EM Nieuwoudt (Rodabel Boerdery CC)					
Municipal Councillor	**X**				
Kamiesberg Ward Councillor		NO COMMENTS RECEIVED			
Municipality	**X**				
Kamiesberg Municipality: Mr Gustav Von Mollendorf		14 September 2020	The landowner is required to rezone the farm or part of the farm where the mining will take place.	The EAP requested the SPLUMA forms to be completed to apply, which Mr. Von Mollendorf provided. The applicant will address this issue. The SPLUMA application	Section 7; Table 7 and **Appendix B** of the FSR..

				is not a component of the EIA process.	
Namakwa District Municipality		NO COMMENTS RECEIVED			
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS)					
Department of Roads and Public Works: Mr H Roberts		NO COMMENTS RECEIVED			
Communities					
NA					
Dept. Land Affairs	**X**				
Northern Cape Department of Rural Development and Land Reform: Mr Itumeleng Mashune		NO COMMENTS RECEIVED			
Traditional Leaders					
N/A					
Dept. Environmental Affairs & Nature Conservation	**X**				
DENC: Mr. Aviwe Nyakaza		NO COMMENTS RECEIVED			
Other Competent Authorities affected	**X**				
Dept. Water & Sanitation: Ms Alexia Hlengani		NO COMMENTS RECEIVED			
South African Heritage Resources Agency (SAHRA)					
OTHER AFFECTED PARTIES					
NA					
INTERESTED PARTIES					
Mr Nico Jano (NIEMAS)		18 September 2020	Requested to be registered but did not complete the registration form emailed to him on 19/9/2020 (included in Appendix B of FSR) to disclose any direct business, financial, personal or other interest.	This person is not entitled to comment as the requirements of Regulation 43 (1) were not fulfilled, i.e. he did not disclose any direct business, financial, personal or other interest.	Section 7, Table 7 and **Appendix B** of the FSR.

8 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT SITE

8.1 Type of Environment Affected by the Proposed Activity

8.1.1 Geology and Soils

The Bushmanland terrain is terminate by the Groothoek Thrust to the north and the Atlantic Ocean in the west. The area is overlain by the younger Quaternary sediments, that fill the valleys, paleo river channels and the coastal areas. The Bushmanland terrain comprises of three groups of rocks. The basement complex, comprising predominantly of granitic rocks, aged approximately 2050 to 1700 Ma. The supracrustal sequence of mixed sedimentary and volcanic origin, aged between 1900 and 1200 Ma and lastly, the syn- and late-tectonic intrusive rocks. Generally, the areas between the rocky hills are filled in by late Pleistocene sediments and consists mainly terrestrial calcrete sands and clays. The sediments are largely fluvial and lacustrine deposits with red dune sands overlying most of the area. The oldest rocks in the Bushmanland Terrain are the Garies and Bitterfontein Subgroup of the Okiep Group. The Garies Subgroup consist mainly of fine-grained biotite gneiss and leucocratic pink gneiss. The Bitterfontein Subgroup consist of feldspathic quartzite and cordierite-bearing gneiss. Locally at the mine, the entire surface is overlain by thin sandy soil cover up to 50 cm thick containing humus and grass seeds at the top. It overlies a zone of red, slightly compacted Kalahari sand up to 2 meters thick. Lensoid bodies of hard duricrust material is interlayered between the red sand and kaolin at the bottom. These rocks were intruded by the Little Namaqualand and the Spekatakel Suites. Heystek et al (1961) has determined that most of the kaolin deposits have been derived from the leucocratic gneiss of the Okiep Group and the Little Namaqualand Suite. The kaolin deposits north of Bitterfontein have been derived from augen gneiss and rocks from formed during the first intrusive phase.

Diagram 10a: Geological Map Regional Scale

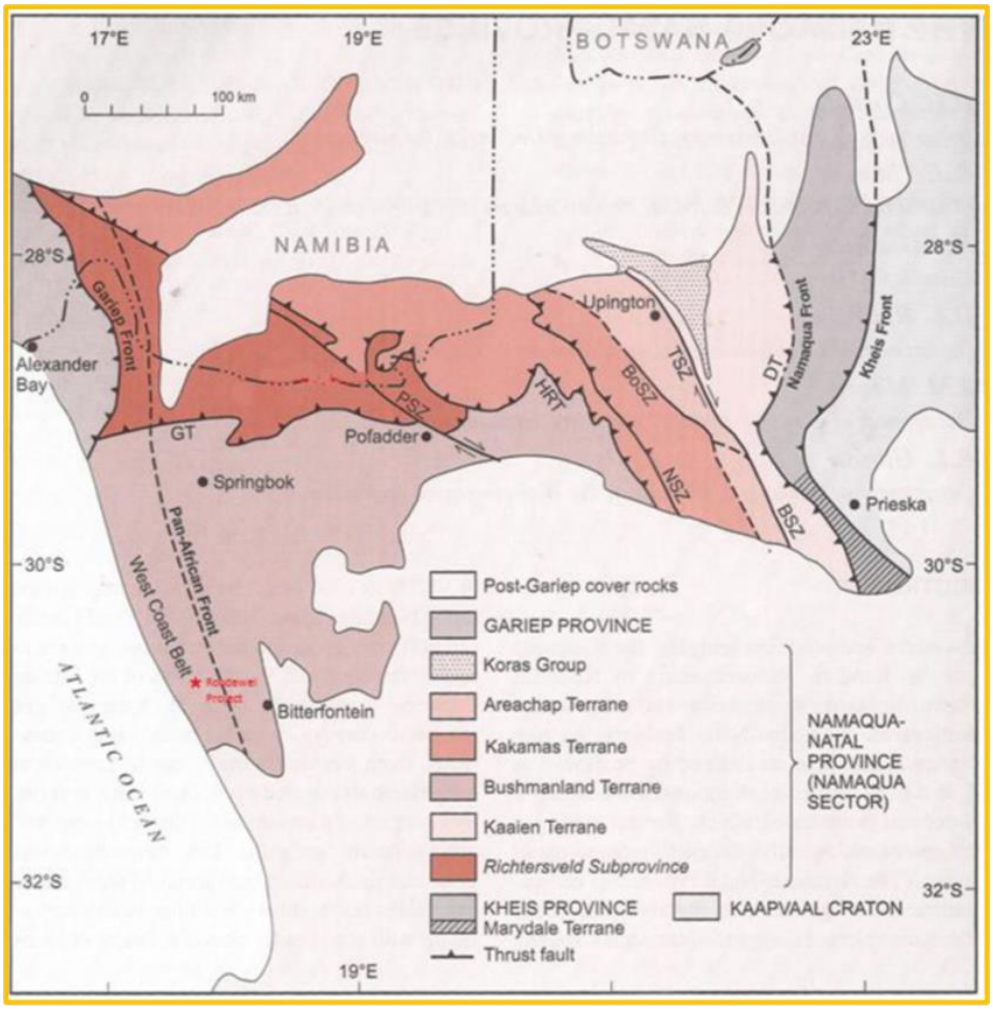
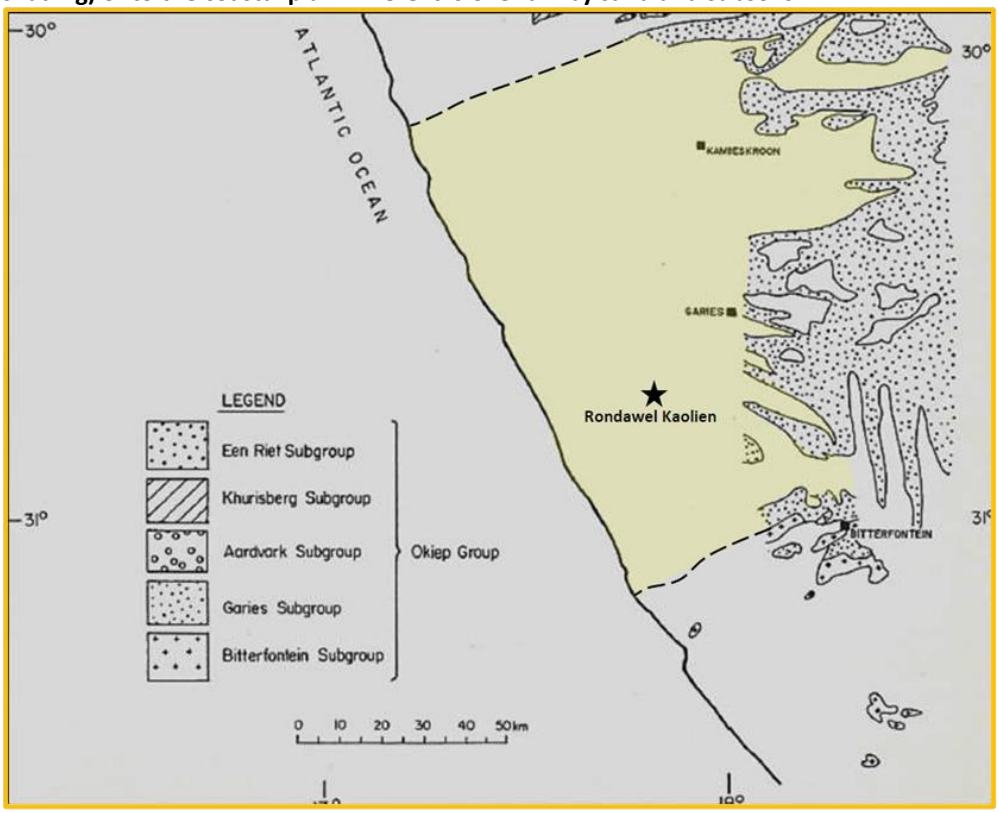


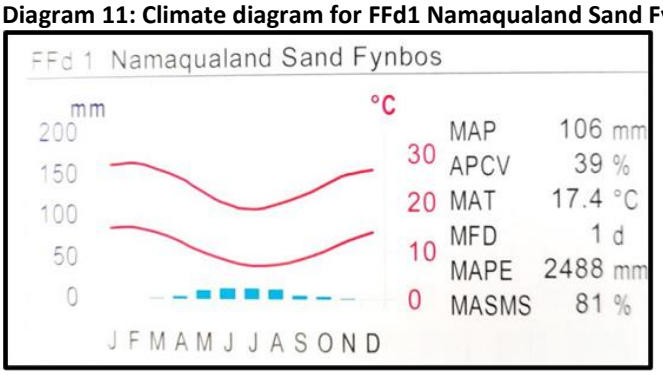
Diagram 10b: Regional geological map showing a portion of the projected extent of the Garies Subgroup (yellow shading) onto the coastal plain where it is overlain by sand and subsoils



8.1.2 Climate

Refer to the climate diagram inserted below as **Diagram 11** for FFd1 Namaqualand Sand Fynbos [referenced from Figure 4.57 in Mucina and Rutherford (2006)]. The Mean Annual Precipitation is 106mm, and the Mean Annual Potential Evaporation is 2488mm. The mean annual soil moisture stress is 81% when evaporation demand was more than double the soil moisture supply. The climatic data provided for the vegetation ecosystem partially located within the mining right area, SKs 9 Namaqualand Inland Duneveld has very similar temperature ranges, rainfall, and evaporation rates exceeding precipitation as for the Namaqualand Sand Fynbos data shown below. For example, the MAP is 104mm and MAPE is 2516mm, with MASMS the same at 81%, therefore indicating that it is slightly drier to the west of the project area.

Diagram 11: Climate diagram for FFd1 Namaqualand Sand Fynbos



[The blue bars show the median monthly precipitation. The red lines show the mean daily maximum and minimum temperature. MAP: Mean Annual Precipitation. MAT: Mean Annual Temperature. MFD: Mean Frost Days. MAPE: Mean Annual Potential Evaporation. MASMS: Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply).]

8.1.3 Vegetation

Refer to **Diagram 12a** mapped from the SANBI BIS National Vegetation Map, which shows the location of the project site within **FFd1 Namaqualand Sand Fynbos**. According to Mucina and Rutherford (2006) this vegetation is associated with slightly undulating plains comprising both isolated streets and dune fields of

aeolian sand (deep, loose red sand overlying marine or other sediments), scattered shrubs dominated by restoid and asteraceous fynbos with localised pockets of proteoid fynbos.

As referenced from the Approved EMPr for 10413MP (for the adjacent existing mine): “Most plant growth is restricted to the relatively shallow topsoil layer. Plant rooting systems favours extensive networks of shallow roots. The area falls within the coastal plain (Strandveld) vegetation of the succulent karoo biome. Strandveld vegetation varies in height and this is associated with depth of calcareous sands.

Short forms of plants occur on exposed calcretes and characterised by the presence of the following dominant species: Ehrharta calycina, E. villosa, Protasparagus capensis, Tetragonia frutescens and Zygophyllum morgansa. Plants which are drought-deciduous with succulent leaves are fairly common. Short Strandveld is found on shallow soils with little storage of moisture. Plants reflect the aridity of the substrate, are very short and considerably succulent. Projected vegetation cover of perennial species is usually less than 50%. Heuweltjies are prominent features and the plant community found on these show an increase in the dwarf succulent components, grading into Succulent Karoo vegetation with an increase in distance from the sea.

Dominant species in this short Strandveld vegetation includes Cepalophyllum spongiosum, Galenia fruticose, Mesembryanthemum barklyii, Othona longifolia, Zygophyllum cordifolium as well as Ruchsia spp.
Medium Strandveld has taller shrubs and a greater grass component. Canopy cover is in the range of 50% to 60% resulting in a "pockmarked" appearance to the veld. Typical dominant species include Arctotis merxmuelleri, Cephallophylum spp, Drosanthemum spp, Manochlamys albicans and Ruchsia robusta.

Tall Strandveld occurs where deeper calcareous sands occur. It is fairly dense with a canopy cover of 65% to 75%. This 1m to 2m tall shrubs are dominated by Ericophalus racemosus, Salvia aurea and Zygophyllum morgansa. The tall Strandveld vegetation takes years to develop to its full potential. Inland from the coast overgrazing can lead to irreversible changes and Cape Fynbos elements take over this niche. The only trees occur along the bank of the drainage channels as represented by Acacia karoo.”

According to Mucina and Rutherford (2006) this vegetation type is Least Threatened, with 1% statutorily conserved in the Namaqua National Park. Alien invasive vegetation associated with the Namaqualand Sand Fynbos is Acacia cyclops and A. Saligna occurs as scattered (Munica and Rutherford (2006).

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Photograph 6: View in a northerly direction from the eastern most edge of the approved 5Ha Mining Permit area looking towards the exiting mine.</td><td>Photograph 7: View in a westerly direction from the eastern most edge of the approved 5Ha mining permit area looking towards the existing mine.</td></tr>
<tr><td colspan="2">Note the scattered shrubs associated with FFd1 Namaqualand Sand Fynbos.</td></tr>
</table>

The other vegetation type found to the west of the project site is shown is **SKs 9 Namaqualand Inland Duneveld** as shown on **Diagram 12a**. According to Mucina and Rutherford (2006) this vegetation type is found in two patches, one of which is between Kotzesrus and Groen River, at an altitude between 60m to 280m. The landscape features are coastal peneplain with mobile dunes and vegetation is tall shrubland dominated by

non-succulent shrubs. The conservation status is Least Threatened with none conserved in statutory conservation areas, with some areas invaded by the alien invasive vegetation, Acacia cyclops.

The existing access road between the farm homestead and mining head-quarters crosses the Groen River, **where AZi Namaqualand Riviere** occurs in the Western and Northern Cape along dry riverbeds throughout Namaqualand. It is characterised by a complex of alluvial shrubland interspersed with patches of tussock graminoids (grasses). Soils are a mix of heavy silts and coarse granitic sands, and are often strongly saline, as reflected by the presence of salt tolerant species such as Sarcocornia and Salicornia. In places low thickets of Acacia karroo and Tamarix usneoides are found, and Phragmites reeds are common in areas with more regular surface water. Alien vegetation includes Prosopis, an invasive species found in Namaqualand. This vegetation type is Least Threatened.

The vegetation type identified in the mining right footprint in **Diagram 12b** is **SKs 14 Namaqualand Heuweltjie Strandveld**, a newly added vegetation type in the 2018 version of the National Vegetation Map as reference from Bothalia (http://abcjournal.org). This vegetation is intermediate between Strandveld vegetation types and Namaqualand Heuweltjieveld that occurs on the plains of the Hardeveld. The key distinction of Namaqualand Heuweltjie Strandveld vegetation is that the soils are derived from consolidated marine sediments (sand), whereas Namaqualand Heuweltjieveld soils are derived from terrestrial deposits and are therefore finer textured with a higher base status. Both types share the distinctive mirma mound (heuweltjie) landscape pattern. A notable feature of heuweltjieveld vegetation is the distinct difference between heuweltjie (mounds) and matrix (slacks between heuweltjies) vegetation. The species patterns tend to be very variable depending on what the neighbouring vegetation types are. Generally, the vegetation is a rich mix (highest total number of species recorded in this vegetation type within the Sandveld) of succulent and non-succulent shrubs mostly less than 0.5 m tall, up to a maximum of 1 m.

The most characteristic feature of the vegetation type is the meso-scale (20 - 100 m) patchiness due to the presence of heuweltjie structures (approximately 20 - 30 m diameter) in the landscape that give the vegetation a very distinct blotchy appearance when viewed on aerial photographs. This pattern can very rarely be detected when standing on the ground by the casual observer. Pair-wise comparisons between soils on and off heuweltjies show that in every case the heuweltjies have higher pH and salt content than neighbouring matrix soils. This vegetation type is conserved in the Namaqua National Park. (The threat status could not be found on the BGIS website, 2019.)

Diagram 12a: Vegetation of the Mining Right Area from the BGIS Map Viewer

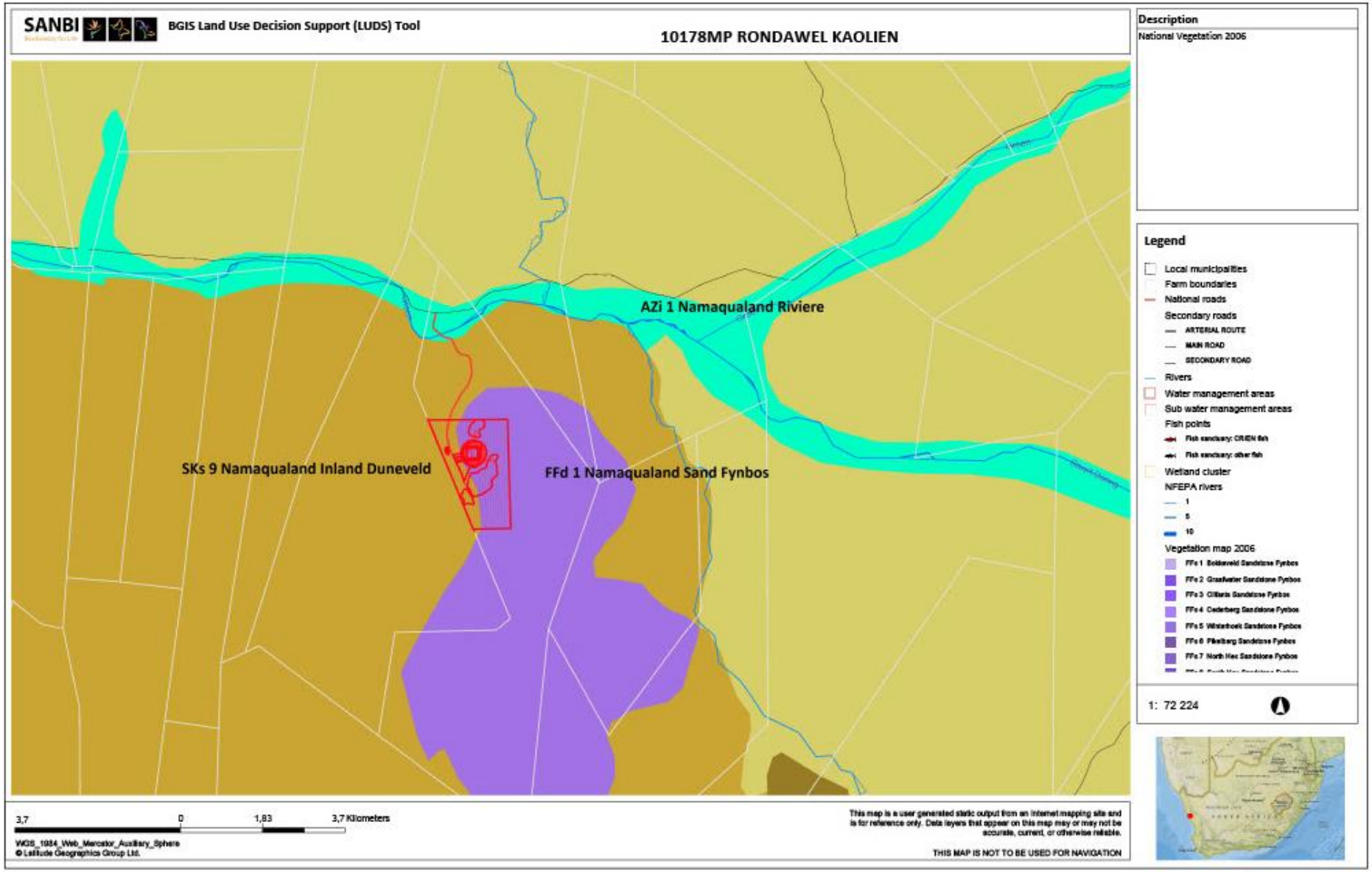
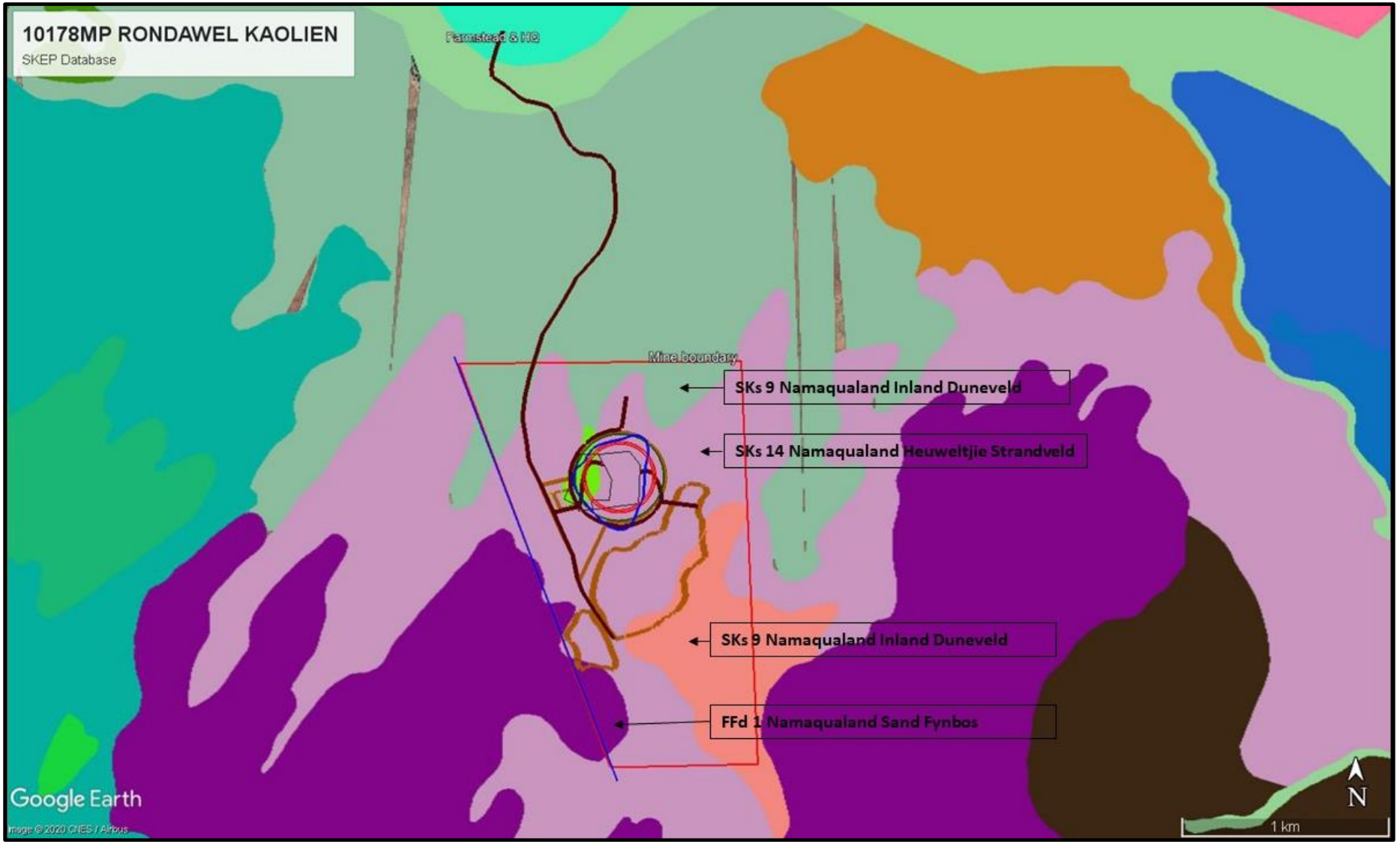


Diagram 12b: Vegetation Map based on SKEP database



8.1.4 Fauna

Endemism rates for invertebrates are high, and many unique and remarkable adaptive insects can be found in this region, including the scorpion, of which 22 are already known to be endemic to the Namakwa District Municipality. There is an abundance of reptiles and snakes in the region, many of which are near endemic (including the Namaqua dwarf adder, which is the smallest of Africa's adders, measuring between 20-25 cm), as well as a few unique frogs such as the endemic rain frog, the marbled rubber frog and the paradise toad. Larger herbivores are absent due to the altered habitat and competitive land uses.

8.1.5 Water Resources

The property is located within the Department of Water and Sanitation's Lower Orange Water Management Area (14). No drainage channels are close to the mining area. In the surrounding area surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is very low given the low rainfall average is 106mm occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils. The surface water quality (when available) is suitable for animal consumption but not for potable water. The Groen River flows in the northern section of the farm boundary, where an existing farm road crosses the river where it is used as the access road between the farm house, which acts as the mine's head-quarters, and the mining area located further south.

Refer to **Diagram 13** that shows the location of the project site in relation to the Groen River, which has been earmarked as a Phase 2 Freshwater Ecosystem Priority Area (FEPA)[4]. The project site is located approximately 1.7 km from the edge of the Groen River and within the NFEPA sub-catchment. The Groen River has a "Class C: Moderately Modified" river status (as referenced from the SANBI BGIS NFEPA Database Map Viewer) which means that a loss and change of natural habitat and biota have occurred, but that the basic ecosystem functions are still predominantly unchanged (Technical Report for the National Freshwater Ecosystem Priority Areas Project; WRC Report No. 1801/2/11, August 2011). For river FEPAs the whole sub-quaternary catchment is applicable, although FEPA status applies to the actual river reach within such a sub-quaternary catchment.

There are no wetlands near the proposed project site as shown in **Diagram 13** within the mining site or within a 500m radius of any proposed development of the Mining Right.

As described in section 5.1 above, the "Mining and Biodiversity Guidelines (2013)" document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The category of relevance to this proposed kaolin mining project is "Category D: Moderate Biodiversity Importance".

8.1.6 Critical Biodiversity Areas

Refer to **Diagram 14** which shows that the proposed kaolin mining right operation is located within a Critical Biodiversity Area 2 (CBA 2). Critical Biodiversity Areas (CBAs)[5] are areas that are required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

These include:

- All areas required to meet biodiversity pattern patterns (e.g. species, ecosystems);
- Critically Endangered (CR) ecosystems (terrestrial, wetland and river types);
- All areas required to meet ecological infrastructure targets, which are aimed at ensuring the continued existence and functioning of ecosystems and delivery of essential ecosystem services; and,
- Critical corridors to maintain landscape connectivity.

[4] FEPAs are strategic spatial priorities for conserving freshwater ecosystems and supporting sustainable use of water resources. FEPAs were determined through a process of systematic biodiversity planning and were identified using a range of criteria for conserving ecosystems and associated biodiversity of rivers, wetlands and estuaries. FEPA maps are suitable to use at a desktop level for planning and decision-making processes at the national or water management area level. In general, confidence in the FEPA maps at a national level is high but decreases at more local levels of planning.

[5] Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. Stellenbosch: CapeNature.

CBAs are areas of high biodiversity and ecological value and need to be kept in a natural or near-natural state, with no further loss of habitat or species. Degraded areas should be rehabilitated to natural or near-natural condition. Only low-impact, biodiversity-sensitive land uses are appropriate. In the maps, a distinction is made between CBAs that are likely to be in a natural condition (CBA 1) and those that are potentially degraded or represent secondary vegetation (CBA 2). This distinction is based on best available land cover data and may not be an accurate or current reflection of condition.

Refer to **Diagram 14** below that shows that the project site is located in "Category D: Moderate Biodiversity Importance in terms as the "Mining and Biodiversity Guidelines" categories referenced from the SANBI BGIS map viewer from 2013.

Diagram 13: BGIS National Wetlands & NFEPA Map (BGIS MAP VIEWER 2019)

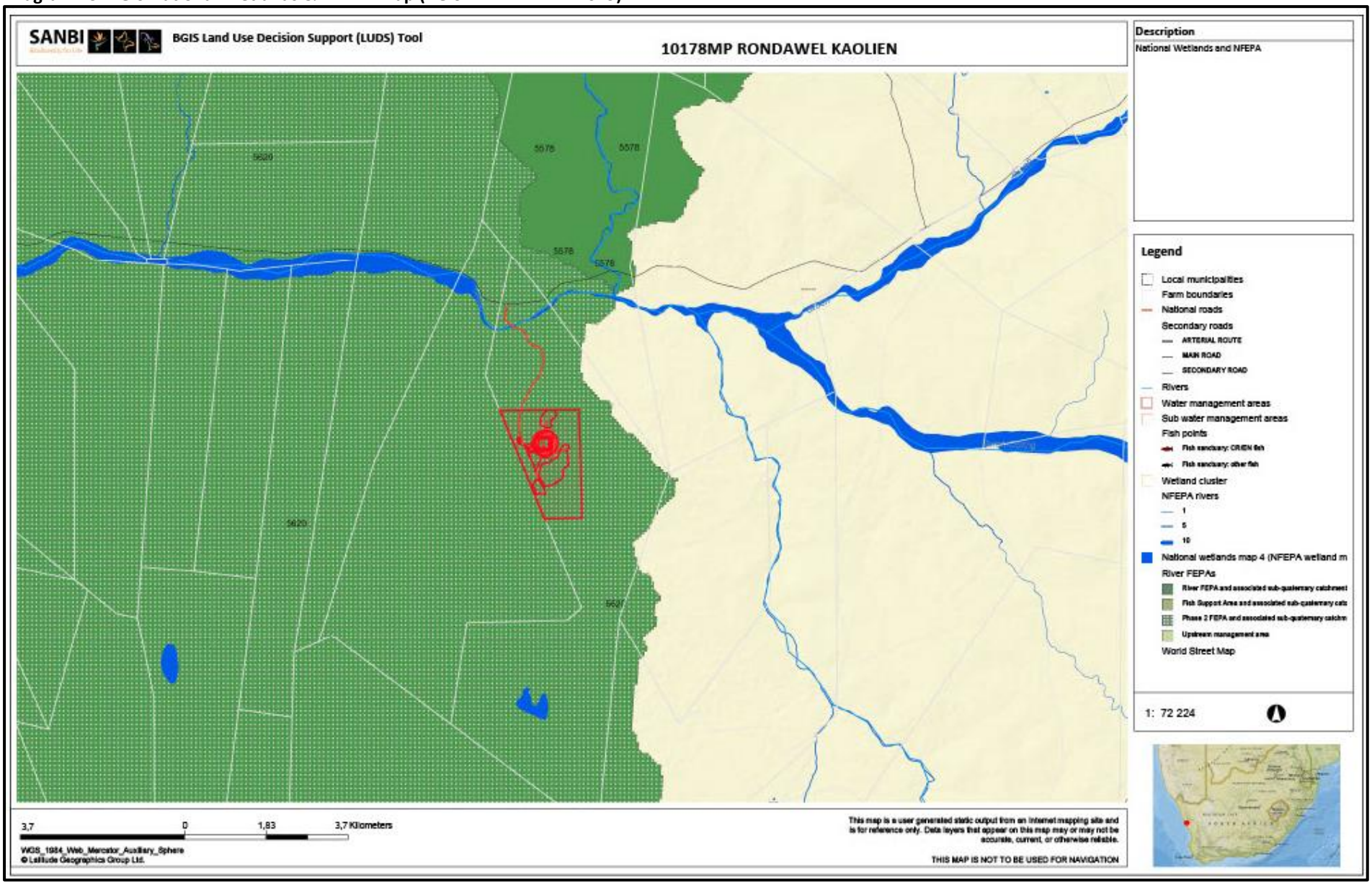


Diagram 14: Critical Biodiveristy Areas

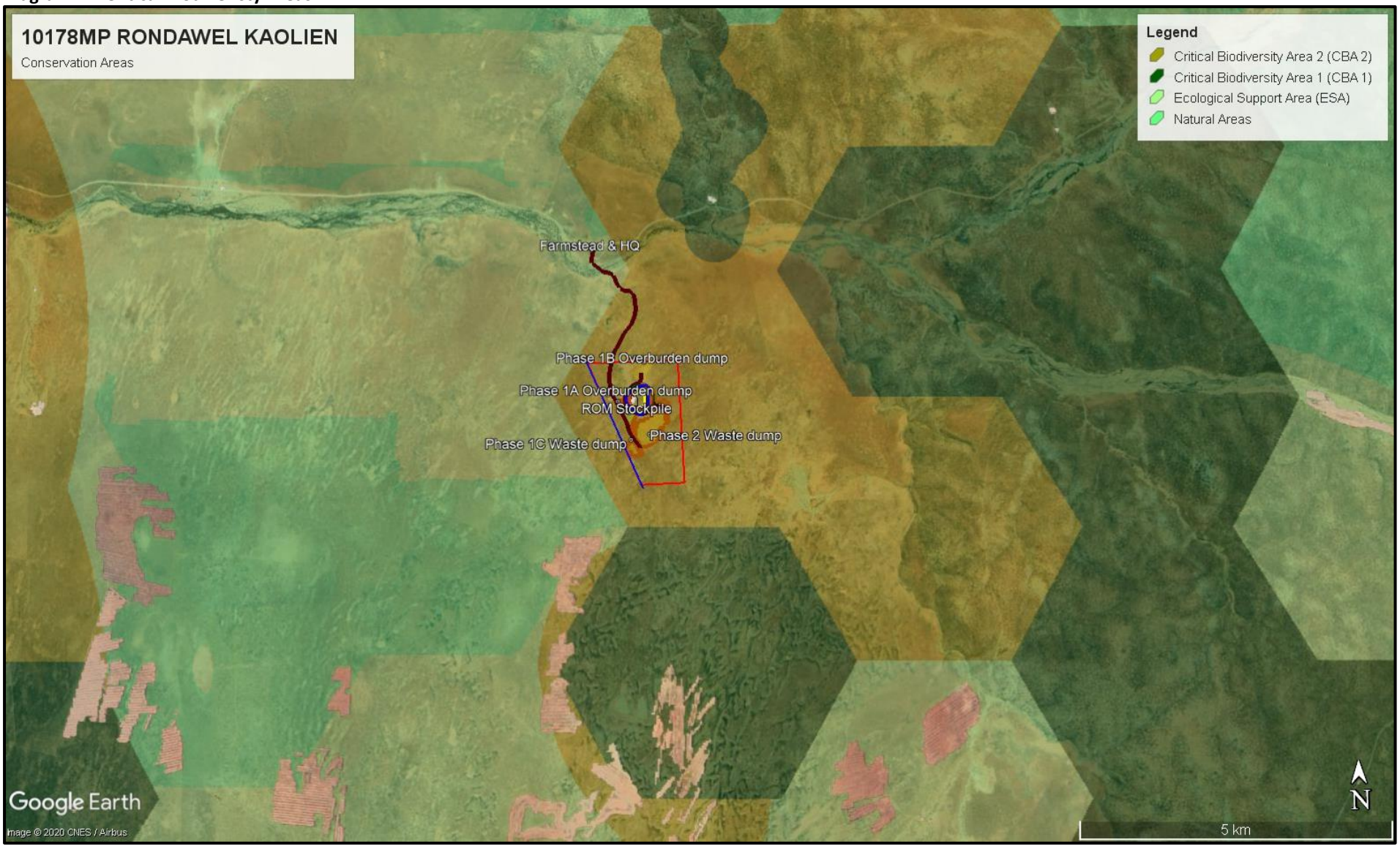
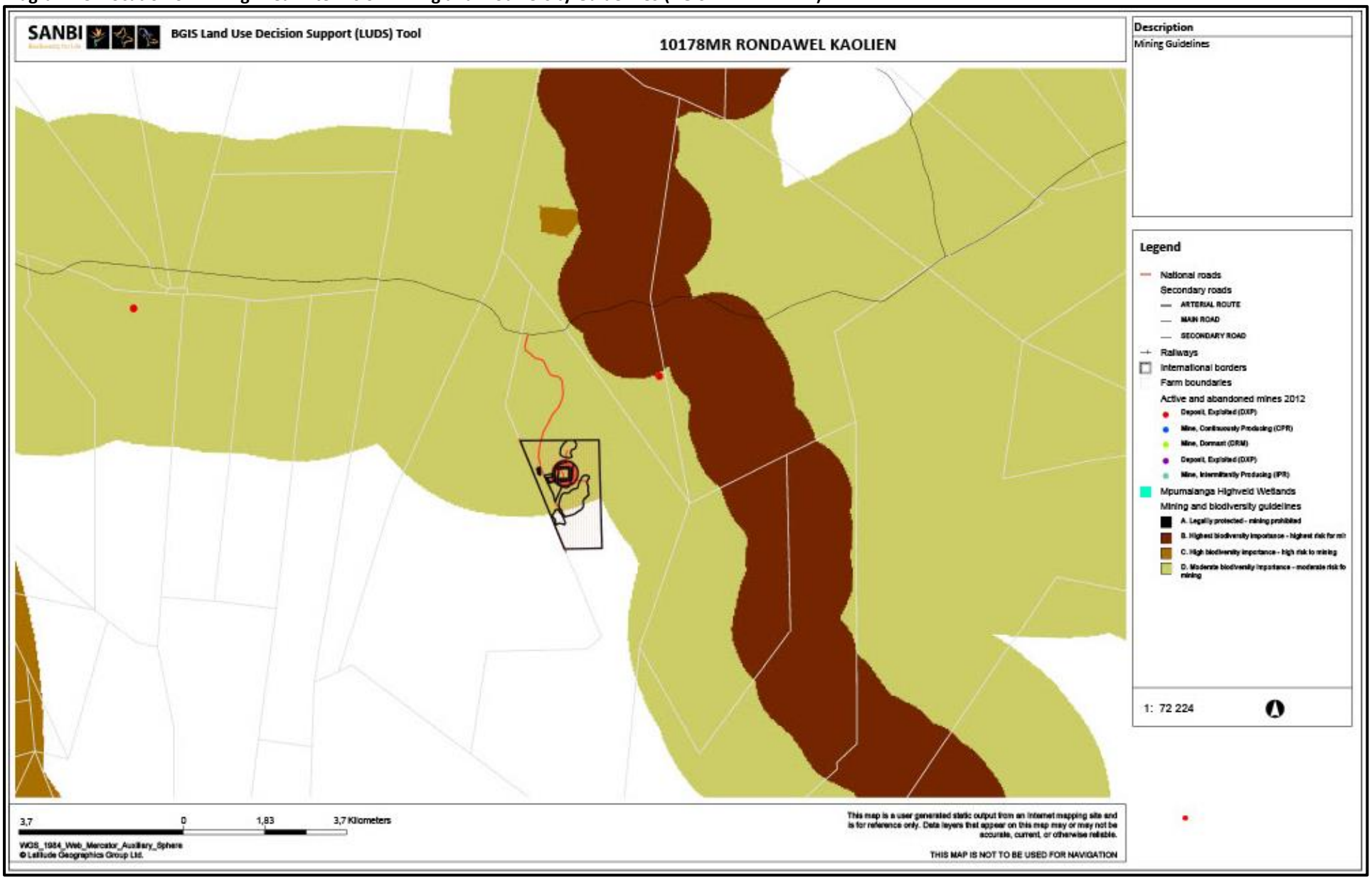


Diagram 15: Location of Mining Area in terms of Mining and Biodiversity Guidelines (BGIS MAP VIEWER)



8.1.7 Emissions

Air Quality

- Dust is generated by wind blowing over un-vegetated or denuded areas and given the surrounding extent of the semi-desert environment, dust generation will occur under windy conditions. Climate change is predicted to impact on Southern Africa with increase in temperatures and lower rainfall, which will impact on vegetation cover increasing soil mobility resulting in wind-blown soil erosion.
- Dust is generated off un-surfaced roadways when vehicles transport materials on site, in off-loading materials at the rock waste dumps and Run of Mines (RoM) stockpiles, during the crushing process when a back-hoe actor drives back and forth over the mined material to crush it.
- Dust will be generated in the mine pit during mining and will be controlled in terms of the Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM: AQA.

Noise and vibration

- Noise and vibration will be generated during the mining activities generated by the movement of earth moving machinery, and by the material transport on the haul roads.
- There are no residents in close proximity due to the remote location of the farm and mining area located approximately 3km from the district road.

Light Pollution

- The mine will operate during week days and will require lighting for operational and security purposes.
- The remote locality of the Rondawel Mine has few receptors in close proximity.

8.1.8 Socio-economic characteristics

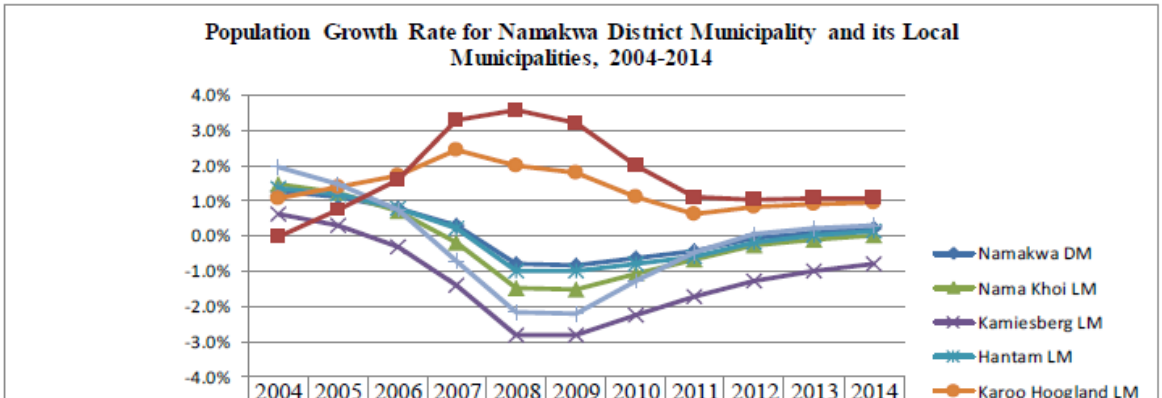
The project site falls within the Namakwa District Municipality, and the Local Municipality of Kamiesberg. The socio-economic profiles are referenced from the IDPs and included below.

The **Namakwa District Municipality** is sparsely populated, with a population of 115 842 and is the least populated district in the Northern Cape Province (and Country, although geographically the largest) with a population comprising 10.11% of the Province's total population.

- The average growth rate for GGP in the area from 1996-2011 was 5.4 % and in 2007-2011 this slowed down slightly to an average growth rate of 4.8%.
- The largest contributing sector to employment in the local economy (21.12% of total employment in the formal sector) is the retail, catering and accommodation sectors.

Diagram 16: Population growth rate in the Namakwa District Municipality

Population growth rate in Namaqua District Municipality



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Namakwa DM	1.2%	1.1%	0.8%	0.3%	-0.8%	-0.8%	-0.6%	-0.4%	-0.1%	0.1%	0.2%
Nama Khoi LM	1.5%	1.2%	0.7%	-0.2%	-1.5%	-1.5%	-1.1%	-0.7%	-0.3%	-0.1%	0.0%
Kamiesberg LM	0.6%	0.3%	-0.3%	-1.4%	-2.8%	-2.8%	-2.2%	-1.7%	-1.3%	-1.0%	-0.8%
Hantam LM	1.3%	1.2%	0.8%	0.2%	-1.0%	-1.0%	-0.8%	-0.6%	-0.2%	0.0%	0.1%
Karoo Hoogland LM	1.1%	1.4%	1.7%	2.4%	2.0%	1.8%	1.1%	0.6%	0.8%	0.9%	0.9%
Khai-Ma LM	2.0%	1.4%	0.7%	-0.7%	-2.2%	-2.2%	-1.3%	-0.5%	0.0%	0.2%	0.3%
Richtersveld LM	0.0%	0.7%	1.6%	3.3%	3.6%	3.2%	2.0%	1.1%	1.0%	1.1%	1.1%

The Kamiesberg area was identified as the "War on Poverty" area in the Namakwa District. The government had to reach out and ensure that these communities are well informed about government basic services and issues of these communities are addressed immediately. The Department of Social Development funds Soup Kitchens and Drop-In- Centers initiatives that have food security as the core of their programmes. All Soup Kitchens that are opened are in War on Poverty Areas like Hondeklipbaai, Leliefontein, Garies and Kharkams. These Soup Kitchens respond to the needs of the poor, vulnerable and destitute who find it difficult to respond to the shocks and stresses that threaten their livelihoods.

Social Profile (refer to Table 8 below)

- The total population of the Kamiesberg Municipal area was 10 187 in 2011.
- The average growth rate of the population from 2001-2011 is -0,54%.
- The average growth rate of households from 2001-2011 is 3.9%.
- The Coloured population dominates the municipal area making up 85.61% of the population and the second most dominant population in the area being the white population making up 8,06% of the total population and thirdly the black population of 5,32% of the total population.

Table 8: Kamiesberg Local Municipality socio-economic summary

KAMIESBERG LOCAL MUNICIPALITY (NC064)	
Demographic Information	
Population	10 187
Age Structure	
Population Under 15	26.50%
Population 15 To 64	63.30%
Population Over 65	10.20%
Dependency Ratio	
Per 100 (15-64)	57.9
Sex Ratio	
Males per 100 females	101.7
Population Growth	
Per annum	-0.54%
Labour market	30.80%
Unemployment Rate (official)	
Youth Unemployment Rate (official) 15-34	40.40%
Education (aged 20 +)	
No Schooling	5.20%
Higher Education	16.60%
Matric	4.10%
Household dynamics	
Households	2992
Average Household Size	3.2
Female Headed Households	40.90%
Formal Dwellings	95.60%
Housing Owned	63.90%
Household services	
Flush Toilet Connected To Sewerage	38.80%
Weekly Refuse Removal	79.40%
Piped Water Inside Dwelling	41.70%
Electricity For Lighting	97.2%

8.1.9 Cultural, Heritage and Paleontological Resources

8.1.9.1 Heritage Impact Assessment

The Heritage Impact Assessment (HIA) was prepared by ACO Associates and is attached at **Appendix C1**. An archaeological survey was undertaken to determine if any pre-colonial or more recent, historical heritage resources would be impacted by the extension of the area covered by mining activities. The survey was undertaken by David Halkett and John Gribble of ACO Associates on 28 and 29 November 2018 and the report was written by John Gribble.

The Palaeontological Impact Assessment (PIA) (attached as **Appendix C2**) prepared by Prof. Marion Bramford is cross-referenced in the HIA and the recommendations from the PIA (see Section 8.1.9.2 below) are included together with the HIA recommendations below.

The report concludes that:

- The archaeological material recorded during the November 2017 and November 2018 surveys on the farm Rondawel consisted of a handful of isolated MSA lithics and a single LSA flake found on the aeolian sand, and a small number of occurrences of MSA and ESA lithics associated with exposed rocky outcrops or with the buried interface between the aeolian sand, silcrete and the kaolin deposits respectively. No non-lithic material was observed during the surveys.
- The lithics noted at J028, at the prospecting pit adjacent to the Infrastructure Area and previously within the existing mine suggest that ESA archaeological material may be widely distributed across the area at the interface between the sand and the harder kaolin or rocky substrate which underlies it.
- With the exception of the mine pit, the impacts of mining activities on archaeological resources are assessed to be **insignificant**. Impacts within the mine pit are assessed to be **medium**.
- According to the palaeontological impact assessment the likelihood of fossils being encountered during mining operations is **extremely low**.
- No historic built environment resources were identified in the area surveyed.

The following recommendations are made:

- Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine.
- A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (Refer to the recommendations provided by Prof. Bramford referenced in Section 8.1.9.2 below)
- Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it; and
- These proposed mitigation measures must be included in the Environmental Management Plan for the mine. Refer to the EMPr (Part B), Table 15, the Impact Tables (**Appendix D**), and the Closure Plan (**Appendix E**), which include these mitigation measures.

ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.

8.1.9.2 Paleontological Assessment

A Palaeontological Impact Assessment was prepared by Prof. Marion Bramford, attached at Appendix C2.

The impact assessment (Section 4) of the report finds that: “Based on the nature of the project, surface activities are unlikely to impact upon the fossil heritage as there would be no fossils in the Quaternary sands, or below in the kaolin. Most rocks in the region are much too old to contain fossils. Potentially fossiliferous rocks of the Knersvlakte Subgroup, Vanrhynsdorp Group (Early Cambrian), occur in the vicinity and might contain trace fossils of invertebrate burrows, stromatolites and shells as they have been reported from other

outcrops, but not here. Since there is a very small chance that fossils from the nearby Knersvlakte Subgroup may be disturbed a Chance find protocol has been added to this report.

Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low."
The assumptions and uncertainties (Section 5) are recorded as: "Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the granites, gneisses, dolomites, sandstones, shales and sands are typical for the country, the ancient igneous rocks and younger sands do not contain fossils, however the Early Cambrian shoreline facies might contain trace fossils because they have been recorded from other sites, but not from the mine area."

The report recommends in Section 7: "Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the loose sands of the Quaternary. There is small chance that fossils may occur in the mudstones and shales of the Knersvlakte Subgroup, Vanrhynsdorp Group so a Chance Find Protocol should be added to the EMPr: if fossils are found once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample."

8.2 Description of the current land uses

Refer to **Diagrams 10 to 15** and Section 8.1 above. Photographs 2 to 5 illustrate the existing mining on the property.

8.3 Description of specific environmental features and infrastructure on the site

Refer to the Mine Site Plans (**Diagrams 6a and 6b**) that provide an overview of the project site and the existing and proposed infrastructure of the mine site.
Diagrams10 to 14 and the corresponding paragraphs in Section 8.1, provide a description of the environmental features on site.

8.4 Environmental and current land use map

Refer to **Diagrams 10 to 15** in Section 8.1 which provides the environmental and current land uses of the mine site footprints and existing and proposed bulk infrastructure within the Mining Right license boundary.

9 IMPACTS IDENTIFIED

The potential risks arising from the mining operation discussed in Section 3 above are applicable to the proposed mining right application as listed below.

9.1 Potential Risks/Impacts

9.1.1 Potential Risks associated with mining in an open quarry pit

- Safety of personnel mining in quarry.
- Management of dust, noise and vibration associated with mining kaolin in relation to surrounding communities.
- Potentially dangerous areas like deep quarry or equipment left behind and uncontrolled access to a potentially unsafe post-mining area.

9.1.2 Potential risk of environmental impacts

- Disturbance to sensitive environments such as land with historical or conservation value, watercourses, terrestrial habitats, fauna and flora and any associated biodiversity corridors, and on high potential agricultural land.
- Potential contamination of groundwater from unmanaged use of hydrocarbons on site, and incorrect storage of hazardous substances.
- Reduction in availability of groundwater used in mining activities in a water scarce area.
- Waste classes not kept in separate streams and incomplete removal of waste.
- Large volumes of waste rock that requires waste rock dump sites demarcated in phases.
- Stockpiles and leftover product remaining after mining.
- Loss of indigenous vegetation due to mining footprints at kaolin deposit.
- Increased soil erosion causing loss of topsoil.
- Climate change causing increase in temperature and decrease in rainfall, reducing vegetation cover leading to wind-blown soil erosion.
- Dust generation from unsurfaced roads and mining activities.
- Chemical contaminants impacting surface and/or groundwater quality or resulting in discharge that exceeds the concentrations permitted.
- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depots or storage facilities of potentially polluting substances can contaminate surface water.
- Oil fuel leaks onto soil through the earthmoving and transport equipment and machinery or spillage of fuel during transfer from fuel bowser to equipment.
- Post mining landscape that increases the requirement for long-term monitoring and management.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.
- Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations, power supply and water installations including pumps and pipelines.
- Equipment and other items used during the mining operation left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.
- Post mining topography not compatible with original landform.

9.1.3 Potential risks associated with viable and sustainable land

- Uncontrolled expansion of mining footprint by not restricting the area disturbed by mining and the associated activities/infrastructure, resulting in loss of land with agricultural potential. Uncontrolled development of roads where existing farm roads are not used for mining operations and redundant internal roads are left behind. Duel used roads still required by the landowner and fences not maintained or repaired.
- Post mining landform not compatible with the surrounding landscape and not capable of a productive land use that achieves a land capability equal to that of pre-mining conditions

- Long term changes in land use caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-mining land use options. Rehabilitated areas could be too unstable to support post-mining land use objectives compatible with surrounding areas.
- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas.
- Inadequate control of alien invasive vegetation species can result in establishment of populations or seed sources that threaten adjacent areas.

9.1.4 Potential Risks associated with a post mining landform

- Impact on surface water through modification of infiltration rates by increasing the extent of hardened surfaces.
- Inadequate topsoil restoration or creation of unnatural surface topography or slope form which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from infrastructure areas is erosive, causing sheet, rill and donga erosion features.

9.1.5 Potential Risks associated with the socio-economic environment

- Disturbance of local communities in rural area caused by noise and dust emissions and increase in heavy vehicles along transport routes.
- Reduction in groundwater in a water scarce area impacting on water availability for other land uses or potential developments.
- Impact on capacity of transport infrastructure, water infrastructure and power transmission lines.
- An influx of people into the local communities looking for work, with an increase in demand for housing, schooling and services. Such an influx of workers into a community often results in a change in social dynamics.
- Positive impacts include for example, the creation of both formal and informal businesses to supply additional needs, whilst negative social impacts include for example, an increase in substance abuse, HIV transmission and unwanted pregnancies.
- Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income. Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.
- Lack of compliance with the approved EMPr and a lack of auditing of the EMPr.
- Mine closure stalled due to non-compliance with relevant legislation (national, provincial and local).
- Insufficient funds for complete rehabilitation.

9.1.6 Potential Risks associated with visual intrusion, noise, vibration, light pollution and air emissions

- Terrain morphology plays a critical role in defining the visual envelope of mining developments and can either reduce or enhance visual impact. Apart from visual intrusion there is also the risk of reduced sense of place. The visual intrusion impact of mining activity would be on nearby roads, homesteads, settlements, tourist accommodation, and along tourism routes or corridors.
- Visual disturbance would be caused by mining activities such as excavations, tailings storage facility, overburden and waste rock dumps. Large buildings provide a colour contrast, as do disturbed areas against adjacent natural areas.
- Nuisance effects of air emissions due to a lack of implementation dust suppression activities could impact on communities.
- Dust generated on haul roads reduces visibility, representing a safety hazard.
- Dust can retard vegetation growth and reduce the palatability of vegetation.
- The cumulative effect of a raise in the ambient noise levels or high noise levels in specific areas that exceed specified levels would impact on communities in close proximity.
- Noise disturbance and light pollution would result from night-time activities in close proximity to communities.

9.1.7 Potential Risks associated with regard archaeological sites, cultural heritage sites or graves

- Disturbance of identified surface, or unknown sub-surface archaeological sites, if mitigation and monitoring is not implemented as per mitigating measures in a Heritage Impact Assessment (**Appendix C1**).
- Progressive development can encroach upon or disturb archaeological sites, cultural heritage sites or graves.

9.2 Potential Impacts and Risks associated with the Preferred Alternative

Refer to Section 6 above, which describes the location, type of activity, design or layout, technology and operational alternatives, and the preliminary result of having a preferred and only alternative, that of the SHIP Mining Right as per the Mine Plan shown in **Diagrams 6a and 6b.** The potential impacts and risks associated with this preferred and only alternative are listed in **Table 9** below.

Table 9: Preferred Alternative: Potential Impacts and Risks per Phase per Activity before mitigation

Phase	Activities	Potential Impacts & Risks	Significance (before mitigation)	Probability	Duration
CONSTRUCTION PHASE	Access & Haul Roads	Dust generation from vehicles using existing access and haul roads	Medium (-)	Definite	Short-term
		Soil compaction from repeated use of existing access and haul roads	Medium (-)	Definite	Short-term
	Construction of Site Establishment Activities: • Processing plant and associated infrastructure • Water and wastewater infrastructure • Electricity infrastructure • Waste management • Stormwater control	Topsoil stripping and stockpiling, soil erosion and soil compaction (land capability)	Medium (-)	Definite	Short-term
		Surface and ground water resource pollution	Low (-)	Possible	Short-term
		Biodiversity (wildlife and vegetation) disturbance from activities and vehicles	Medium (-)	Definite	Short-term
		Soil contamination and waste management	Medium (-)	Possible	Short-Term
		Visual impact	Medium (-)	Definite	Short-term
		Emissions (Dust and light), Noise and Vibration causing nuisance from topsoil stripping, site establishment activities and vehicles	Low (-)	Definite	Short-term
		Lack of socio-economic impact on job security, employment creation and economic spin-offs (i.e. prior to mine construction)	Medium (-)	Definite	Short-term
		Social impact on community	Medium (-)	Possible	Short-term
		Impact on heritage artefacts, heritage sites or graveyards	Medium (Mine Pit only - all other areas are insignificant pre-mitigation) (-)	Possible	Long-term
OPERATIONAL PHASE	• Services and associated infrastructure • Primary Processing operation • Water and wastewater management • Waste generation and management • Waste rock dumps • Access roads	Change in topography	High (-)	Definite	Long-term
		Erosion control or runoff diversion structures and soil compaction (land capability)	High (-)	Definite	Long-term
		Water resources: potable water to be supplied from collected rainfall or trucked in from outside sources as the groundwater has a high salt content; no process water is required as processing is a dry process; service water will be made-up from recycling greywater in the closed loop sewage tank. Potential for groundwater pollution from hydrocarbons.	Medium (-)	Definite (water requirements) Possible (water pollution)	Long-term
		Biodiversity (wildlife and vegetation) disturbance from activities	Low (-)	Definite	Long-term
		Soil contamination and waste management	Medium (-)	Possible	Short-Term
		Visibility of mining operations	Medium (-)	Definite	Long-term
		Dust, vehicle, noise and light emissions from site activities and haul trucks	Medium (-)	Definite	Long-term
		Lack of socio-economic impact on job security, employment creation and economic spin-offs (i.e. prior to mine operating)	Medium (-)	Definite	Long-term
		Social impact on community	Medium (-)	Possible	Long-term
		Impact on heritage artefacts, heritage sites, graves and fossils	Medium (Mine Pit only - all other areas are insignificant pre-mitigation) (-)		

DECOMMISSIONING PHASE	Rehabilitation of the mining right area: shaping landscape profile; landscape the waste rock dumps; scarifying compacted areas and vehicle tracks; replacing topsoil, etc.	Rehabilitation: Visibility of the rehabilitated mining operations; Biodiversity (wildlife and vegetation) disturbance from vehicles; Dust and vehicle emissions from rehabilitation activities; Erosion control or run-off diversion structures	Medium (-)	Definite	Long-term
		Socio-economic impacts: employment during rehabilitation and decommissioning activities followed by end of employment contracts once Mining Right has expired.	Medium (-)	Definite	Short-term

9.3 Potential Impacts and Risks associated with the No-Go Alternative

There would be no change to the biophysical environment with the No-Go Alternative. The No-Go Alternative implies that the Applicant would forgo an opportunity to provide job security and additional employment opportunities in an area and sector identified for opportunities for job provision and economic growth. There is a demand for kaolin as described in Section 5.2. This potential would not be reached with the "no-go" option.

9.4 Methodology used in determining significance of potential impacts

Refer to Table 10 below, which provides the impact assessment criteria applied in the rating of the impacts associated with each phase of the proposed mining activity for the Preferred and Only Alternative. Each impact is assessed in terms of: nature (character status); extent (spatial scale); duration (time scale); probability (likelihood) of occurring; reversibility of the impact; the degree to which the impact may cause irreplaceable loss of resources; the significance (size or magnitude scale) prior to mitigation; the degree to which the impact can be mitigated; and, the significance (size or magnitude scale) after mitigation.

Table 10: Impact Assessment Criteria (Green Direction Rating Table)

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial nor harmful
EXTENT (GEOGRAPHICAL)	
Site	The impact will only affect the site
Local/ district	Will affect the local area or district
Province/region	Will affect the entire province or region
International and National	Will affect the entire country
CONSEQUENCE	
Loss/gain	The impact will result in loss or gain of resource
No loss/gain	The impact will result in no loss or no gain of resource
DURATION	
Construction period / Short term	Up to 3 years
Medium term	Up to 6 years after construction
Long term	More than 6 years after construction
PROBABILITY	
Definite	Impact will certainly occur (>75% probability of occurring)
Probable	Impact likely to occur (50 – 75% probability of occurring)
Possible	Impact may occur (25 – 50% probability of occurring)
Unlikely	Impact unlikely to occur (0 – 25% probability of occurring)
REVERSIBILITY	
Reversible	Impacts can be reversed though the implementation of mitigation measures
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures
IRREPLACEABLE LOSS OF RESOURCES	
High	The impact is result in a complete loss of all resources
Medium	The impact will result in significant loss of resources
Low	The impact will result in marginal loss of resources
No Loss	The impact will not result in the loss of any resources
CUMULATIVE EFFECTS	
High	The impact would result in significant cumulative effects
Medium	The impact would result in moderate cumulative effects
Low	The impact would result in minor cumulative effects
SIGNIFICANCE RATINGS	
Very High	Major to permanent environmental change with extreme social importance.
High	Long term environmental change with great social importance.
Medium	Medium to long term environmental change with fair social importance.
Low	Short to medium term environmental change with little social importance.
Very low	Short-term environmental change with no social importance
None	No environmental change
Unknown	Due to lack of information
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED	
High	The impact could be significantly avoided/managed/mitigated.
Medium	The impact could be fairly avoided/managed/mitigated.
Low	The impact could be avoided/managed/mitigated to a limited degree.
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact from occurring.

9.5 The positive and negative impacts that the proposed activity and alternatives will have

Positive impacts

- Creation of employment and job security with economic spin-offs.
- Investment into the local community as required to be addressed in the Social and Labour Plan.
- Provision of kaolin for local and international markets.
- Access road upgrading.
- Reduction in development footprint by utilizing existing infrastructure.

Negative impacts

The key potential negative impacts associated with the mining activity include the following:

- Site access:
  - Disturbance of onsite fauna and flora.
  - Soil compaction from repeated use of access tracks.

- Site Establishment Activities (topsoil stripping and stockpiling, placement of logistics, waste generation and management)
  - Visual intrusion.
  - Emissions (dust, vehicle and noise) from topsoil stripping; vehicles and machinery.
  - Wildlife and vegetation disturbance from site preparation.
  - Contamination and disturbance of topsoil and soil from compaction and soil disturbance due to topsoil stockpiling
  - Waste generation.
  - Water use for dust suppression during site establishment.

- Mining and processing activities:
  - Noise caused by the machinery and vehicles on site, and by vehicles on haul roads.
  - Visibility of the mining operations.
  - Dust emissions from general site activities (vehicle entrained dust).
  - Water for dust suppression to be sourced from recycled grey water system.
  - Potable water to be sourced from rain collection or trucked in from outside sources.
  - Disturbance of biodiversity from vehicles.
  - Contamination of soil from hydrocarbon spills and compaction on access tracks.
  - Storage and use of hazardous chemicals in processing.
  - Disposal of sewage from logistics in an on-site Biozone type facility that is containerised. Effluent will be taken off site and disposed of at the municipal sewage works.
  - The specialist heritage resources report was included in the Scoping Report.

- Rehabilitation of the mining area, scarifying compacted areas and vehicle tracks
  - Mine shaft stability and slope stability.
  - Rehabilitation of Tailings Storage Facility.
  - Dust emission from decommissioning activities (vehicle entrained dust).
  - Soil erosion of topsoil.

9.6 The possible mitigation measures that could be applied

Refer to Table 15 for the potential mitigation measures included under each impact.

9.7 The outcome of the Site Selection Matrix & Final Site Layout Plan

Refer to **Diagram 1b and 1c** for the overall mining right area, and **Diagrams 6a and 6b** for the site plan of the kaolin mine. These are presented for comment as part of the Scoping Phase stakeholder engagement process.

9.8 Motivation where no alternative sites were considered

Alternatives have been considered for this project, as described in Section 6 above. Where alternatives are not likely to be considered in the Impact Assessment Phase (to be included in the DEIR), reasons have been provided in Section 6 above.

9.9 Statement Motivating the Preferred Sites

Refer to Section 6 above. The project site has been selected based on the results from prospecting. The layout and technology of the quarry pit and associated infrastructure has been determined by the shape, position and orientation of the mineral resource. Refer to the Mine Site Plans included as **Diagram 6a and 6b.** The existing access roads will be utilised.

In summary therefore:

- The Preferred Alternative is the mining and primary processing of kaolin within the Mining Right area demarcated in **Diagrams 6a and 6b**.
- The preferred **location and layout alternatives** of the mining activity are on the earmarked sites shown on the Mine Site Plan as per **Diagram 6a and 6b.** The location of the mining logistics, processing components and associated infrastructure have been positioned in relation to the location of the mineral resource below ground and existing mining infrastructure will be utilised.
- The preferred **activity** alternative is the mining of kaolin based on the mineral resources investigated during prospecting.
- The preferred **technology** alternative for the open pit mining, extraction, processing, waste and water management, and use of a generator are those described in Section 6.5 above.
- The preferred **operational** alternative is the open pit mining and the above-ground primary processing activities illustrated in the Plant Process Diagrams (**Diagrams 9a and to 9g**).

The Preferred Alternatives described above have been assessed in the impact assessment tables (**Appendix D**), together with the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline.

10 SUMMARY OF SPECIALIST REPORTS

Table 11: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED
Archaeological /Heritage Impact Assessment Scoping Report	The following recommendations are made in **Appendix C1**: • Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine. • A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (**Appendix C2**). • Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it. • These proposed mitigation measures must be included in the Environmental Management Plan for the mine. ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.	**X** All of the recommendations included in the column to the left have been included in this report.	Section 8.1.2 **Appendix C1** PART B: EMPr Table 15 Impact Tables (**Appendix E**) Closure Plan **(Appendix F**)
A desktop palaeontological assessment was included in the AIA/HIA and provided by Professor Marion Bamford, Director of the WITS Evolutionary Studies Institute for ACO Associates.	A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (**Appendix C2**).	**X** The recommendations included in the column to the left has been included in this report.	Section 8.1.2 **Appendix C2** PART B: EMPr Table 15 Impact Tables (**Appendix E**) Closure Plan **(Appendix F**)

11 ENVIRONMENTAL IMPACT STATEMENT

11.1 Summary of the key findings of the environmental impact assessment

The significance ratings of impacts after mitigation on the key aspects of the "preferred alternative" and the "no go" alternative are summarised in the tables below, from the detailed Impact Assessment Tables attached at **Appendix D**.

Table 12: Significance Ratings of Impacts after Mitigation during Construction Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
2. SOIL EROSION AND COMPACTION: The clearing of areas for the mine footprint will result in the removal of existing vegetation and topsoil, which will disturb the soil increasing the potential for soil erosion by wind and loss of soil in the event of rainfall. Soil compaction will result from ongoing repeated use of access tracks.	**Low / Insignificant Risk**	**N/A**
2. WATER RESOURCES: Potential for ground water pollution due to oil spills during routine maintenance of equipment. No surface water resources are in close proximity to the proposed mining site. The mining method makes use of a dry primary processing technique. No Water Use License is required.	**Very Low / Insignificant Risk**	**N/A**
2.IMPACT ON NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 2 (CBA 2): The mining footprint will be cleared and topsoil stockpiled for rehabilitation as required.	**Low / Insignificant Risk**	**N/A**
4.POTENTIAL FOR SOIL CONTAMINATION AND WASTE MANAGEMENT DURING CONSTRUCTION PHASE	**Low / Insignificant Risk**	**N/A**
5. VISUAL INTRUSION: Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The site is remote and rural in nature with very few receptors (people or nearby public roads).	**Very Low / Insignificant Risk**	**N/A**
6. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front-end loaders) and vehicles, which will emit Greenhouse Gases.	**Very low / Insignificant Risk**	**N/A**
7. HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS Refer to **Appendix C1.**	**Low / Insignificant Risk** **(Mine Pit area – all other areas require no mitigation and rating post mitigation is N/A)**	**N/A**
8. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

Table 13: Significance Ratings of Impacts after Mitigation during Operational Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
3. SOIL EROSION, SOIL COMPACTION AND CHANGE IN GEOLOGICAL SEQUENCE: The mining of Kaolin will result in the removal of topsoil, and 1 metre of overburden and the sub-layers of Kaolin. Impacts are the potential for soil erosion by wind and loss of soil in the event of rainfall; soil compaction from repeated use of access tracks; and changes in the landscape and topography from overburden and waste dumps, stockpiles and the open pit.	**Low / Insignificant Risk**	**N/A**
4. WATER RESOURCES: Potential for ground water pollution due to oil spills during routine maintenance of equipment. No surface water resources are in close proximity to the proposed mining site. The mining method makes use of a dry primary processing technique. No Water Use License is required.	**Low/ Insignificant Risk**	**N/A**
3. IMPACT ON NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CRITICAL BIODIVERSITY AREA 2 (CBA 2): The proposed mining area footprint will be cleared, mined and rehabilitated with the topsoil from the site, resulting in a short-term impact on localised ecological functioning. Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The machinery and trucks will disturb local fauna however, the adjacent area is already being mined.	**Low / Insignificant Risk**	**N/A**

4. POTENTIAL FOR SOIL CONTAMINATION, AND WASTE MANAGEMENT DURING OPERATIONAL PHASE:	**Low / Insignificant Risk**	**N/A**
5. VISUAL INTRUSION: Caused by the machinery, topsoil and rock stockpiles, cleared areas, and movement of trucks on site. The site is, however, remote and rural in nature with no receptors (people) as it is located on private property.	**Very Low / Insignificant Risk**	**N/A**
6. EMMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by mining equipment (e.g. front end loaders) and vehicles, which will emit Greenhouse Gases.	**Low / Insignificant Risk**	**N/A**
7. HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS: Refer to **Appendix C1.**	**Low / Insignificant Risk** **(Mine Pit area – all other areas require no mitigation and rating post mitigation is N/A)**	**N/A**
9. CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

All of the negative identified impacts will occur for a limited period and the extent of the negative impacts will be localised. All of the identified impacts can be suitably mitigated. There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in **Appendix D.**

11.2 Final Site Map

Refer to Diagrams 6a and 6b above for the location of the quarries that comprise this Mining Right Application.

11.3 Summary of the positive and negative implications and risks of the proposed activity and identified alternatives

Refer to Section 11.1 above, and Tables 12 and 13.

11.4 Proposed Impact Management Objectives and the impact management outcomes for inclusion in the EMPr

11.4.1 Management Objectives

The proposed impact management objectives are listed below:

Objective 1 - To create a safe and rehabilitated post-mining environment.

- Safe excavations
- Slope stability of remaining excavation
- No potentially dangerous areas secured if required
- Limited residual environmental impact
- Develop a landscape that reduces the requirement for long term monitoring and management
- No surface and/or groundwater contamination
- Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
- Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
- Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post mining landform
- Prevent alteration or diverting natural drainage lines and reduced natural runoff.

- Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-mining social opportunities

- Optimised benefits for the social environment
- Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
- Undertaking environmental management according to approved EMPr and Closure Plan and regular auditing of the environmental management system.
- Minimal negative aesthetic impact
- Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of a raise in the ambient noise levels
- Prevent disturbance of archaeological sites and implement mitigating measures according to the archaeological assessment.

11.4.2 Outcomes

- By providing sufficient information to strategically plan the kaolin mining activities, unnecessary social and environmental impacts be avoided.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a EMPr that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social and environmental impacts can be managed and mitigated effectively.
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary.
- Visual intrusion can be managed through natural vegetation or shade cloth, etc.
- Dust fall can be managed by reducing driving speeds when driving on unsurfaced roads.
- Wildlife disturbance and clearance of vegetation will be limited to the absolute minimum required and disturbed areas will be re-vegetated with locally indigenous species as soon as possible.
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refueling with care to minimise the chance of spillages and by having a spill kit available on each site.

11.5 Final Proposed Alternatives

Refer to Section 6.

11.6 Aspects for inclusion as conditions of authorisation

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**).
- Concurrent mining and rehabilitation must be undertaken where possible.
- The proposed mining area must be clearly demarcated with semi-permanent markers.
- The upper 50cm of soil must be removed and stockpiled to be returned after mining by spreading evenly over the mined area.
- Eradicate all alien vegetation in the area during and regularly after mining.
- The Applicant must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
    - The ECO must:
        - Inspect the site and record compliance with the EMPr;
        - Inform key, on-site staff of their roles and responsibilities in terms of the EMPr;
        - Ensure that all activities on site are undertaken in accordance with the EMPr;

- Immediately notify the mine operator of any non-compliance with the EMPr, or any other issues of environmental concern.

The following recommendations are made in the Heritage report (Appendix C1):

- Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine.
- A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (Appendix C2).
- Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.
- These proposed mitigation measures must be included in the Environmental Management Plan for the mine.
- ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.

Integrated Waste Management

- The mine operation must follow an Integrated Waste Management approach. Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.
- The permanent ablution facilities at the logistics areas shall have effluent purification and recycling systems in place to contain and treat the waste on site. The grey water shall be recycled for mining use.
- Haul roads are to be upgraded as required.
- A speed limit of 30km/hour will be displayed and enforced through a fining system within the project boundary.

11.7 Descriptions of any Assumptions, Uncertainties & Gaps in Knowledge

- The desk-top research included reference to the SANBI BGIS database map viewer for the various baseline environmental attributes, and any assumptions or gaps in knowledge expressed by SANBI in the provision of this information would be applicable to this information as referenced.
- It is assumed that the proposed mitigation measures as listed in this report and included in the EMPr will be implemented and adhered to. Mitigation measures are proposed which are considered reasonable and must be implemented in order for the outcome of the assessment to be accurate.
- It is assumed that the Rehabilitation, Decommissioning and Closure Plan (**Appendix E**) and any annual rehabilitation plans as part of production, will be implemented and adhered to.

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

11.8.1 Reasons why the activity should be authorized or not

It is the opinion of the EAP that the proposed kaolin mining right activity should be authorised. In reaching this conclusion the EAP has considered that:

- The “preferred alternative” takes into account location alternatives, activity alternatives, layout alternatives, technology alternatives and operational alternatives.
- The approach taken is that it is preferable to avoid significant negative environmental impacts, wherever possible. There are no significant environmental impacts associated with the proposed activity.
- Although the site is located in a Critical Biodiversity Area 2 (CBA2) and river FEPA sub-catchment, it is the opinion of the EAP that the underlying biodiversity objectives and ecological functioning will not be compromised, subject to the strict adherence to the EMPr and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**).

- ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.
- The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of kaolin for the local and international market.
- Provided the recommended mitigation measures are implemented in an environmentally sound manner and mining activities are managed in accordance with the stipulations of the EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**), the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

11.9 Conditions that must be included in the authorisation

11.9.1 Specific conditions to be included into the compilation and approval of EMPr

As per section 11.6 above:

- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**).
- Concurrent mining and rehabilitation must be done where possible.
- The kaolin mining operator must appoint a suitably qualified ECO who will be responsible for ensuring compliance with the requirements of the EMPr during the mine operation and decommissioning.
    - The ECO must:
        - Inspect the site and record compliance with the EMPr;
        - Inform key, on-site staff of their roles and responsibilities in terms of the EMPr;
        - Ensure that all activities on site are undertaken in accordance with the EMPr;
        - Immediately notify the mine operator of any non-compliance with the EMPr, or any other issues of environmental concern.
- Should any burials or other historical material be encountered during construction, work must cease immediately and SAHRA must be contacted.
- The mine operation must follow an Integrated Waste Management approach.
- Control measures must be implemented to prevent pollution of any water resource or soil surface by oil, grease, fuel or chemicals. Appropriate pollution prevention measures must be implemented to prevent dust.
- A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers will be informed of the speed limit applicable to the length of the access road, where after the national speed limits will be applicable for hauling trucks. The access road will be maintained during operational activities.

11.9.2 Rehabilitation requirements

- While some disturbed areas can be rehabilitated on a progressive basis during operation, others cannot be rehabilitated until mining is complete. For this reason, some rehabilitation is generally still required during and after closure. Remedial initiatives to minimise environmental impact during and after mining can be divided into three main categories:
    - Firstly, the removal of surface infrastructure that cannot be used for other purposes.
    - Secondly, the remediation and rehabilitation of old pits to remove the hazard they present to people and animals. Earthworks and contouring the mine area to as close as possible to the pre-mining landscape. This includes filling pits, trenches and small excavations; making pit side's safe and covering the surface area with subsoil and topsoil as necessary; and mitigation or restoration of all surface disturbances and revegetation of the pit slopes and waste dumps.
    - Lastly, the removal and isolation of potential pollutants from the environment. Containment and treatment of contaminated water and correct storage and removal of hazardous materials. Waste rock present specific problems, as they are unsuitable for other uses. For this reason, all waste rock and even low-grade product produced are destined to remain in the environment.
- Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff.

11.9.3 Period for which the environmental authorisation is required

The authorisation is required for the duration of the Mining Right, which is a period of 30 years.

11.9.4 Undertaking

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of this report.

12 FINANCIAL PROVISION

12.1 Introduction

With the repeal of Section 41 of the MPRDA (Act 28 of 2002) that requires that the owner of a mine must make financial provision for the remediation of environmental damage, regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No.107 of 1998) were issued in 2015.

According to regulation 7 the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11(1). In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for:

(a) annual rehabilitation, as reflected in an annual rehabilitation plan;
(b) rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and,
(c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

Financial provision in terms of reg. 6(c) are covered by the requirements for the actual costs of implementation of the measures required for rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the Rehabilitation, Decommissioning and Mine closure plan in terms of regulation 6(b) and attached as **Appendix E**.

The calculation in Table 14 below is for the expanded scale of operations as part of the mining right. The financial guarantee for current operations is already in place with DMR and will be upgraded as part of this environmental authorisation and reviewed annually.

Table 14: Table of Costs for Final Rehabilitation, Decommissioning and Closure of the Mining Operations

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Cost Factor 1				
Demolish and remove Buildings/Infrastructure including subsurface structures and bunded fuel storage - Salvage useable material, break structure and dispose in waste dump				
Risk based criteria and assumptions with regard to rehabilitation				
The cement structures used as part of the waste management facilities of the mine will not form part of this final decommissioning, rehabilitation and closure plan. All other structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level. Inert waste, which is more than 500 mm underground, such as pipes, will be left in place All services related to the mining operation, water supply lines and storage on site will have to be demolished				
Logistical facilities 0.5 Ha	Areas	1.00	R10 121.20	**R10 121.20**
Processing plant 0.5 Ha	Areas	1.00	R10 121.20	**R10 121.20**
			Sub-Total	**R20 242.40**
Cost Factor 2				
Remove waste from temporary storage and scrap from salvage yard				
Risk based criteria and assumptions with regard to rehabilitation				
A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility. Waste will be dispose/recycled every 3 month and there will never be more than 3 month worth of waste in the temporary storage areas				
Salvage Yard	Areas	1.00	R10 311.20	**R10 311.20**
Temporary waste storage area	Areas	1.00	R10 311.20	**R10 311.20**
			Sub-Total	**R20 622.40**
Cost Factor 3				
Final cleanup - remove all mining related waste walk through with landowner				
Risk based criteria and assumptions with regard to rehabilitation				
Removal of all structures and infrastructure not to be retain by the landowner in terms of section 44 of the MPRDA. All fixed assets that can be profitably removed will be removed for salvage or resale. Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and removed from site.				
Areas les than 10 Ha	Areas	1.00	R5 311.20	**R5 311.20**
			Sub-Total	**R5 311.20**
Cost Factor 4				
Loading and transport of overburden and product stockpile for backfill > 80m				
Risk based criteria and assumptions with regard to rehabilitation				
Return of land to its pre-mining land capability where possible It is assumed that the post-mining pit stability and profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure. Backfilling of leftover product to be done at final closure				
Leftover Product or low grade product & safety berm	m^3	2 000.00	R10.94	**R21 889.54**
			Sub-Total	**R21 889.54**
Cost Factor 5				
Profiling pit slope 18° by means of dozing <80m				
Risk based criteria and assumptions with regard to rehabilitation				
Mine pit to be developed in benches not exceeding 3m in height. Bench high waals to be sloped at final closure to create even depression				
Profiling pit slope	Ha	1.00	R9 648.98	**R9 648.98**
			Sub-Total	**R9 648.98**

Cost Factor 6				
Spreading topsoil level area and profile waste dumps				
Risk based criteria and assumptions with regard to rehabilitation				
All disturbed and exposed surfaces will be covered with at least 300 mm of topsoil and re-vegetation must be allowed to take place naturally It is assume that overburden and spoils will be dumped in the designated areas and profiled on a continuous basis as indicated in table 3. Provision is only made for partial replacement of topsoil still outstanding at final closure Where topsoil is not available, the cost for in-situ remediation will be the same as the estimate for top soiling				
Product drying, Stockpile and Dispatch Yard	Ha	0.50	R18 570.20	**R9 285.10**
Laydown and movement area	Ha	0.50	R18 570.20	**R9 285.10**
Overburden dumps	Ha	5.00	R18 570.20	**R92 851.02**
			Sub-Total	**R111 421.23**
Cost Factor 7				
Ripping and levelling Roads and all compacted areas				
Risk based criteria and assumptions with regard to rehabilitation				
All compacted areas due to hauling and stockpiling must be ripped to 300 mm Existing tracks will be used and no new roads will be developed. The stockpile and logistics area will not exceed the planned footprint.				
Product drying, Stockpile and Dispatch Yard	Ha	0.50	R280.82	**R140.41**
Laydown and movement area	Ha	0.50	R280.82	**R140.41**
Salvage Yard	Ha	0.50	R280.82	**R140.41**
			Sub-Total	**R421.23**
Total estimated cost to fully decommissioned the mining site at final closure				**R189 556.98**

Financial provision for the above are in place with DMR as follows:

- Cash deposit dated 08 May 2018 R100 000.00
- Financial Guarantee G0657/314253/GLO FNB dated 14 September 2015 R 50 250.00
- Addendum to Financial Guarantee G0657/314253/GLO to increase it to R100 000.00

12.2 Explain how the aforesaid amount was derived

According to regulation 6 an Applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:

(a) annual rehabilitation, as reflected in an annual rehabilitation plan;
(b) rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and,
(c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

12.3 Confirm that this amount can be provided for from operating expenditure

The amount needed for the implementation of the rehabilitation, decommissioning and closure plan will be provided to DMR in the form of a bank guarantee and the plan will be revised on an annual basis in terms of regulation 11(1) of the NEMA Financial Regulations 2015.

Provision for implementation of the annual rehabilitation plan is to be provided as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014) and will be provided as part of the operational budget. Proof of access to the necessary fund will be provided as part of the Mine Works Plan (MWP) together with proof of access to the necessary financial resources.

13 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

13.1 Deviations from the methodology used in determining the significance of potential environmental impacts and risks

No deviations were made.

13.2 Motivation for the deviation

Not applicable.

14 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

14.1 Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998)

The EIA report must include the: -

(1) Impact on the socio-economic conditions of any directly affected person

Potential socio-economic impacts have been addressed by the specialists who have prepared the Social and Labour Plan, a copy of which is attached at **Appendix F**.

A full consultation process is being implemented during the environmental authorisation process. The purpose of the consultation is to provide affected and interested persons with the opportunity to raise any potential concerns. Refer to Section 7 which provides a summary of the public participation process followed and the only comments received that were from the Kamiesberg Local Municipality.

2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

A Specialist Archaeology/Heritage Report (attached at **Appendix C1**) has been prepared. A Desk-Top Palaeontological Letter prepared by Prof. Marion Bamford is attached at **Appendix C2** and is submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. Recommendations and conclusions from **Appendix C1** are included in Section 8.1.12 above, and any additional measures stipulated by SAHRA will be included in the Final EIA Report, EMPr (Part B), Impact Tables (**Appendix D**) and Closure Plan (**Appendix E**).

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

Section 2 of NEMA sets out a number of principles (see section 5.7 above) that are relevant to the:

- EIA process, such as:
  - Adopt a risk-averse and cautious approach;
  - Anticipate and prevent or minimise negative impacts;
  - Pursue integrated environmental management;
  - Involve stakeholders in the process; and
  - Consider the social, economic and environmental impacts of activities; and regarding the
- Project such as:
  - Place people and their needs at the forefront of concern and serve their needs equitably;
  - Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;
  - Assume responsibility for project impacts throughout its life cycle; and the
  - Polluter pays for remediation costs.

This EIA process complies with the principles set out in section 2 of NEMA through its adherence to the EIA Regulations 2014 (as amended), and associated guidelines, which set out clear requirements for, inter alia, impact assessment and stakeholder involvement, and through the assessment of impacts and identification of mitigation measures during the Impact Assessment Phase.

- The Preferred and Only Alternative is considered in the Impact Assessment Phase (see Section 6) and the Impact Tables attached at **Appendix D**.
- The potential social and environmental impacts of the project will be identified, assessed and evaluated using Green Direction's impact assessment methodology (Section 9.4) to understand the significance of each positive and negative impact. The Impact Tables are attached at **Appendix D**.
- An EMPr has been compiled (Part B) of this report to ensure that potential environmental impacts are prevented or minimised.
- Mitigation measures will be recommended in the Impact Assessment Phase to allow for unavoidable impacts on the environment and people's environmental rights to be minimized and remedied.
- Opportunities for public participation are allowed for in the EIA process.
- The needs and interests of I&APs will be taken into account.
- All relevant information is being made available for public comment before submission to DMR, as part of the public participation process.
- No comments were received o the Draft Scoping Report, however, should comments be received from the relevant government departments. These comments will inform the decisions taken by DMR regarding Environmental Authorisation of the project.

PART B
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

15 DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

15.1 Details of the EAP
Refer to Section 1.1 In Part A above.

15.2 Description of the Aspects of the Activity
Refer to Section 9.10 and Table 9 above.

15.3 Composite Map
This is addressed in Section 8 in each environmental baseline map, in conjunction with the Mine Site Plans in Diagrams 4a to 4f.

15.4 Description of Impact Management objectives including Management Statements
This is addressed in Section 11.4.1 in Part A above.

15.5 Determination of Impact management objectives including management statements

15.5.1 Determination of Closure Objectives

Objective 1 - To create a safe and healthy post-mining environment

- Safe excavations
  - Slope stability of remaining excavation
  - No potentially dangerous areas secured if required
- Limited residual environmental impact
  - Develop a landscape that reduces the requirement for long term monitoring and management
  - No surface and/or groundwater contamination
  - Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
  - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
  - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post mining landform
  - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
  - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-mining social opportunities

- Optimised benefits for the social environment
  - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
  - Undertaking environmental management according to approved EMPr and Closure plans and regular

auditing of the environmental management system.

- Minimal negative aesthetic impact
  - Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of an increase in the ambient noise levels
  - Prevent disturbance of archaeological sites and implement mitigating measures according to the archeological assessment.

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

The mitigation measures contained in Table 14 and **Appendix E** provide the measures for managing any environmental damage, pollution, water or ecological degradation.

In addition, an Environmental Control Officer is required to audit the mine on an annual basis, to ensure that mitigation measures are employed correctly and continuously.

15.5.3 Potential risk of Acid Mine Drainage

No acid mine drainage associated with kaolin quarries, which are classified as Category C mines.

15.5.4 Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

Not applicable.

15.5.5 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

Not applicable.

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

Not applicable.

15.5.7 Volumes and rate of water use required for the mining operation

The mining method makes us of dry primary processing technique. Rainwater will be collected off the mine infrastructure for use in dust suppression, and drinking water will be trucked in. Grey water will be recycled. Dry enviro-loos will be used and therefore no effluent will be generated.

15.5.8 Has a water use license been applied for?

A Water Use License is not required

15.6 Impacts to be mitigated in their respective phases

Table 15: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SITE ACCESS & SITE ESTABLISHMENT	**CONSTRUCTION**	TOTAL EXTENT OF AREA REQUIRED FOR MINING INCLUDING PRODUCT STOCKPILES, OPEN PIT, OVERBURDEN AND WASTE DUMPS • Infrastructure & logistics = 20Ha • Overburden & waste dumps = 36.5 Ha • Mine Pit, processing plant, processing and drying area = 17.8 Ha • Stockpiles, RoM, and topsoil = 7.9 Ha Total is 82.2 Ha	**Impact 1: Soil erosion & soil compaction** • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. • In particular, topsoil must not be subject to compaction greater than 1 500 kg/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Soil erosion and compaction on the section of access roads used by the Applicant is required to be monitored and timeously repaired. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. **Impact 2: Water resources** • Implement and follow water saving procedures and methodologies. • Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Take care that temporary onsite sanitation facilities are well maintained and serviced regularly. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Ensure that good housekeeping rules are applied. • Minimise storage of hazardous substances onsite during construction. • Service and refuel construction vehicles at a fit-for-purpose facility to minimise pollution risks.	NEMA Section 2 Principles Environmental Authorisation	Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities) Upon cessation of each activity where applicable. Immediately in the event of spills

			• Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training and comply with the requirements of the EMPr. • No sewage system will be required and a dry enviro loo system will be developed. • Water for dust suppression to be sourced from recycled grey water system. • Potable water to be sourced from rain collection or trucked in from outside sources. • Waste water (i.e., including process water and grey water) - By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. - Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum existing vegetation coverage. - Slow storm water runoff with contoured, low-gradient drains and channels. Storm water diversion and erosion control contour berms separate clean and contaminated water systems around the pit and infrastructure areas.		
			Impact 3: Impact on biodiversity • Refer to **Diagrams 6A and 6b**. • Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area. • No indigenous plants outside of the demarcated work areas may be damaged. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals. These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary.		
			Impact 4: Contamination & Pollution • Oils and lubricants must be stored within sealed containment structures if kept on site. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where mining activities are in progress. • Any spillages will be cleaned up immediately. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training. • Provide a bin at the site. • Regularly dispose of any solid waste at a municipal waste disposal site. • Ensure all workers comply with the requirements of the EMPr. • Provide a mobile ablution facility.		
			Impact 5: Visual Impact • The construction areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads.		
			Impact 6: Emissions		

			• The Contractor shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. • The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding "built-up" area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. • Construction and demolition activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise of neighbours. • No amplified music shall be allowed on site. • Hauling vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.		
			Impact 7: Heritage Resources The following recommendations are made (**Appendix C1**): • Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine. • A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (**Appendix C2**). • Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it. • These proposed mitigation measures must be included in the Environmental Management Plan for the mine. ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.		
			Impact 8: Socio-economic – creation of employment and job security during construction phase with local and regional economic spin-offs • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		
Kaolin open pit mine in operation	**OPERATION**	TOTAL EXTENT OF AREA REQUIRED FOR MINING INCLUDING PRODUCT STOCKPILES, OPEN	**Impact 1: Soil erosion, soil compaction and geological sequence** The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan (**Appendix E**) must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. • Mine pit to be developed in benches not exceeding 3m in height . • At final closure the sides of the burrow pit will be sloped to form an even depression without any steep high walls.		

		PIT, OVERBURDEN AND WASTE DUMPS • Infrastructure & logistics = 20Ha • Overburden & waste dumps = 36.5 Ha • Mine Pit, processing plant, processing and drying area = 17.8 Ha • Stockpiles, RoM, and topsoil = 7.9 Ha Total is 82.2 Ha	• Actions to mitigate the risk of erosion on waste dumps will be through implementation of practices such as leaving the profiling contours created by equipment tracks. • Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated with reduce erosion and runoff. • The main closure objective is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated. • The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures. • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilised areas shall be demarcated accordingly. • Incremental clearing of vegetation should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • The stockpile areas for topsoil are temporary as they will be re-used on a cut and fill basis. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. • No industrial or mine waste is generated during the mining process. • Processing shall include the spreading of Kaolin to dry out where after it will be screened and bagged to be sold as a FoT product. • Product stockpiles shall form part of the drying area that shall also serve as a dispatch yard. • Primary processing shall include screening by means of a “trommel screen” provided as part of the adjacent operation so no Fine Residue Dumps (FRD) will be created.		

			Impact 2: Water Resources • Implement and follow water saving procedures and methodologies. • Place oil traps under stationary machinery, only re-fuel machines at fueling station, construct structures to trap fuel spills at fueling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Take care that temporary onsite sanitation facilities are well maintained and serviced regularly. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Ensure that good housekeeping rules are applied. • Minimise storage of hazardous substances onsite during construction. • Service and refuel construction vehicles at a fit-for-purpose facility to minimise pollution risks. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training and comply with the requirements of the EMPr. • No sewage system will be required and a dry enviro loo system will be developed. • Water for dust suppression to be sourced from a recycled grey water system. • Potable water to be sourced from rain collection or trucked in from outside sources. Drinking water to be brought on site as per existing practices. • **Waste water (i.e., including process water and grey water)** - By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. - A Standard French drain system will be developed for grey water disposal. - Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum existing vegetation coverage. - Slow storm water runoff with contoured, low-gradient drains and channels. - Storm water diversion and erosion control contour berms separate clean and contaminated water systems around the pit and infrastructure areas.	NEMA Section 2 Principles Environmental Authorisation	During the estimated 30 year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.
			Impact 4: Impact on biodiversity • Refer to Diagrams 6a to 6B, which show the proposed areas for mining and the existing tracks that will be used. . • The annual rehabilitation plan must be implemented. • Remove alien invasive vegetation, and ensure ongoing alien vegetation clearing should this be required. • No indigenous plants outside of the demarcated work areas may be damaged. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals. These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary. • Regular maintenance of the boundary fence is required.		
			Impact 5: Contamination & Pollution • Oils and lubricants must be stored within sealed containment structures of the demarcated areas of the adjacent mine.		

			• Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where mining activities are in progress. • Any spillages will be cleaned up immediately. • Unwanted steel, sheet metal and equipment need to be stored in a demarcated salvage yard, and will need to be sold or disposed of as scrap metal. Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment. • All equipment and other items used during the mining operation needs to be removed from the site during rehabilitation. • Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be buried or burned on the site. • All temporary waste storage areas need to be cleaned out and waste removed. • Tyres to be return to supplier or a company that uses old tyres for making door mats, shoes, swings, etc. • Batteries to be return to supplier or dispose at a permitted hazardous waste facility. • Fluorescent tubes to be collected in sealed containers (stored on concrete slabs) and removed from site for disposal at a permitted hazardous waste facility. • Chemical containers to be returned to supplier or disposed of at a legal, permitted facility that is capable of disposing of the waste. (DO NOT sell chemical containers to workers or communities). • Laboratory waste (chemicals) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. • Industrial chemicals (laboratory waste) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. • Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company. • All waste in the temporary storage area for used lubrication products and other hazardous chemicals will be disposed of at a collection point from where it will be collected by a waste recycling company. • Generator bays will be constructed with the necessary pollution control measures (drip trays). • Hydrocarbon contaminated sludge (collected in oil traps) - Removed from the oil traps and removed from site for recycling (if possible) or disposal at a suitably permitted facility. • Equipment used in the mining process will be adequately maintained in the workshops of the company so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid. • By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. • Oils and lubricants must be stored within sealed containment structures of the demarcated areas of the adjacent mine. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training. • In order to ensure that waste classes are kept in separate streams, communication will be passed on and people will be trained on the different waste classes.		

			• Ensure all workers comply with the requirements of the EMPr. Training of personnel in the implementation of the Closure Plan will done and the implementation of the environmental awareness plan will be an ongoing process. • Regularly dispose of any solid waste at a municipal waste disposal site. • Provide a mobile ablution facility.		
			Impact 6: Visual landscape • Maintain the height of the stockpile areas at a maximum of 2 metres. • The site shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads. • The impact is temporary and after mining the excavations will be sloped, all oversize material and overburden will be backfilled, top soiled and allowed to re-vegetate naturally resulting in an even depression with no residual impact.		
			Impact 7: Emissions • Ensure Kaolin hauling is during normal working hours and not on weekends. • No amplified music should be allowed on site. • Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite. • On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Ensure bagged Kaolin is properly secured for hauling.		
			Impact 8: Heritage resources **The following recommendations are made (Appendix C1):** • Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine. • A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (as per **Appendix C2**). • Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it. • These proposed mitigation measures must be included in the Environmental Management Plan for the mine. • ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.		
			Impact 9: Socio-economic • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		

Final Rehabilitation and removal of temporary infrastructure	DECOMMISSIONING	TOTAL EXTENT OF AREA REQUIRED FOR MINING INCLUDING PRODUCT STOCKPILES, OPEN PIT, OVERBURDEN AND WASTE DUMPS • Infrastructure & logistics = 20Ha • Overburden & waste dumps = 36.5 Ha • Mine Pit, processing plant, processing and drying area = 17.8 Ha • Stockpiles, RoM, and topsoil = 7.9 Ha Total is 82.2 Ha	• Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix E**). • Compacted areas shall be scarified after use during decommissioning and rehabilitation. • Any stored topsoil shall be spread over the scarified surface. • Ongoing removal of alien invasive vegetation as required. • After mining the excavations will be sloped, all oversize material and overburden will be backfilled, top soiled and allowed to re-vegetate naturally resulting in an even depression with no residual impact. • Distinguished between farming and mining infrastructure and waste, and in consultation with landowner Identify infrastructure and services to remain after closure. • The cement structures for the fuel supply including service apron/wash bay will remain as part of farm improvement and the mine will only be responsible for maintenance and waste management. • Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be removed for use elsewhere or demolished and discarded. • All redundant infrastructure and services need to be demolished including ruins, buildings, foundations, footings. • Building rubble will be used as backfill in excavations or removed from site in the absence of excavations. • All steel structures and reinforcing will be discarded or sold as scrap. • Remove all power supply installations not to be retained by landowner in terms of section 44 of the MPRDA. • Excavations created by removing subsurface infrastructure needs to be filled, levelled and compacted. • Implementing screening as part of the cleaning activities before materials are moved from the mine. • The infrastructure area will be screened for petrochemical spills and cleaned. • The compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled. • Decontaminate oil and diesel contaminated soils and structures with biochemical agents prior to removal. • Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site. • Coarse natural material used for the construction of ramps must be removed and dumped into the excavations. • Reshaping of the mine pit to create shallow depressions. • Level the complete disturbed areas and restore the original profile to blend in with the natural topography. • On completion of mining operations, the surface of the disturbed areas especially if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 300mm and the previously stored topsoil will be returned to its original depth over the area. • To ensure long-term stability, the restored soil cover should attempt to mimic the pre-mining distribution of soil texture and thickness • Unnecessary destruction of vegetation should be avoided by ensuring that traffic and personnel movement be restricted to demarcated areas. No traffic should be allowed on the rehabilitated areas. • Minimise noise disturbance: limiting earth moving to day time.	NEMA Section 2 Principles Environmental Authorisation	

15.7 Impact Management Outcomes

Table 16: Impact Management Outcomes

ACTIVITY (whether listed or not listed).	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Site access	Disturbance of fauna and flora	Biodiversity in an CBA2 area	Construction	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil compaction and erosion	Soil resource		Control through monitoring and management	
Site establishment, including waste generation and management	Visibility	Visual intrusion	Construction	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity CBA2 area		Remedy through restriction and rehabilitation	
	Soil and sand contamination, soil compaction and disturbance	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management	
	Destruction or loss of Heritage resources	Cultural and Heritage		Avoidance by relocation of activity if required Management via permit application for destruction of heritage resources, with potential for salvage	Impact avoided Impact mitigated
Removal of kaolin, loading and hauling, waste generation and management	Change in landscape	Topography	Operation	Remedy through restriction and rehabilitation	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil and ground water contamination, and waste management	Contamination & pollution		Control through monitoring and management	
	Visibility	Visual		Control through monitoring and management	
	Emissions (dust, noise & vehicles)	Noise & Air quality		Control through monitoring and management	
	Disturbance of fauna and flora	Biodiversity in an CBA2 area		Remedy through restriction and rehabilitation	
	Soil erosion and compaction	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management.	
	Use of borehole water for mining process (cooling of saw blades)	Ground water resource			

				Management and control would include focus on recycling of water wherever possible.	
	Destruction or loss of Heritage resources	Cultural and Heritage		Avoidance by conducting a heritage impact assessment, followed by control and management if necessary.	Impact mitigated or avoided
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Soil resource	Decommissioning	Control through monitoring and management	Impacts minimised and mitigated. End use objectives achieved through rehabilitation.
	Soil erosion due to slow recovery of vegetation	Soil resource & biodiversity		Remedy through restriction and rehabilitation & control through monitoring and management	
	Change in topography	Topography			

15.8 Impact Management Actions

Table 17: Impact Management Actions

ACTIVITY whether listed or not listed.	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Site access	Disturbance of fauna and flora	Remedy through restriction and rehabilitation	Concurrently with site access activities Upon cessation of activity	Remain within the ambit of the Mining Right Programme and Environmental Authorisation
	Soil compaction and erosion	Control through monitoring and management		
Site establishment, including waste generation and management	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)			
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and sand contamination, soil compaction and disturbance	Remedy through restriction and rehabilitation & control through monitoring and management		
	Destruction or loss of Heritage resources	Avoidance		
Removal of kaolin ore, loading and hauling, waste generation and management	Change in Topography	Remedy through restriction and rehabilitation	Concurrently with site access activities Upon cessation of activity	Remain within the ambit of the Mining Right Programme and Environmental Authorisation.
	Visibility	Control through monitoring and management		
	Emissions (dust, noise & vehicles)	Control through monitoring and management		
	Disturbance of fauna and flora	Remedy through restriction and rehabilitation		
	Soil and sand contamination, soil compaction and disturbance	Remedy through restriction and rehabilitation & control through monitoring and management		
	Groundwater extraction for mining			
	Destruction or loss of Heritage resources	Avoidance		
Removal of temporary infrastructure and site rehabilitation	Dust emissions (vehicle entrained dust)	Control through monitoring and management	Upon cessation of activity	Remain within the ambit of the Mining Right Programme and Environmental Authorisation
	Soil erosion due to slow recovery of vegetation	Remedy through restriction and rehabilitation & control through monitoring and management		
	Change in topography			

16 FINANCIAL PROVISION

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

As detailed in Section 15.5.1 above:

Objective 1 - To create a safe and healthy post-mining environment

- Safe excavations
  - Slope stability of remaining excavation
  - No potentially dangerous areas secured if required
- Limited residual environmental impact
  - Develop a landscape that reduces the requirement for long term monitoring and management
  - No surface and/or groundwater contamination
  - Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
  - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
  - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post mining landform
  - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
  - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-mining social opportunities

- Optimised benefits for the social environment
  - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
  - Undertaking environmental management according to approved EMPr and Rehabilitation, Decommissioning and Closure Plan (**Appendix E**) and regular auditing of the environmental management system.
- Minimal negative aesthetic impact
  - Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of an increase in the ambient noise levels
  - Prevent disturbance of archaeological sites and implement mitigating measures according to the archeological assessment.

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

The closure objectives are included in this Draft EIR and in the Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix E**), which is being made available to all registered Interested and Affected Parties.

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

Refer to the Rehabilitation, Decommissioning and Mine Closure Plan, which includes the Environmental Risk Assessment in **Appendix E**.

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

The closure objectives are to return the land disturbed by mining activities back to its original condition. The rehabilitation plan provides the detail on how this will be achieved as detailed in **Appendix E**.

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

Refer to Part A, Section 12, and Table 14 of this report.

16.6 Confirm that the financial provision will be provided as determined

Refer to Part A, Section 12.3 of this report.

16.7 Mechanisms for monitoring compliance with and performance assessment against the Environmental Management Programme and reporting

Table 18: Mechanisms for Monitoring Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All mining activities	All commitments contained in the EIA Report and accompanying EMPr.	Ensure commitments made within the approved EIR and EMPr are being adhered to.	Site Manager and EAP.	Annual Undertake and submit an environmental performance audit to DMR
Site access and site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads and soil stockpiles must be monitored for erosion on a regular basis, specifically after rainfall events.	Site Manager and Independent EAP	Weekly, and after rain-fall events Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Operational - Kaolin Mining	Visual inspection of biodiversity impacts Visual inspection of waste and effluent management, access and haul roads, housekeeping and maintenance.	Visual inspection of mining activities and other possible secondary impacts Control and prevent the development of new access tracks. Repair and maintenance of access roads and boundary fence. Control and prevent growth of alien vegetation in cleared areas and on stockpiles. Standard waste management practices must be implemented to prevent contamination and littering. All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure.	Site Manager & Contractor (or sub-contractors)	Daily Weekly monitoring reports to be signed-off by the Site Manager. Corrective action to be confirmed and signed-off by the Project Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted. Report incidents in terms of the relevant legislation, including the MPRDA and NEMA.
Closure & Rehabilitation	Revegetation; Stability; Soil erosion Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.	Site Manager	Bi-Annual A final audit report for site closure must be submitted to the DMR for approval.

16.8 Indicate the frequency of the submission of the performance assessment/ environmental audit report

An external environmental performance audit and the EMPr performance assessment shall be conducted annually interchangeably by an independent environmental assessment practitioner.

17 ENVIRONMENTAL AWARENESS PLAN

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

Environmental awareness and training includes:

- Awareness training for contractors and employees.
- Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts.
- Comprehensive training – on emergency response, spill management, etc.
- Specialised skills.
- Training verification and record keeping.

Before commencement of the mining activities all new employees and contractors who are involved with such activities should attend relevant induction and training. It is standard practice for employees and the employees of contractors that will be working on a new project or at a new site to attend an induction course where the nature and characteristics of the project and the site are explained.
The training course should include key information abstracted from the EMPr pertaining to the potential environmental impacts, the mitigation measures that will be applied, the monitoring activities that will be undertaken and the roles and responsibilities of contractors' and personnel.
The EMPr document will also be made available to attendees.

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

Environmental risks and how to manage them are dealt with in the induction course referred to in Section 17.1 above. Should an incident of environmental pollution or damage occur it will be analysed and appropriate prevention and/or mitigation measures developed. These measures will be added to the EMPr and conveyed to the relevant personnel. All unplanned incidents with the potential to cause pollution or environmental degradation or conflict with local residents will be reported to the Mineral Resources Manager within 24 hours.

Hydrocarbon Spills

Hydrocarbon spills that are considered to be emergency incidents are large-scale spills (cover a surface area >1m²), resulting from situations such as: a leaking diesel bowser; an oil drum that is knocked over; and large spillages from equipment.

Activities that are involved in the clean-up of such instances include:

- The containment of the spill;
- The removal of all contaminated material; and,
- The disposal (at a licensed hazardous disposal facility) or bioremediation (at a licensed facility) of this material.

Fire

There is the potential for fire to occur in the following locations of the sand mining site:

- Veld fires across vegetated areas; and
- Vehicles and equipment.

Veld fires: Any person who observes the fire must report it to the fire brigade immediately and then to their supervisor. If possible, additional personnel may be sent to contain the fire, but only if the lives of the personnel will not be endangered.

Vehicles and Equipment: Fire extinguishers will be available at the site where sand mining activities will take place and in the vehicles. All staff members will be trained in the use of fire-fighting equipment.

17.3 Specific information required by the Competent Authority

Not applicable at this stage.

18 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, **Jennifer Anne Barnard** herewith undertake that the information provided in the foregoing report is correct including reference to Specialist Reports (as attached), and to be read in conjunction with the Disclaimer provided in the beginning of the report.

Signature of the Environmental Assessment practitioner:

Green Direction Sustainability Consulting (Pty) Ltd

Name of company:

28 December 2020

Date:

19 REFERENCES

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South African National Biodiversity Institute (2006-2018). The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors). Online http://bgis.sanbi.org/Projects/Detail/186, Version 2018.

20 APPENDIX A: CV OF EAP

Summary of the Environmental Assessment Practioner's Experience

Jennifer Barnard has been registered with the South African Council for Natural Scientific Professions since 2009, and was awarded certification as an Environmental Assessment Practioner (EAP) by the Environmental Assessment Practioner's Association of South Africa in September 2020, with registration number 2020/2492. She has worked on numerous Environmental Impact Assessments, both in South Africa and the United Kingdom and has considerable experience in the preparation and compilation of Environmental Impact Reports, Environmental Management Programmes, Environmental Audits, and Environmental Management Frameworks, including construction monitoring where required. She has been working in the environmental consultancy field for 23 years, and prior to that in the KwaZulu-Natal Provincial Local Government and Development Planning (Environmental Planning and Policy Division) for 5 years.

Specific examples of private consultancy EAP experience include:

- Project Manager and Lead EAP of the Eskom Transnet Coal Link Suite of Projects (in terms of the NEC2 Contract with EIA project value of R6 million), which spanned both Mpumalanga and KwaZulu-Natal.
- Project Manager and Lead EAP of two SANRAL Road Upgrades on the N7, Western Cape, that included Borrow Pits.
- Project Manager and Lead EAP for numerous Basic Assessments for Eskom Distribution Powerlines (in KZN and Western Cape), and CapeNature Tourism Infrastructure Upgrades in the Western Cape.
- EAP for various Basic Assessments and EIAs in the Northern Cape for agricultural activities, and related Water Use General Authorisation Risk Matrices.
- ECO monitoring of the construction of the Kogelberg Phase 2 tourism infrastructure development, EA Amendment and iWULA, Western Cape.
- Water Use General Authorisation for a sand mining permit outside Pella, Northern Cape.
- EAP for Basic Assesment and Water Use General Authorisation for a Sand Mining Application in the Hartbees River, Kakamas, Northern Cape.
- EAP for Basic Assesment and Water Use General Authorisation for a Sand Mining Application in the Donkerhoekspruit, and in an unnamed tributary outside Upington, Northern Cape.
- EAP for Basic Assessment for Kaoline Mining outside Garies in the Northern Cape.
- EAP for Environmental Impact Asessments and WULAs, and Integrated Water and Wastewater Management Plan for three granite mines located north-east of Pofadder in the Northern Cape.
- EAP for Environmental Impact Asessments and WULAs, and Integrated Water and Wastewater Management Plan (in progress) for a granite mine outside Steinkopf, Northern Cape.
- EAP for Environmental Impact Assessments (completed) and iWULAs (in progress) for two Copper Mining Rights, one north of Springbok, Northern Cape, and the other for a copper mine in the Concordia area.
- EAP for Basic Assessment for sand mining permit outside Klawer, Western Cape.

21 APPENDIX B: PUBLIC PARTICIPATION PROCESS

22 APPENDIX C1: HERITAGE IMPACT ASSESSMENT

23 APPENDIX C2: PALAEONTOLOGICAL IMPACT ASSESSMENT

24 APPENDIX D: IMPACT ASSESSMENT TABLES

25 APPENDIX E: REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN

26 APPENDIX F: SOCIAL LABOUR PLAN