SHIRLEY HAYES-IPK (PTY) LTD

MINING RIGHT APPLICATION ON PORTION OF PLOT 2100, CONCORDIA, NAMA KHOI LOCAL MUNICIPALITY, NAMAKWA DISTRICT MUNICIPALITY, NORTHERN CAPE

DMR REF.: NC 30/5/1/2/2/10166MR

Draft Environmental Impact Assessment Report (DEIR)

green direction
sustainability consulting

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Date:	15 October 2020
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Author:	Jennifer Barnard
EAPASA Reg. No.	2020/2492
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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

DRAFT 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: **Shirley Hayes-IPK (Pty) Ltd (SHIP)**
TEL NO: **083 632 6742**
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DMR REFERENCE NUMBER: **NC 30/5/1/2/2/10166MR**

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.

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 Report and Public Participation Documentation
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.: 202/2492. New Buildings AP Green Star SA (2016. 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: 10 January 2020

EXECUTIVE SUMMARY

"Shirley Hayes-IPK (Pty) Ltd (SHIP) has been engaged in exploration activity under cover of Prospecting Right NC 30/5/1/1/2/11046 PR since it first applied for a prospecting right on the current Concordia Copper Prospecting Area (CCPA) since 2010. During this time SHIP has developed a Cluster Mining Model where a number of smaller deposits that would not normally be economically viable on its own can be mined in sequence from one central processing facility to support a major copper mining operation. This application forms part of the planning work that has been completed to show that such an approach can unlock the mineral wealth of the area and has the potential to create significant economic prosperity on a sustainable basis.

SHIP propose to build a 30ktpm processing plant that will produce copper concentrate at the Rietberg Mine locality. This plant will be the central processing facility for the Mining Complex, and tailings from ore mined at different sites at Jubilee and Homeep will be deposited at the one central processing plant at the Rietberg Mine with one Tailings Storage Facility, thereby reducing the overall development footprint. Mining is planned to start at the Rietberg mine in year 2 (Year 1 will be the period during which the central processing plant is constructed and access mine development completed) from underground in the first 7 years and then shift to mining at the Jubilee Open Pit and the Homeep Mine from year 8 to 15.

The proposed mine will employ 178 people directly and will impact on at least 20 local businesses in the area. It is estimated that the indirect economic benefit to the area will be in excess of ZAR100m. The direct investment is well over ZAR180m bringing the total benefit to the area of some ZAR280m exclusive of direct salary payments in excess of ZAR68m per annum. In addition, SHIP will also implement a social and labour plan including a social responsibility project to support the local community.

Diagrams 3b, 3c and 3d provide the detailed Mine Site Layout for the three mines that comprise the Mine Complex. These diagrams indicate the mining footprint including infrastructure, services, mining portals, open cast and blast radius perimeter, waste and RoM stockpiles, waste rock dumps, and the centralised tailings storage facility at the Rietberg Mine. Mining is proposed to take place from underground portals included in the infrastructure areas, and from open pit excavations for the following areas:

- Rietberg mine – underground portals;
- Jubilee mine – open pit excavation; and
- Homeep mine - underground portals.

The process flow diagram is provided in **Diagram 6**.

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 in Section 5.

The **project alternatives** are described in Section 6 and summarised as:

- The referred and only **activity** alternative is the mining and primary processing of copper (and other metals) within the Mining Right area demarcated in **Diagram 3a, 3b, 3c and 3d**.
- The preferred and only **location and layout alternatives** of the mining activities are on the earmarked sites shown on the Mine Site Plans as per **Diagram 3b (Rietberg), Diagram 3c (Jubilee), Diagram 3d (Homeep)** and **Diagram 4** for the bulk infrastructure.
    - 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, to avoid watercourses and sites of heritage significance considered to be "no-go" areas.
    - The original location of the Tailings Storage Facility (TSF) has been moved out of the watercourses and is now located further to the north-west. The specialist report addressing the TSF location and design is attached at **Appendix D**.
    - The new section of haul road has been identified to by-pass the main centre of the town of Concordia as shown in **Diagram 4: Bulk Infrastructure**. The haul routes are shown in **Diagram 4**, and an alternative haul road has been identified to the east, to avoid the 600m section of residential area on the outskirts of Concordia.
    - The potable water supply pipeline will connect to the Henkries line adjacent to the N7 and follow a direct line to the proposed Rietberg Mine Site as shown in **Diagram 3b and Diagram 4**.
    - As shown in the mine site layouts and in **Diagram 4**, the electricity supply routes will connect to the existing power grid. Investigations are currently underway with Eskom regarding the supply of power to the mines.
- The preferred and only **technology** alternative is the underground and open cast mining, extraction, processing, waste and water management, design of the Tailings Storage Facility with a Class C containment system (**Appendix D**) and use of electricity with backup generators as described in Section 6.5 below.

- The preferred and only **operational** alternative is the highly mechanised underground and open cast mining method of long-hole open stoping, open-cast mining, and the above-ground primary processing activities (crushing and screening; milling; reagent make-up and conditioning; flotation; and, product handling) as illustrated in the Plant Process Flow (**Diagram 6**).

The preferred and only alternatives described above have been included the impact assessment, together with the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline, as detailed in the Impact Tables attached at **Appendix F**.

Public Participation Process

During the public participation process completed for the Scoping Phase, completed Registration and Comment Forms were received from the Okiep Copper Company, and numerous members of the Concordia Community. Comment was received via email from the owner of the Apollis Cottage. No comments were received from any organs of state. Responses to the comments received during the Scoping Phase are included in Table 11 in Section 7.3. The Final Scoping Report was uploaded onto the Green Direction website on 19 February 2020 and made available to registered I&APs via the email dated 19/02/2020 included in **Appendix B**.

The Letter of Acceptance of the Scoping Report from the Department of Mineral Resources (DMR) dated 5 August 2020 is included in **Appendix B**. The public participation process chapter is described in Section 7. Registered Interested and Affected Parties (I&APs) have been notified via a "Notice of Commencement of the EIA Phase and availability of the DEIR", a copy of which is included in **Appendix B**.

The 30-day comment period on the DEIR starts on the 16 October 2020 and ends on the 17 November 2020. A copy is available for download off the Green Direction website, details of which are included in the project notice and attached at **Appendix B**.

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 Nama Khoi Integrated Development Plan (IDP) and Namakwa District IDP. Project site photographs are included to illustrate the existing disturbed areas of the three mine sites, access roads, vegetation type and the general landscape. A Heritage Impact Assessment is included in this DEIR.

The following **specialist assessments** and/or detailed investigations identified in the Final Scoping Report and listed in the Plan of Study for Scoping have been prepared as explained below:

1. **Heritage Impact Assessment and Palaeontology Assessment (attached at Appendix C).**

2. **Definitive Feasibility Study Design of Tailings Storage Facility (TSF) (Appendix D)**:
   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), (as amended by GNR 990 of 21 September 2018) stipulates a site selection process and pollution control measure to be determined on a case by case basis, based on a risk analysis conducted by a competent person. GNR634 requires the waste classification of the tailings stream, and requirements for a lining of the TSF. A definitive feasibility study has been undertaken to address the following areas related to the location and design of the TSF:
   - Waste classification of the tailings assessed in conjunction with the report on groundwater conditions (Geo-hydrological report – see point 2 below).
   - The report includes the Applicant's preference for a Class C containment barrier system in the design of the proposed TSF.
   - A full geotechnical investigation to determine the suitability of the available in-situ materials for use as construction materials, depth to bedrock/refusal, depth of in-situ materials, foundation indicators of the in-situ soils, shear strength parameters of the in-situ soils; permeability/hydraulic conductivity of the in-situ soils; identification of any natural fault lines; and the volumes of material available and where borrow pits may be instated.
   - The sizing of the Stormwater Dam (SWD) is to be confirmed by a detailed water balance, which includes accurate rainfall and evaporation data and confirmation of the design flood depths.
   - A seepage assessment and slope stability analysis must be conducted to confirm the geometry and drainage requirement of the TSF, Return Water Dam (RWD), and SWD.
   - The Zone of Influence should be determined to establish the potential hazard posed to nearby water resources, settlements, and sensitive flora and fauna.
   - A topographical survey.

2. **Geo-hydrological Impact Assessment** attached at **Appendix E** to inform the location and design of the Tailing Storage Facility Design; to provide information on the groundwater quality and quantity in the Rietberg and Homeep mine

shafts, Jubilee open quarry, and boreholes, and to inform the sustainable management thereof. This report is also a key specialist report in the Integrated Water Use Licence Application (iWULA).

3. **Integrated Water Use License (iWULA)** to be prepared subject to the receipt of a positive Environmental Authorisation from DMR to include the following:
   - **Geo-hydrological Impact Assessment (Appendix E):** as described above to inform the location and design of the TSF and provide groundwater information to inform the iWULA.
   - **Integrated Water and Wastewater Management Plan (IWWMP)** is a specialist report required to inform the IWULA and provides all relevant information on the surface and groundwater, its management in relation to the proposed mining activities, and the associated monitoring programme required to achieve the water management objectives.
   - **Stormwater Management Plan** is required as a component of the iWULA.
   - Water use activities to be applied for as detailed in Section 8.1.8 below:
     - Section 21(a): Taking water from a resource;
     - Section 21(b): Storing water;
     - Section 21(c): Impeding or diverting the follow in a watercourse;
     - Section 21(g): Disposing of waste in a manner which may detrimentally impact on water resource;
     - Section 21(i): Altering the beds, banks, course or characteristics of a watercourse; and,
     - Section 21(j): Removing, discharging or disposing of water found underground.

4. **Infrastructure routes such as powerlines, water pipeline routes and haul roads** have been assessed in more detail.
   - The water pipeline providing potable water from the Henkries Line to the Rietberg Mine has been surveyed and the existing stone plinths from the previous mining activities' water pipeline will be utilised to transport the above ground pipeline across the watercourses to the Rietberg Mine.
   - There is a lack of existing electricity capacity required for the processing plant and mining activities at Rietberg and for the mining activities at Jubilee and Homeep. Investigations have been initiated with Eskom in this regard. The mine site layout plans indicate the capacity required and approximate powerline routes and locations of transformers.
   - An alternative haul road between the Jubilee Mine and the Rietberg Mine has been identified to avoid the town of Concordia as shown in the mine site layout for Jubilee, and bulk infrastructure map. Existing roads will be utilised as far as possible and upgraded to accommodate the haul trucks. Borrow material for the road base layer has been identified.

Impact assessment and significance ratings

The **risks, impacts and aspects** are described in Section 9. The impact assessment rating methodology and process including the associated significance ratings are described in Section 9 and detailed in the Impact Tables attached as **Appendix F**. The risks, impacts and aspects are described in Section 9. The impact assessment rating methodology and process including the associated significance ratings are described in Section 9 and detailed in the Impact Tables attached as **Appendix F**. The significance ratings of impacts after mitigation on the key aspects of the "preferred alternative" and the "no go" alternative are shown per phase in the following tables.

Significance Ratings of Impacts after Mitigation during the Construction Phase

IMPACTS ND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. IMPACT 1: SOIL EROSION AND COMPACTION The clearing of areas for mining logistics, the waste rock dump site and TSF at Rietberg and all other infrastructure not located on an existing historical mining footprint will result in the removal of existing vegetation and topsoil. This 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**
2.1 IMPACT 2.1: SURFACE WATER RESOURCES Potential for watercourse pollution due to oil spills during routine maintenance of equipment, and potential for polluted run-off into nearby watercourses during construction. Ephemeral watercourses are located at the Rietberg Mine and the processing facility, TSF and logistics have been located to avoid these wherever possible. The water pipeline from the Henkries line will cross watercourses using existing historical plinths to reach the Rietberg Mine. Construction activities will need to be managed to avoid pollution of watercourses. An ephemeral watercourse is located to the north of the Jubilee Mine historically impacted on by mine waste rock dumps. Management of stormwater run-off will be required to keep clean water from entering polluted water systems. Any watercourse crossings for haul roads will be designed to minimise impact on the water resource.	**Low** **Insignificant Risk**	**N/A**

2.2 IMPACT 2.2: GROUNDWATER QUALITY Limited use of groundwater during site establishment due to poor quality that will require treatment prior to use for construction purposes, such as mixing with cement. Potential for groundwater pollution due to oil spills during routine maintenance of equipment.	**Low** **Insignificant Risk**	**N/A**
2.3 IMPACT 2.3: GROUNDWATER QUANTITY Limited use of groundwater during site establishment due to poor quality.	**Low** **Insignificant Risk**	**N/A**
3. IMPACT 3: LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN CBA 1 AND CBA 2 Rietberg TSF, WRD and processing plant has been moved out of a CBA1 and are now located in a CBA2. Jubilee mine is located on an existing mining footprint surrounded by a CBA1 associated with the Koeries River corridor. Homeep mine is located on an existing mining footprint surrounded by a CBA2. The expansion of the mine footprints into critical biodiversity areas is limited by using the existing historical mine footprints wherever possible.	**Medium-Low** **Medium Risk**	**N/A**
4. IMPACT 4: POTENTIAL FOR SOIL CONTAMINATION AND WASTE GENERATION DURING CONSTRUCTION PHASE	**Low** **Insignificant Risk**	**N/A**
5. IMPACT 5: VISUAL INTRUSION Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The 3 mining sites are located on existing mining footprints, and existing waste rock dumps will be utilised at Jubilee and Homeep. The TSF and waste rock dump at Rietberg will be located adjacent to the mountain slope (Diagram 3b), where the visual intrusion is less compared to its original location on the flat plain located to the west of the mine.	**Medium-Low** **Insignificant Risk**	**N/A**
6. IMPACT 6: EMMISSIONS (DUST, VEHICLES, NOISE & LIGHT): Noise and dust will be created by site establishment equipment (e.g. front-end loaders), blasting (if required during construction), and vehicles (emitting Greenhouse Gases & other fugitive emissions). Light pollution will occur from safety lighting at the construction camp, etc.	**Very low** **Insignificant Risk**	**N/A**
7. IMPACT 7: PALAEONTOLOGICAL AND CULTURAL IMPACTS Refer to **Appendix C**. . The heritage resources identified as no-go area have been demarcated at the Homeep mine where the mine footprint will not impact on it, and at the Jubilee mine the graveyard is outside the mine footprint. There are no expected impacts on palaeontological resources.	**Medium-Low** **Insignificant Risk**	**N/A**
8. IMPACT 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. IMPACT 1: CHANGE IN TOPOGRAPHY ABOVE GROUND & GEOLOGY BELOW GROUND: Ore removed below ground at the mines will leave voids. Mined ore will be stored as Run of Mine rock stockpiles prior to processing; existing historical waste rock dumps will be utilised at Jubilee and Homeep. Existing historical mine footprints will be utilised. A self-raising Tailings Storage Facility (TSF) at Rietberg impacting on the site's topography. Change in topography and below ground geology is associated with mineral extraction.	**Medium-Low** **Insignificant Risk**	**N/A**
2. IMPACT 2: SOIL EROSION & SOIL COMPACTION The potential for soil erosion by wind and stormwater run-off; soil compaction from repeated use of access tracks inside mining area.	**Low** **Insignificant Risk**	**N/A**
3.1 IMPACT 3.1: SURFACE WATER RESOURCES Ephemeral watercourses are located at the Rietberg Mine and the processing facility, TSF and logistics have been located to avoid these wherever possible. The water pipeline from the Henkries line will cross watercourses to reach the Rietberg Mine. An ephemeral watercourse is located to the north of the Jubilee Mine historically impacted on by mine waste rock dumps. Management of stormwater run-off will be required to keep clean water from entering polluted water systems. Any watercourse crossings for haul roads will be designed to minimise impact on the water resource and maintained during operation.	**Low** **Insignificant Risk**	**N/A**
3.2 IMPACT 3.2: GROUNDWATER RESOURCES: QUALITY The TSF at Rietberg is to be lined with a class c containment system preventing pollution of groundwater. Generic mitigation measures to prevent pollution from mining activities will be implemented as per the EMPr (as per Impact 5 below).	**Low** **Insignificant Risk**	**N/A**
3.3 IMPACT 3.3: GROUNDWATER RESOURCES: QUANTITY Process water is to be obtained from dewatering the mine shafts, and potentially off-site from the O'Kiep open pit which will need to be treated and trucked in. Water is to be recycled from the mining operations. Dewatering of the Rietberg mine will not impact on the local spring in the valley. Dewatering of Jubilee and Homeep mine will have drawdown that will impacts on the Apollis Guest house, and potable water of a better quality than the borehole water on the property (which has high salinity), will be supplied to compensate.	**Medium-Low** **Insignificant Risk**	**N/A**

4. IMPACT 4: LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CBA1 AND CBA2 Rietberg TSF, WRD and processing plant has been moved out of a CBA1 and are located in a CBA2. Jubilee mine is located on an existing mining footprint surrounded by a CBA1 associated with the Koeries River corridor. Homeep mine is located on an existing mining footprint surrounded by a CBA2. All mine infrastructure will be operated in accordance with the EMPr to avoid impacting on the surrounding areas during the operational phase.	**Low** **Insignificant Risk**	**N/A**
5. IMPACT 5: POTENTIAL FOR SOIL CONTAMINATION, AND WASTE GENERATION DURING OPERATIONAL PHASE Waste rock dump; overburden; industrial waste (hazardous wastes, oil & greases); domestic waste; wastewater, including effluent & sewage sludge and the TSF. All mine infrastructure will be operated in accordance with the EMPr to avoid impacting on the surrounding areas during the operational phase.	**Low** **Insignificant Risk**	**N/A**
6. IMPACT 6: VISUAL IMPACT Mining activities during the operational phase will have a visual impact associated with mining machinery, topsoil and run of mine stockpiles, waste rock dumps, TSF, logistics and movement of trucks on site and on access and haul roads. Mining activities are located in areas historically mined.	**Low** **Insignificant Risk**	**N/A**
7. IMPACT 7: EMMISSIONS (DUST, VEHICLES, NOISE & LIGHT) Blasting will generate noise, vibration and dust. Hauling vehicles emit Greenhouse Gases and other fugitive emissions. Dust will be generated on access roads, and in rock dumping. Lighting impacts on surrounding communities and fauna.	**Low** **Insignificant Risk**	**N/A**
8. IMPACT 8: HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS Refer to **Appendix C**. The heritage resources identified as no-go area have been demarcated at the Homeep mine where the mine footprint will not impact on it, and at the Jubilee mine the graveyard is outside the mine footprint. There are no expected impacts on palaeontological resources.	**Medium-Low** **Insignificant Risk**	**N/A**
9. IMPACT 9: CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS Including Improvement in road infrastructure, and safety of community from haul trucks due to by-pass routes.	**Medium (+)**	**Medium (-)**

Significance Ratings of Impacts after Mitigation during Decommissioning Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. IMPACT 1: REHABILITATION OF MINED AND CLEARED AREAS As per Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**)	**Low** **Insignificant Risk**	**N/A**
2. IMPACT 2: GROUND WATER RESOURCES As per **Appendix E** and Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**)	**Medium-Low** **Insignificant Risk**	**N/A**
3. IMPACT 3: CREATION OF EMPLOYMENT, JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS DURING DECOMMISSIONING & CLOSURE PHASE Including improved road infrastructure.	**Medium (+)** **Insignificant Risk**	**N/A**

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, and the specialist findings have provided mitigation measures which are included in the EMPr and Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**). There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in **Appendix F.**

It is the opinion of the EAP that the proposed 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, and to provide acceptable mitigation measures.
- The role of specialists are important in providing the necessary understanding to identify key impacts, such as the heritage resources (**Appendix C**), groundwater quality and quantity (**Appendix E**), and the TSF Design (**Appendix D**) required by legislation to follow specific planning and design parameters.
    - Even though there is the potential for the relaxation of the requirements for the installation of a containment barrier system, the Applicant has requested that the design of the TSF must include the installation of a containment barrier system to ensure the environmental sustainability of the mine.
    - The TSF has been designed to include the installation of a Class C containment barrier system comprising a 1.5mm HDPE geomembrane to be installed on top of a Geosynthetic Clay Liner (GCL) (**Appendix D)**.

- Potable water supply will be provided via a pipeline from the Henkries Line to the Rietberg Mine and trucked from there to the other mines when they become operational.
- Potable water will be supplied to the Apollis Guest House located within the groundwater drawdown zone from the dewatering of the Homeep Mine.
- The groundwater from the dewatering of the mines will be used for primary processing, which will be recycled in a closed loop system. The dewatering of the Jubilee open cast pit will be treated at the existing oxidation ponds located in close proximity to the Jubilee Mine. The upgrading of the oxidation ponds has been identified as the Social and Labour Plan project (described in **Appendix H**).
- 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 G**).
- DHSWS will assess the Water Use Application and the decision to grant of refuse the license with any conditions of the WULA that needs to be implemented by the Applicant will be determined by DHSWS. Obtaining a WUL will however, be one of the conditions for granting of the Mining Right.
- The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of copper for the local and international market. Existing roads to be used as haul roads will be upgraded and maintained during the life of the mine.
- Haul roads have been realigned to avoid the community of Concordia as far as possible.
- 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 G**), the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

Adherence to Regulatory Requirements, Regulation No R. 982 published in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (as amended)

Content of an Environmental Impact Assessment Report (EIA) as per the 2014 EIA Regulations (Appendix 3) (as amended)		Relevant Section within the EIA Report
(a)	Details of:	
	(i) the EAP who prepared the report; and	Page iii; Section
	(ii) the expertise of the EAP, including a curriculum vitae;	Section 1.2; Appendix A
(b)	The location of the activity, including:	
	(i) the 21 digit Surveyor General code of each cadastral land parcel;	Section 2, Table 1
	(ii) where available, the physical address and farm name;	Section 2, Table 1
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Diagram 1b
(c)	A plan which locates the proposed activity or activities applied for as well as the associated structure and infrastructure at an appropriate scale, or, if it is:	Diagram 3b: Rietberg Diagram 3c: Jubilee Diagram 3d: Homeep Diagram 4: Bulk infrastructure
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken;	NA
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	NA
(d)	A description of the scope of the proposed activity, including:	Section 3
	(i) all listed and specified activities triggered and being applied for; and	Section 4.1, Table 9
	(ii) a description of the associated structures and infrastructure related to the development;	Section 3
(e)	A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Section 4
(f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;	Section 5
(g)	A motivation for the preferred development footprint within the approved site	Section 6, and Section 9.9
(h)	A full description of the process followed to reach the proposed development footprint within the approved site, including:	Section 6
	(i) details of all the alternatives considered;	Section 6.2 to 6.7
	(ii) details of the Public Participation Process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 7 Appendix B
	(iii) a summary of the issues raised by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 7.2
	(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 8
	(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts: (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 9 Appendix F: Impact Tables
	(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 9.4
	(vii) positive and negative impacts that the proposed activity will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 9.5
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Section 9.6
	(ix) If no alterative development locations for the activity were investigated, the motivation for not considering such; and	Section 9.8
	(x) A concluding statement indicating the preferred alternative development location within the approved site;	Section 9.9

Content of an Environmental Impact Assessment Report (EIA) as per the 2014 EIA Regulations (Appendix 3) (as amended)		Relevant Section within the EIA Report
(i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including	Section 9 Appendix F: Impact Tables
	(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Section 9.1
	(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Section 9.2
(j)	An assessment of each identified potentially significant impact and risk, including	Appendix F: Impact Tables
	(i) Cumulative impacts;	
	(ii) The nature, significance and consequences of the impact and risk;	
	(iii) The extent and duration of the impact and risk;	
	(iv) The probability of the impact and risk occurring;	
	(v) The degree to which the impact and risk can be reversed;	
	(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and	
	(vii) The degree to which the impact and risk can be mitigated;	
(k)	Where applicable, a summary of the finding and recommendation of any specialist report complying with Appendix 6 to these Regulation and an indication as to how these finding and recommendation have been included in the final assessment report;	Section 10, Table 15
(l)	An environmental impact statement which contains	Section 11
	(i) A summary of the key findings of the environmental impact assessment	Section 11.1
	(ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	Diagram 14.1: Mining Right Area Diagram 14.2: Rietberg Diagram 14.3: Jubilee & Homeep
	(iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 11.3; Tables 12, 14, 16, 17 & 18
(m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management objectives, and the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;	Part B: EMPR Section 15.5
(n)	The Final proposed alternatives which respond to the impact management measures, avoidance, the mitigation measures identified through the assessment;	Section 9.9
(o)	Any aspects which were conditional to the finding of the assessment either by the EAP or specialist which are to be included as conditions of authorisation	Section 11.6
(p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 11.7
(q)	A reasoned opinion as to whether the proposed activity should or shouldn't be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 11.8
(r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	NA
(s)	An undertaking under oath or affirmation by the EAP in relation to:	Section 18
	(i) the correctness of the information provided in the reports;	
	(ii) the inclusion of comments and inputs from stakeholders and I&APs;	
	(iii) The inclusion of inputs and recommendation from the specialist reports where relevant; and	
	(iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made interested or affected parties;	
(t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 12
(u)	An indication of any deviation from the approved scoping report, including the plan of study, including	NA

Content of an Environmental Impact Assessment Report (EIA) as per the 2014 EIA Regulations (Appendix 3) (as amended)		Relevant Section within the EIA Report
	(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	NA
	(ii) a motivation for the deviation;	NA
(v)	Any specific information that may be required by the competent authority; and	NA
(w)	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	NA

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
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
TSF	Tailings Storage Facility
WMA	Water Management Area
WML	Waste Management License
iWULA	Integrated Water Use License Application

CONTENTS

LIST OF DIAGRAMS

LIST OF TABLES

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) Registration Number: 400197/09
- Registered Environmental Assessment Practioner with EAPASA: 2020/2492

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

2 LOCATION OF THE ACTIVITY

Table 1: Location and Property Information

Farm Name:	A Portion of Remaining Extent of Erf 2100 Concordia (83611.1684Ha in extent). Registered in the name of the Nama Khoi Municipality by virtue of title deed T56484/2016.
Application area (Ha)	20 079 Ha
Magisterial district:	Namakwaland
Distance and direction from nearest town	The Mining Area is approximately 10km north of the town of Springbok in the Northern Cape province of South Africa.
21-digit Surveyor General Code for each farm portion	C05300020000210000000

2.1 Location

Springbok is located approximately 550km north of Cape Town in the Northern Cape Province and is one of the major towns in the region. Springbok is also located approximately 350km west of Upington.

Refer to the locality plan attached at **Diagram 1a.**

Diagram 1b shows the properties and co-ordinates as detailed in Table 1 above.

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

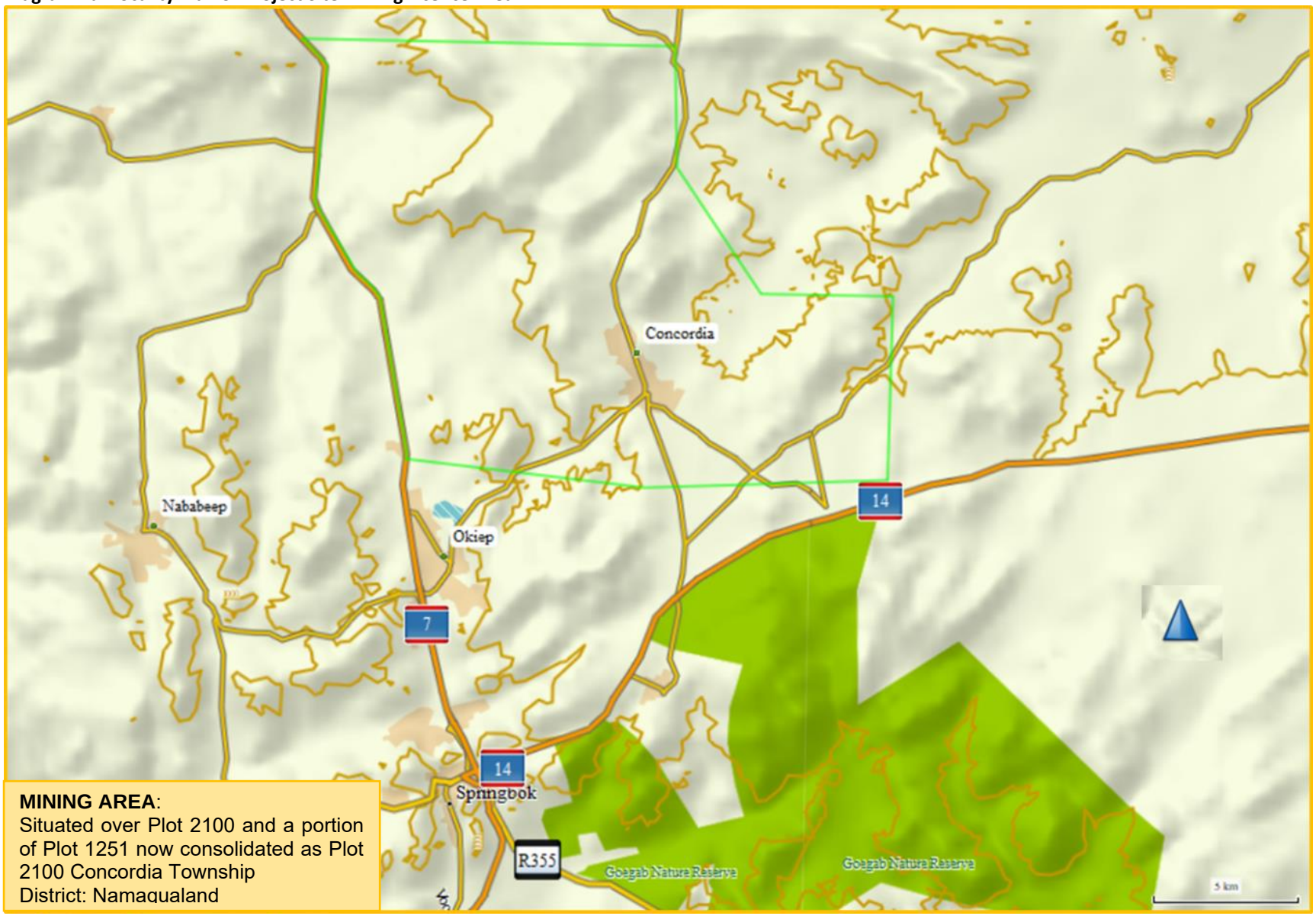
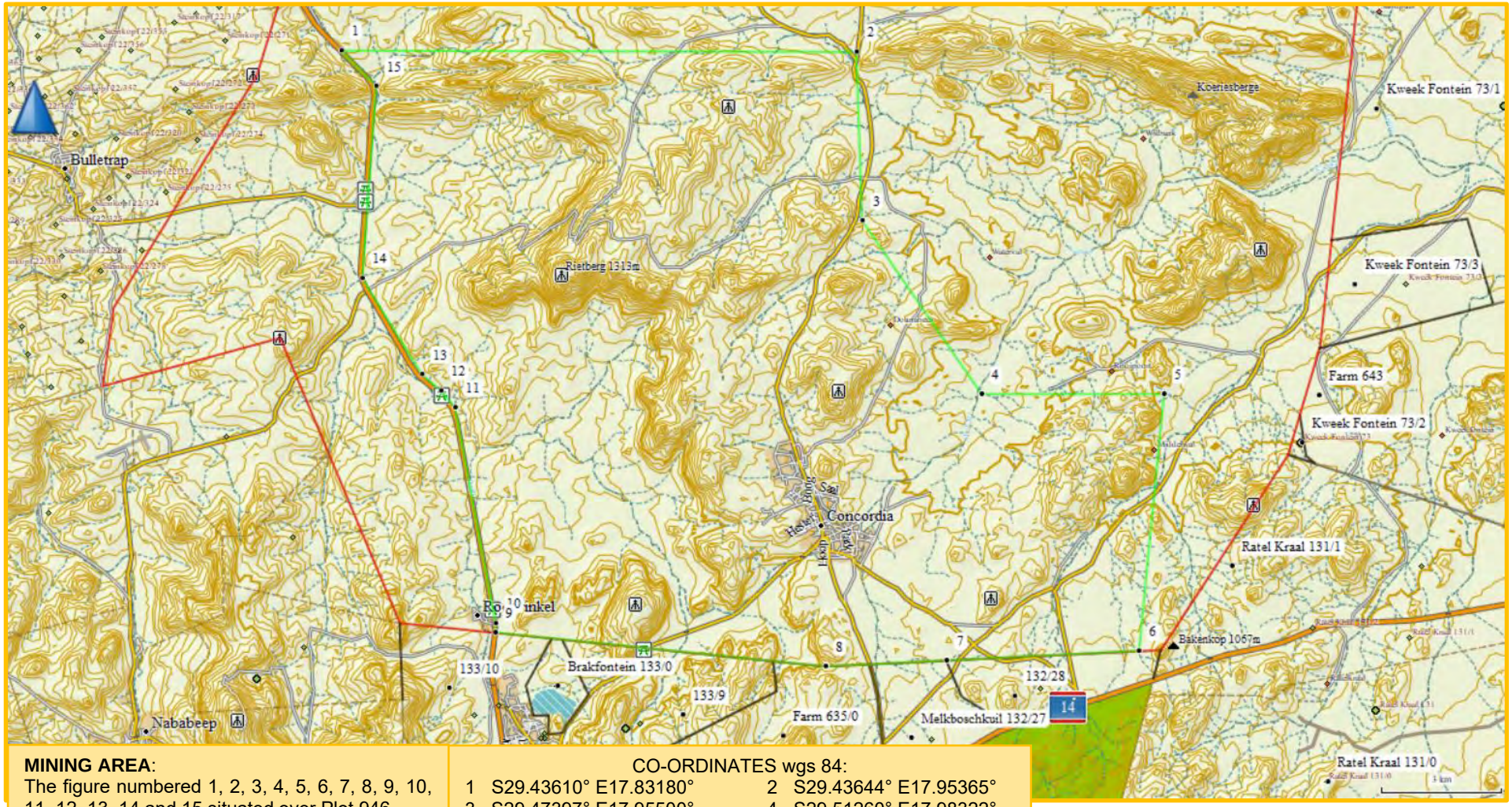


Diagram 1b: Locality Plan of Project Site showing Farm Boundaries and Co-ordinates

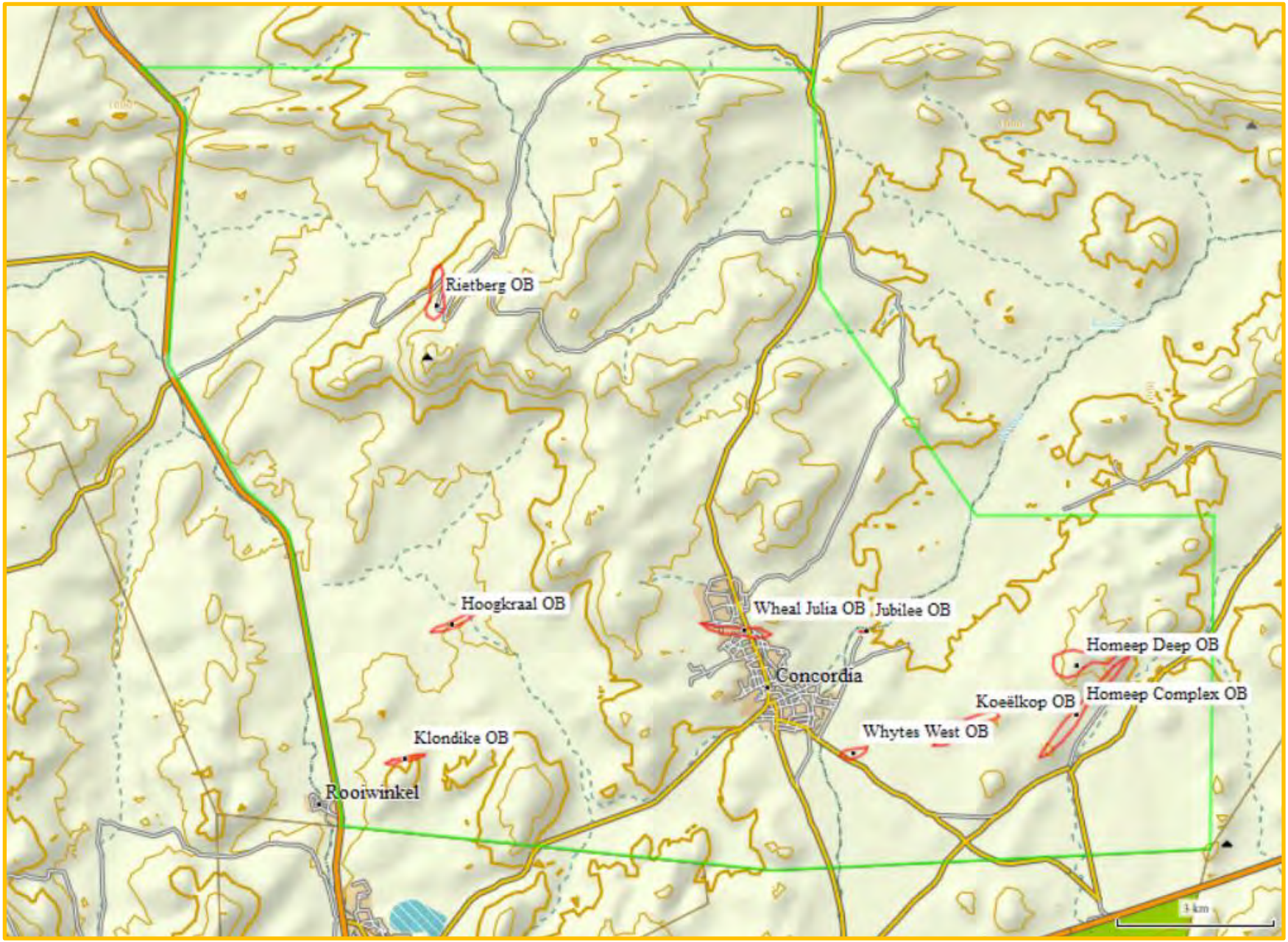


MINING AREA:
The figure numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 situated over Plot 946 (2719.1320Ha), and a portion of Plot 1251 (17359.87Ha).
Plot 946 and Plot 1251 now consolidated as Plot 2100 Concordia Township
Total Extend 20 079 Ha
District: Namaqualand

CO-ORDINATES wgs 84:

1	S29.43610° E17.83180°	2	S29.43644° E17.95365°
3	S29.47397° E17.95500°	4	S29.51260° E17.98322°
5	S29.51262° E18.02636°	6	S29.56954° E18.02565°
7	S29.57189° E17.97489°	8	S29.57317° E17.94628°
9	S29.56561° E17.86816°	10	S29.56358° E17.86824°
11	S29.51556° E17.85868°	12	S29.51182° E17.85536°
13	S29.50812° E17.85083°	14	S29.48676° E17.83674°
15	S29.44398° E17.84003°		

Diagram 1c: Location of All Ore Bodies within Mining Right Area



3 DESCRIPTION OF THE PROPOSED ACTIVITIES

3.1 Introduction and Background

Shirley Hayes-IPK (Pty) Ltd (SHIP) has been engaged in exploration activity under cover of Prospecting Right NC 30/5/1/1/2/11046 PR since it first applied for a prospecting right on the current Concordia Copper Prospecting Area (CCPA) in 2010. During this time SHIP has developed a Cluster Mining Model where a number of smaller deposits that would not normally be economically viable on its own can be mined in sequence from one central processing facility to support a major copper mining operation.

SHIP will build a 30ktpm processing plant that will produce copper concentrate at the Rietberg Mine locality. This plant will be the central processing facility for the Mining Complex. The Mining Complex will also deposit tailings from ore mined at different sites at the Tailings Facility at the Rietberg Mine.

Mining will start at the Rietberg mine in year 2 (Year 1 will be the period during which the central processing plant is constructed and access mine development completed) from underground in the first 7 years and then shift to mining at the Jubilee Open Pit and the Homeep Mine from year 8 to 15.

3.2 The Scope of the Proposed Activities

3.2.1 Mineral Resource particulars

As referenced from the MWP (2019) test results indicate that a copper concentrate with a grade of 30% will be produced with a mass pull of between 10 and 12% with a copper recovery of 90%. The product is a copper concentrate grading at 30% Cu with a moisture content of 5%.

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

ITEM	DETAIL
Type of mineral	Copper (Cu), Lead (Pb), Zinc (Zn), Gold (Au) and Silver (Ag)
Locality (direction and distance from nearest town)	The Mining Area is approximately 10km north of the town of Springbok in the Northern Cape province of South Africa
Extent of application	20 079 Ha
Extent of area required for mining	Refer to **Diagram 3a** which indicates the three ore bodies comprising this Mining Right Application. Refer **to Diagrams 3b, 3c and 3d** that indicate the mining footprint including infrastructure, services, mining portals, open cast and blast radius perimeter, waste and RoM stockpiles, waste rock dumps, and the tailings storage facility at the Rietberg Mine. Mining is proposed to take place from underground portals (included in the infrastructure areas and from open pit excavations for the following areas: • Rietberg mine – underground portals; • Jubilee mine – open pit excavation; and • Homeep mine - underground portals. Other ore bodies within this application area, but which are not part of this mining right application, are shown in **Diagram 1c.** • Koeëlkop mine – open pit excavation; • Whytes West prospect – underground portals; • Hoogkraal prospect – surface excavation; • Klondike prospect – underground excavation; • Wheal Julia – underground excavation; and, • Waaihoek – surface excavation.
Extent of area required for infrastructure, roads, servitudes etc.	The main infrastructure will be developed at Rietberg mine covering an estimated area of 50 Ha. At the Jubilee and Homeep mine only satellite infrastructure with a footprint of less than 5Ha will be developed.

	Refer to the Mine Site Layouts (**Diagram 3b: Rietberg; Diagram 3c: Jubilee; and Diagram 3d: Homeep**) for each mine showing the mining footprint including infrastructure, services, mining portals, open cast and blast radius perimeter, waste and RoM stockpiles and tailings storage dam (at Rietberg Mine).
Depth of mineral below surface	• Rietberg: extends 25m to 600m below surface • Jubilee: extends from surface to 85m below surface • Homeep: extends from surface to 750m below surface **Other ore bodies within this application area but not part of this Mining Right Application** Koeëlkop: extends from surface to 150m below surface Whytes West: extends from surface to 250m below surface Hoogkraal: extends from surface to 180m below surface Klondike: extends from surface to 250m below surface Wheal Julia: extends from 50m to 350m below surface Waaihoek: extends from surface to 125m below surface
Geological information	The detailed regional and local mine description on geology, mineralization, deformation, structural controls and metamorphic overprint are summarised in Section 8.1.3 in this Report.

3.2.2 Basic overview of the Mining Method

Mining operations are focussed on the Rietberg Underground Mine where mining operations are focussed for the first 7 years of operation and then the focus shifts to Jubilee and Homeep for mainly open pit operations in year 8 to 15.

Rietberg Underground Mine

The current Rietberg mine consists of 4 adits/declines that provides access to the orebody. Two of these tunnels are declines and two are flat. The flat tunnel on RL 940 used to be equipped with rails and material was transported by locomotives and hoppers from the drawpoints to the tip near the adit.

The basis of the mine design was to use as far as possible, the existing development to access the new stoping areas. Some of the stopes will be accessed directly from existing footwall drives, however the majority of the new areas will require new declines/spirals and footwall development. The existing decline and other development sizes seems to be in the order of 4m (W) x 3m (H) from what could be derived from existing digital data.

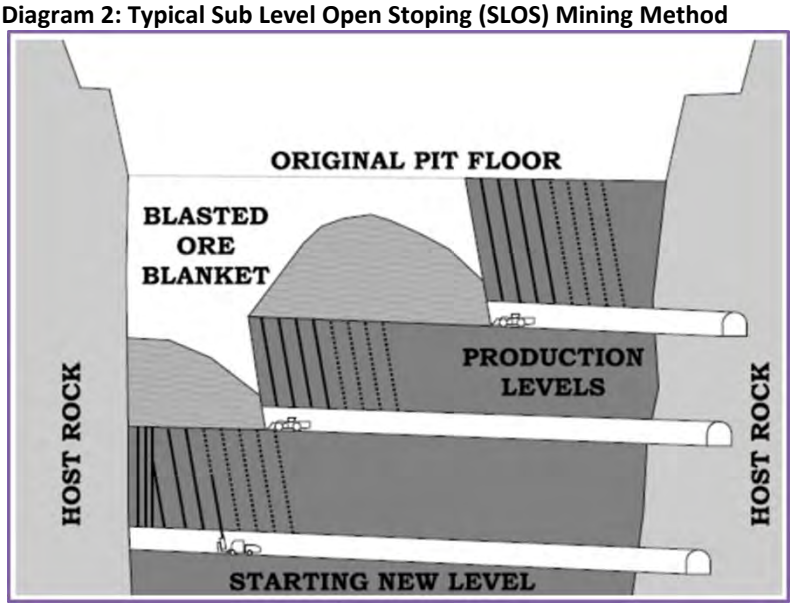
The selected mining method will be Sub Level Open Stoping (SLOS). This method was selected based on the following criteria:

- Orebody Dip (70 Degrees)
- Orebody Continuation on Strike (No Continuation on Upper Orebody (pillars) and very Scattered for Lower Orebody)
- Minimise Development Requirements

Footwall Drives will be developed from the declines. These Footwall drives will be positioned 15m below the reef horizon as per Geotechnical recommendations. Reef Drives will then be developed from the Footwall drives at 25m spacing to the bottom of each stope, thus intersecting each stope in the middle.
The portion of the reef drive between the Footwall Drive and Stope will be off-reef, whereas all development in the stope will be on-reef. The on-reef portion will be developed to the end of the stope (Hangingwall Contact). A slot raise will then be blasted from the end of the on-reef drive upwards to the top limit of the stope. This will create a free face for ring blasting.

The stopes will be mined in a retreat fashion from the top stopes to the bottom stopes. **Diagram 2** below illustrates the typical retreat mining strategy. This same method will apply to the pillar/skins mining in the Upper Orebody, with the only difference that very few stopes will be dependent on stopes above it. Where possible the blasted material from the skins will fall directly into the existing mining void for extraction at the existing draw points.

Diagram 2: Typical Sub Level Open Stoping (SLOS) Mining Method



Jubilee Open Pit Mine

The Jubilee orebody will be mined by a **conventional open pit method**. Material will be extracted on benches from the top to the bottom. Ramps will be developed to access each bench. The typical mining sequence will comprise of drilling, blasting, loading and hauling. Ideally two benches will be mined simultaneously in different locations to ensure a proper split between waste and ore mining.

Open-pit mining is the most common method used throughout the world for mineral mining and does not require extractive methods or tunnels. This surface mining technique is used when mineral or ore deposits are found relatively close to the surface of the earth.

Homeep Underground Mine

The current Homeep mine consists of 4 adits/declines that provides access to the orebody. The central two adits access the lower decline and exploration decline to the lower Homeep orebody. This decline will be equipped to access the main ore on the lower exploration decline area. The upper adits will be used to access pillars in the upper 4 levels still available for mining.

The basis of the mine design was to use as much as possible of the existing development to access the new stoping areas. Some of the stopes will be accessed directly from existing footwall drives, however majority of the new areas will require new declines/spirals and footwall development. The existing decline and other development sizes seems to be in the order of 4m (W) x 3m (H) from what could be derived from existing digital data.

The selected mining method will be Sub Level Open Stoping (SLOS) as show in **Diagram 2** above. This method was selected based on the following criteria:

- Orebody Dip (70 Degrees)
- Orebody Continuation on Strike (No Continuation on Upper Orebody (pillars) and very Scattered for Lower Orebody)
- Minimize Development Requirements

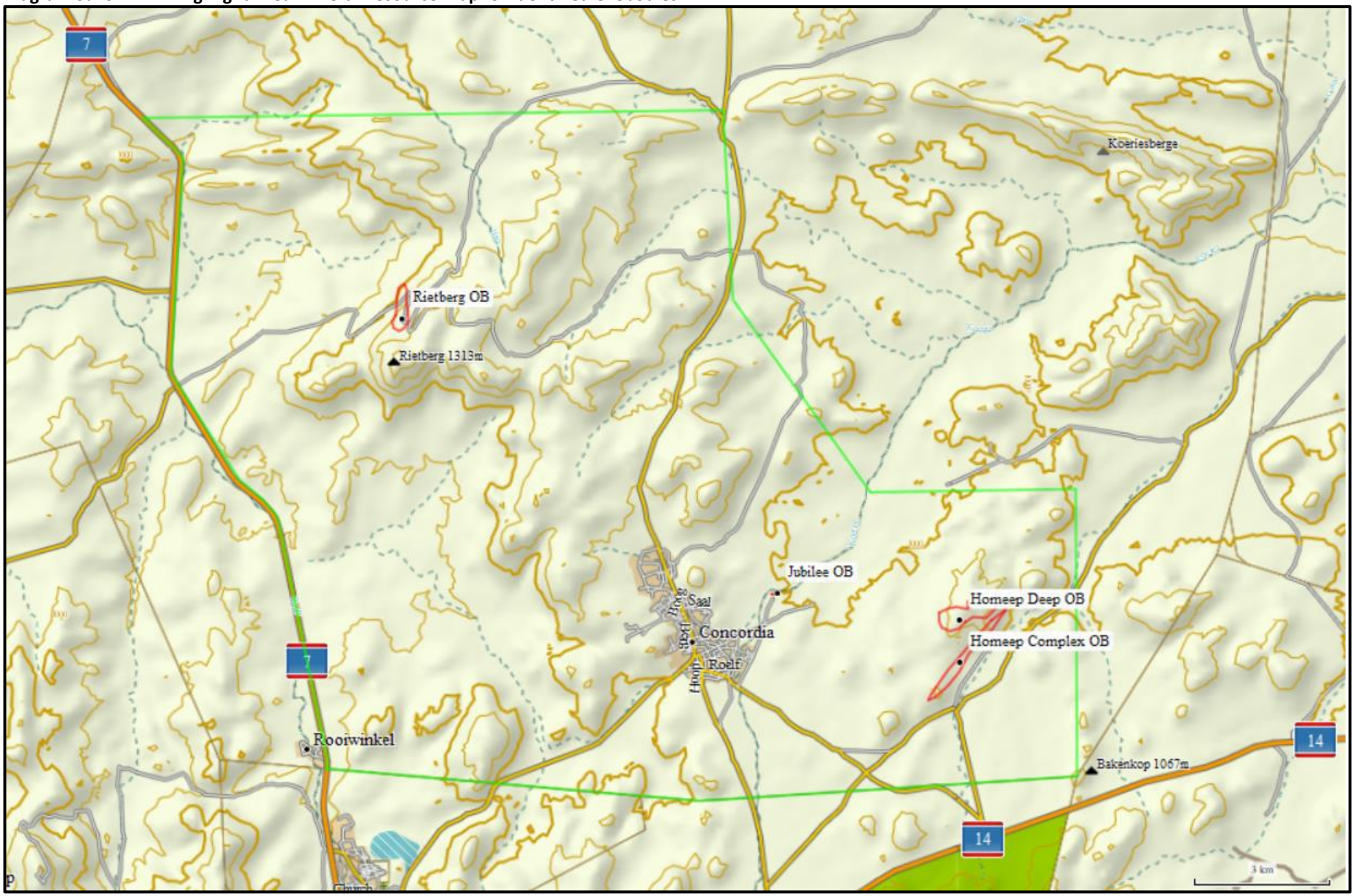
Footwall Drives will be developed from the declines. These Footwall drives will be positioned 15m below the reef horizon as per Geotechnical recommendations. Reef Drives will then be developed from the Footwall drives at 25m spacing to the bottom of each stope, thus intersecting each stope in the middle.

The portion of the reef drive between the Footwall Drive and Stope will be off-reef, whereas all development in the stope will be on-reef. The on-reef portion will be developed to the end of the stope (Hangingwall Contact). A slot raise will then be blasted from the end of the on-reef drive upwards to the top limit of the stope. This will create a free face for ring blasting.

3.2.3 Mineral Resource Map

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

Diagram 3a: SHIP Mining Right Area Mineral Resource Map for Identified Orebodies



3.2.4 Timeframes and Life of Mine

Refer to Table 3 below which illustrates the Life of Mine (LoM) extending over a 15-year period in a phased manner between Rietberg, Jubilee and Homeep.

Table 3: Life of Mine Forecast (MWP (2019): Table 13 Concordia 15-year LOM reserve Depletion Forecast)

Life of Mine Year	Total Production	Rietberg		Jubilee		Homeep East	
		Mined	Reserve	Mined	Reserve	Mined	Reserve
OB			2 880 000		980 000		2 880 000
1	-	-	2 880 000	-	980 000	-	2 880 000
2	390 412	390 412	2 489 588	-	980 000	-	2 880 000
3	392 904	392 904	2 096 684	-	980 000	-	2 880 000
4	385 528	385 528	1 711 156	-	980 000	-	2 880 000
5	367 631	367 631	1 343 525	-	980 000	-	2 880 000
6	365 400	365 400	978 125	-	980 000	-	2 880 000
7	365 774	365 774	612 351	-	980 000	-	2 880 000
8	357 987	-	612 351	105 987	874 013	252 000	2 628 000
9	361 128	-	612 351	121 128	752 885	240 000	2 388 000
10	361 128	-	612 351	121 128	631 757	240 000	2 148 000
11	361 128	-	612 351	121 128	510 629	240 000	1 908 000
12	361 128	-	612 351	121 128	389 501	240 000	1 668 000
13	361 128	-	612 351	121 128	268 373	240 000	1 428 000
14	361 128	-	612 351	121 128	147 245	240 000	1 188 000
15	361 128	-	612 351	121 128	26 117	240 000	948 000

3.3 Project Description

The Mine Site Layout showing the development areas and services are included in:

- **Diagram 3b: Rietberg;**
- **Diagram 3c: Jubilee; and,**
- **Diagram 3d: Homeep**.

Diagram 4 provides on overview of the Bulk Services Infrastructure for the Mining Right Area.

Diagram 3b: Mine Site Plan for Rietberg Mine

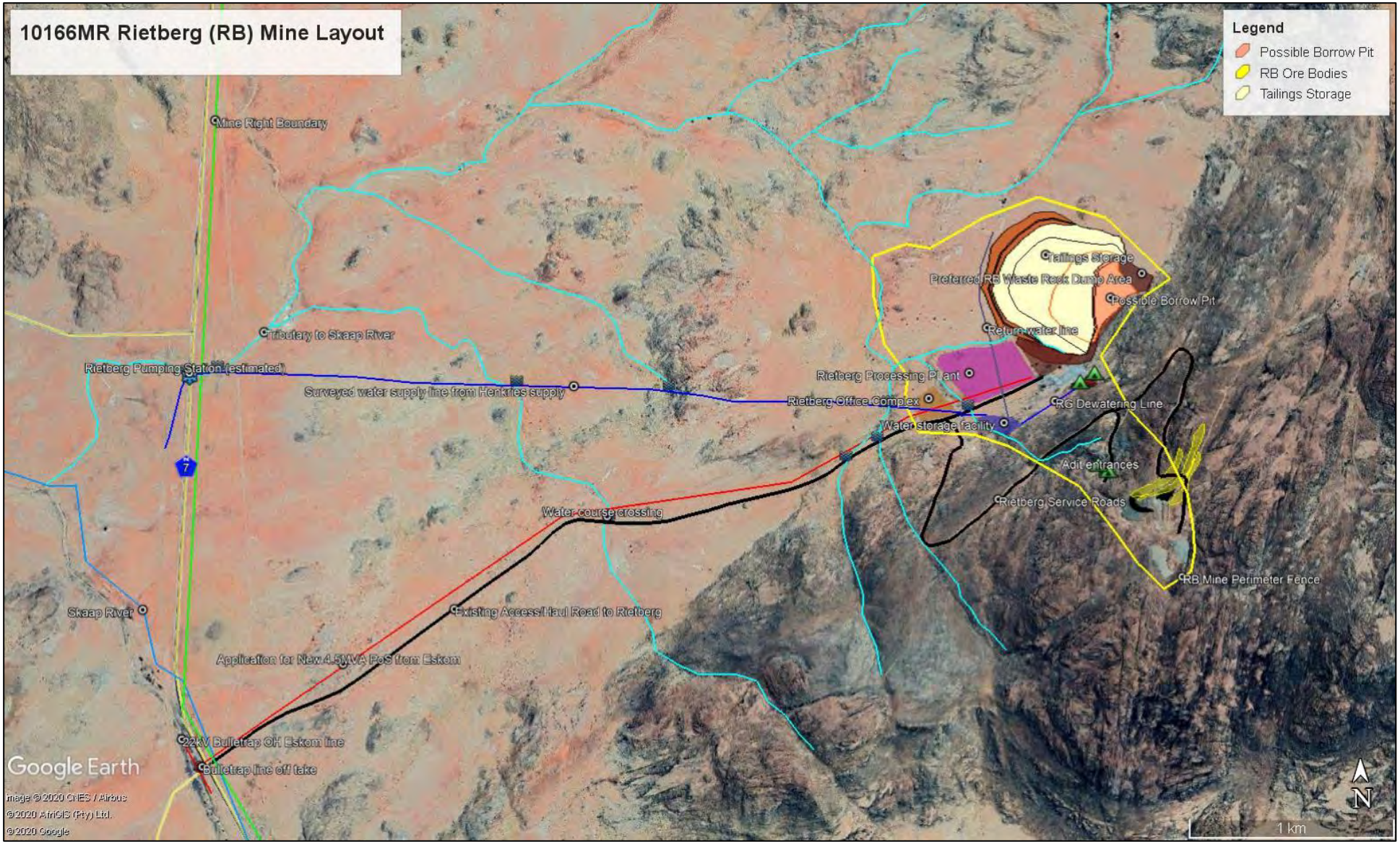


Diagram 3c: Mine Site Plan for Jubilee mine (Oct. 2020)

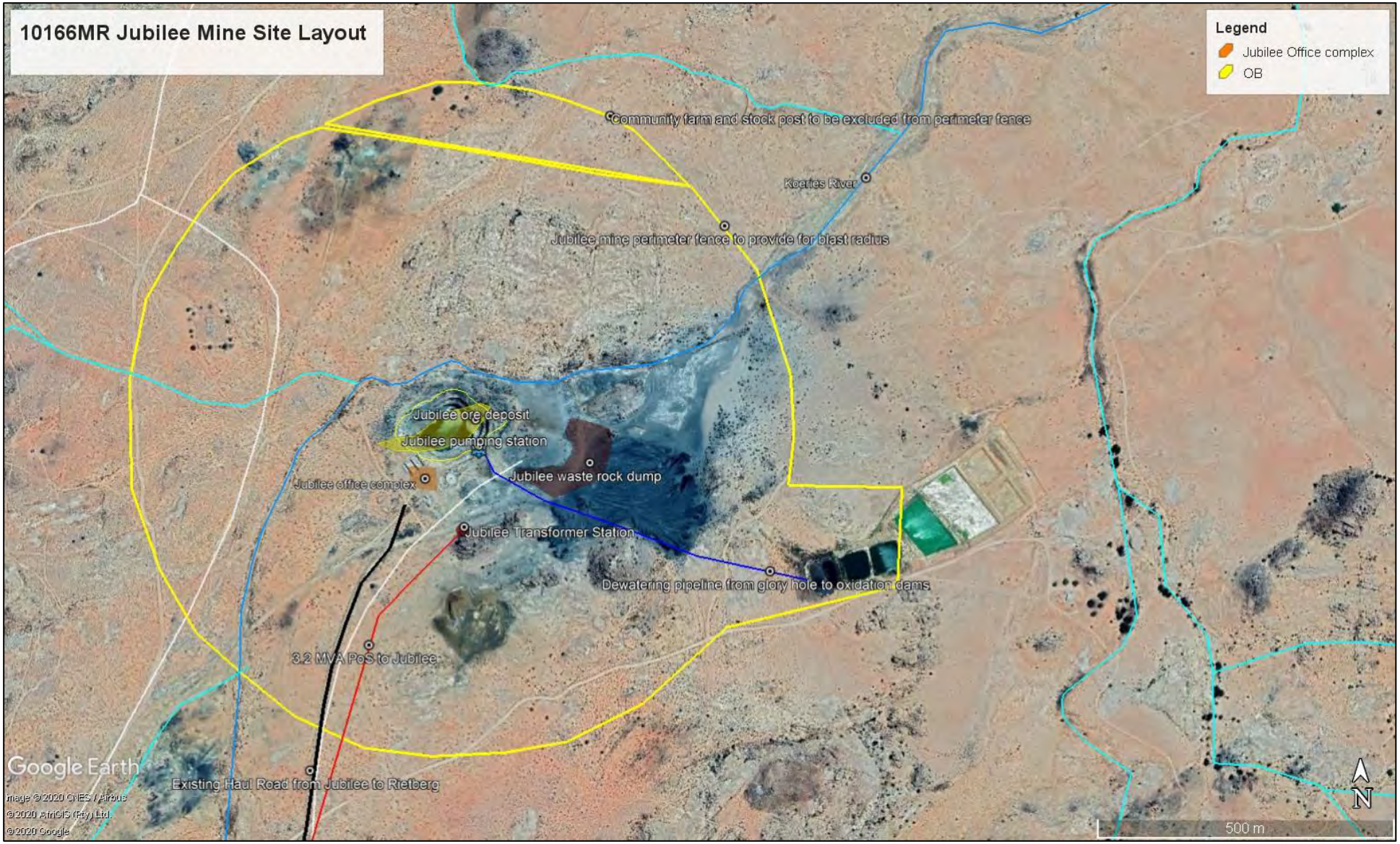


Diagram 3d: Mine Site plan for Homeep mine (Oct. 2020)

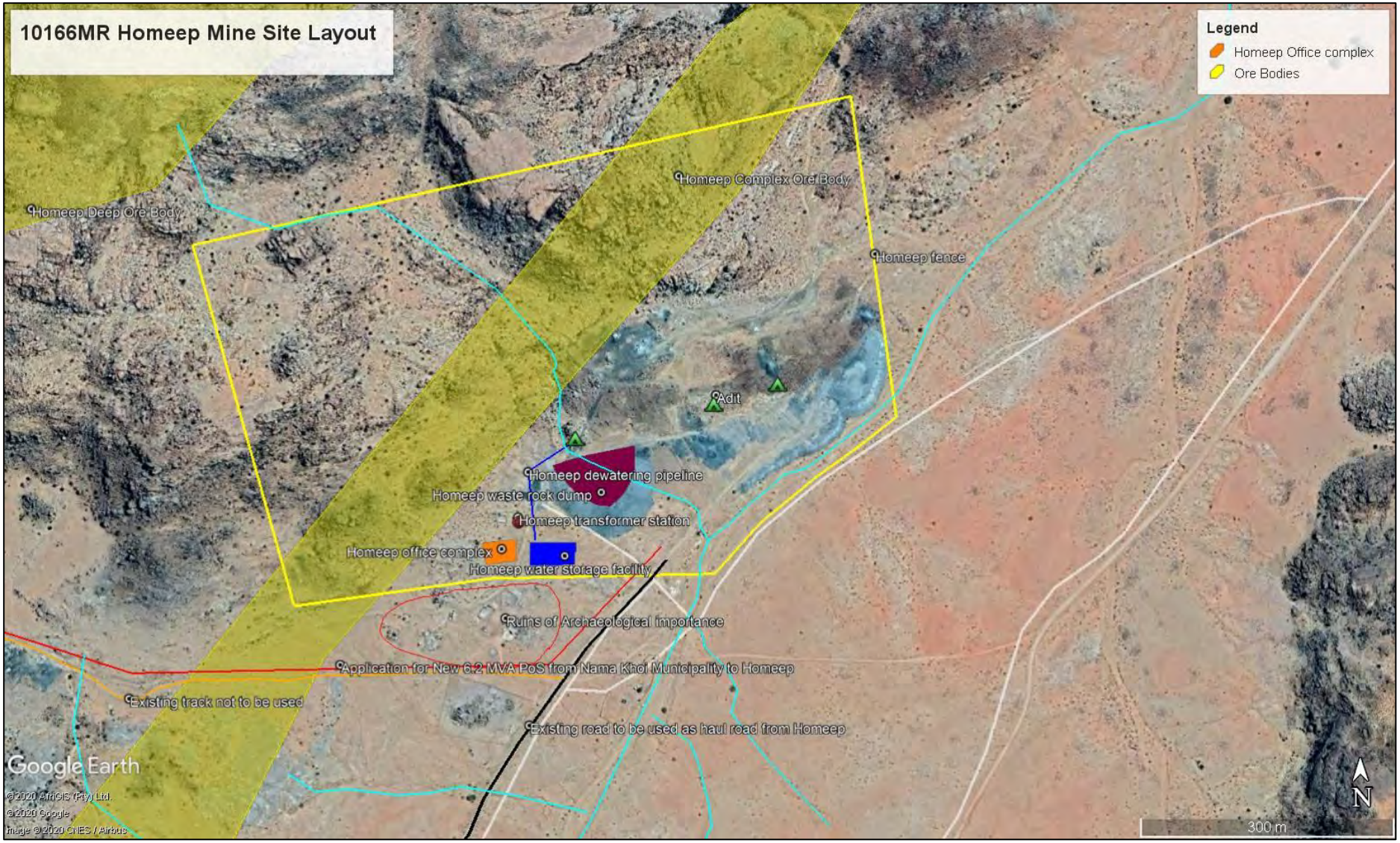
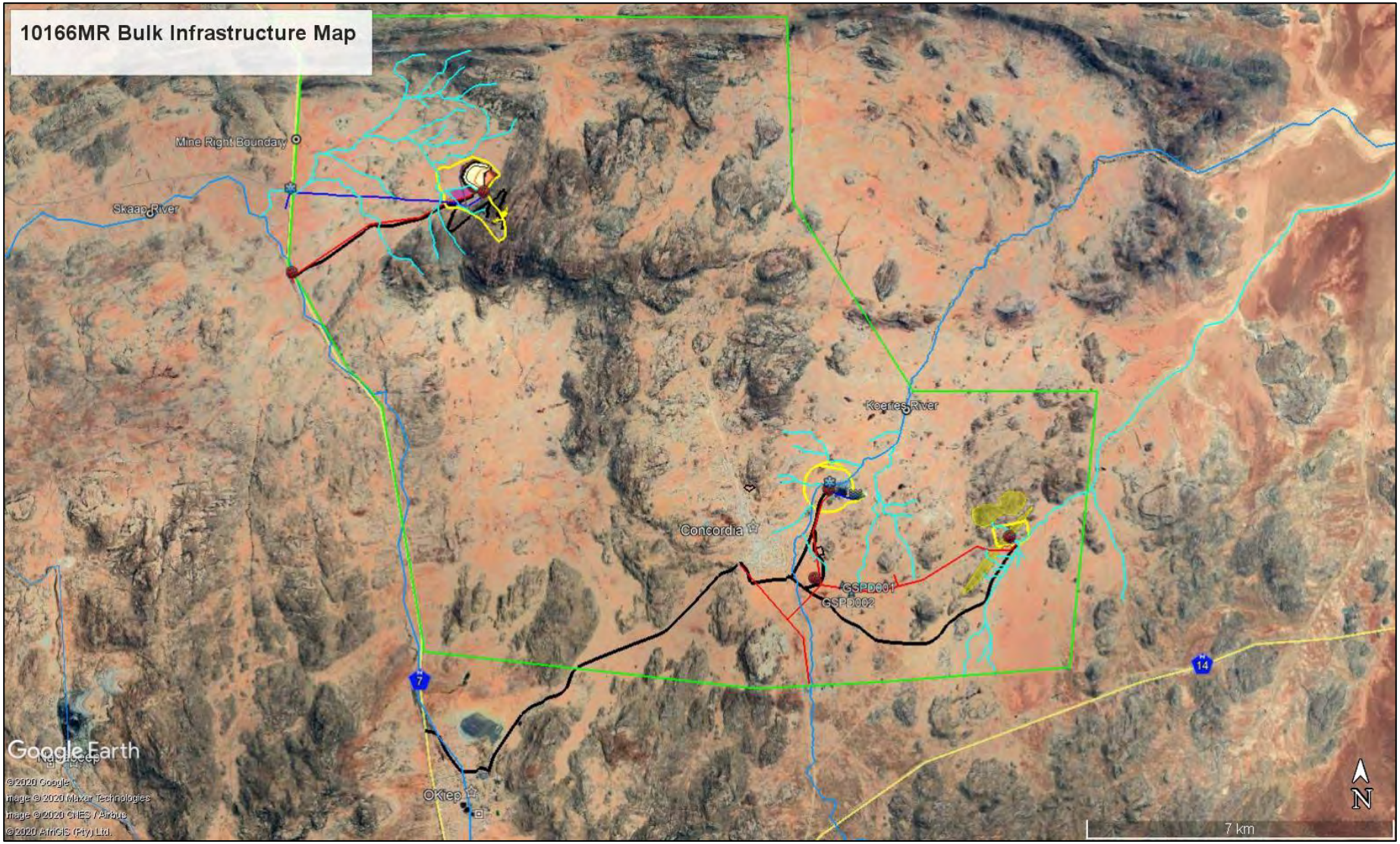


Diagram 4: Bulk Services Diagram dated Oct 2020. Refer to labels in Diagrams 3b (Rietberg), 3c (Jubilee) & 3d (Homeep).



3.3.1 Proposed Road Access and Haul Routes

Refer to **Diagram 4** which shows the access roads and proposed haul routes.

The Rietberg Mine will be accessed by an existing gravel road located eastwards from the N7 approximately 19km north of the town of Springbok. This existing road that was built to access the historical Rietberg Mine will be required to be upgraded to accommodate heavy equipment and loaded haul trucks. The existing Rietberg Mine access and haul road length, approximately 4.6km in length can accommodate two-way traffic. Construction will be conducted by removing vegetation and topsoil, and through scraping and compacting of the area adjacent to the existing road.

Refer to **Diagram 4** which indicates the proposed transport routes for haul trucks between the Jubilee Mine and Rietberg Mine and between the Homeep Mine and Rietberg Mine, making use of the existing secondary roads in the area that can accommodate two-way traffic. These haul routes link to the N7 Provincial road just south of Concordia. The loaded haul trucks will travel northwards for a distance of approximately 11km before reaching the Rietberg Mine exit to the east of the N7, where the ore will be taken to the Rietberg Processing Plant.

The need for a new section of road has been identified to avoid transporting construction materials and ore (once the Jubilee Mine is operational), through the main sections of the town of Concordia, as shown by the by-pass on **Diagram 3c** and **Diagram 4** labelled as "Jubilee new haul road". There is however a section of the Jubilee Mine haul route, approximately 600m in length that passes through a section of residential houses where the road is surfaced, to the east and on the outskirts of Concordia. There is an alternative route to avoid this section of road through the community as shown on **Diagram 3c** and **Diagram 4**.

As urban expansion occurs in the town of Concordia, the potential road by-passes identified now could need to be revised for the Jubilee mine prior to mining commencing in year 8 of the proposed overall mine plan.

Base material for the new sections of roads referred to as the G4 layer is available from the oxidation ponds. This material has been tested and can be used. In addition, the Nama Khoi Local Municipality has a registered borrow pit at Concordia where base materials for the roads can be sourced, and the waste rock material from mining activities also provides a suitable source of base material.

3.3.2 Security and access control

Rietberg, Jubilee and Homeep Mines

A site perimeter fence around the development areas at the Rietberg, Jubilee and Homeep Mines will be required for safety and security purposes. The fence should be able to restrict access of livestock and other animals as well as prevent persons from any unauthorized access. The fence should have a total height of 2.4m. The fully galvanized wire mesh fence should be 2.1 m high with a razor mesh topping of 0.3 m and spacing between stay and intermediate posts of 3m.

Drones will be used to patrol the mine areas and will have a communication system linked to haul trucks and security that will patrol the mine areas to prevent accident and facilitate safe crossing of the haul road by animals and people. This system also has the least impact on the environment.

Access to the logistics area will be gained through two dedicated sliding vehicle gates and a single pedestrian gate. A security house will be located at the main entrance to the mining site area. Access to the complex by outside service providers will be strictly controlled, and where possible, limited to delivery at the main stores.

3.3.3 Power supply

Currently no power supply exists to the Mine Sites. In order to establish power to the project site a number of off-site installations will be required. This will include:

- Rietberg: There is an application for a new 4.5MVA power supply from Eskom's Bulletrap 22kV overhead powerline to the Rietberg processing plant requiring the construction of approximately 4,6km of 22 kV powerline from the Bulletrap Eskom line running along the N7. Refer to **Diagram 3b** and **Diagram 4**.
- Jubilee: The application includes a 3.2 MVA power supply to the Jubilee mine requiring the construction of 1,4km x 22 kV line from just after the Marlin Granite Mine to the sports field just outside the town of Concordia. Refer to **Diagram 3c** and **Diagram 4.**
- Homeep - Construction of 3.5km x 22 kV line from the sport field to the Homeep Mine. Refer to **Diagram 3d**.

Refer **to Diagram 4** which shows the bulk infrastructure including electricity supply overview for the mining right.

Transformers will have to be constructed at the tap-off points at the mine site locations as indicated in the mine site layout plans (**Diagrams 3b, 3c** and **3d**).

The off-site power supply infrastructure will be designed on a maximum demand of 4.54 MVA to the Project Area at Rietberg during the 30 ktpm option. The load summary is listed in Table 4 and the electricity supply network in the sub-region shown in **Diagram 5**. The Mines will feed off the Nama Transmission Sub-Station (Tx S/S) line.

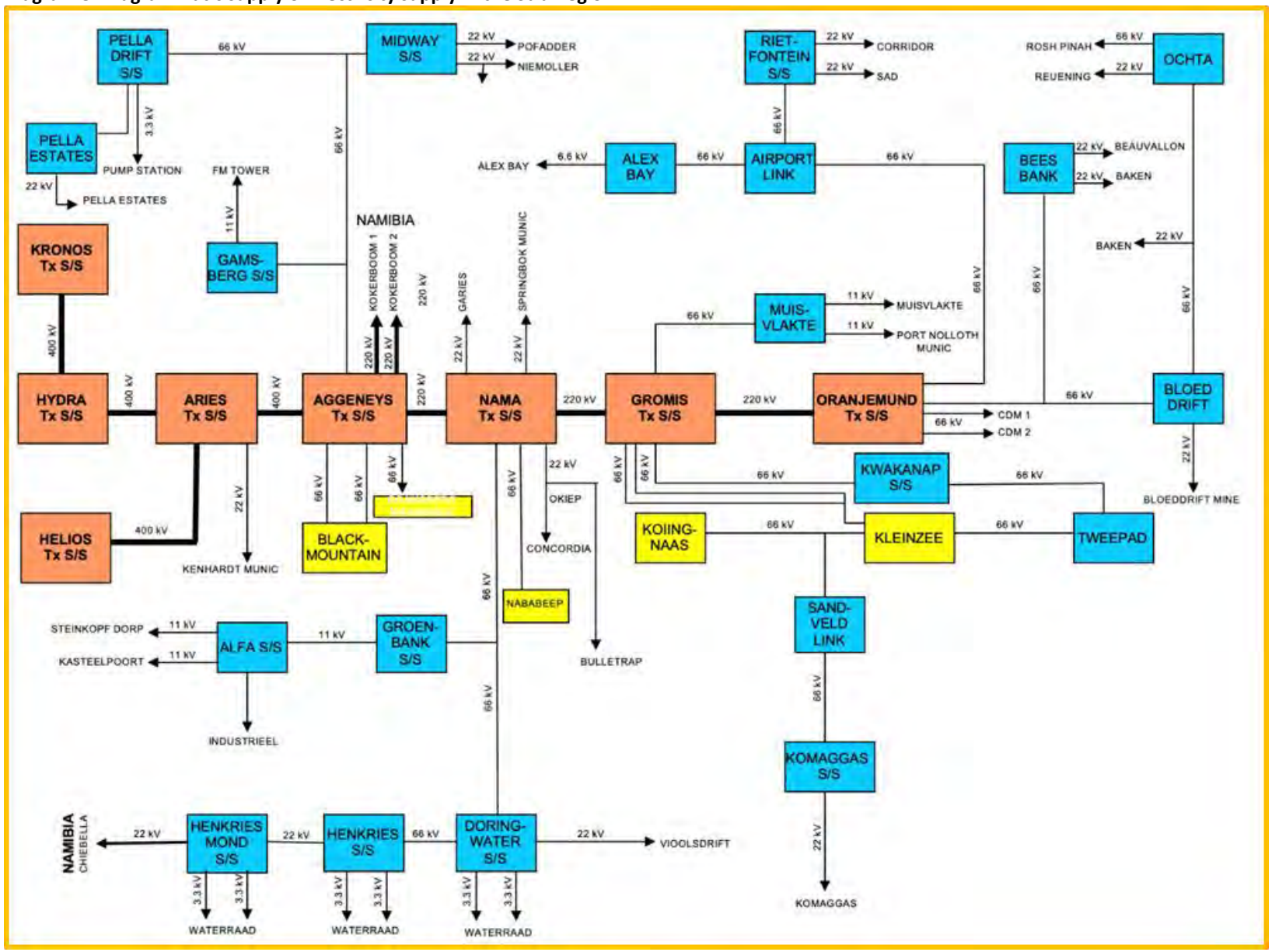
The load summary is listed in Table 4 and indicated in **Diagram 5**.

Table 4: Project Power Supply Load Summary for 30 ktpm option

Area Description	Unit	Maximum Demand
Processing Plant	kVA	3035
Tailings Storage Facility	kVA	50
Mine Site	kVA	2200
TOTAL	**KVA**	**5285**

Eskom is currently working with environmental consultants to find a suitable corridor for the development of a 400kV powerline for the integration of Independent Power Producers (IPPs) between the substation of Aggeneis, Nama and Gromis (located near Kleinsee) based on the Strategic Environmental Assessment (SEA) undertaken by the CSIR that identified nationwide corridors for the strategic expansion of Electricity Grid Infrastructure (EGI) (Enviroworks; July 2020). The corridor options follow various routes in close proximity to the SHIP Mining Right area, one of which will sterilise the Homeep Ore Deposit. Communication has been provided to the Eskom Consultant in this regard.

Diagram 5: Diagrammatic supply of Electricity supply in the Sub-Region



3.3.4 Water Supply

Groundwater status quo

Refer to Hydrogeological Assessment attached at **Appendix E** (SRK; May 2020) and the description of the water resources in Section 8.1.8.2 where the groundwater quality and quantity are summarised. As referenced from **Appendix E**, the groundwater in the area is naturally of poor quality and generally unfit for long term human consumption unless treated.

The groundwater quality of water abstracted from Jubilee mine and O'Kiep mine, if the latter is to be used for water supply, is of very poor quality with many constituents exceeding the DWA (2013) permissible limits for discharging wastewater to water resources. High sulfate concentrations, fluoride and salinity, and above background trace-metal concentrations, especially uranium, of groundwater abstracted from Jubilee and O'Kiep mines are indicative of pollution from the old mines and associated remnants of their sulfide orebodies.

Aquifers in the area are predominantly of the fractured-rock type and are generally low yielding with very low transmissivities, poorly developed fracture systems of limited extent and are classified as minor aquifers. In many areas of the site, the bedrock is solid with no fractures and hence no groundwater is present. Boreholes drilled in these areas remain dry with no evidence of groundwater ingress. Groundwater usage in the study area is very low and mostly for livestock watering;

Process water supply is proposed to be sourced from the O'kiep Copper Mine where approximately 4 billion litres of water is present within the old mine workings. The O'Kiep Copper Company (OCC) in partnership with ReThink Resources plan to apply for a water use licence to extract copper from the water in the old mines and to use the water that has been cleaned to truck it to the Rietberg mine site in container tankers to fill up a reservoir at the mine site. The water use license process is a separate process to the water use license required for this mining right. All process water for the Rietberg processing plant will therefore be trucked to the site and no process water supply lines will be necessary. The application to treat the O'Kiep open pit water is yet to begin, and establishment of the treatment facility at the source means that the timeframes for the supply of this treated water are unknown.

The dewatered groundwater from the mine shafts will be stored on site to be used in processing. More information of the groundwater quantity and quality and the impacts of the drawdown of the dewatering process are detailed in **Appendix E**.

Potable water is to be sourced from the Municipal Henkries supply line that runs parallel to the N7 in close proximity to the Rietberg Mine, from where the potable water is proposed to be accessed via a pump station as shown on **Diagram 3b** and **Diagram 4** showing the proposed bulk services layout.

A total water allowance of 150 l/person/day has been made. The various unit conversions for potable water supply to be utilised to determine pumping, storage and treatment capacities include:

- Potable water 178 employees x 150 l/person/day = 26,700 l/day
- Process water for mine site and dust suppression – 750 m^3/month for 30 ktpm option
- Process water for processing plant the 30 ktpm option - 18,000 m^3/m

3.3.5 Water Management

All dirty rainfall run-off, process plant discharge, treated sewage and grey water will be collected, stored, treated and recycled as far as possible. Should an excess of water exist on the operation, all effluent from the site will be suitably treated and tested to ensure compliance to acceptable standards before being released into the environment. All clean rainfall run-off should be diverted from dirty and contaminated areas to minimize the risk of environmental and water pollution. Trenches or berms will be constructed to divert clean run-off, collect dirty run-off and route dirty water to suitable storage dams. The low rainfall in the area means that little stormwater run-off can be expected.

Appendix D details the clean and dirty water management of the Tailings Storage Facility (TSF) and includes the design of a surface water diversion system around the TSF in section 3.3.10 below.

3.3.6 Mine logistics

The mine logistics is the area where the mining contractor and relevant technical services personnel will manage each mine. Each mine site will be enclosed by a security fence. 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, waste handling area, explosive delivery area, earth moving vehicle and engineering workshops as well as an earth moving vehicle parking area, fuel storage facility and a wash bay. 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.

Effluent will be managed by means of a treatment facility called a "Biozone", which is a mobile container that treats effluent above ground in tanks within a container. This method of effluent management avoids the disposal of sewage into underground septic tanks or soakaways. The capacity will be selected to manage the number of staff on site, and the bioreactor flow rates range from 2.5 to 40kl/day.

3.3.7 Processing Plant Design

The processing plant site will include the processing plant, a metallurgical and assay laboratory, offices, reagent storage facility and a workshop located at the Rietberg Mine as shown in **Diagram 3b**. The process flow (refer to summary included as **Diagram 6**) is made up of the following components. Diagrams of these components will be provided in the EIA Report.

- Crushing circuit
- Secondary crushing circuit
- Mill Feed Stockpile
- Milling circuit
- Flotation Feed circuit
- Rougher Flotation circuit
- Cleaner Flotation circuit
- Re-cleaner Flotation circuit
- Concentrate Thickening circuit
- Tailings thickening circuit
- Concentrate Filtration circuit
- Flocculant Make-up circuit
- Depressant Make-up circuit
- Frother, Xanthate and co-collector dosing circuit
- Utilities Water circuit
- Utilities Air circuit

Crushing

Ore from the Run of Mine (RoM) stockpile at the Rietberg Mine will be conveyed to the processing plant and discharged into the jaw crusher feed bin which is fitted with a vibrating grizzly feeder. The vibrating grizzly undersize combines with the jaw crusher discharge and is fed to the secondary crusher screen. The vibrating oversize is fed into a jaw crusher where the size of material is reduced from 500 mm to 80 mm suitable to be fed to the secondary (cone) crusher.

The crusher discharge together with vibrating grizzly undersize is fed to the secondary crusher double deck screed. The top deck has an aperture of 50mm with the bottom deck having an aperture of 15 mm. The oversize of both decks is fed into the secondary cone crusher that reduces the material to less than 15mm. The secondary cone crusher product is recycled back to the secondary screen feed conveyor and combines with the vibrating grizzly undersize, as feed, to the secondary crusher feed screen. The undersize from the screen is conveyed onto the mill feed stockpile.

Milling

The product, from the crusher circuit, is conveyed to the mill feed stockpile with a live capacity of 8 hours. Vibrating feeders underneath the stockpile will discharge mill feed onto the mill feed conveyor.

The ball mill grinds at 65-70 % solids (RD of 1.7-1.8) using steel balls as grinding media. Mill feed dilution water is added if required, to maintain the required in-mill density. The mill discharge gravitates to the mill discharge sump in which dilution water is added. The content of the mill discharge tank is pumped to a classification cyclone with a cut point of 150 um. The cyclone underflow is returned to the mill feed hopper while the cyclone overflow reports to the flotation feed surge tank.

Flotation

Collector, frother and depressants are added into the rougher flotation feed tank to condition the slurry prior to flotation. Water is added, if required, to reduce the density to 1.33; an adequate density for flotation treatment. The content of the feed tank is pumped to the first cell of the flotation rougher bank.

Rougher Flotation

The rougher flotation circuit has a residence time of 31 minutes and uses 5 tank cells. The cells are air induced using blowers. All concentrate from the roughers cells is pumped to the Cleaner flotation cells. The rougher cells tails gravitate to the rougher tailings tank from where it is pumped to the Tailings thickener. All walkways on the float section will be below float cell lips in order to ensure access to overflow launders.

Cleaner Flotation

The cleaner flotation circuit has a residence time of 30 minutes and uses trough type cells comprising of 2 banks of 2. The cleaner concentrate gravity flows via launder piping to the designated concentrate froth pump. Each bank will have its own dedicated froth pump which will allow for potential re-circulation of second cleaner bank to cleaner feed in events of low-grade feed. The concentrate is then pumped to the re-cleaner flotation.
The cleaner tailings are pumped to the rougher feed tank for circulation through the roughers.

Re-Cleaner Flotation

The re-cleaner flotation circuit has a residence time of 25 minutes and uses two (2) banks of two (2) trough type cells. The re-cleaner concentrate of each bank gravity flows via launder piping to the designated concentrate froth pump. The concentrate from the re-cleaners is pumped to the concentrate thickening circuit.
The re-cleaner tailings simply gravitate, in closed circuit, to the cleaner flotation cell feed.

Concentrate Thickener and Concentrate Handling

Final concentrate from the re-cleaners is thickened in a high rate thickener, underflow of which is pumped to a transfer tank. The final concentrate is then filtered by filter press, and the filter cake stockpiled prior to dispatching.
Concentrate thickener overflow gravitates to a spray water tank where it will be used as spray water in the flotation circuit. The filter press filtrate is pumped to the spray water tank.

Tailings Thickener and Tailings Handling

The flotation plant tailings are pumped to the tailing's thickener, to increase the density and recover process water prior to pumping the tailings to the TSF. Flocculant is added to the thickener to aid the settling of the material. The water recovered from thickener overflow gravitates to the process water tank. The thickener underflow, at a density of about 1.55, is pumped to the Tailings Storage Facility (TSF).
Flocculant is added to the thickener to aid the settling of the material. The water recovered from thickener overflow gravitates to the process water tank. The thickener underflow, at a density of about 1.55, is pumped to the Tailings Storage Facility (TSF).

Water Circuit

Process Water Handling

Process water overflow from the tailing's thickener gravity flows into a process water tank. From the process water tank, it is pumped back to the process for re-use. Overflow from the process water tank gravity flows to the tailings transfer tank.

Potable Water

Potable water is used for safety equipment like showers and eye washes. It is also used as gland service water and reagent make-up water. Potable water is supplied from the mine into a potable water holding tank. Reagent make-up will make use of potable water.

Spray Water

Spray water is made-up of concentrate thickener overflow and filtrate and will be stored in a holding tank. Spray water is pumped to the flotation circuit to be used in all the overflow launders.

Reagents Handling

A reagent storage shed will be located adjacent to the reagent make up facility.

- Collector – Xanthate is delivered in 40% strength solution, 1m³ plastic containers. The solution is pumped to the rougher feed tank ahead of the rougher flotation using small peristaltic pumps. There is also an optional extra pumping line to the cleaner flotation feed. Standby pumps will be allowed for in this area. The impact on safety and flame proofing requirements will be considered in the Mine Health and Safety Plan.
- Frother is delivered in 100 % strength solution, in 20 litre containers. The solution is pumped to rougher flotation using a small peristaltic pump. There is also an optional extra pumping line to the cleaner flotation feed. Standby pumps should be allowed for in this area.
- Depressant is delivered as dry powder. The solution is made up to 1% strength in a make-up plant that consists of mixing, agitating and hydration steps. The solution is pumped to the flotation feed surge tank ahead of the rougher flotation. There is also a pumping line to the cleaner flotation feed, as well as a spare pump and line to be used in the re-cleaners.
- Flocculant is delivered as a solution or powder. The flocculant will be diluted to the required strength in the make-up plant prior to dosing. The flocculant is then pumped to the respective thickener feed boxes.

Process Control and Automation

Monitoring and Control instrumentation for operating the sulphide flotation plant will be installed in order to minimise manual supervision and control requirements.

Sampling and Evaluation

- Routine quality checks for the relevant elements of the feed will be taken automatically prior to reporting to the surge feed tank, by using a primary and secondary combination of rotary vezin[1] cutters. The combined sample will be taken after the mill prior to the rougher feed tank.
- The rougher tailing sample will also be taken prior to the tailing's thickener using rotary vezin cutters. The re-cleaner flotation concentrate is sampled using rotary vezin cutters prior to the final concentrate thickener.
- The final concentrate is sampled prior the filtration feed tank also using a rotary vezin cutter.

Slurry Handling

General spillage from within the various sections of the flotation plant will be contained within a five degree (5˚) sloped, bunded concrete area. Floors will be sloped towards a spillage sump with a one cubic meter (1 m³) capacity, which will be protected with a 6 mm slotted wedge-wire screen.

A vertical spindle type sump pump will be used to transfer the spillage within the following circuits:

- Mill circuit, into mill feed hopper
- Flotation circuit into either final tailing tank or feed tank.
- Concentrate circuit, into concentrate thickener.
- Tailing circuit, into tailings transfer tank.
- Reagents circuit, into rougher tailings tank
- Utilities circuit, into flotation feed.

3.3.8 Efficiency of process

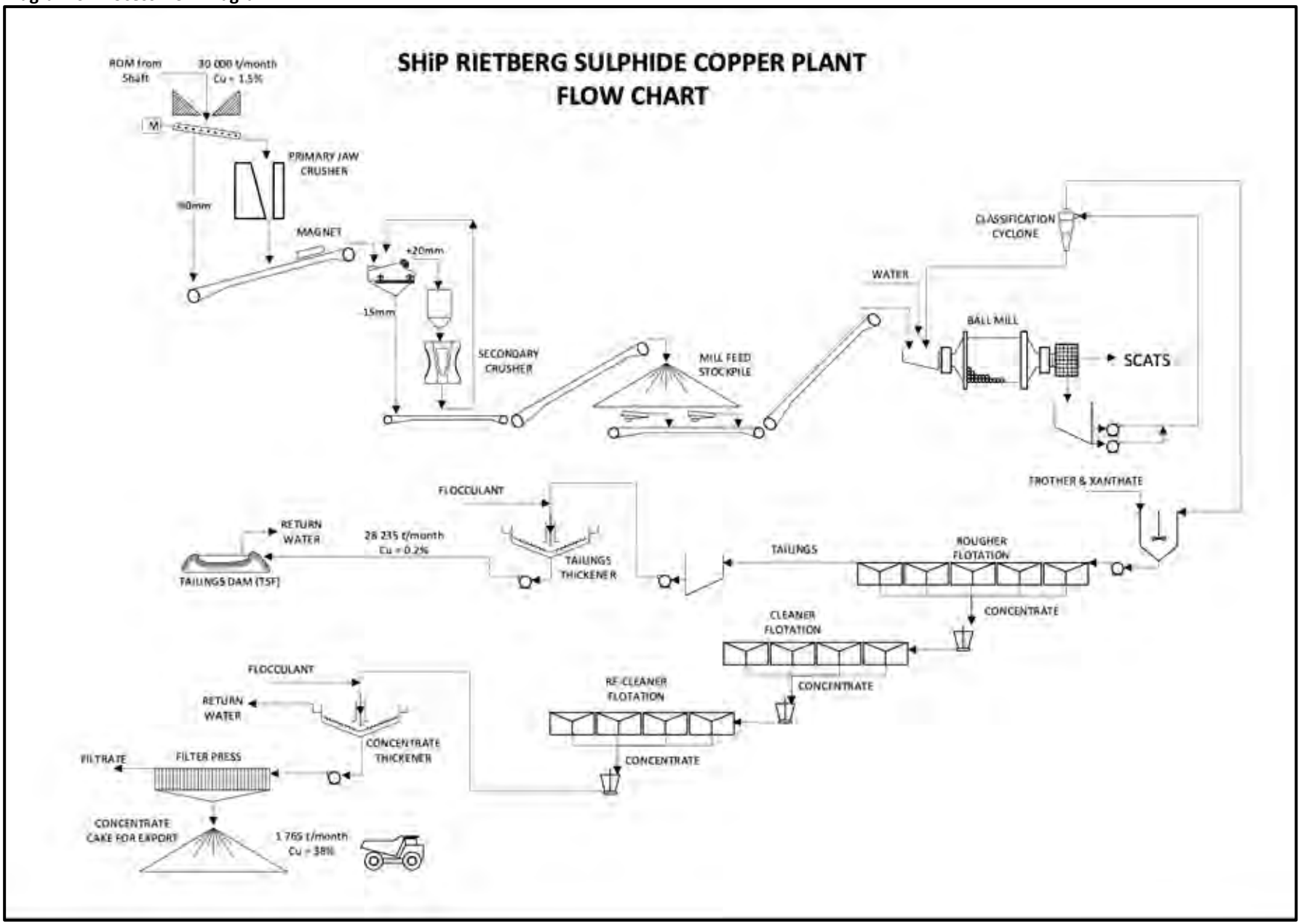
The copper will be upgraded by means of flotation with the final flotation concentrate representing 10 % to 12% of the original mass of the plant feed. 90% of the copper will be contained in this fraction. This will be the final product. It will be filtered (dewatered), bagged, and sold at the mine gate. The reclaimed water will be returned to the process water circuit.

The remaining 88% to 90% of the original plant feed will be discarded as flotation tailings.

This product, grading at 75% passing 106 microns, will be pumped to the tailings disposal facility (TSF), which will be a contained area 450m from the processing plant. The TSF will be self-raising. The tailings will be pumped at 50% solids and allowed to settle on the TFS. Water will be recovered and returned to the plant for re-use, thereby reducing the raw water requirement.

[1] Vezin - refers to a rotating cutter that passes at constant speed through the falling stream of slurry or free flowing solids entering it..

Diagram 6: Process Flow Diagram



3.3.9 Waste Rock Dumps and Stockpiles

Waste rock dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff. Examples of waste rock dump classifications are provided in **Diagram 7** below.

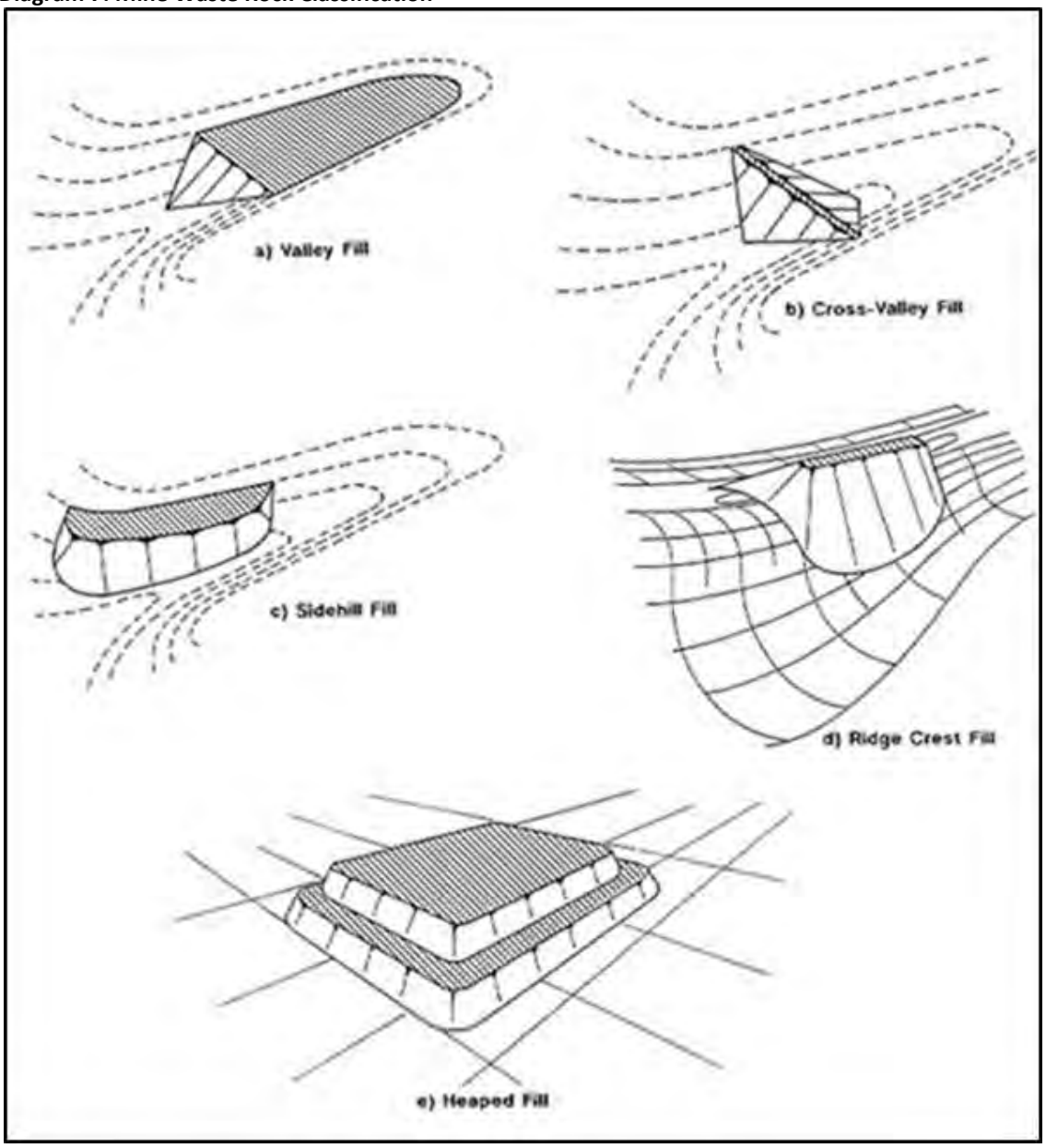
In mountainous terrain consisting of natural depressions along the slope and with the limited topsoil available, the best option for waste dumps is filling and levelling the top of these natural depressions called "valley fill".

Waste rock dumps on the sides of kopjes "sidehill fill", which have large slopes will be terraced once the dump has reached its final profile at the top level, by dumping additional material along the sides at progressively lower levels, and developing these terraces at differing angles.

In the case of waste rock dumps in valleys "heaped fill" excavations are used with the final designed perimeter of the waste rock dump created to obtain cover material for the top of the dumps and profiling the slope of dumps. Dumping will proceed above surface on the top of this buried dump at successive tiers with an appropriate height of around 6 to 10m, leaving terraces of 6m wide and working from the perimeter toward the centre. This will allow for reclamation of the outside profiles at a much earlier stage, resulting in very little outstanding reclamation toward the end of the life of the dump.

Waste rock dumps are included at each mine site as shown in **Diagram 3b, Diagram 3c and Diagram 3d** above.

Diagram 7: Mine Waste Rock Classification



The Run of Mine (RoM) stockpile will be sized to ensure sufficient supply to the plant for a minimum of 3 months. With a 30 ktpm production profile this will amount to 3kt per day. The stockpile thus needs to be a minimum size of 90,000t. Existing waste rock dumps from historical mining will be expanded wherever possible.

Table 5: Waste Rock Dumps & RoM Stockpile based on the 30 ktpm Design Parameter

Description	Unit	Rietberg Upper WD	Rietberg Lower WD	Jubilee WD	Homeep	ROM Stockpile
Height	m	67	20	27	67	4
Width	m	295	130	210	295	30
Length	m	24	240	210	24	30
Wall Gradient	degrees	37	30	33	37	33-37
Stockpile/Waste Dump Volume	m3	450 000	385 000	520 000	450 000	-
Footprint Area	m2	49 500	28 300	35 200	49 500	900
ROM Stockpile Tonnage	t					10 500

3.3.10 Tailing Storage Facility (TSF)

Design Criteria and Battery Limits

Refer to the Definitive Feasibility Study Design of Tailings Storage Facility (October 2020) attached at **Appendix D**.
The proposed facility is required to accommodate 15 years of tailings production at a rate of 480ktpa dry tons of solids per annum, which relates to a maximum storage capacity of 7.2Mt of tailings during the life of mine. The tailings will arise from the processing of a copper ore body.

The required storage volume for the facility has been calculated based on an estimated average in-situ dry density of the tailings product of 1.375t/m^3 based in turn on a particle specific gravity of 2.75 and an estimated average in-situ void ratio of 1. The tailings will be pumped to the TSF in a slurry comprising 45-55% solids by mass. At an estimated particle SG of 2.75, the slurry density is expected to be between 1.47 and 1.54 t/m^3.

The battery limits for the design of the facility have been defined as:

- The first flange of the overland slurry delivery line(s) after the line crosses into the site of the TSF as defined by the innermost of the perimeter access road or storm water diversion works.
- The surface of the decant pond.
- The perimeter fence of the TSF.

It should be noted that the scope as defined is intended to exclude all mechanical equipment and power supply to the slurry pumping and return water systems from the design of the TSF.

Selection of Preferred Site for Development of the TSF

A preferred site for the establishment of the TSF has been identified to the North-West of the proposed Rietberg Mine processing plant. The site was selected based mainly on consideration of surface drainage systems and the presence of protected species, as well as the prevailing wind direction, visibility of the facility and the location of a potential borrow pit for the construction of TSF starter embankment. Refer to **Diagram 3b** and **Diagram 8f** and the site selection process described in Section 6.2.3 below.

Waste Classification and Selection of Containment Barrier System

Waste classification of the tailings has been carried out (Future Flow GPMS cc, January 2020) in accordance with the requirements of NEM:WA on two representative samples of copper ore tailings (CJB Epoch 1B and 1C Flotation Tailings). The Acid-Mine-Drainage (AMD) potential of the samples was also determined by Acid-Base-Accounting (ABA). The waste classification and ABA testing processes concluded that:

- Both tailings samples classified as Type 3 Wastes, requiring disposal to a site with Class-C containment barrier system.
- Neither of the tailings samples are expected to be acid forming.

Based on detailed assessment of the waste classification and a review of the reports on groundwater conditions and usage, it is believed that a case could be made for the risk based relaxation of the requirements for the containment barrier system to the TSF, based on:

- The absence of leachable contaminants in the tailings, with all potential contaminants complying with the LCT0 guideline values.
- The nature of the groundwater which has been assessed by SRK (**Appendix E**) as being of poor quality and generally unfit for long term human consumption unless treated, with usage very low and mostly for livestock watering.
- The expectation, based on modelling by SRK, that the potential contaminant plume from an unlined TSF would not have spread more than 150m from its footprint.

Notwithstanding the potential for relaxation of the requirements for the installation of the containment barrier system, SHIP have indicated to Epoch their preference for the inclusion of a Class C containment barrier system into the design of the proposed TSF.

Geotechnical Investigation

A geotechnical investigation of the proposed site of the TSF was carried out and documented (Bear GeoConsultants, January 2020) in accordance with prescribed standards. The investigation comprised:

- The excavation of fifty-one test pits were excavated using a 320D CAT excavator. It is noted that the preferred location of the TSF was amended and finalized after the geotechnical investigation. The excavated test pits did however, cover the area of the starter embankment and also assisted in the identification of a potential source of borrow material for its construction.
- Profiling of the test pits by an engineering geologist in accordance with using standard procedures (SABS, 2012), and the retrieval of samples considered representative of the soil horizons on the site.
- Laboratory testing of the soil samples retrieved from the test pits to enable their classification and to determine their strength and hydraulic conductivity parameters and suitability for use in construction.

While amendments to the layout of the TSF resulted in the test pits not covering the entirety of the TSF basin, this is not believed to be a concern based on the uniformity of the soil profiles, which are described as comprising a thin cover of transported soils underlain by shallow, hard rock granite gneiss. A thick drift of sand was identified on the eastern portion of the TSF footprint at the foot of the hill forming the south eastern boundary and is considered a suitable source of construction material for the TSF starter embankment.

Description of the Tailings Storage Facility

The TSF will be constructed as a conventional self-raised facility consisting of a starter embankment from which wall raises will be constructed using dried tailings once the basin behind the embankment is filled. The facility will be equipped with a containment barrier system to prevent the release of seepage its foundation and promote the recovery of water for reuse. The facility is to consist of:

- An engineered earth fill starter wall with side slopes constructed to 1V:2.5H (upstream) and 1V:3H (downstream) respectively and a crest width of 6 m
- A Class C Containment barrier system to the basin and inside slopes of the facility comprising a 1.5mm HDPE liner, underlain by a Geosynthetic Clay Liner (GCL)
- A system of drains to prevent the build-up of water pressures on the containment barrier system, promote drainage and consolidation of the deposited tailings, and to ensure the structural stability of the facility comprising:
    - A graded sand and stone blanket drain located beneath the planned crest location of the TSF, with outlets located at 50m centres.
    - Graded sand and stone outfall trenches and drains at 50m centres along the perimeter of the TSF.
    - A curtain drain with outfalls at 50m centres within the starter embankment to protect it against seepage in the event of a failure of the liner system to its inside face.
- A contaminated water collection and containment system comprising:
    - A solution trench collecting water from the drains within the TSF and starter embankment.
    - A concrete lined sump to store drainage water, from where it can be pumped to the plant.
    - A series of unlined toe paddocks and cross walls to retain storm water runoff from the outer face of the TSF embankment and to protect the solution trench against siltation.
- A decant tower and associated waste rock access wall to enable the collection of excess slurry and stormwater runoff water from the basin of the TSF, which would be pumped directly back to the plant for reuse. The system will comprise a series of intermediate inlets to promote the early recovery of water until the decant pool can be located in its final position and will also enable the collection of all excess water off of the basin of the TSF as well as some interstitial water which would drain to the inlets.
- A surface water diversion system to ensure clean stormwater runoff is diverted around the facility, comprising:
    - A Northern storm water diversion trench between the TSF and the Archaeological site.
    - A Southern storm water diversion trench between the TSF and the processing plant.

Water Balance Calculations

Water balance calculations have been carried out for the TSF to estimate the expected rate of slurry water return capacity to store runoff associated with rainfall on the basin. The water balance model and calculations illustrate that:

- Between 45 and 50% of the slurry water pumped to the facility would be available for return to the plant.
- While stormwater runoff to the basin of the facility would supplement the water available for reuse during the rainy season, it is unlikely that such water would ever entirely negate the need for plant make-up water to be sourced elsewhere.

- Average monthly rainfall and storm events of up to 7 days duration and 200 years recurrence interval are unlikely to result in the storage of more than 50 000m^3 on the facility.
- Given the limited requirement for storage of runoff on the TSF, and the demand for make-up water in the plant, it is proposed that excess water on the facility be returned directly to the plant, negating the need for the construction of a storm water control dam.

Hazard Classification of TSF

Based on the prescribed hazard classification criteria (SANS 0286:1998, 1998) the TSF has been classified as a High Hazard facility based on its Zone of Influence (ZOI) extending to the N7 national road and bridge to the west. It is considered unlikely that more than 10 residents or 100 employees would be present in the ZOI at any given time. The design, construction, operation and eventual rehabilitation and closure of the TSF will have to comply with the requirements specified for High Hazard facilities.

Slope Stability Analyses

Seepage and slope stability assessments have been carried out on the TSF, the results of which illustrate that the factors of safety against failure are a function of the location and levels of water being stored behind the starter embankment, the physical configuration of the embankment, the interface shear angles between the layers of the containment barrier system, and the functionality of the drainage systems to the embankment and the basin of the facility. The analyses confirm that the factors of safety against failure of the facility are within accepted norms for both static and pseudo-static loading scenarios.

Table 6 presented below provides the summary tailings production plan referenced from **Appendix D**, Section 3.2.

Table 6: Rietberg Mine Summary Tailings Production Plan

PARAMETER	UNIT	RIETBERG TSF
OPERATING LIFE OF TSF	years	15
TAILINGS PRODUCTION RATE	dry ktpa	480
TOTAL TAILINGS PRODUCTION	Mt	7.2
PARTICLE SPECIFIC GRAVITY	t/m^3	2.75
ESTIMATED LONG TERM IN-SITU VOID RATIO		1
ESTIMATED LONG TERM IN-SITU DRY DENSITY	dry t/m^3	1.375
TAILINGS STORAGE CAPACITY REQUIRED	Mm^3	5.237

Optimisation of Site Layout

The site selection process for the location of the TSF is described in Section 4 of **Appendix D**, and in Section 6.2.3 of this DEIR under Location Alternatives.

The preferred and only alternative is shown in **Diagram 3b** (and Figure 5 in **Appendix D**) is located further up the slope to the West and towards the area of the Waste Rock Dump. While the site encroaches on a minor drainage line, it avoids the larger surface water features and would enable the consolidation of the Waste Dump and TSF pollution control works. The facility is also located over a potential borrow area identified during the geotechnical investigation, which could be incorporated into the facility, thereby reducing the overall surface disturbance.

Table 7 below provides a summary of the stage calculations for comparison purposes and provides useful information on Option 3 (as per **Appendix D**) which is the preferred and only design and location option for the TSF as described in Section 6 above.

Table 7: Summary of Results of stage capacity calculations on TSF (Table 4 in Appendix D)

PARAMETER	UNIT	TSF1	OPTION 1	OPTION 2	OPTION 3[2]
STORAGE CAPACITY	yrs	15	15	14	15
DATUM LEVEL	m.a.m.s.l.	841	866	849	882
MAX CRES ELEVATION	m.a.m.s.l.	884	902	906	926
MAX TAILINGS ELEVATION	m	43	51	57	44
TSF CAPACITY	Mt	7.225	7.422	6.880	7.352
TSF CAPACITY	10^6 x m^3	5.254	5.378	4.985	5.328
CREST AREA	ha	17.48	26.09	17.30	19.04
FOOTPRINT AREA	ha	36	39	34.3	33.4
TERMINAL RATE OF RISE	m/yr	2	1.33	2.01	1.83
STARTER WALL VOLUME	m^3	185,000	572,232	538,610	325,984
STARTER WALL HEIGHT ABOVE DATUM	m	19	27	28	15.5
MONTHS TO STARTER WALL CREST	mnth	23.69	25.07	17.30	19.89
RATE OF RISE AT STARTER WALL CREST	m/yr	3.2	3.0	3.6	3.1

3.3.11 Project Services

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

Sewage treatment will be in the form of Biozones which are mobile containerised treatment plants. Wastewater from this plant will be recycled and utilised as service and process make up water.

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 firefighting truck will form part of the project services vehicles. 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 will be transported to suitable disposal facilities in the area.

Lastly, Information Technology (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 externally off-site.

3.3.12 Rehabilitation, decommissioning and Mine Closure

The final Rehabilitation, Decommissioning and Closure Plan (**Appendix G**) addresses 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.

[2] Option 3 is the Preferred and Only location of the TSF

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, mine or pit footprint, access ramps and haul roads, waste rock dump, residue and product stockpiles, handling areas, water storage and reticulation, stormwater management structures, and electrical connections to the existing substation in … with an …kV line to the project site, detailed further in Section 3.4.1 below
- Operation: Mining below ground, processing activities, operation of the logistics, and all mining infrastructure detailed further in Section 3.4.2 below.
- Decommissioning and Closure: As detailed further in Section 3.4.3 below. 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 construction phase entails the development of the infrastructure and logistics, including the removal of vegetation and topsoil in preparation of development footprints:

- Erect perimeter fences for safety and security purposes, and to demarcate the project site. The fence should have a total height of 2.4 m. The fully galvanised wire mesh fence should be 2.1m high with a razor mesh topping of 0.3m and spacing between stay and intermediate posts of 3m.
- Upgrade existing access roads and develop new access roads, with removal of vegetation and topsoil prior to construction as detailed in Section 3.3.1 above and shown in **Diagram 4: Bulk Services**.
- Provide electrical supply to each mine as there is currently no power supply to theses= sites. In order to establish power to the project site each site will require a transformer as shown in the Mine Site Layout Plans (**Diagrams 3b, 3c** and **3d**).
- Development of water supply and water management infrastructure to Project Area for all activities requiring water for processing and consumption; diverting stormwater and recycling. Water supply is an essential service as various steps in the mining and particularly the processing processes are heavily reliant on the usage of water.
- Development of mine logistics. The mine logistics will be the area from where the mining contractor and relevant technical services personnel will manage the mine. The mine site will be enclosed by a security fence. 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, waste handling area, explosive delivery area, earth moving vehicle and engineering workshops as well as an earth moving vehicle parking area, fuel storage facility and a wash bay. 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 construction of the hydrocarbon storage area, explosives bay and storage room for hazardous chemicals will take place within the logistics footprint, comprising of:
  - Fuel storage area comprised of 2 tanks x 45m³ is 90m³.
  - Volume of hazardous chemicals with 3-month stock stored on site will not exceed 80m³:
    - Xanthate storage of 24.072m³;
    - Dow Frother is storage of 27.582m³.
  - Explosives capacity not provided but a 7-day supply is the normal volume for storage.
- Establishment of Processing Plant Site at the Rietberg Mine that will include the processing plant, a metallurgical and assay laboratory, offices, reagent storage facility and a workshop.
- Establishment of a RoM stockpile with a process plant feed at Rietberg, and mining portals as shown on **Diagrams 3b, 3c** and **3d**.
- Establishment of areas for Waste Rock Dumps (WRDs) on existing historical waste rock dumps.
- Construction of Tailings Storage Facility (TSF) and associated infrastructure.

3.4.2 Operational Phase

The selected underground mining method will be Sub Level Open Stoping (SLOS) as described in Section 3.2.2 and illustrated in **Diagram 2**. This method was selected based on the following criteria:

- Orebody Dip (70 Degrees)
- Orebody Continuation on Strike (No Continuation on Upper Orebody (pillars) and very Scattered for Lower Orebody)
- Minimise Development Requirements

Footwall Drives will be developed from the declines. These Footwall drives will be positioned 15m below the reef horizon as per Geotechnical recommendations. Reef Drives will then be developed from the Footwall drives at 25m spacing to the bottom of each stope, thus intersecting each stope in the middle.
The portion of the reef drive between the Footwall Drive and Stope will be off-reef, whereas all development in the stope will be on-reef. The on-reef portion will be developed to the end of the stope (Hangingwall Contact). A slot raise will then be blasted from the end of the on-reef drive upwards to the top limit of the stope. This will create a free face for ring blasting.
The stopes will be mined in a retreat fashion from the top stopes to the bottom stopes. Diagram 2 illustrates the typical retreat mining strategy. This same method will apply to the pillar/skins mining in the Upper Orebody, with the only difference that very few stopes will be dependent on stopes above it. Where possible the blasted material from the skins will fall directly into the existing mining void for extraction at the existing draw points.

The **primary processing activities** include:
- Crushing and screening;
- Milling Circuit
- Reagent Make-up and conditioning
- Flotation circuit; and,
- Product Handling

As detailed in Section 3.3.7 above the Processing Plant is illustrated in the Plant Flowsheet (**Diagram 5**) and incorporates a conventional two stage crushing circuit with a primary jaw crusher followed by a secondary cone crusher in closed circuit with a vibrating screen. The primary mill discharge is pumped through a cyclone with the underflow passing through a flash flotation cell before gravitating to the secondary milling circuit. The cyclone overflow streams from the primary and secondary milling circuits form the feed to the flotation circuit. The flotation circuit comprises rougher, cleaner and re-cleaner tank flotation cells. The rougher concentrate is pumped to the cleaner cells with that concentrate progressing to the re-cleaner stage. The tailings from each stage are returned to the previous stage with the rougher tailings passing through a scavenger stage. The re-cleaner concentrate is the final concentrate which is filtered to and stored prior to export. The scavenger tailings will be thickened to 60% solids before being pumped to the tailings dam. The concentrate, equating to 10% of the original plant feed mass, will be sold at the mine gate.

3.4.3 Decommissioning Phase

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. The decommissioning and closure phase at the end of the life of the mine will consist of implementing the final rehabilitation, decommissioning and closure plan (**Appendix G**).

As included in Section 3.3.12 above, 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 TSF and development areas will not exceed the planned footprint. Recommendations for the decommissioning, closure and rehabilitation of the TSF have been provided in the Specialist Report by Epoch Resources (Pty) Ltd (**Appendix D**) 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 profiles 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 8: 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 GNR420 of 27 March 2020. ➢ The recent amendment to the MPRDA regulations were gazetted after the submission of the Final Scoping Report dated 11/02/2020 to DMR. ➢ The revised MPRDA Regulations requires meaningful consultation on the contents of the Social and Labour Plan to ensure that it addresses the relevant needs and is aligned to the updated Municipal Integrated Development Plans. ➢ The consultation with landowners, lawful occupiers and interested and affected persons is required in terms of the public participation process prescribed in the EIA Regulations.	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. The Social and Labour Plan is attached as **Appendix H**.
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 9 for list of activities.	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation (EA). The listed activities in Table 9 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

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
		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, as amended by GNR 990 of 21 September 2018.** **GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits**	Refer to Table 9 for the listed waste activities. The location and design of the Tailings Storage Facility is described in Section 3.3.10 and the specialist report prepared by Epoch: "Rietberg Copper Mine Definitive Feasibility Study of Tailings Storage Facility" (October; 2020), attached at **Appendix D**.	The listed activities that are triggered determine the Environmental Authorisation (EA) application process to be followed. The Application for Environmental Authorization has included the waste listed activities as shown in Table 9 below. Site Specific mitigation measures are included in Table 14, in the EMPr, and in the Closure Pan (**Appendix G**). **Appendix D** ensures compliance with the regulations regarding the planning and management of the residue stockpiles and deposits.
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 12 Section 8.1.9 Diagrams 14.1 to 14.4.	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The Mining Right area is located within Critical Biodiversity Areas 1 and 2 (CBA1 & CBA2) as shown in Diagram 14.1 The Rietberg Logistics area is located in a CBA2 and the TSF is located in CBA1 and CBA2, and not in a river FEPA. The Jubilee logistics area is located within a CBA1 and River FEPA sub-catchment. The Homeep Logistics area is located within a CBA2 and river FEPA.
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 8.1.6	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 8.1.10	Dust control measures are to be included in the EMPr
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 8.1.12	A Heritage Impact Assessment and a Palaeontological Report is attached at **Appendix C**. This 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.** • **GN 509 of 2016 – General Authorisation in terms of section 39 of the NWA for water uses as defined in section 21(c) and (i).** • **GN 267 of 2017 – Regulations regarding the procedural requirements for water use licence applications and appeals.**	Section 8.1.8 for description of water resources in local area. Diagram 4: Bulk Services and Diagram 13, Diagrams 14.1 to 14.3.	A site visit with DWS was undertaken on 5 March 2019 and again on 30 October 2019. The following listed activities were identified requiring an Integrated Water Use License: (a) Taking water from a water resource; (b) Storing water; (c) Impeding or diverting the flow of water in a watercourse; (g) Disposing of waste in a manner which may detrimentally impact on a water resource; (h) Disposing in any manner of water which contains waste from, or which has been

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
		heated in, any industrial or power generation process; (i) Altering the bed, banks, course or characteristics of a watercourse; (j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people. The proposed mining activities require a water use license for a number of listed water uses. An Integrated Water Use License Application (IWULA) will be applied for. Exemption from compliance with certain regulations in GN 704 of 1999 will be included in the iWULA. An Integrated Water and Wastewater Management Plan and a Geohydrological Assessment is required for this mining application. Refer to Plan of Study of Scoping in Section 10.
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 reagent chemicals to be used in the mineral processing plant, as well as chemicals typically found in petroleum products (for example) benzene, are regulated in terms of this Act. The processing plant, chemical storage area, 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 to be taken into account by the Project Team in the design of Mine.	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 Nama Khoi 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.

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
Municipal Plans and Policies		
Nama Khoi Local Municipality Integrated Development Plan (Draft IDP 2018-2019)	Section 5.3	The Need & Desirability of the project is referenced in terms of the Nama Khoi 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 will be included in the EMPr.
Namakwa District Municipality (Draft IDP 2017 2018)	Section 5.4	The Need & 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 & 8.1.9 & 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 5.9	Refer to Section 5.9
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7, Table 8 & **Appendix B**.	Refer to Section 7 & Table 13 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 10, 12, 13 and 15.	Used during desktop research to identify sensitive environments within the mining right area. Maps were prepared in mid-2019, and the 2018 revised SANBI BGIS datasets did not provide the overlays to update these maps. Updated maps will be prepared for inclusion in the DEIR subject to availability.
CBA database for Northern Cape	Section 8.1.9 Diagrams 14.1, 14.2, and 14.3	Used during desktop research to identify sensitive environments within the mining right area.
SKEP database highlighting fauna within mining right area	Section 8.1.7 and Diagram 14.4	Used during desktop research to identify sensitive environments within the mining right area.
South African National Land-Cover 2018 (SANLC 2018)	Databases to be sourced for updated map preparation for DEIR.	Databases to be sourced for updated map preparation for DEIR.
National Biodiversity Assessment (2018)	Databases to be sourced for updated map preparation for DEIR.	Databases to be sourced for updated map preparation for DEIR.
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 9: 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	The mining areas including infrastructure will be fenced and the estimated footprint for each mining area is as follows: Rietberg mine –.425Ha Jubilee mine – 100Ha Homeep mine – 40Ha **Total is approx. 565Ha** The main infrastructure will be developed at Rietberg mine covering an estimated area of 50 Ha. At the Jubilee and Homeep mine only satellite infrastructure with a footprint of less than 5Ha will be developed.	**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	Using fences as demarcation system. The total perimeter fence length has been estimated at: • Rietberg: 5km • Jubilee & Homeep Complex: 2.5km The fence should have a total height of 2.4 m. The fully galvanised wire mesh fence should be 2.1 m high with a razor mesh topping of 0.3 m and spacing between stay and intermediate posts of 3m. • Footprint of fence posts included in estimated calculation of total area of mine infrastructure (565Ha comprised of 425Ha for Rietberg Mine; 100Ha for Jubilee Mine; and 40Ha for Homeep Mine), including areas of vegetation to be cleared and topsoil to be stockpiled.	**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.[3]:** 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.	

[3] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.3 Upgrade existing access roads and develop new access roads and haul roads, with removal of vegetation and topsoil prior to construction.	Upgrading of existing unsurfaced road for length of 4.6km leading eastwards from the N7 at a point approximately 19km north of the town of Springbok to accommodate heavy equipment and two-way traffic. The access /haul road length will be 4.6km with an 8.9 m width to accommodate two-way traffic and should allow for a trench and berm on each side of the road.	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 12:** The development of (ii) infrastructure or structures with a physical footprint of 100m² or more (a) within a watercourse; (c) within 32 metres of a watercourse measured from the edge of the watercourse. • Applicable to the development of river crossings within watercourses and within 32m of watercourses outside an urban area where no road reserve exists. **GNR 983 (dated 8/12/2014) LN1 Activity 19, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 19:** The infilling or depositing of any material of more than 10m³ into or removal or moving of soil, sand or rock of 10m³ or more from a watercourse. • Applicable to the upgrading of existing unsurfaced roads that require culverts or low-level bridges to cross watercourses. **GNR 983 (dated 8/12/2014) LN1 Activity 24, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 24:** The development of a road (ii) where no reserve exists is wider than 8 metres and longer than 1km outside an urban area. • Where applicable to the development of sections of new haul and access roads, not to upgrading of existing roads where potential realignment of roads could be required. **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. • Combined increase in existing road widths for haul and access roads, and for sections of new roads where applicable. **GNR 983 (dated 8/12/2014) LN1 Activity 48, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 48:** The expansion of (i) infrastructure where the physical footprint is expanded by 100m² or more where such expansion occurs (a) within a watercourse; and (c) within 32 metres of a watercourse. • Applicable to the expansion of mining infrastructure, outside an urban area, within a watercourse, and within 32m of a watercourse (where LN 3:14 does not apply, i.e. the Homeep Mine located within 5km of the Goegab Nature Reserve). **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. • Applicable to clearance of vegetation associated with upgrading existing roads for haul and access roads, and development of new roads where applicable. **GNR 985 (dated 8/12/2014) LN3 Activity 14, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 14(ii)(a)(c)g.ii.(hh):** The development of (ii) infrastructure or structures with a physical footprint of 10m² or more; where such development occurs (a) within a watercourse, and (c) where no development setback has been adopted, within 32m of a watercourse measured from the edge of a watercourse g. Northern Cape ii. Outside Urban areas (hh) Areas within 5km from any other protected area identified in terms of NEMPAA. • Applicable to mining infrastructure at the Homeep Mine located within 5km of the Goegab Nature Reserve. **GNR 985 (dated 8/12/2014) LN3 Activity 18, as amended by GNR 324 (dated 7/04/2017), LN3 Activity 18(g)ii.(gg)(ii):** The widening of a road by more than 4 metres, or the lengthening of a road by more than 1km; (g) Northern Cape; ii. Outside urban areas; (gg) Areas within 5km from any other protected area identified in terms of NEMPAA; (ii) within a watercourse or within 100 metres from the edge of a watercourse • Applicable to the upgrading should this be required, of the existing road and creation of a trench and berm on each side of the haul road for the Homeep Mine.	**No**

2.4 Provide electrical supply to Project Area, with removal of vegetation and topsoil prior to construction where relevant.	Currently no power supply exists to the Project Area. In order to establish power to the project site a number of off-site installations will be required. This will include: - • **Rietberg** - Construction of 4,6km x 22 kV line from the Bulletrap Eskom line running along the N7 • **Jubilee** - Construction of 1,4km x 22 kV line from just after the Marlin Granite Mine to the sports field just outside the town of Concordia • **Homeep** - Construction of 3.5km x 22 kV line from the sport field to the Homeep Mine. Transformers will have to be constructed at the tap off points at the mine site locations. The 22kV powerlines will be strung across watercourses to avoid structures being located within 32m of any watercourses, wherever possible.	X	**GNR 983 (dated 8/12/2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017), LN1 Activity 12:** The development of (ii) infrastructure or structures with a physical footprint of 100m² or more (a) within a watercourse; (c) within 32 metres of a watercourse measured from the edge of the watercourse. • Applicable to the combined footprint of powerline structures placed within watercourses and within 32m of watercourses outside an urban area, outside existing roads, or road reserves, in cases where the powerline cannot be strung over the extent of the watercourse and 64m total set-back. **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. • Combined development footprint of the structures required for 9.5km of 22kV powerline to be constructed within the Mining Right area. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.[4]:** 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. • The combined development footprint of the structures required for 9.5km of 22kV powerline to be constructed within the Mining Right area. **GNR 985 (dated 8/12/2014) LN3 Activity 14, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 14:** The development of (ii) infrastructure or structures with a physical footprint of 10m² or more; where such development occurs (a) within a watercourse, and (c) where no development setback has been adopted, within 32m of a watercourse measured from the edge of a watercourse g. Northern Cape ii. Outside Urban areas (hh) Areas within 5km from any other protected area identified in terms of NEMPAA. • Applicable to the combined development footprint of the 22kV structures at the Homeep Mine, related to stringing the powerline over watercourses located within 5km of the Goegab Nature Reserve	**NA**

[4] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.5 Development of water supply and water management infrastructure to Project Area for all activities requiring water for processing and consumption; diverting stormwater and recycling, including removal of vegetation and topsoil prior to construction where relevant. .	Water supply is an essential service as various steps in the mining and particularly the **processing processes** are heavily reliant on the usage of water. Apart from the mining and process requirements, water will also be required for use as **potable water**. All dirty rainfall run-off, process plant discharge, treated sewage and grey water will be **collected, stored, treated and recycled** as far as possible. Should an excess of water exist on the operation, all **effluent** from the site will be suitably treated. All **clean rainfall run-off should be diverted** from dirty and contaminated areas. **Trenches** will be constructed to divert clean run-off, collect dirty run-off and route dirty water to suitable storage dams. A **surface collection dam** will be constructed to store all dirty water from the mining area and a series of dams will also be constructed within the plant to store run-off and discharged process water. Process water supply will be sourced from the O'Kiep mine where some 4 billion liters of water is present within the old mine workings. The OCC in partnership with ReThink Resources has applied for a water use license to extract copper from the water in the old mines and to use the water that has been cleaned. An agreement has been reached with ReThink Resources to source water from this operation and to truck it to the mine site in container tankers to fill up a reservoir at the mine site. All process water for the Rietberg processing plant will be trucked to the site and no water supply lines will be necessary except for potable water supply lines. Potable water will be sourced from the municipal Henkries supply line. In addition, potable and process water will also be sourced from 2 water boreholes drilled on site for this purpose near the Jubilee Mine, subject to the findings of the specialist Geo0Gydroloigical Report to be included in the DEIR.	**X**	**GNR 983 (dated 8/12/ 2014) LN1 Activity 12, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 12:** The development of (ii) Infrastructure with a physical footprint of 100m² or more; (a) within a watercourse; (c) or, if no development setback exits, within 32m of a watercourse, measured from the edge of the watercourse – excluding located in an urban area, with road or in road reserve. • Pipeline infrastructure crossing numerous watercourses and located within 32m of watercourses. **GNR 983 (dated 8/12/ 2014) LN1 Activity 19, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 19:** The infilling or depositing of any material of more than 10m³ into or removal of soil, sand or rock of more than 10m³ from a watercourse • Water pipeline infrastructure crossing numerous watercourses. **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. • The combined water infrastructure footprint contributes to the total area to be developed being greater than 1 hectare. **GNR 983 (dated 8/12/ 2014) LN1 Activity 48, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 48:** The expansion of (i) infrastructure where the physical footprint is expanded by 100m² or more where such expansion occurs (a) within a watercourse; (c) if no setback exists, within 32 metres of a watercourse. • The upgrading of existing roads and stormwater management will occur adjacent to the existing road and not inside a road reserve outside an urban area, within a watercourse and within 32m of a watercourse. **GNR 985 (dated 8/12/2014) LN3 Activity 12, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 12(g) iv.** [5]**:** 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. • The combined footprint of the water pipelines exceeds 300m². **GNR 985 (dated 8/12/2014) LN3 Activity 14, as amended by GNR 324 (dated 7/04/2017) LN3 Activity 14:** The development of (ii) infrastructure or structures with a physical footprint of 10m² or more; where such development occurs (a) within a watercourse, and (c) where no development setback has been adopted, within 32m of a watercourse measured from the edge of a watercourse **g. Northern Cape** ii. Outside Urban areas (hh) Areas within 5km from any other protected area identified in terms of NEMPAA. • Applicable to mine infrastructure at the Homeep Mine located within 5km of the Goegab Nature Reserve	

2.6 Development of mine logistics, including removal of vegetation and topsoil prior to construction where relevant.	The mining areas including infrastructure will be fenced and the footprint for each mining area is as follows: Rietberg mine – 425Ha Jubilee mine – 100Ha Homeep mine – 40Ha The main infrastructure will be developed at Rietberg mine covering an estimated area of 50 Ha. At the Jubilee and Homeep mine only satellite infrastructure with a footprint of less than 5Ha will be developed. The mine site will include offices, change houses, control room, first aid station, stores, waste handling area, explosive delivery area, earth moving vehicle and engineering workshops as well as an earth moving vehicle parking area, fuel storage facility and a wash bay. 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.	**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**
2.7 Construction of Hydrocarbon storage area, explosives bay and storage room for hazardous chemicals within logistics footprint, including removal of vegetation and topsoil prior to construction where relevant.	• Fuel storage area comprised of 1 tank x 68m³. Fuel usage will vary between 20 000 liters per month to 45 000 liters per month between build up, ramp down and steady state mining. • Volume of hazardous chemicals not provided. • Explosives capacity not provided but a 7-day supply is the normal volume for storage.	**X**	**GNR 983 (dated 8/12/2014) LN1 Activity 14, as amended by GNR 327 (dated 7/04/2017) LN1 Activity 14:** The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. **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**

[5] Status of land's zoning to be determined. Only applies if zoning is Open Space, conservation or equivalent zoning.

2.8 Establishment of Processing Plant Site including removal of vegetation and topsoil prior to construction where relevant.	The main infrastructure will be developed at Rietberg mine covering an estimated area of 50 Ha.	**X**	**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 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**
2.9 Establishment of areas for RoM stockpiles and process plant feed, and mining portals, including removal of vegetation and topsoil prior to construction where relevant.			**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 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**

2.10 Establishment of area for Waste Rock Dump including removal of vegetation and topsoil prior to construction where relevant.	Existing historical waste rock dumps will be expanded. The combined footprints of the waste rock dumps will be confirmed in the DEIR.	**X**	**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 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.	**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.

2.11 Construction of Tailings Storage Facility (TSF), including removal of vegetation and topsoil prior to construction where relevant.	The footprint of the TSF at the Rietberg Mine will be provided in the DEIR. The proposed facility is required to accommodate 15 years of tailings production at a rate of 480ktpa dry tons of solids per annum, which relates to a maximum storage capacity of 7.2Mt of tailings during the Life of Mine.	**X**	**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 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.	**X** **GNR 921 (dated 29/11/ 2013) Category B: Disposal of waste on land** (7) the disposal of any quantity of hazardous waste to land. **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). **GNR 632 (dated 24/07/2015): Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits from a Prospecting, Mining, Exploration or Production Operation** **GNR 633 (dated 24/07/2015): Category B: Residue stockpiles or residue deposits** (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right in terms of the MRPDA (28 of 2002)

3. OPERATIONAL PHASE ACTIVITIES				
3.1 Mining activities	**Mining will take place from underground portals (included in infrastructure areas) and from open pit excavations for the following areas:** Rietberg mine – underground portals Jubilee mine – open pit excavation Homeep mine - underground portals **Depth of mineral resource below surface:** Rietberg: extends 25m to 600m below surface Jubilee: extends from surface to 85m below surface Homeep: extends from surface to 750m below surface	**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.	**X** **As listed where relevant.**

3.2. Processing activities: 3.2.1 Crushing and screening 3.2.2 Milling Circuit 3.2.3 Reagent Make-up and conditioning 3.2.4 Flotation circuit 3.2.5 Product Handling	The main infrastructure will be developed at Rietberg mine covering an estimated area of approximately 50 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.	**NA**

3.3 Transport waste rock to waste rock dumps at each mine	**NA**	**NA**	**NA**	**NA**
3.4 Operation of RoM Stockpiles	The RoM stockpile will be sized to ensure sufficient supply to the plant for a minimum of 3 months. With a 30 ktpm production profile this will amount to 3kt per day. The stockpile thus needs to be a minimum size of 90,000t.	**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**
3.5 Operation of Waste Rock Dumps	Existing historical waste rock dumps will be expanded The combined footprints of the waste rock dumps will be confirmed in the DEIR.	**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. *General waste includes inert waste, as defined in the NEM: WA; Act 59 of 2008, as amended.* **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. *Inert waste as defined in the NEM: WA; Act 59 of 2008, as amended.*

3.6 Use of all facilities and amenities associated with mine logistics	NA	NA	NA	NA
4. DECOMMISSIONING PHASE ACTIVITIES				
4.1. Cover waste rock dumps leading edge with topsoil removed prior to establishment.	Leading edge	NA	NA	NA
4.2. Secure mine shafts & fence off all accesses securely	Included in total of 565Ha (extent of total area required for infrastructure for all 3 mines)	NA	NA	NA
4.3. Remove all structures, foundations and footings not required by landowner/s	Included in total of 565Ha (extent of total area required for infrastructure for all 3 mines)	NA	NA	NA
4.4. Rip all hardened areas and allow to revegetate naturally	Included in total of 565Ha (extent of total area required for infrastructure for all 3 mines). Improved road surfaces and watercourse crossings will not be removed as they will improve access for the community.	NA	NA	NA
4.5 Decommissioning of waste management facility – Waste rock dumps and FRD	The combined footprints of the waste rock dumps will be confirmed in the DEIR. The size of the TSF is to be provided in the DEIR.	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 and continue	Unknown	NA	NA	NA
5.3. Conduct final environmental audit	NA	NA	NA	NA
5.4. Lodge closure Application	20 079Ha	**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)[6] 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"[7].

The primary environmental objective of the MPRDA is to give effect to the "environmental right"[8] 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**.
The latest conservation mapping (refer to **Diagram 14.1 to 14.3**) indicates that Category B and Category C are applicable to this mining right project as shown in Diagram 15 and described in section 8.1.9
These categories basically require an environmental impact assessment process to address the issues of sustainability.

5.2 Copper Mineral Resources Supply and Employment Benefits

The mine will employ 178 directly and will impact on at least 20 local businesses in the area. It is estimated that the indirect economic benefit to the area will be in excess of ZAR100m. The direct investment is well over ZAR180m bring total benefit to the area of some ZAR280m exclusive of direct salary payments in excess of ZAR68m per annum.
In terms of **new employment opportunities**, there will be 2 posts for top management, 7 posts for senior-management; 9 posts for professional qualified staff; 40 posts for skilled technical staff; 120 posts for semi-skilled staff, providing a total of 178 employment opportunities from year 1 to 10.
Services that will outsourced and that will provide job security will be mine health and safety, environmental monitoring services and compliance officer, training, security, consultant geologist, main workshop and auditing/tax/accounting services.

5.3 Nama Khoi Local Municipality 2017/2022 (IDP 2020/2021)

In the Constitution of South Africa (108 of 1996) the objectives of a municipality or local government structure are described as follows under "section 152. (1) The objects of local government are-
(a) to provide democratic and accountable government for local communities;
(b) to ensure the provision of services to communities in a sustainable manner;
(c) to promote social and economic development;
(d) to promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organisations in the matters of local government".

The vision of the Nama Khoi Municipality is:
"To proudly deliver sustainable local economic development and climate resilient quality services to the Nama Khoi Municipality"

[6] 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.
[7] Constitution of the Republic of South Africa (No. 108 of 1996).
[8] 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."

The development and implementation of the Nama Khoi Local Economic Development (LED) strategy aims at ensuring the alignment to the economic sectors and also assist the SMME's in co-operation with other stakeholders:

- To initiate, lead and sustain an environment for job creation in the Nama Khoi Municipal Area.
- To leverage municipal assets and the municipal procurement process with the view to stimulate redistribution and growth.

The Macro Strategic Development concept provides a broad spatial development framework for the total municipal area and contains spatial planning proposals based on the following concepts (those of relevance referenced here):

SPATIAL OBJECTIVE 3: To develop sustainable and diverse local economies by the utilisation of opportunities in the different spatial categories.

MINING

- There is a concentration of minerals around the Springbok area, as well as in a broad band along the south of the Orange River.
- Although many of these sources have been depleted, there are still plenty of occurrences that can be exploited, and this should be considered for small scale mining.
- The Industrial mining corridor as indicated in the PSDF must be investigated for opportunities and exploited where possible.
- To solve the disputes and issues related to mining rights and to investigate the possibility for local communities to gain access and limited mining rights in areas to be identified for this.

SPATIAL OBJECTIVE 4: To protect the pristine and unique natural environment with its four distinct bio-geographical regions by means of effective management and managed use.

CORE & BUFFER AREAS

- To protect and manage the following environmentally important areas in line with the objectives and targets of the NBSAP:
  - The western part of the local municipality from the coast to the east of the N7, which has been identified as a SANBI priority area; and
  - The western mountain ranges including the Kamiesberg and the Hantam which has been identified as a SANBI Escarpment.
- To protect the natural spaces affected by the Terrestrial and Aquatic Critical Biodiversity areas against development and overgrazing, due to its vital role in maintaining biodiversity.
- To support the Critical Biodiversity Corridor Linkages towards the surrounding municipalities.
- To expand the three statutory protected conservation areas in the municipal area, i.e. Goegap Provincial Nature Reserve, Namaqua National Park and Nature Reserve.
- To rehabilitate all mining areas and damaged areas in the region and to remove and terminate unwanted activities and undesirable structures in and around protected areas.
- To investigate and eradicate the invasive Prosopis tree which poses a significant threat to biodiversity and ecosystem services in the Northern Cape Province of South Africa.

OTHER

- To ensure that future planning in the region consider the mitigation of climate change, including the curbing of greenhouse emissions associated with transport and electricity use. A Climate-Neutral Strategy is to be developed for the Northern Cape. The implementation of this strategy into land use management regulations would be mandatory on all municipalities and the private sector.
- To improve the urban areas' natural character through landscaping, tree planting, the development of natural parks and the protection of natural areas and (flowers) in the neighbourhoods.
- To rehabilitate the old mining areas to improve the environmental character of the area.
- To develop additional environmental awareness campaigns and environmental education programmes for the communities and visitors.

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 is being undertaken in a transparent manner and involving all the relevant stakeholders and Interested and Affected Parties. i.e. Public participation is being undertaken to obtain the issues / concerns / comments of the I&APs for input into the process. The implementation of recommendations and mitigation measures made by the specialists regarding the heritage resources **(Appendix C);** location, design and management of the Tailings Storage Facility **(Appendix D);** and, groundwater quantity and quality **(Appendix E)** are detailed in this report, the Environmental Management Programme Report (EMPr), Impact Tables **(Appendix F)** and Closure Plan **(Appendix G)** ensuring minimum environmental degradation. The Draft Social and Labour Plan is attached at **Appendix H**, which identifies the upgrading of the existing oxidation ponds at the Jubilee mine as the project (identified in the IDP) that the Applicant will facilitate.

- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted on 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 are proposed to ensure that the impact is mitigated. i.e. this report along with the EMPr (Part B Section 15) proposes mitigation measures which will minimise the negative impacts of the proposed mining on the environment.

- **Consideration for ecosystem disturbance and loss of biodiversity** – Refer to **Diagram 14.1** which shows that the mining areas are located within a Critical Biodiversity Area (CBA1 and CBA2), as detailed in **Diagram 14.2** for the Rietberg Mine and **Diagram 14.3** for the Jubilee and Homeep Mines. The vegetation types (refer to **Diagram 12** found on site are 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 proposed mining on the environment.

- **Pollution and environmental degradation** – The implementation of recommendations and mitigation measures made by the specialists regarding location, design and management of the Tailings Storage Facility (**Appendix D**); and, groundwater quantity and quality (**Appendix E**) are detailed in this report, the Environmental Management Programme Report (EMPr), Impact Tables (**Appendix F**) and Closure Plan (**Appendix G**) ensuring minimum environmental pollution and degradation.

- **Landscape disturbance** – 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 have been detailed in EMPr and Closure Plan (**Appendix G**) to ensure that the impact is mitigated. For example, landscape disturbance impacts associated with the development such as the Tailings Storage Facility (TSF), waste rock dump sites, erosion and dust have been identified and detailed mitigation measures have been 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; there is not much scope to reduce the use of non-renewable resources, such as vehicle transport using fossil fuels, and the use of Eskom supplied electricity is more affordable than generated renewable energy on site.

- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this is likely to impacted on 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 will be

proposed to ensure that the impact is mitigated. A number of mitigation measures have been 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 involving 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, and this Draft EIA Report is being available for a 30-day comment period.

- **Access of information** – Potential Interested and Affected Parties were notified of the proposal and the availability of the Draft Scoping Report (DSR), and the opportunity to register as an I&AP. Refer to the I&AP database and comments received in Appendix B. Registered I&APs have been notified of the availability of this report for comment.

- **Promotion of community well-being and empowerment** – This process will be undertaken in a transparent manner and involving all the relevant stakeholders and I&APs. The Draft Social and Labour Plan is attached at **Appendix H**.

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

6.2.1 Infrastructure and bulk services

- The location of a mining project is determined by the shape, position and orientation of the mineral resource. the location of the ore bodies comprising this mining right application is shown in **Diagram 3a**. There are other ore bodies within the mining right license area, but only the three indicated are included in this Mining Right Application. Refer to **Diagram 1c** which shows the ore bodies within the area.
- The layout of the Mine Site Plans are shown in **Diagram 3b: Rietberg, Diagram 3c: Jubilee** and **Diagram 3d: Homeep** and are based on the location of the mineral resources (ore bodies) as shown in **Diagram 3a** and are positioned on existing disturbed footprints from the historical mining activities at Rietberg, Jubilee and Homeep.
- The N7 National road to Springbok provides access to the Rietberg Mine and to the Jubilee Mine and Homeep Mine via Concordia. The mining right area is located approximately 10km north of Springbok. Refer to **Diagram 4** which shows the access roads and proposed haul routes.
  - The Rietberg Mine will be accessed by an existing gravel road located eastwards from the N7 approximately 19km north of the town of Springbok. This existing road that was built to access the historical Rietberg Mine will be upgraded if necessary, to accommodate heavy equipment and loaded haul trucks.
  - Refer to **Diagram 4** which indicates the proposed transport routes for haul trucks between the Jubilee Mine and Rietberg Mine and between the Homeep Mine and Rietberg Mine, making use of the existing secondary roads in the area that can accommodate two-way traffic. These haul routes link to the N7 Provincial road just south of Concordia.
  - The loaded haul trucks will travel northwards for a distance of approximately 11km before reaching the Rietberg Mine exit to the east of the N7, where the ore will be transported to the Rietberg Processing Plant.
- The new section of haul road has been identified to by-pass the main centre of the town of Concordia as shown in **Diagram 4: Bulk Infrastructure**. The proposed haul routes are shown in **Diagram 4**, and an alternative haul road has been identified to the east, to avoid the 600m section of residential area on the outskirts of Concordia.
- Infrastructure related to dewatering the underground mines are included in the mine site diagrams for each mine layout.
- In addition, the linear type infrastructure such as the electricity and water supply will follow the topography and lie of the land in a direct path wherever possible, avoiding homesteads, to minimise cost of materials and to maximise gravity feed (for the water pipeline to reduce costs of electricity for pumping).
- Investigations into the available power supply from Eskom have been started and applications are in progress for each mine, the capacity of which is shown in **Diagram 3b: Rietberg**, **Diagram 3c: Jubilee**, and **Diagram 3d: Homeep**.
- Potable water supply will be supplied from the Henkries water line that runs parallel to the N7 adjacent to the mining right boundary, and which supplies water from the Orange River to Springbok and other areas. This water line has been surveyed and the existing water support plinths from the historical mining activities, will be used to raise the above ground water pipe to traverse the watercourses, the locations of which are shown in **Diagram 3c**.

6.2.2 Individual Mine Site Plan Layouts

- The location of the mining activities is determined by the shape, position and orientation of the mineral resource as illustrated in **Diagram 3a: Ore Bodies**. There are no site alternatives for the mineral resources to be mined.
  - The Site Plan Layout for each separate mine comprising the Mining Right Complex are detailed in: **Diagram 3b: Rietberg**; **Diagram 3c: Jubilee**; and **Diagram 3d: Homeep**.

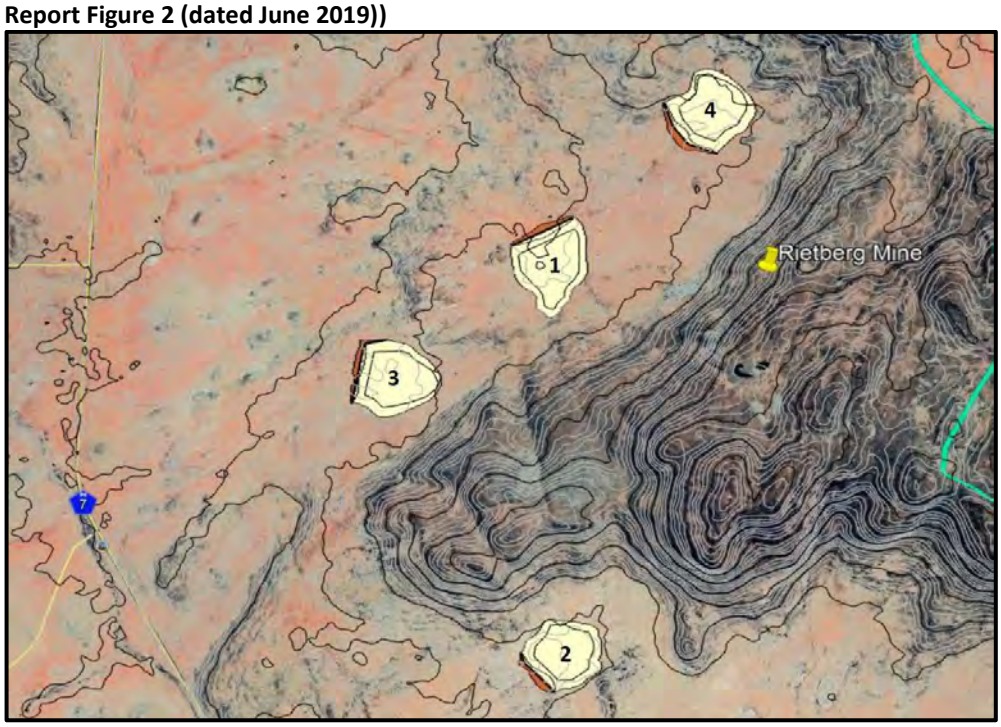
- The location of the mine logistics and waste rock dump sites have been based on the existing disturbed footprints of the previous mining activity at Rietberg, Jubilee, and Homeep.
- The location of the primary processing activities made up of the Processing Plant and Tailings Storage Facility (TSF) are proposed for the Rietberg Mine as shown in **Diagram 3b**. Refer to Section 6.2.3 below for further information on the site selection process for the TSF.

6.2.3 Site Alternatives for Tailings Storage Facility

6.2.3.1 Background to site selection process

- The location of the Tailings Storage Facility (TSF) is proposed for the Rietberg Mine where the primary processing plant is to be located.
- 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)[9] as amended (GNR 990 of 21 September 2018) stipulates a site selection process.
- The initial site selection process and pre-feasibility design of the Rietberg Mine TSF was undertaken by Epoch Resources (Pty) Ltd, a specialist mine residue and environmental engineering consultant company, in June 2019.
- The initial site selection process identified four potential sites as shown in **Diagram 8a** below. Epoch recommended their Site No. 1 shown in **Diagram 8b** as a potential suitable location based on: the location overlying an existing environmentally disturbed location; the site positioned over a wide valley in which it is possible to establish a large depositional basin reducing the volume requirement for a starter embankment; it does not encroach on nearby settlements; and it is also centrally located within the mining right area, approximately 1.5 km south-east of the processing plant.
- The environmental team (GDSC) provided input on the site selection process and noted that the location of the proposed TSF was in an ephemeral watercourse. Following the site visit with the Department of Water and Sanitation (DWS) official held on 30 November 2019, the site for the TSF was deemed unsuitable due to the presence of the watercourse, and an alternative site was identified further east out of the larger ephemeral watercourse.
- **Diagram 8c** shows the location of the TSF out of the larger watercourse was included in the Final Scoping Report, with the understanding that additional options would be considered in the EIA Phase based on further detailed investigation, which are now described in Section 6.2.3.2 below.

Diagram 8a: High Level Site Selection Process identifying four potential sites for the Tailings Storage Facility (from Epoch Report Figure 2 (dated June 2019))



[9] GN 632 of 24 July 2015: The purpose of the regulations is to regulate the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation. The regulations deal with: the assessment of impacts and analyses of risks relating to the management of residue stockpiles and residue deposits; the characterisation of residue stockpiles and deposits; classification of residue stockpiles and deposits; investigation and the selection of site for residue stockpiling; design of the residue stockpiles and deposits; environmental Impact Assessment and Management; duties of the holder of right or permit; monitoring and reporting system for residue stockpiles and deposits; dust management and control; decommissioning, closure and post closure management of residue stockpiles and deposits.

Diagram 8b: Tailings Storage Facility Site located in Ephemeral Watercourses as per PFS Design

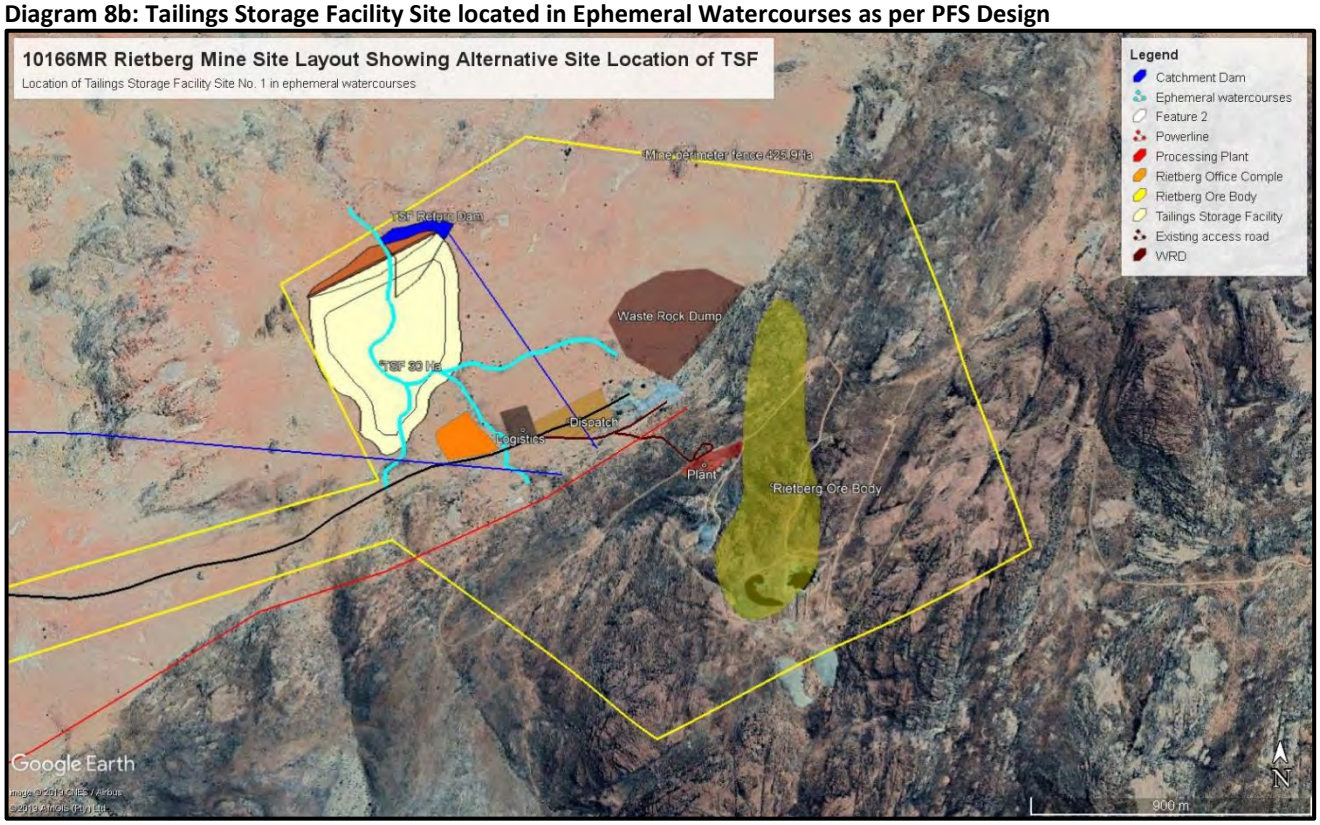
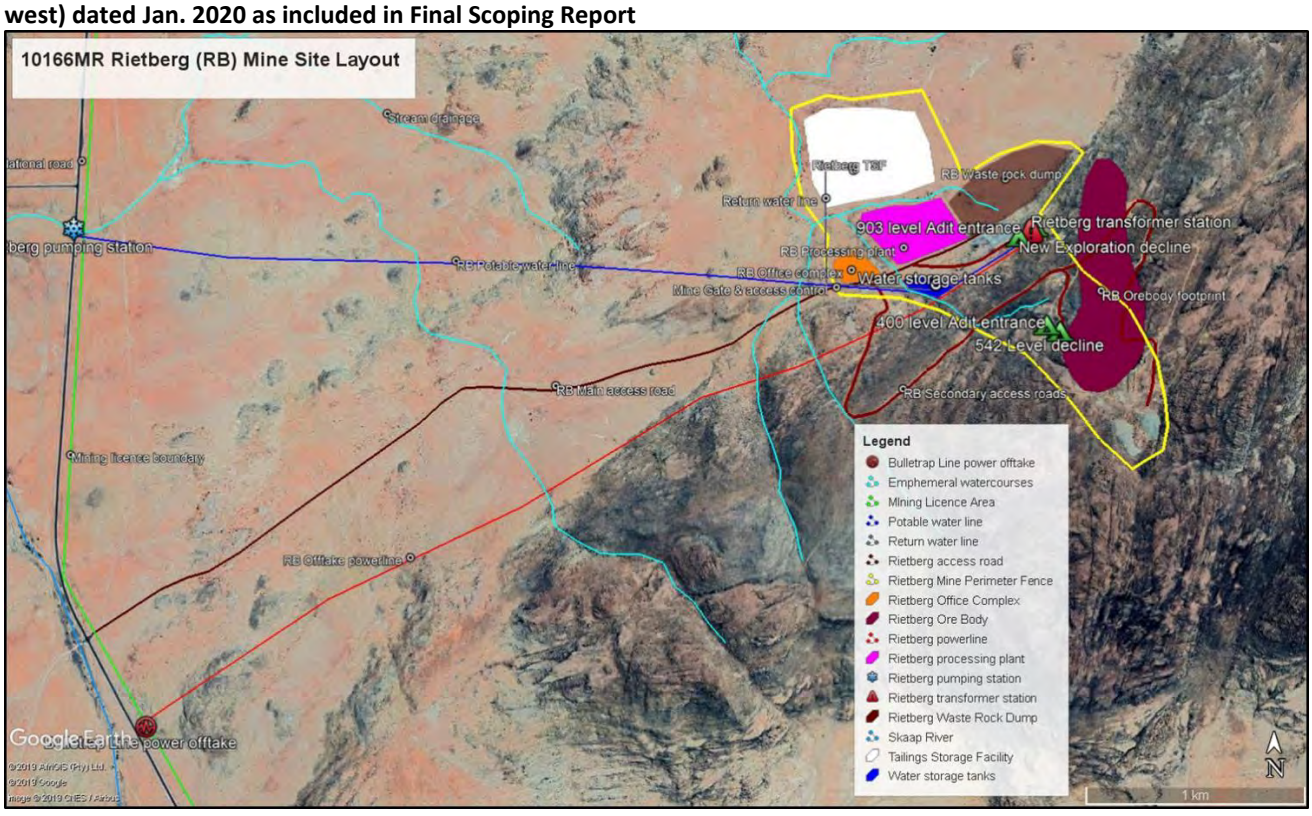


Diagram 8c: Rietberg Mine Site Layout Potential Location of TSF (removed out of larger watercourse located to the west) dated Jan. 2020 as included in Final Scoping Report



6.2.3.2 Site Layout Options presented in Definitive Feasibility Study to inform the EIA Process (Section 4 in Appendix D dated October 2020)

The detailed investigations have been undertaken and are reported in the Rietberg Copper Mine Definitive Feasibility Study Design of Tailings Storage Facility (Epoch; October 2020), which provides location options as described in Section 4 of **Appendix D**. Table 10 below details the summary results of the stage capacity calculations on the TSF options (as referenced from Table 4 in **Appendix D**).

Three options were identified for the rearrangement of the TSF layout, all of which have the capacity to store the proposed Life of Mine tailings production. The options are summarised as follows:

- Option 1 (**Diagram 8d**) is located to the West of the original site and, while an improvement on that site, also impacts on the drainage line to the south and an area of Kokerbooms (albeit less dense than on the original site).

- Option 2 (**Diagram 8e**) is arranged so as to avoid the drainage lines entirely, which results in an awkwardly shaped facility which is subject to capacity and rate of rise constraints. Due to the topography of the site and the limited footprint area the site will also require a larger starter embankment.

- Option 3 (**Diagram 8f**) is located further up the slope to the West and towards the area of the Waste Rock Dump. While the site encroaches on a minor drainage line, it avoids the larger surface water features and enables the consolidation of the Waste Dump and TSF pollution control works. Although the preferred location of the TSF encroaches on a minor first order drainage line, surface water runoff diversion measures will be designed and run-off managed by an appropriately sized storm water diversion trench/berm arrangement located along the southern and northern flanks of the TSF. The facility is also located over a potential borrow area identified during the geotechnical investigation, which could be incorporated into the facility, thereby reducing the overall surface disturbance. Option 3 (**Diagram 8f**) is the Preferred and Only Location of the TSF at the Rietberg Mine for consideration in the impact assessment process.

Table 10 (also included in Section 3 above) provides capacity calculations for comparison purposes.

Table 10: Summary results of stage capacity calculations on TSF options (Table 4 in Appendix D).

PARAMETER	UNIT	TSF1	OPTION 1	OPTION 2	OPTION 3[10]
STORAGE CAPACITY	yrs	15	15	14	15
DATUM LEVEL	m.a.m.s.l.	841	866	849	882
MAX CRES ELEVATION	m.a.m.s.l.	884	902	906	926
MAX TAILINGS ELEVATION	m	43	51	57	44
TSF CAPACITY	Mt	7.225	7.422	6.880	7.352
TSF CAPACITY	10^6 x m^3	5.254	5.378	4.985	5.328
CREST AREA	ha	17.48	26.09	17.30	19.04
FOOTPRINT AREA	ha	36	39	34.3	33.4
TERMINAL RATE OF RISE	m/yr	2	1.33	2.01	1.83
STARTER WALL VOLUME	m^3	185,000	572,232	538,610	325,984
STARTER WALL HEIGHT ABOVE DATUM	m	19	27	28	15.5
MONTHS TO STARTER WALL CREST	mnth	23.69	25.07	17.30	19.89
RATE OF RISE AT STARTER WALL CREST	m/yr	3.2	3.0	3.6	3.1

[10] Option 3 is the Preferred and Only location of the TSF

Diagram 8d: Alternative TSF Site Layout Option 1 (as per Appendix D)

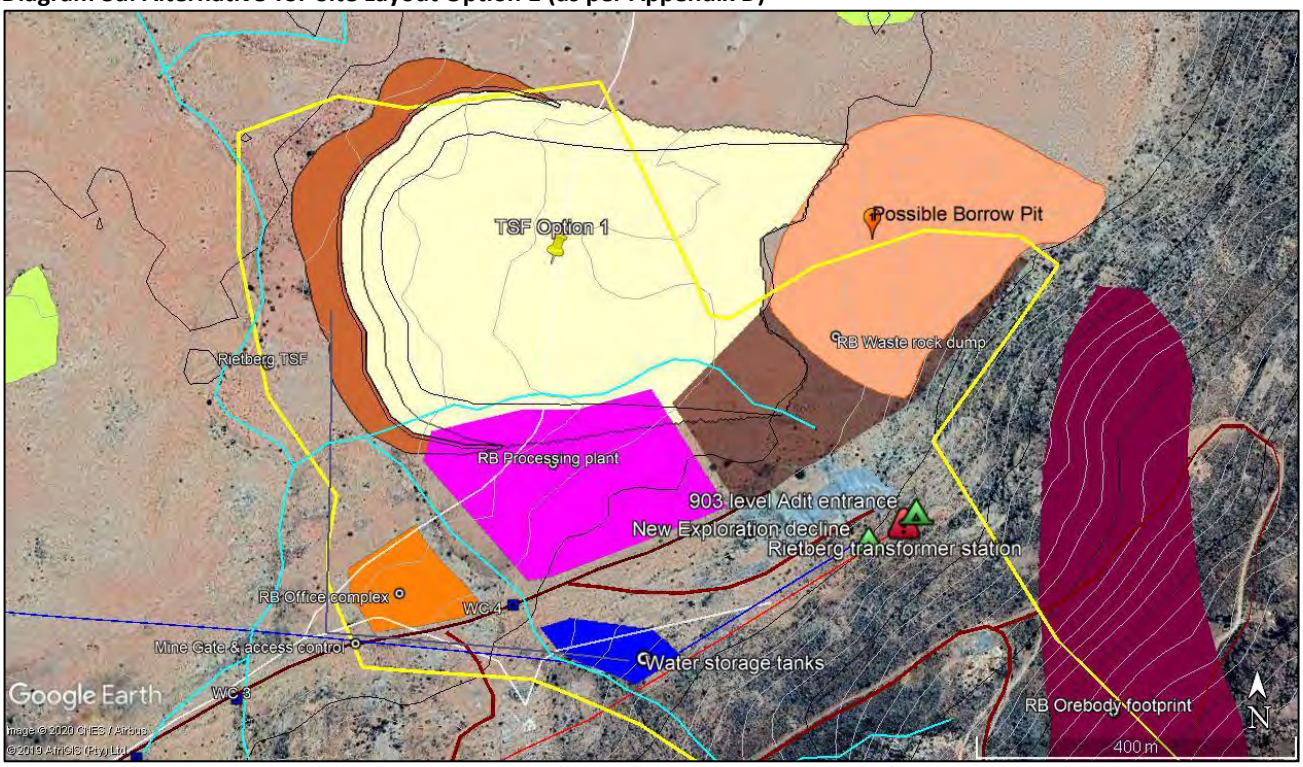


Diagram 8e: Alternative TSF Site Layout Option 2 (as per Appendix D)

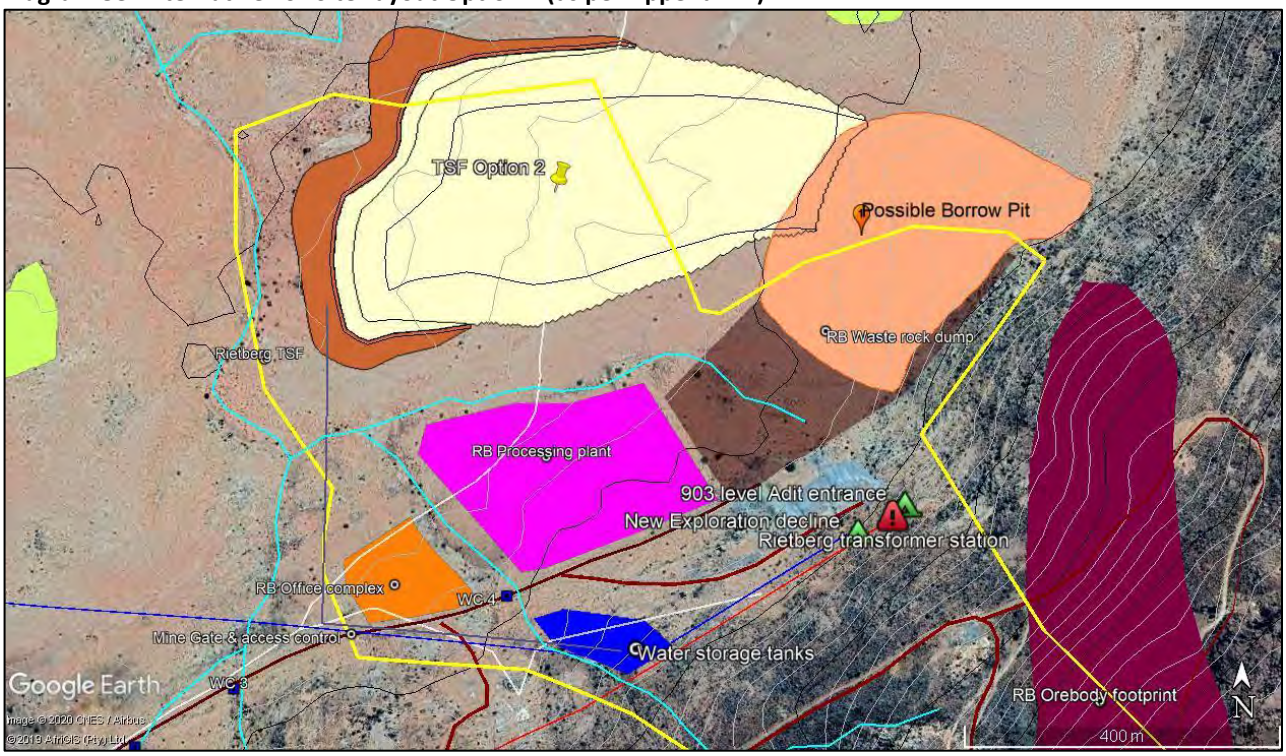
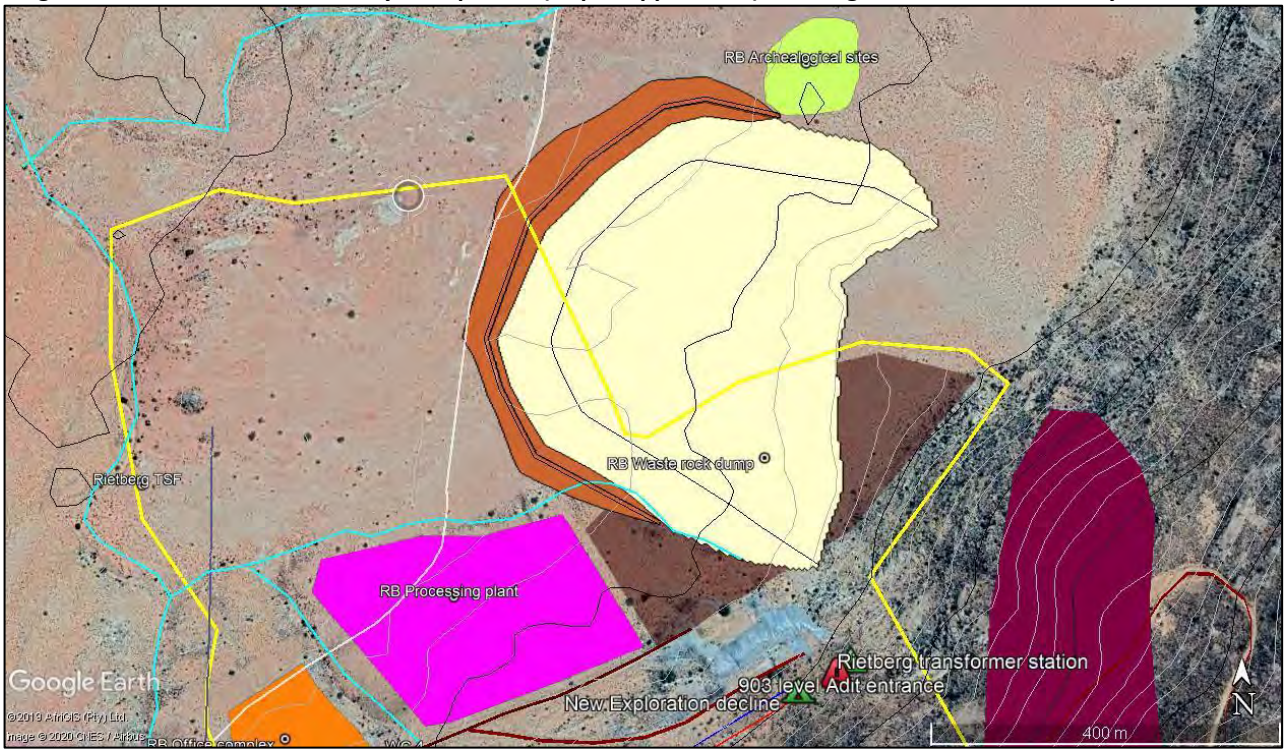


Diagram 8f: Alternative TSF Site Layout Option 3 (as per Appendix D) showing the Preferred and Only Site Alternative



6.3 Type of Activity

The Applicant is not the landowner, and it therefore it would not be realistic for this company to propose another type of activity as their core business is mining. Although the proposed mining activity takes place over a long time period, the best post-mining land use alternative is to return the site to its natural state. The holder of a mining right is required to rehabilitate the environment affected by mining to its natural state or to another predetermined land use.
Other activity alternatives have therefore not been considered as the purpose of the proposed project is to mine copper, silver, gold, lead and zinc from the identified ore deposits with the Mining Right application area as shown in **Diagram 3a**. The mines were historically mined as shown in **Diagram 15** and Photographs 1 to 7 below. With the increase in value of these minerals, the left-over ore deposits are being re-assessed with modern technology in terms of viability.

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.

The layout of the Mine Site Plans is shown in the series of diagrams in **Diagram 3b** (Rietberg), **Diagram 3c** (Jubilee) and **Diagram 3d** (Homeep) and are based on the location of the mineral resources (ore bodies) as shown in **Diagram 3a**. The proposed development footprints for the three mines are positioned on the existing disturbed footprints from the historical mining at Rietberg, Jubilee and Homeep wherever possible to avoid new disturbed areas.

The existing Rietberg mine consists of 4 adits/declines that provide access to the ore body. Two of these tunnels are declines and two are flat. The flat tunnel on RL 940 used to be equipped with rails and material was transported by locomotives and hoppers from the drawpoints to the tip near the adit. The basis of the Rietberg mine design was to use as far as possible, the existing development to access the new stoping areas. Some of the stopes will be accessed directly from existing footwall drives, however the majority of the new areas will require new declines/spirals and footwall development. The existing decline and other development sizes are in the order of 4m (wide) x 3m (high) from what could be derived from existing digital data.

The remaining ore body at the existing Jubilee Open Pit Mine will need to be accessed via blasting, and the blasting radius has been indicated as the mine perimeter fence to ensure compliance with Mine Health and Safety requirements.

The existing Homeep Mine has mine entrances as shown in **Diagram 3d**. As for the Rietberg Mine, the existing entrances will be utilised, and updated data gathered to inform the detailed underground mine design prior to mining commencement planned from year 8 to 15.

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 considered to be the only reasonable and feasible alternative as described below:

- **Underground mining technology**:
  The selected underground mining method will be Sub Level Open Stoping (SLOS) as described in Section 3.2.2 and illustrated in **Diagram 2**.

- **Processing Plant technology**: as detailed in Section 3.3.7 above and illustrated in the Plant Flowsheet (Diagram 6).
  Tailings Storage Facility Design: As detailed in Section 3.3.10 above, the technology to inform the design of the TSF will follow best practice and ensure legislative compliance. AS described in Appendix D, the TSF design is to incorporate a contained barrier system equivalent to that specified in the regulations as a Class C System. Based on the absence of clays suitable for use in the construction of containment barrier systems it is proposed therefore that the facility be constructed with a system comprising a 1.5mm HDPE geomembrane installed on top of a Geosynthetic Clay Liner.

- **Water management technology:** Process water will be trucked in and potable water will be sourced from the existing Henries line that runs parallel to the N7 adjacent to the Mining Right area. A specialist Geo-Hydrological assessment will determine the water quality and quantity of the groundwater, to inform the mine shaft dewatering strategy and presence of any aquifers that the design of the TSF will need to take into account, including the borehole groundwater yield and suitability for potable or process water. The technology includes the separation of clean water from dirty water, and recycling of water wherever possible.

- **Use of electricity**: Connections to the sub-regional power grid are included in the bulk infrastructure design (**Diagrams 3b, 3c, 3d** and **Diagram 4**) and detailed in Table 4 and **Diagram 5**. Investigations are being made to Eskom for the supply of electricity to the mines for the capacity described in Section 3.3.3 above. Back-up generators will be provided to ensure a continuous source of power. The use of alternative sources of energy has not been included in the design of the mine due to costs.

6.6 Operational alternatives

As described in the operational phase (Section 3.4.2 above) long-hole open stoping is a highly mechanised mining method utilising a wide range of equipment for drilling and mucking. Production drilling is typically carried out by high-efficiency column and arm long-hole drills or down-the-hole ("DTH") drill rigs. These systems use electric drive instead of hydraulic and have high pressure pneumatic DTH hammers or rotary percussion drilling systems. It is with recent gains in drilling technology that these systems have revolutionised long-hole stoping operations. The primary processing activities include of crushing and screening; Milling Circuit; Reagent Make-up and conditioning; Flotation circuit; and Product Handling are specific operational activities required to process copper bearing ore. The Plant Process Flow as shown in **Diagram 6** illustrates best practice for efficient and effective primary processing of the ore.

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 copper, silver, gold, lead or zinc for the local and international market, and no generation of much needed employment opportunities. The town of Concordia has a high unemployment rate, as does most of the local municipality with the decline in mining a decade ago resulting in existing mines being closed. The opportunity provided by the increase in the price of copper has led to the revitalisation of interest in copper mining of the existing deposits north of Springbok. The inflow of revenue and employment opportunities will have a very positive spin-off locally and regionally.

6.8 Summary of Alternatives

The assessment of alternatives must at all times include the "no-go" option as a baseline against which all other alternatives must be measured. The "no go" alternative is assessed together with the preferred and only alternative in the impact rating process.

The project site has been selected based on the results from prospecting. The layout and technology of each mine shaft and associated infrastructure has been determined by the shape, position and orientation of the mineral resource. Refer to the Mine Site Plans included as **Diagrams 3b, 3c** and **3d**. The existing infrastructure and access roads will be utilised, and existing dump sites expanded where indicated. The operational approach is practical and based on best practice to ensure a phased mining, followed by rehabilitation in sequential stages.

In summary therefore:

- The referred and only **activity** alternative is the mining and primary processing of copper (and other metals) within the Mining Right area demarcated in **Diagram 3a, 3b, 3c and 3d**.
- The preferred and only **location and layout alternatives** of the mining activities are on the earmarked sites shown on the Mine Site Plans as per **Diagram 3b (Rietberg), Diagram 3c (Jubilee), Diagram 3d (Homeep)** and **Diagram 4** for the bulk infrastructure.
    - 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, to avoid watercourses and sites of heritage significance considered to be "no-go" areas.
    - The original location of the Tailings Storage Facility (TSF) has been moved out of the watercourses and is now proposed in a location further to the north-west as shown in **Diagram 3**b. The specialist report addressing the TSF location and design is attached at **Appendix D**.
    - The new section of haul road has been identified to by-pass the main centre of the town of Concordia as shown in **Diagram 4: Bulk Infrastructure**. The proposed haul routes are shown in **Diagram 4**, and an alternative haul road has been identified to the east, to avoid the 600m section of residential area on the outskirts of Concordia.
    - The potable water supply pipeline will connect to the Henkries line adjacent to the N7 and follow a direct line to the proposed Rietberg Mine Site as shown in **Diagram 3b and Diagram 4**.
    - As shown in the mine site layouts and in **Diagram 4**, the electricity supply routes will connect to the existing power grid. Investigations are currently underway with Eskom regarding the supply of power to the mines.
- The preferred and only **technology** alternative is the underground mining, extraction, processing, waste and water management, design of the Tailings Storage Facility with a Class C containment system (**Appendix D**) and use of electricity with back-up generators, as described in Section 6.5 above.
- The preferred and only **operational** alternative is the highly mechanised underground mining method of long-hole open stoping, open-cast mining, and the above-ground primary processing activities (crushing and screening; milling; reagent make-up and conditioning; flotation; and, product handling) as illustrated in the Plant Process Flow (**Diagram 6**).

The preferred and only alternatives described above have been included the impact assessment, together with the mandatory "no-go" alternative that must be assessed for comparison purposes as the environmental baseline, as detailed in the Impact Tables attached at **Appendix F**.

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) are detailed below.

7.2 Scoping Phase Consultation

- 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 is included in **Appendix B** in the Final Scoping Report.
- The commenting period of 30 days on the Draft Scoping Report was from 10 January 2020 to 10 February 2020.
- It was stated in the DSR that should an Organ of State or Interested and/or Affected Party wish to discuss the findings of the Draft Scoping Report, they could request a meeting on the Registration and Comment Form. No such requests were made.
- Comments received were included in the Final Scoping Report dated 11 February 2020 submitted to DMR for consideration. All public consultation documents, such as a copy of the advertisement placed in a local newspaper; site notices placed on site; project notification; and proof of project notification were included in the Final Scoping Report in **Appendix B**.

- A number of Registration and comment forms were received. The comments received have been summarised in Table 11 in Section 7.3 below and responses to these comments provided in terms of how these have been responded to in this Draft EIA Report.
- Email notification was provided to the registered IAPs on 19 February 2020 advising that comments received had been included in the Final Scoping Report, and it provided a link to a copy of the FSR on the Green Direction website.

7.3 EIA Phase Consultation

- The Letter of Acceptance of the Scoping Report from the Department of Mineral Resources (DMR) dated 5 August 2020, is included in **Appendix B**.
- Registered I&APs have now been notified of the commencement of the EIA Phase and the availability of this Draft EIA Report (DEIR), as per the Commencement of EIA Letter included in **Appendix B**.
- The comment period commences on the 16th October 2020 and ends on the 17th November 2020.

7.4 Summary of Issues Raised by I&APs during the Scoping Phase

The following comments were received on the Draft Scoping Report, and the sections in this Draft EIA Report are referenced where responses have been provided to the issues raised.

Table 11: Summary of Issues Raised by I&APs

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 on DSR**	**Scoping Issues raised**	**EAPs response to issues as raised on the Scoping Report mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES					
Landowner	**X**				
Nama Khoi Municipality		NONE			
Lawful occupier/s of the land					
Landowners or lawful occupiers on adjacent properties	**X**				
O'kiep Copper Company (Pty) Ltd (OCC) Mr Basie Fourie		14 January 2020	OCC supports the project.	Noted	(Appendix B of FSR)
Municipal Councillor	**X**				
Concordia Ward Councillor		NONE			
O'kiep Ward Councillor		NONE			
Municipality	**X**				
Nama Khoi Municipality		NONE			
Namakwa District Municipality		NONE			
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA)	**X**				
Eskom		NONE			
Department of Transport (provincial)		NONE			
SANRAL		NONE			
Communities	**X**				
Concordia Community – refer to I&AP Database and forms received included in **Appendix B.** **The forms were collected and emailed to the EAP by Mr. Marco Engelbrecht, a local business owner in**		6 & 7 February 2020	The community claim that the Erf 2100 Concordia is still is dispute, and that	• The concerns raised by the community members concerning the change in land	(Appendix B of FSR)

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 on DSR	Scoping Issues raised	EAPs response to issues as raised on the Scoping Report mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Concordia. His contact details have therefore been recorded as the community representative on the IAP Database, representing all the community's comments received. **Due to the repetition of the comments these have been combined into common concerns and issues. The responses have therefore been combined.**			permanent operations like mining activities cannot take place before this matter is resolved. They claim that there is a TRANCRAA (Transformation of Certain Rural Areas Act, 1998 (Act No. 94 of 1998) process taking place currently. They are claiming that the land was sold without consultation with the community of Concordia, and that they are consulting legal advice on this matter. Comments state that they want their land back. Community members are asking who receives the levies.	ownership do not qualify as environmental issues. • It is noted that the during the Prospecting process that took place in 2008 by the same mining company applying for this mining right, there were no issues raised by the community at the time. Since then the land ownership has changed and the Nama Khoi Local Municipality is now the landowner. • No matter what the outcome of this dispute, the mineral rights will remain with government and therefore the final decision will be with DMR. • As registered I&A Parties they will be kept up to date on the progress of this application and when a final decision from DMR is available they will be provided the opportunity to appeal against the decision of DMR.	Notice of the commencement of the EIA Phase has been provided with the notice of availability of this report for the 30-day comment period.
Concordia Community – refer to I&AP Database and forms received included in **Appendix B.** **The forms were collected and emailed to the EAP by Mr. Marco Engelbrecht, a local business owner in Concordia.**			Members have expressed their concern regarding the impact on plants and animals and on the community as a whole. Other comments were more	• The purpose of the environmental impact assessment process is to identify the potential impacts and propose mitigation measures to reduce these	Refer to Section 8 which provides the environmental and socio-economic baseline of the mining right area;

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 on DSR	Scoping Issues raised	EAPs response to issues as raised on the Scoping Report mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			specific listing ground water, population, dust, waste, open pits and that the SLP (Social Labour Plan) was not consulted with the community. A member wants the mine bosses to tell them what they will get out of the mining process and not the Nama Khoi Local Municipality, as the money is meant for the community. Members listed the impact on the community's health and safety as an issue. Members stated that they do not want mining or mining activities in their town. A member stated that the community has unemployed people.	impacts on plants, animals and the community. • The SLP is a separate process with its own consultation process and is conducted outside of the EIA process. • The mining activities are located outside the town of Concordia. • Transport haul routes have been identified to avoid the main section of Concordia. A section of road located to the west of the Concordia residential area is however included in the transport route. • The mining project will generate employment opportunities, and local economic spin-offs.	Section 9 which provides an impact assessment with mitigation measures; and Part B: Environmental Management Programme. Specialist studies have been prepared to address the heritage resources (**Appendix C**), the Tailings Storage Facility (**Appendix D**), and the hydrogeology of the area (**Appendix E**)These mitigation measures are included in the Impact Tables (**Appendix F**) and in the Rehabilitation, Decommissioning and Closure Plan (**Appendix G**). A copy of the SLP is attached at **Appendix H.**
Concordia Community – refer to I&AP Database and forms received included in **Appendix B.** **The forms were collected and emailed to the EAP by Mr. Marco Engelbrecht, a local business owner in Concordia.**			Community members commented that no consultation was held with them.	• The purpose of the Draft Scoping Report is to initiate consultation on the environmental issues associated with this proposed mining right. The comment form completed is the consultation process.	Section 7 Additional comments can be provided on the comment form included with the notification letter for the commencement of the EIA Phase.

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 on DSR	Scoping Issues raised	EAPs response to issues as raised on the Scoping Report mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
Dept. Land Affairs	**X**	NONE			
Traditional Leaders					
N/A					
Dept. Environmental Affairs & Nature Conservation	**X**				
DENC		NONE			
Other Competent Authorities affected	**X**				
Dept. Water & Sanitation		NONE			
Dept. Agric., Land Reform & Rural Development		NONE			
OTHER INTERESTED AND AFFECTED PARTIES					
Owner of Apollis Cottage: Ms Annie Vonk-Apollis		10 February 2020	• The mining project at the two mines in Homeep affects them directly, as they have a guesthouse situated in the middle of the two mines. • They reside in the Netherlands and did not receive notification during November or December. • Someone asked for their email address in April last year but no one contacted them regarding a meeting planned for the next day. • An extension of time was requested.	• The owner of the Apollis Cottage was identified as an I&AP and the contact details obtained prior to the email notification. • A "notice of intent" site notice and advert were placed in October 2019. The public participation process details on these notices were unfortunately incorrect as the Draft Scoping Report was not yet available for comment. • The Project Notification emailed on the 9th January 2020 was the first formal public participation process communication regarding the	**SCOPING PHASE RESPONSE:** The response provided by the EAP dated 11 February 2020 included a copy of the email notice dated 9 January 2020 with the correct email address of the landowner, and an explanation that an opportunity for further comment is provided in the EIA process, and the EIA process is illustrated in the diagram included in the Project Notification process attached to the project notice email.

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 on DSR	Scoping Issues raised	EAPs response to issues as raised on the Scoping Report mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		• Issues that they want to discuss: o Water supply – how will their borehole be affected. o The environmental effects and waste at the current mine in Concordia and the two old mines on Homeep. o Who will be responsible for the upkeep of roads to and from the mine as they have guests visiting and going on tours. o Health effects of people living in the area. o The projects promised in the document for the people of Concordia – who will administer and what exactly is planned. o Did the community of Concorida respond and how did they respond and is there a forum.	project and included the email address of the landowner of the Apollis Cottage. • Site Notices were placed on site on the 8th January 2020 and the advertisement was placed in the local newspaper on the 17th January 2020. • The meeting referred to in April 2019 was not part of the EIA process which was initiated in January 2020. • An extension of time is not possible, due to the timeframes of the process and the lateness of the request. The process was explained that further opportunities for comment are provided on the EIA Report. • The environmental issues listed by the owner have already been identified by the EAP and included in the Draft Scoping Report. • Maintenance of roads used of haul roads will be included in the Environmental Management Programme (EMPr) in the EIA Report. • The projects referred to as being promised to the people of community are not part of	**EIA PHASE:** Notice of the commencement of the EIA Phase has been provided with the notice of availability of this report for the 30-day comment period. The hydrogeological specialist report (**Appendix E**) has identified that the dewatering of the Homeep mine will impact on the availability of the groundwater at the Apollis Cottage. The Applicant will supply potable water to the Apollis Cottage as mining commences at the Homeep mine. The supply of water will need to be a permanent arrangement as the drawdown will take more than 30 years after mining to recover.

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 on DSR	Scoping Issues raised	EAPs response to issues as raised on the Scoping Report mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
		• The Owner stated that they had not received the email notice and requested minutes of previous meetings or reports provided before 9th January 2020. • The owner requested an explanation of the abbreviations of I&P and EIA Report. • The correct surname is Vonk-Apollis and not Jepthas.	the EIA process. A separate process referred to as the Social Labour Plan provides for community projects. • Various members of Concordia submitted their comment as per the forms included in **Appendix B**, as co-ordinated by Mr. Marco Engelbrecht. • The abbreviations are provided in the front of the Draft Scoping Report – I&AP is Interested and Affected Party and EIA is Environmental Impact Assessment. • Apologies for this error, the name and details are included in the I&AP Database.	The water quality of the groundwater in this area is saline according to the report attached at **Appendix E**.

8 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROJECT SITE

8.1 Type of Environment Affected by the Proposed Activity

8.1.1 Regional Setting

Namaqualand is a unique and diverse environment owing in large part to the presence of four distinct biogeographically regions within its boundaries. The Orange River valley lies to the north and is characterized by very dry desert conditions. In the west the area is composed of coastal plains, which transition into granite hills that straddle the escarpment, before transforming into low lying Bushmanland plains to the East of Springbok.

8.1.2 Geology and Soils

The locality of the proposed mining area is superimposed on the regional geological map is shown in Diagram 8 below.
In the Northern Cape Province, where the project is located, the rocks of the Namaqua-Natal Metamorphic Province (NNMP) are collectively termed the Namaqua sector and are further subdivided into four different terrains, namely: the Bushmanland-, Kakemas-, Areachap- and Kaaiens Terranes, as well as the Richterveld Subprovince and Koras Group.

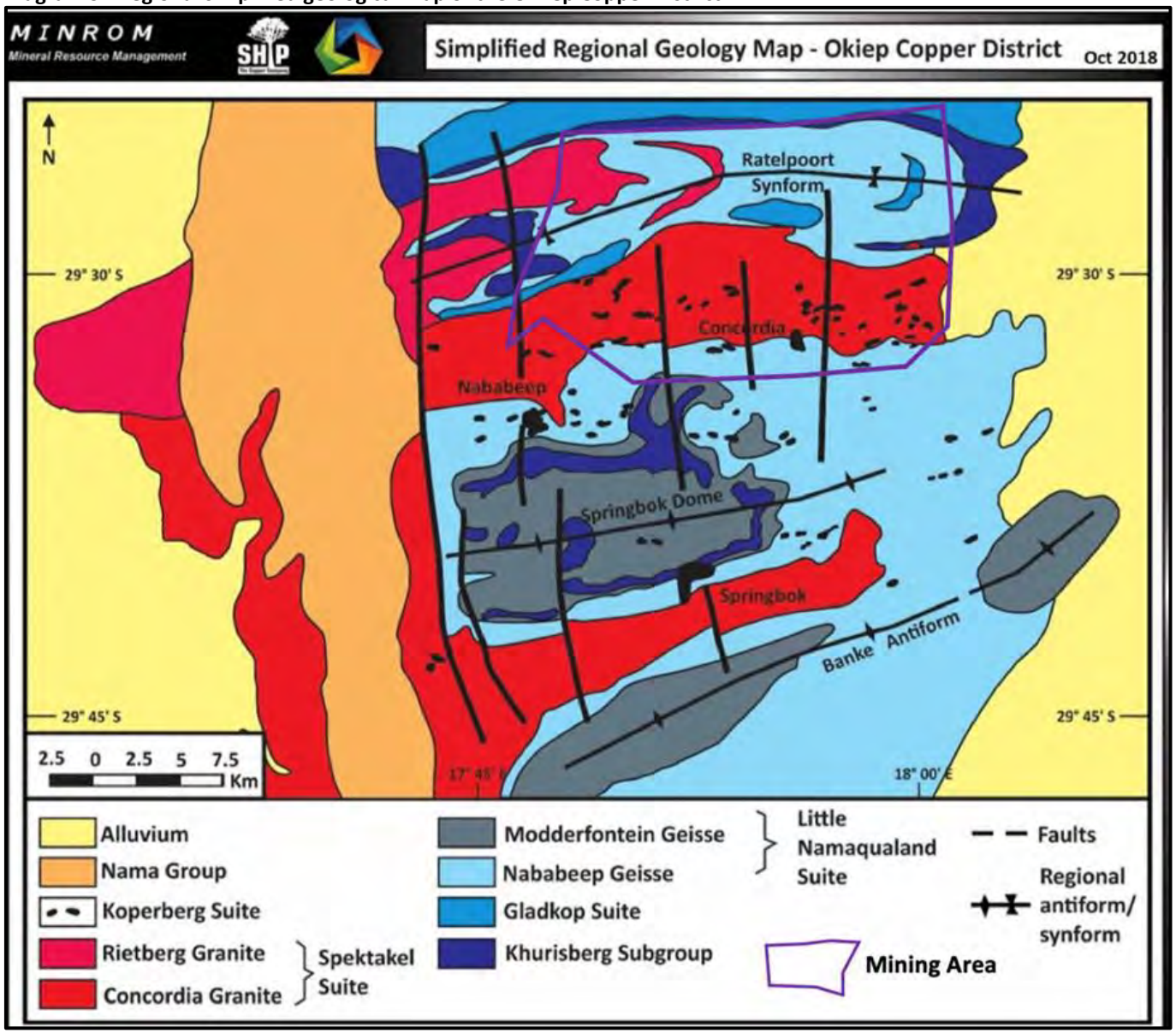
The Rietberg Mine, along with all the other mines in the Concordia Mining area, occurs in the Bushmanland Terrane of the NNMP. This terrain is comprised of Palaeoproterozoic basement, high-grade supracrustal gneisses and younger granitoids. In the Rietberg Mine area these lithologies are referred to as the O'kiep Copper District which covers an area of approximately 3000 km². The O'kiep Copper District consists of the basement rocks of the Gladkop Suite, rocks of the Khurisberg Subgroup (pre-tectonic supracrustal sedimentary and volcanic units), rocks of the Little Namaqualand and Spektakel Suites (pre- to syn-tectonic intrusive units), as well as the syn-tectonic units of the Koperberg Suite.
The sedimentary and volcanic units Khurisberg Subgroup are described as large rafts of xenoliths within the younger orthogneisses of the Gladkop Suite.

The rocks of the Little Namaqua Suite are intruded within the Khurisberg Subgroup and Gladkop Suite, which is in turn intruded by the granites of the Spektakel Suite (Concordia and Rietberg granites). The youngest phase of intrusion, the Koperberg Suite, hosts the copper mineralisation and consists of up to 1700 identified, irregular and discontinuous sheet- and plug like bodies that range in composition from anorthosites to biotite diorite, pyroxene diorite and pyroxenites. These intrusive bodies range in size from a few meters to several hundred meters.

The local geological features associated with the study area consist of the Concordia granites of the Spektakel Suite along with xenoliths of Nababeep Gneisses. Intrusive basic and intermediate rocks of the Koperberg Suite intruded these highly deformed granitic and gneissic members at approximately 1060-1030 Ma.

The lithostratigraphical successions of the study area consist dominantly of the sheet-like intrusive sequences of the Spektakel Suite or Concordia Granites. These sheet-like orthogneisses and granites intruded into the metavolcano-sedimentary supracrustal formations of the Khurisberg Group and gneisses of the Gladkop Suite. The youngest intrusive encountered is the copper hosted basic Koperberg Suite. The contact between the intrusive Koperberg Suite and host rock is generally marked by a sharp boundary with little to no evidence of a chilled margin. This indicates that the basic to intermediate suite intruded into the host formation during peak to early retrograde metamorphism.

Diagram 9: Regional simplified geological map of the O'kiep Copper District



8.1.3 Landscape and Land Use

Mucina and Rutherford (2006) describe the landscape of the Namaqualand Hardeveld as being a dramatic landscape of huge granite and gneiss domes, smooth glacis and disintegrated boulder kopies supporting open shrubland up to 1m tall dominated by shrubs of dwarf to medium stature and with ericoid or succulent leaves. Flat or gently sloping rock sheets are the dominant feature of this area that support dwarf prostrate succulents in shallow pockets with soil or in cracks. Fringe vegetation is found at the bottom of steep rock sheets collecting run-off water.

Refer to **Diagram 10**[11] which shows the land-use as per the SANBI BGIS Map Viewer Database dated 2009 as mostly natural, where the local community grazes livestock in the open natural areas. There is an existing rock waste dump at the Rietberg Mine from historical mining. The Jubilee Mine is located just to the east of the urban node of Concordia. The area at the existing Jubilee quarry pit is shown in Photograph 1 below. The mine area is heavily polluted with dumped waste of all descriptions and vandalised infrastructure. There are extensive areas of waste rock dumps at the Jubilee Mine from historical mining as shown in Photograph 2 below.

Photograph 1 (dated 30/10/2019): View north of the Jubilee Quarry Pit filled with groundwater.

Photograph 2 (dated 30/10/2019): View north of the historical waste rock dumps at the Jubilee Mine.

Photograph 3 (dated 30/10/2019): View north-east of the existing Homeep Mine waste rock dumps and level platform.

Photograph 4 (dated 30/10/2019): View south-west of the level platform at the Homeep Mine and waste rock dumps.

8.1.4 Slope

Refer to **Diagram 3b, 3c** and **3d** of the Mine Site Layout Plans on the Google Earth™ image base layer to understand the topography and slope of the sites and the most suitable location of particular mining activities in relation to these site characteristics. For example, the location of the processing plant and logistics is on the flat area at the Rietberg Mine Site and the rock waste dump at Homeep and Rietberg are in valley fill positions expanding on the historical waste rock dumps.

The proposed location of the TSF at Rietberg was re-located out of the watercourses and valley depression to a potential site further north-east and is now partially located on a site that is not level or hollowed but described as a “hogsback”.

[11] Diagram 10 was prepared based on the BGIS Map Viewer database available in mid-2019; difficulty was experienced in 2020 in trying to update this map with the revised mine site layouts. The BGIS databases have been updated, but access to the 2018 layers could not be sourced. This map will be updated in the DEIR, subject to being able to access the updated BGIS Map Viewer Database.

Further details will be provided in the specialist report to be included in the DEIR. Refer to the Photograph Series 3 included below.

8.1.5 Climate

The project site is located within the Succulent Karoo Biome where the climate has epizodic drought periods (well below 100mm per year) of one or two years in succession. The area experiences hot summers with mean maximum and minimum daily temperatures of 30°C and 5°C for January and July respectively. Given the variability of semi-arid rainfall, the mean annual runoff (MAR) is very low given the low rainfall which is less than 200mm per year occurring mainly in the winter months with high evaporation rates. Refer to the climatic diagrams included as **Diagram 10** below.

Photograph Series 5 (dated 30/10/2019): View from the existing historical Rietberg Mine platform looking west over the valley where the Rietberg TSF was re-located out of the watercourses and valley depression and is currently proposed to be located further north-west. The area shown in this photograph is earmarked for the Rietberg Processing Plant, Office Complex, Waste Rock Dump (extension of historical WRD in foreground) and other associated infrastructure.

Photograph 6 (dated 30/10/2019): View east of the existing Rietberg Mine Shaft secured to prevent illegal acess, where the groundwater is seeping out the mine due to the historical mining activities.

Photograph 7 (dated 4/3/2019): View south towards the N7 of the existing access roads at Rietberg that will be developed into the secondary access roads to the mine adits.

Diagram 10: SANBI BGIS Land Use (dated Oct. 2020)

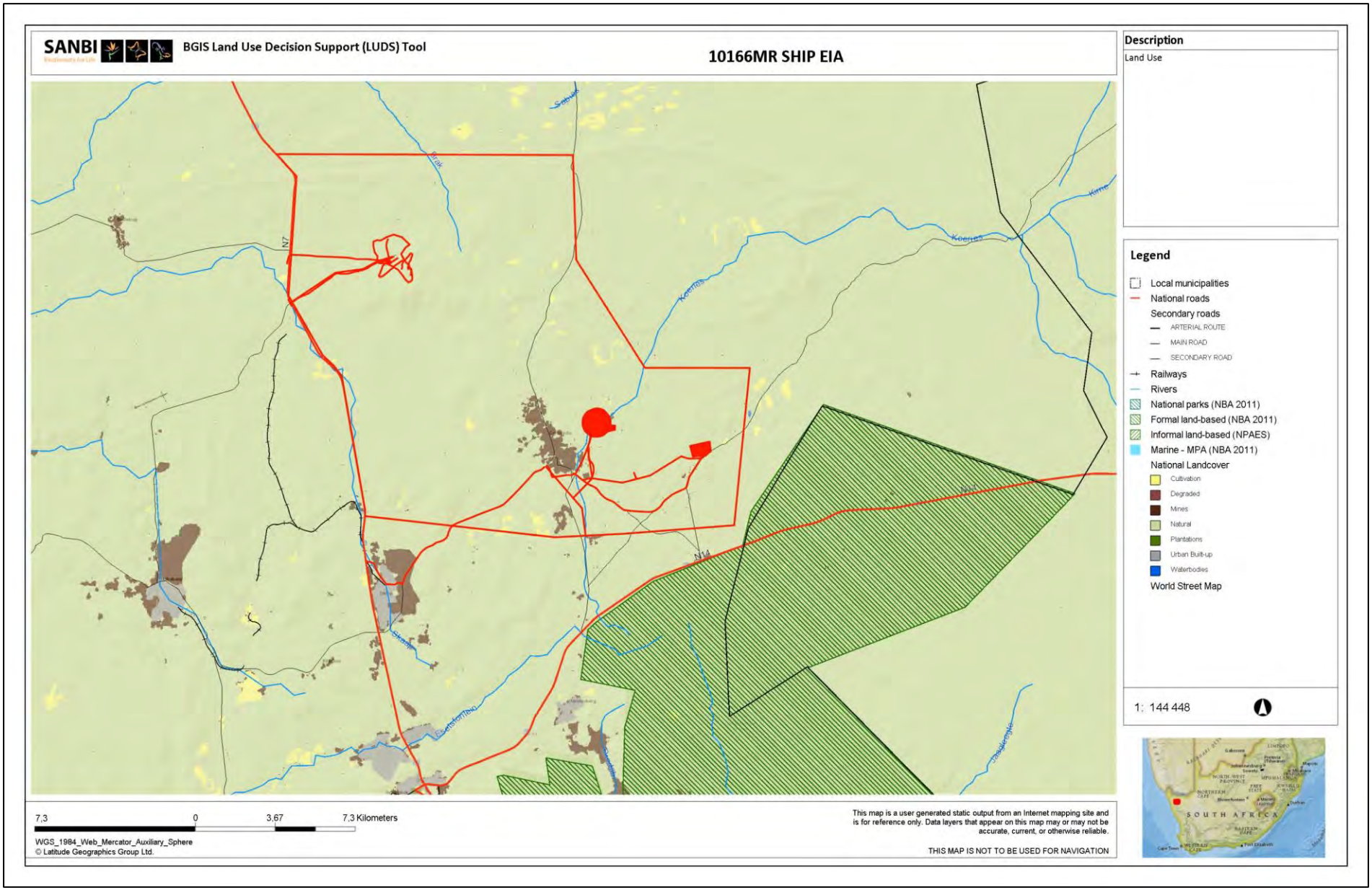
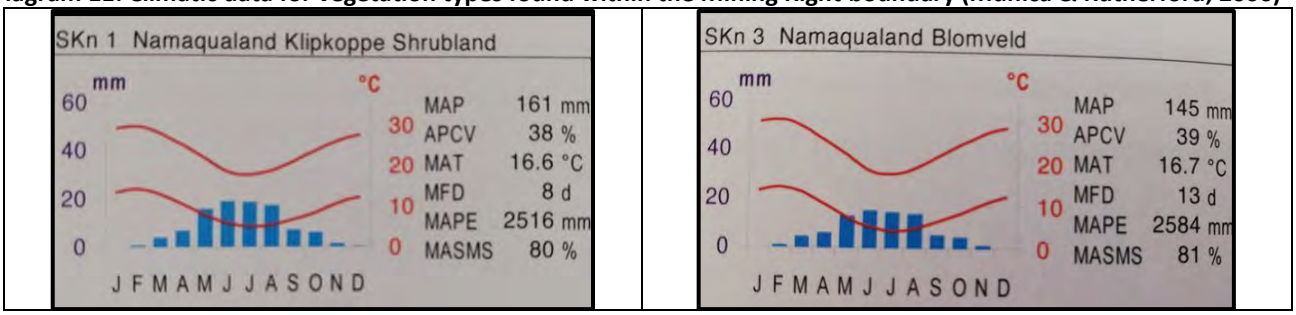


Diagram 11: Climatic data for vegetation types found within the Mining Right boundary (Munica & Rutherford; 2006)



[The blue bars show the median monthly precipitation. The red lines show the mean daily maximum and minimum temperature.]

8.1.6 Vegetation

The Nama Khoi local municipality contains 37 of the 93 vegetation types found in Namaqualand. Of these, 23 are endemic and a high number demonstrates the high levels of diversity in the area. Refer to **Diagram 12** mapped from the SANBI BIS National Vegetation Map[12], which shows the location of the project site within the SKn1 Namaqualand Klipkoppe Shrubland (yellow colour), and SKn3 Namaqualand Blomveld (khaki colour).

As referenced from Mucina and Rutherford (2006), the Namaqualand Klipkoppe Shrubland (SKn 1) of which the mining right area forms part has 15 endemic plant species. The Namaqualand Klipkoppe Shrubland (SKn 1) and the Kamiesberg Mountain Shrubland vegetation types are structurally very similar and share many species. The Kamiesberg Mountain Shrubland occurs at higher elevations (900–1300m) than Namaqualand Klipkoppe Shrubland (<600 – 1300m), or in moister situations, such as on south and east facing slopes or in the western part of the Kamiesberg. A significant number (>15) of endemic species occur primarily or wholly within these two vegetation types, but which may be partly a function of insufficient habitat or locality information, and also partly a function of the physical extent of these two vegetation types, which cover very large areas in Namaqualand. Namaqualand Klipkoppe Shrubland fades into various forms of Succulent Karoo at lower elevations, and on the dry eastern fringes of the Kamiesberg (at the relatively high altitude of 1000m) changes into Platbakkies Succulent Shrubland (and Blomveld).

The Namaqualand Blomveld (SKn 3) is distributed in sedimentary surfaces in broad valleys and wide plains or flat areas with dry channels of intermittent water courses, between granitic rocky hills of the Namaqualand Escarpment at altitudes from 460 – 1080m. Sparse dwarf shrubs with succulent or ericoid leaves dominate the shrublands. Geophytes and ephemeral herbs and in places also low, spreading, leaf-succulents show spectacular flower displays in wet years, and hence the name “blomveld” (Mucina and Rutherford; 2006).

There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site, confirmed by assessing the 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).

The Mining Right area is located within Critical Biodiversity Areas 1 and 2 (CBA1 & CBA2) as shown in **Diagram 14.1.**

- The Rietberg Mine Site area is located within a CBA2 and the TSF located in both a CBA1 and CBA2, and not in a river FEPA. Refer to **Diagram 14.1, 14.2** and **Diagram 13** respectively.
- The Jubilee Mine Site area is located within a CBA1 and River FEPA sub-catchment, and the Homeep Mine Site area is located within a CBA2. Refer to **Diagram 14.1, 14.3** and **Diagram 13** respectively.

[12] The BGIS Map Viewer for Vegetation does not provide a legend that shows only the vegetation units on the selected map. An updated map will be included in the DEIR.

Photograph 8: Typical vegetation found at the Rietberg site of the Namaqualand Klipkoppe Shrubland taken on 4 March 2019. In the foreground of the photograph is a stream that has originated from the groundwater seepage out of the mine shaft at the existing Rietberg Mine (refer to Photograph 6). This groundwater has created a localised wetland habitat supporting bird life in the local area. The presence of invertebrates was limited, and no mayflies or dragon flies were present, only "water boatmen". No amphibians were observed. The water quality of the mine will be determined and included in the Geohydrological Report to be included in the DEIR.

Photograph 9: **View of a dry watercourse located in a wide plain where Namaqualand Blomveld occurs.**
Vegetation is spare due to overgrazing worsened by the drought conditions.

Photograph 10: View north-east from the bed of the Koeries watercourse observing the close proximity of the waste rock from the historical Juilee quarry mine on the watercourse.
Small pieces of sharp "fly-rock" were observed in the area from the historical rock blasting at the quarry.

8.1.7 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.

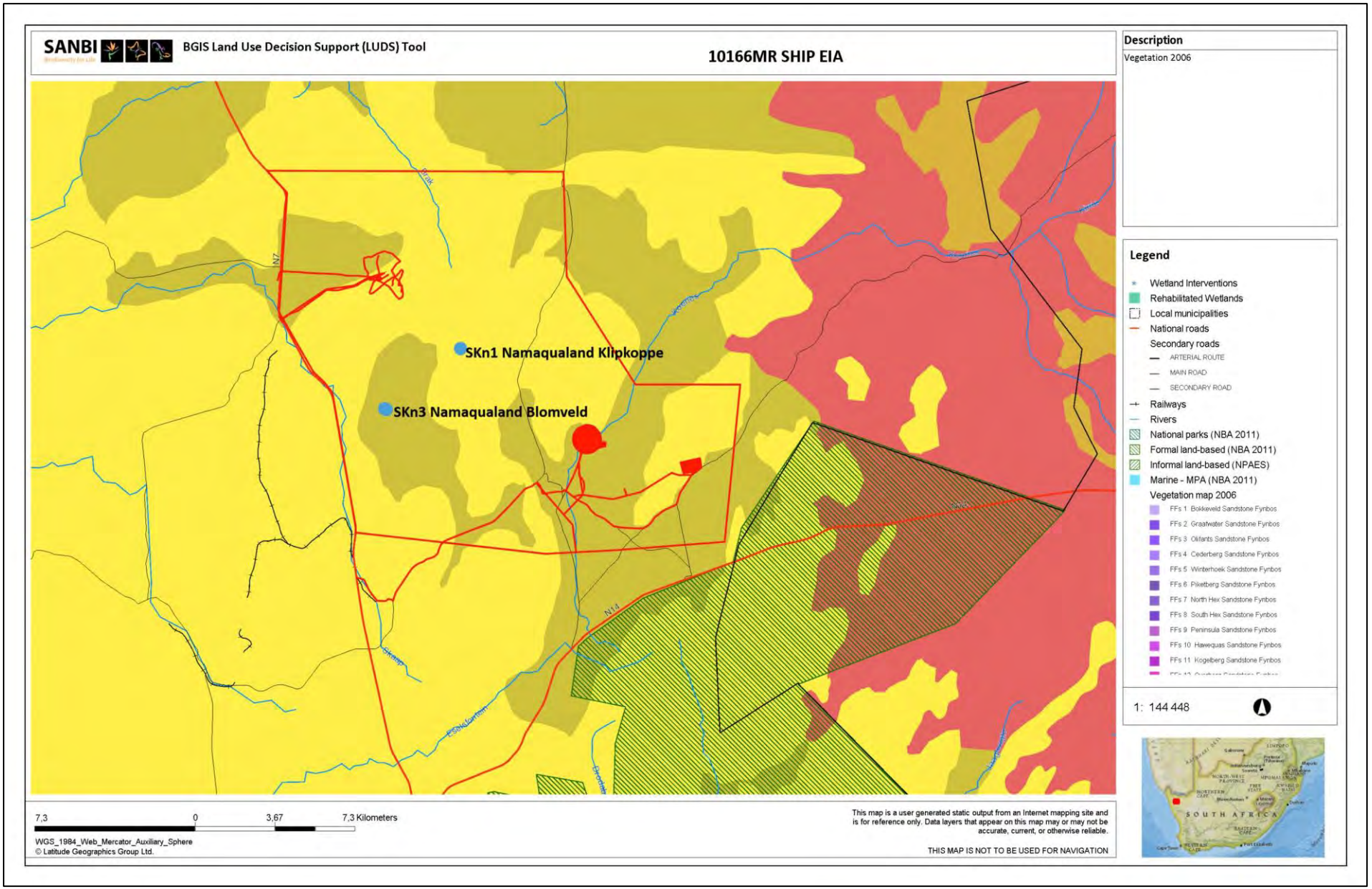
Refer to **Diagram 14.4** which shows the Succulent Karoo Ecosystem Programme (SKEP) database that has highlighted the fauna and flora found within the project boundary. The SKEP database identified a mammal (mole rate) and amphibian species that occur within the mining right area. The green mapped area is noted as "plant group" with notes on communal grazing on the SKEP database and is not located in the mining footprint of the Rietberg Mine.

According to the SANBI website[13], the SKEP Priority Regions are nine geographic priority areas in the Northern Cape area that were identified as the most efficient locations for achieving the conservation targets of SKEP. These geographic priority areas were refined on the basis of their ability to contribute to the maintenance of Red Data List species, and maintain important ecological processes, particularly in the face of climate change. The nine identified geographic priority areas have conservation value and are most vulnerable to increasing land-use pressures. In these priority areas, SKEP seek to establish informal conservation networks that will achieve vegetation and process targets.

The Mining Right application area is located within the SKEP Greater Richtersveld area (which includes the town of Springbok) and includes the Gariep region which has approximately 2700 plant species, 560 of which are endemic. Since 80% of the plant species are succulents, this is widely regarded as the area with the world's highest succulent diversity.

[13]https://www.sanbi.org/biodiversity/science-into-policy-action/mainstreaming-biodiversity/succulent-karoo-programme-skep/the-skep-priority-regions/

Diagram 12: BGIS Vegetation Map (SKn1 Namaqualand Klipkoppe Shrubland (yellow colour), and SKn3 Namaqualand Blomveld (khaki colour) (dated Oct. 2020)



8.1.8 Surface and Ground Water Resources

8.1.8.1 Surface Water Resources

The project site is located within the Department of Water and Sanitation's Lower Orange Water Management Area (14), and in Quaternary Catchment F30E and D32D. Surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is in very low given the low rainfall average occurring in the winter months, with high evaporation rates. Refer to the climatic information in **Diagram 11** above.

- The Rietberg Mine Site is not located in a River Freshwater Ecosystem Priority Area (FEPA)[14] sub-catchment FEPA as shown in **Diagram 13**.
- The Jubilee logistics area is located within a CBA1 and FEPA as shown in **Diagram 14.3** and **Diagram 13** respectively.
- The Homeep Logistics area is located within a CBA2 as shown in **Diagram 14.3** and **Diagram 13** respectively.

Refer to **Diagram 13[15] and Diagram 14.1** which shows the location of the project site in relation to the watercourses in the area:

- The Skaap River flows north parallel to the N7 adjacent to the Mining Right area and then westwards away from the Mining Area;
- The Koeries River flows north-eastwards around the perimeter of the Jubilee Mine where its course and characteristics were historically disturbed by the mining activities.

There are no mapped wetlands within the project site as shown in **Diagram 13**. There is however, a wetland that has developed at the mine shaft of the existing Rietberg Mine where groundwater is seeping out the mine as shown in Photograph 1. The associated aquatic life appeared to be limited possibly due to the water quality, and no amphibians were observed (seen or heard).
According to the SANBI BGIS database the Koeries River is a Category B: Largely Natural River, and the Skaap River is a Category C: Moderately Modified river.

8.1.8.2 Hydrogeological Specialist Assessment

A Hydrogeological Assessment (SRK, May 2020) attached at **Appendix E** was prepared to address the groundwater quality and quantity, dewatering of the mine shafts, and the Jubilee quarry, and provides recommendations for the sustainable management of the groundwater for the life of the mine.

Groundwater levels

- As referenced from **Appendix E** (Section 5.4) water level data derived from boreholes, shallow dug wells, shafts and pits in the study area indicate groundwater levels ranging from a maximum of approximately 64 mbgl at the Homeep mine shaft to a minimum of 0 mbgl at the spring near Rietberg.
- The median groundwater levels reported for this area by the DWAF (2005) are approx. 13 mbgl and by the DWS (2016) are from 12 – 30 mbgl. An average natural seasonal water level change of 2 m is reported in the GRA2 data for F30E and 10 m for D82D (DWAF, 2005).
- Groundwater contours are expected to mimic the topography to a certain extent, with deeper water levels in the higher lying areas and shallower levels close to the lower lying valleys.
- Local groundwater flow at the site and its surrounds is inferred to be from the higher lying areas towards the Schaap River. Regionally, flow is inferred northwards from the water divide of the Quaternary Catchment in the south and then northwestwards and westwards towards the lower lying Schaap River and finally the Atlantic Ocean in the west.
- In the Homeep and Jubilee areas, groundwater flow is northeast towards the Koeries River, which is a tributary of the Kirri River, which in turn drains into a dry pan (both the Kirri River and the dry pan are outside the model area and therefore are not indicated on any of the figures in this report).

[14] 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.
[15] Diagram 13 was prepared based on the BGIS Map Viewer database available in mid-2019; difficulty was experienced in 2020 in trying to update this map with the revised mine site layouts. The BGIS databases have been updated, but access to the 2018 layers could not be sourced. This map will be updated in the DEIR, subject to being able to access the updated BGIS Map Viewer Database.

Groundwater Quality

As referenced from Section 5.6 in **Appendix E**, water quality analysis of samples collected at the Rietberg mine adit and decline, Jubilee mine pit, Homeep shaft, the two SHIP exploration boreholes and at the calibration tested borehole CON91/17, are summarised and compared to the South African National Standard for Drinking Water (SANS 241:2015), the Mixing Water for Concrete Guideline (SANS 51008:2006), and the latest general permissible wastewater quality for discharge to water resources (DWA, 2013).

- Groundwater from all the points sampled is of poor quality with various chemicals exceeding the drinking (SANS 241:2015) and waste water discharge (DWA, 2013).
- Jubilee Mine Pit's water is also of poor quality with high salinity.
- Water from Homeep shaft and borehole CON91-17 also has high salinity exceeding drinking water standard limits.
- Fluoride and uranium concentrations at most of the water points sampled exceed the limits by some margin.
- Uranium concentration (1 174 ug/L) of water from the Homeep Shaft is especially high. These high uranium concentrations in the water originating from Rietberg Decline and Adit, Homeep Shaft, Jubilee Pit and borehole CON91-17 could be indicative of contamination, but the possibility remains that this is naturally high in the groundwater.
- The iron concentration (21 369 ug/L) at CON91-17 is very high.
- The sulfate concentration at Jubilee Pit is very high (3 620 mg/L), which could be indicative of contamination from the old mine and associated sulfide ore body remnants. Concentration of the chemical constituents through evaporation from the pit will also contribute to the poor water quality at Jubilee Pit.
- Values of the water from the three mines under consideration exceeding the DWA (2013) general limits for discharging domestic and industrial wastewater into water resources are copper and EC at Homeep and Jubilee, and fluoride at Rietberg, Homeep and Jubilee.
- Groundwater samples collected at the Rietberg Decline and Adit, CON91-17, SHIP-BH1 and -BH3, and CON91-17 all have negative Langelier Indexes, which is indicative of a corrosive tendency.
- Groundwater samples collected at Homeep Shaft, Jubilee Pit and SHIP-BH2, however, all have positive Langelier Indexes, which is indicative of a scale forming tendency. The Ryznar Indexes, however, for all these water samples are >6.5, which is indicative of a corrosive tendency. Similarly, all the samples have Larson-Skold Indexes of ≥1.2, which indicates a high-corrosive tendency to metal (mild steel) fittings.
- Except for SHIP-BH3, Jubilee and O'Kiep Mine Pit water samples, the groundwater from all other water points sampled is suitable for mixing concrete. Water from SHIP-BH3, Jubilee pit and O'Kiep pit is unsuitable for concrete mixing due to Sodium (Na) exceeding the SANS 51008:2006 limits for use as concrete mixing water. Similarly, the Sulfate (SO4-2) limit is exceeded at Jubilee and O'Kiep pits, whilst the pH of O'Kiep Mine Pit water (3.0) is also too low for concrete mixing.

Aquifer characterisation

- Aquifer vulnerability is defined as the likelihood for contamination to reach a specified position in the groundwater system after being introduced at some point above the uppermost aquifer. According the DWAF's aquifer vulnerability map (DWAF, 2013), the site's vulnerability rating is 'Medium'.
- An aquifer classification system provides a framework and objective basis for identifying and setting appropriate levels of ground water resource protection. The aquifer in the site area is classified as a 'Minor' aquifer system, according to the DWS classification system (DWS, 2012).
- The aquifer protection classification calculation (refer to section 6.3 in Appendix E) classifies the fractured-rock aquifer at the site as 'medium sensitive' due to it being classified as a Minor aquifer with Medium vulnerability.
    - Medium protection is therefore required, which will primarily include conservative abstraction to limit drawdown so as not to severely impact on other water users, as well as monitoring, protection and good management of the water supply sources.
    - Contamination of the aquifers, especially the more conductive fault/fracture zones, should be prevented.
    - Similarly, contamination of the limited extent perched intergranular alluvial aquifers should be prevented.

Groundwater modelling

- The assumptions and limitations in the groundwater modelling process are provided in Section 7.1 of **Appendix E**.
- The model scenarios simulate predictive mine dewatering, and potential groundwater contamination from an unlined TSF. It should be noted however, that the TSF will be lined with a Class C containment system as described in Section 3.3.10 and in **Appendix D**.
- The following conclusions are provided:
    - Rietberg underground mine has a very low groundwater ingress of only c.180 KL over the LoM. Note: The c.11 400 KL water reportedly (SHiP Water Balance) stored in old mine void is not included.
    - Jubilee open pit mine has the highest groundwater ingress of c.218 400 KL/a in year-9 and thereafter c.75 KL/a totalling to c.218 900 KL over the LoM.

- Homeep has a total groundwater ingress of c.26 000 KL over the LoM. As this is the proposed deepest mine, it also experiences the most drawdown of the three mines.
- Drawdown still exists in the Jubilee and Homeep mines 30 years post mining with water level recovering to 36 m and 563 m, respectively. However, in comparison Rietberg mine's groundwater level has recovered to 5 m by year 15 and to <5 m 30 years post mining.
- Potential groundwater contamination from an unlined TSF is very localised, with the maximum concentration of c.65% of the contaminant concentration infiltrating <10 m in the upper aquifer at the end of the actual 15 years LoM. A mixing zone (1 to 2% of the leachate) exists 30 years post mining in the centre of the TSF footprint and extends c.800 m southwest from the TSF and WRD footprints.

8.1.8.3 Integrated Water Use License Application (iWULA)

Clarity was sought from the Department of Water and Sanitation during the site visit that took place on the 5th of March 2019 and on the 30th October 2019 and the following water uses require an Integrated Water Use License (iWULA):

- Section 21(a): Taking water from a resource.
- Section 21(b): Storing water.
- Section 21(c): Impeding or diverting the follow in a watercourse.
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on water resource.
- Section 21(i): Altering the beds, banks, course or characteristics of a watercourse.
- Section 21(j): Removing, discharging or disposing of water found underground.

The dewatering of the Jubilee Open quarry and the disposal of the contaminated groundwater in the Municipal Evaporation ponds as shown in **Diagram 3c**, will not be included in the iWULA for this Mining Right Application. The reasons are related to the timing of the proposed mining at the Jubilee Mine in Year 8 to 15, and the ownership of the evaporation ponds.
DWS confirmed during the site visit held on the 30th October 2019 that the location of the Tailings Storage Facility (TSF) in the watercourses (see Photograph Series 5 above) was not acceptable. The proposed location of the TSF has subsequently been re-located further to the north-west as detailed in Section 6.2.3 above.

8.1.9 Critical Biodiversity Areas

Refer to **Diagram 14.1** which shows that the logistics of the project site are located within a Critical Biodiversity Area (CBA1 and CBA2), as detailed in **Diagram 14.2** for the Rietberg Mine and **Diagram 14.3** for the Jubilee and Homeep Mines.

Critical Biodiversity Areas (CBAs) 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 (e.g. species, ecosystems) targets;
- 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.

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.

Refer to **Diagram 15** below that shows that the project site has sections demarcated in Category B (Jubilee Mine), Category C (Homeep Mine) 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) (Dated Oct. 2020)

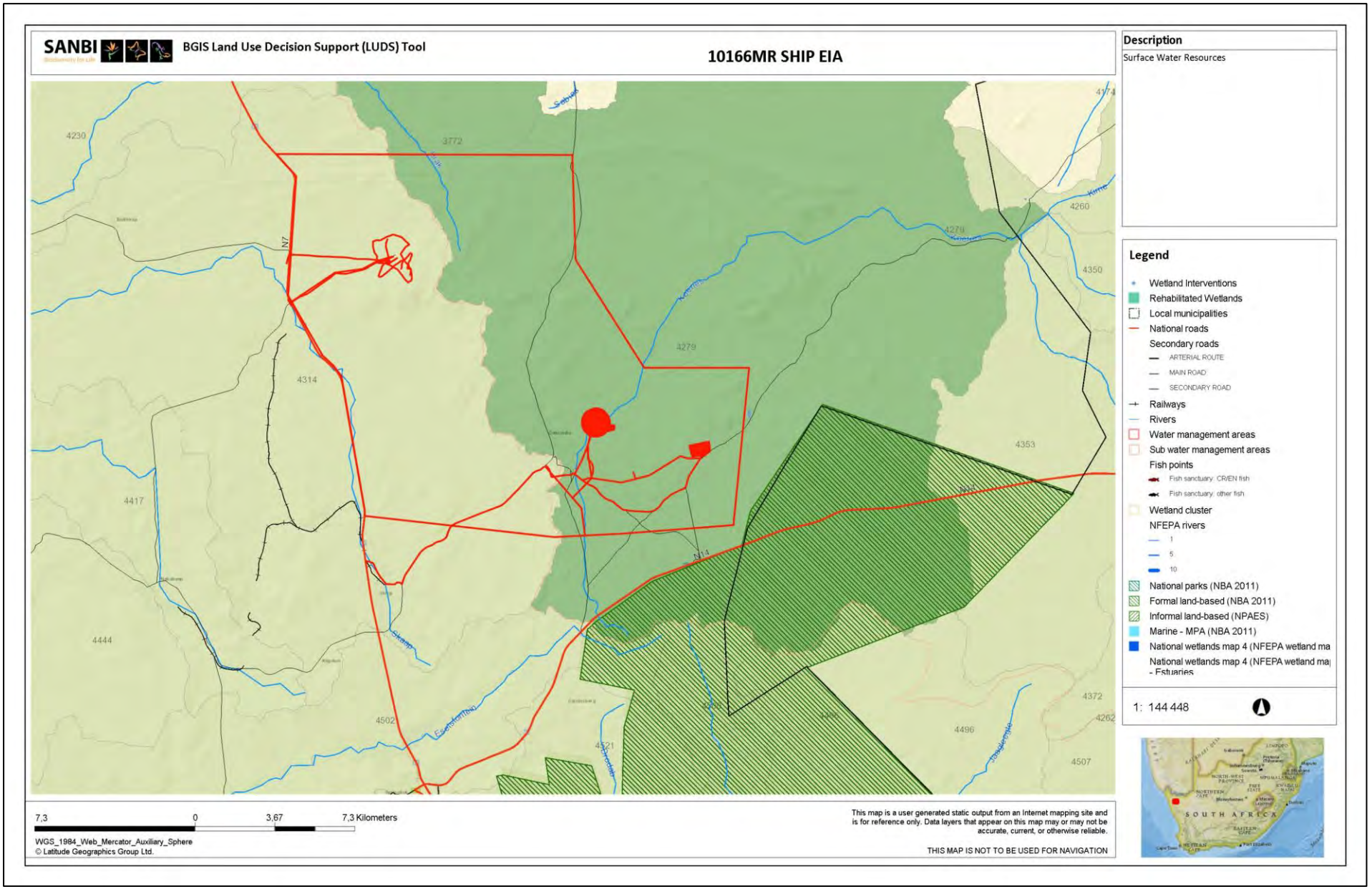


Diagram 14.1: Critical Biodiversity Areas Map of the Mining License Area (dated Oct. 2020)

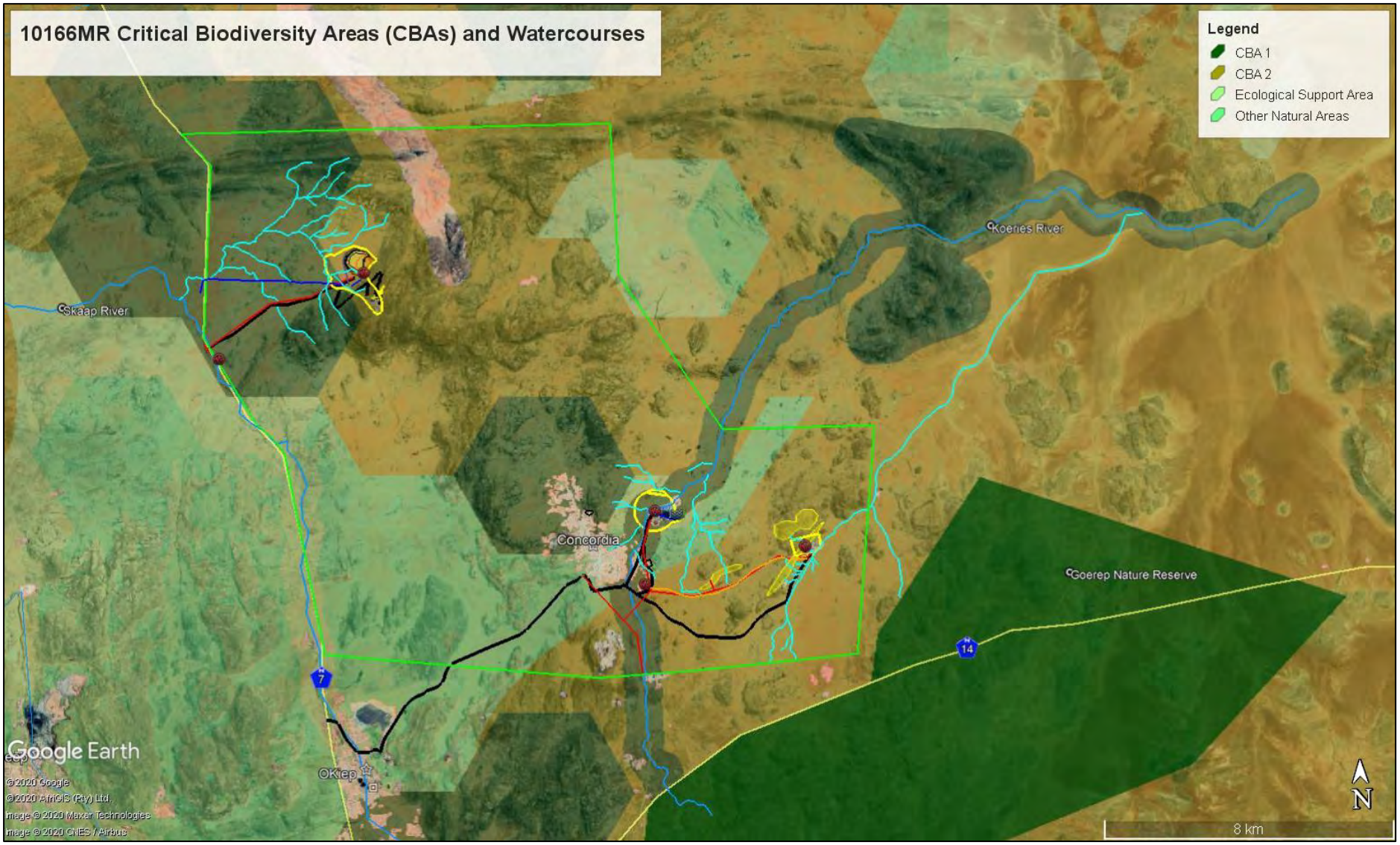


Diagram 14.2: Rietberg Mine Site Layout overlapping CBA1 and CBA2 Conservation areas (dated Oct. 2020)

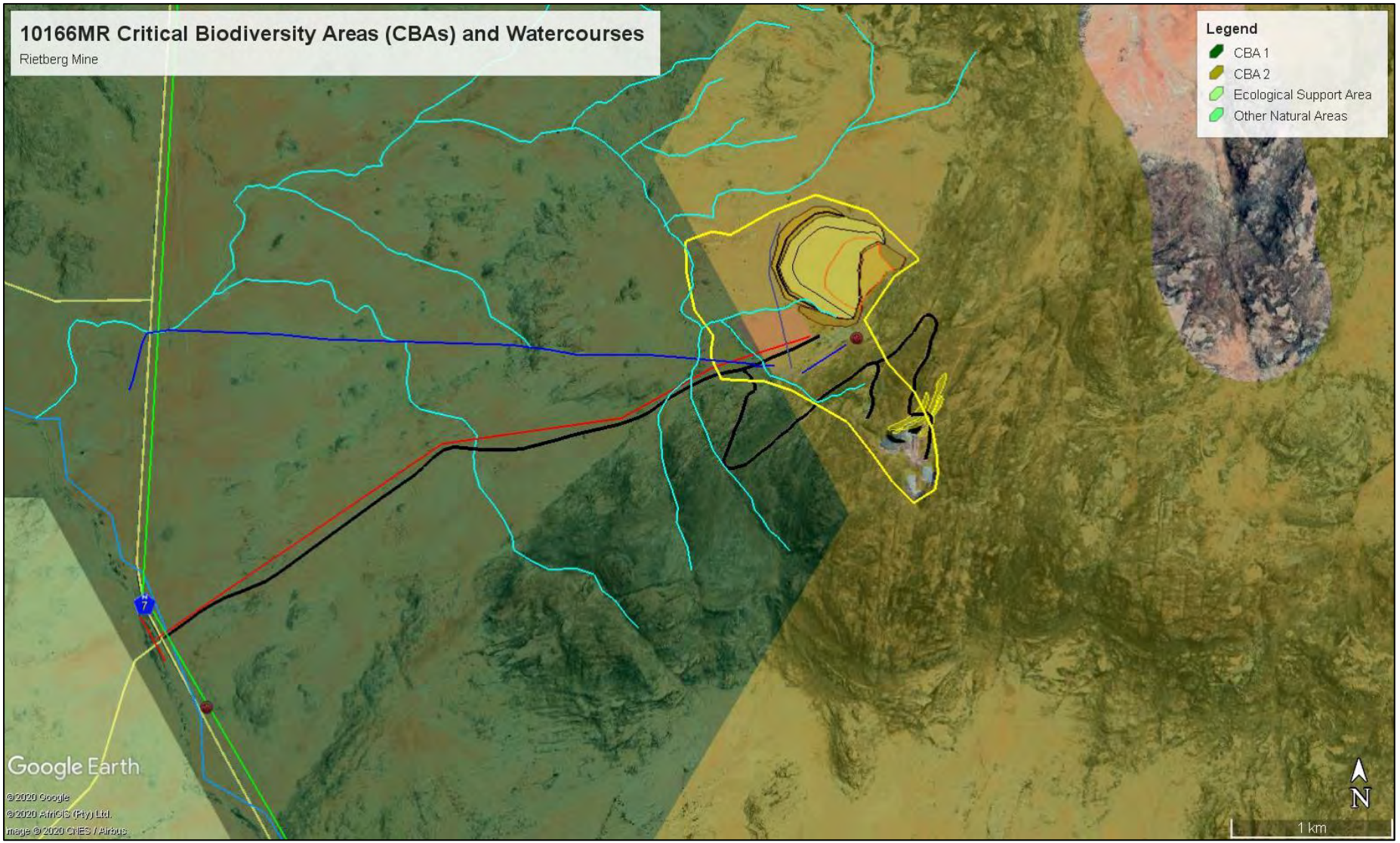


Diagram 14.3: Jubilee and Homeep Mine Site Layouts in relation to CBAs (dated Oct. 2020)

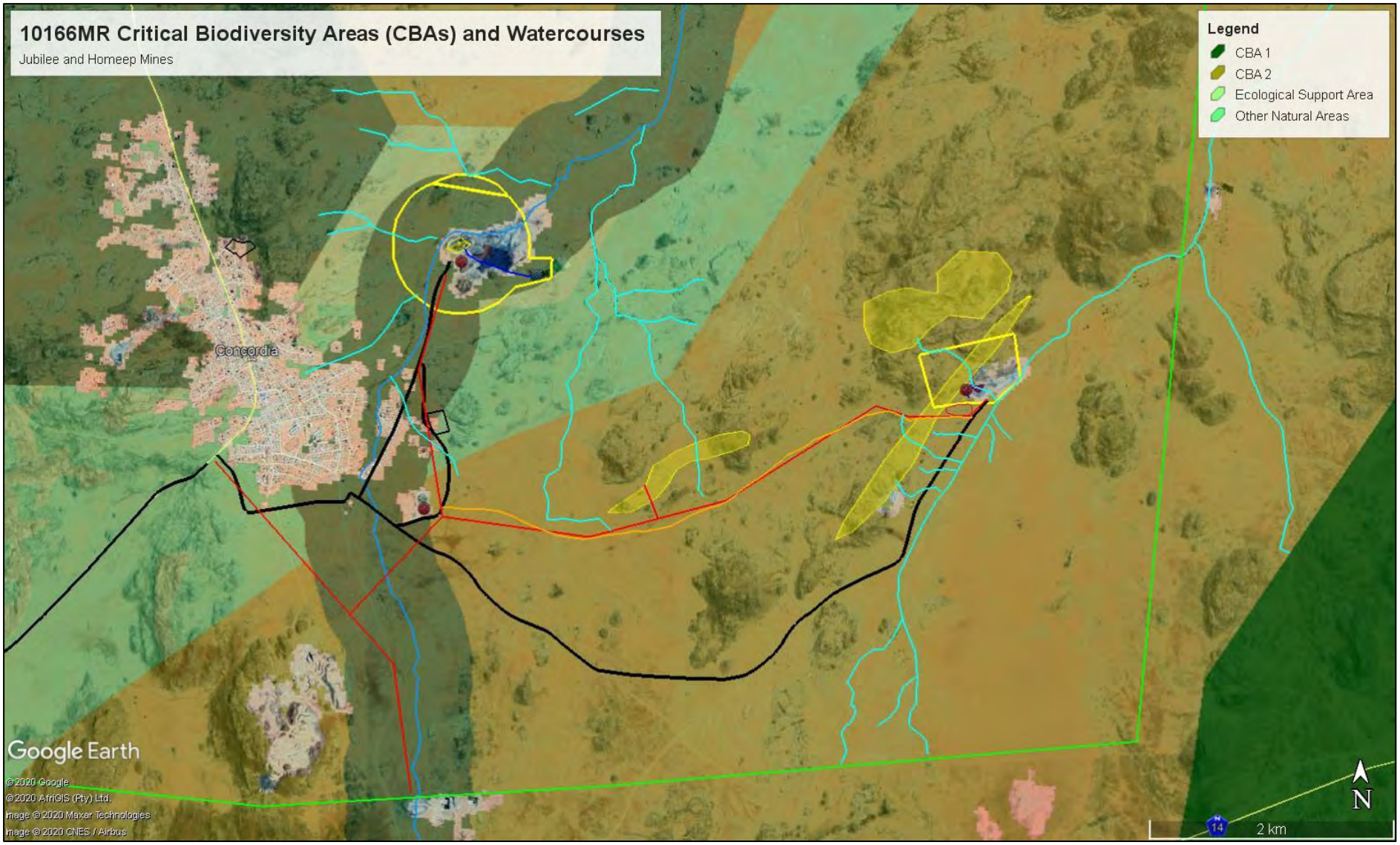


Diagram 14.4: SKEP Fauna and Flora Biodiveristy Map (dated Oct. 2020) (Note: green areas are vegetation dataset not in mining footprint)

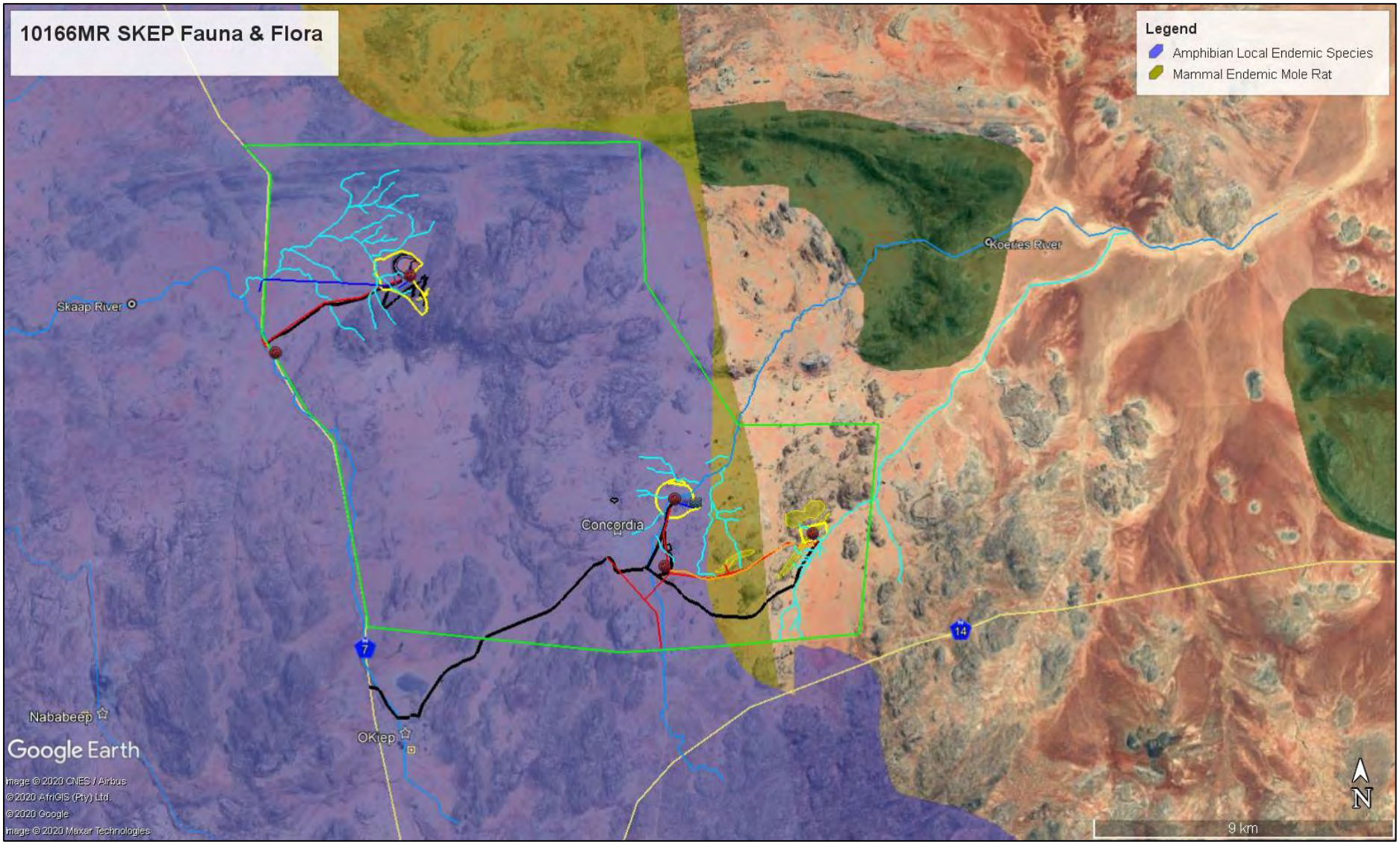
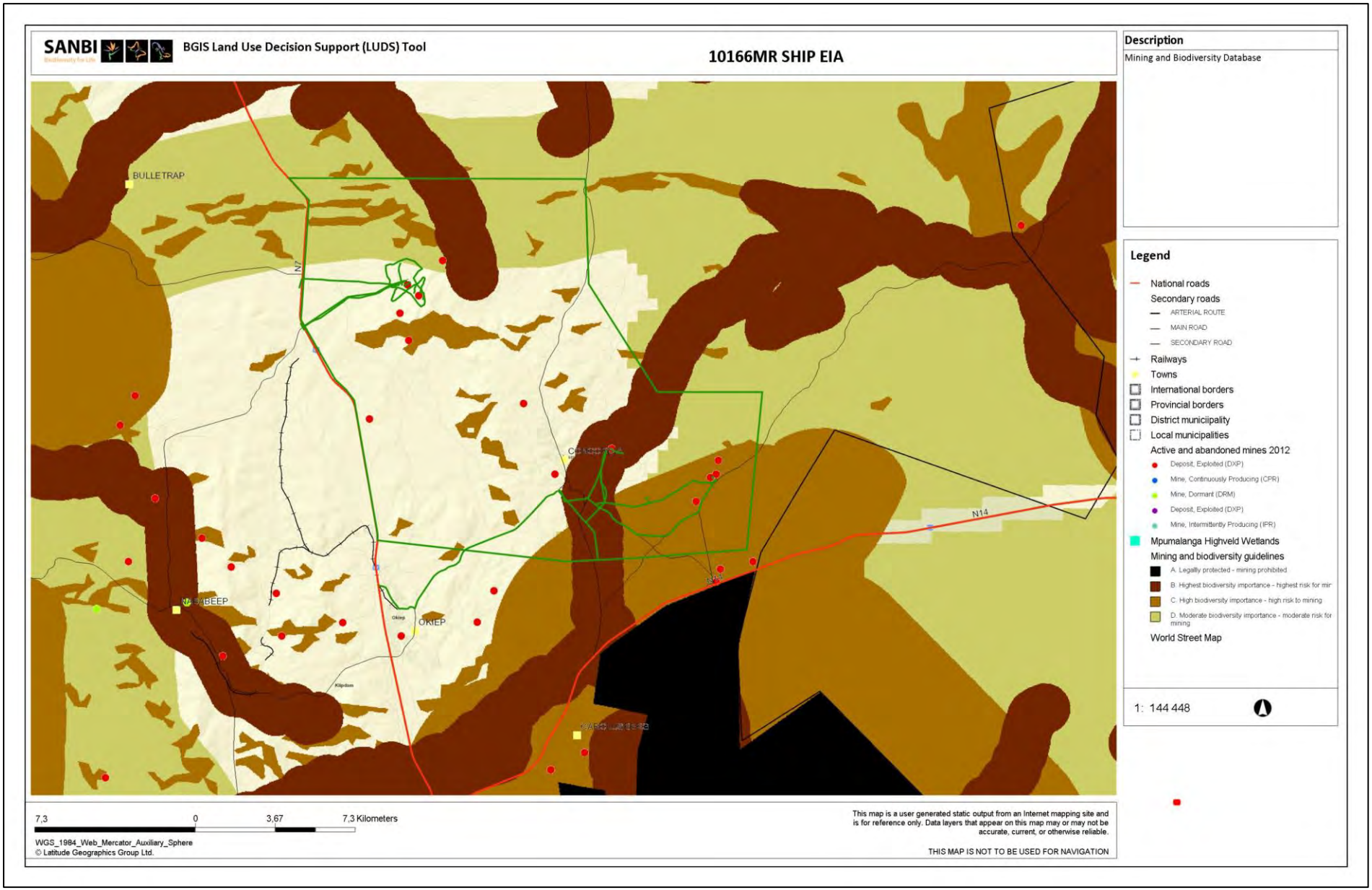


Diagram 15: Location of Mining Area in terms of Mining and Biodiversity Guidelines (BGIS MAP VIEWER) (dated Oct. 2020)



8.1.10 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-blow
- n soil erosion.
- Dust is generated off un-surfaced roadways when vehicles transport materials on site and in off-loading materials to the rock waste dump and RoM stockpiles.
- Dust will be generated underground during blasting and will be controlled in terms of the Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM: AQA. Air ventilation shafts are included in the mine site plan.
- Dust generation will result from blasting at the Jubilee open cast mine. A blast radius has been demarcated around the Jubilee Open cast pit as shown in **Diagram 3c** as required in terms of the Mine Health and Safety Regulations.
- Dust will be generated off the Tailings Storage Facility (TSF) at Rietberg, and additional information will be included in the specialist report to be included in the DEIR.

Noise and vibration

- Noise and vibration will be generated during blasting below ground, and above ground at the Jubilee open quarry.
- Mine related traffic will generate noise and vibration on the haul roads that pass in close proximity to residents along a 600m section of road within the outskirts of the town of Concordia.
- The operational and processing activities will generate noise within the mine area which will not affect any communities in the remote location at the Rietberg Mine.

Light Pollution

- The Mines will operate for 24 hours a day, with the need to have lighting for operational and security purposes.
- The remote locality of the Rietberg Mine has few receptors in close proximity. The Jubilee Mine is located outside the town of Concordia and light pollution could be an issue. The Homeep Mine is located far from Concordia, but local there are local residents that could be affected by the mine operation.

8.1.11 Socio-economic characteristics

Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and urban development. Tourism is a seasonal but rapidly growing feature with visitors to the region arriving almost exclusively between July and October in order take in the world-renowned yearly flower display. Urban development is not a major feature of the landscape, except at the town of Concordia,

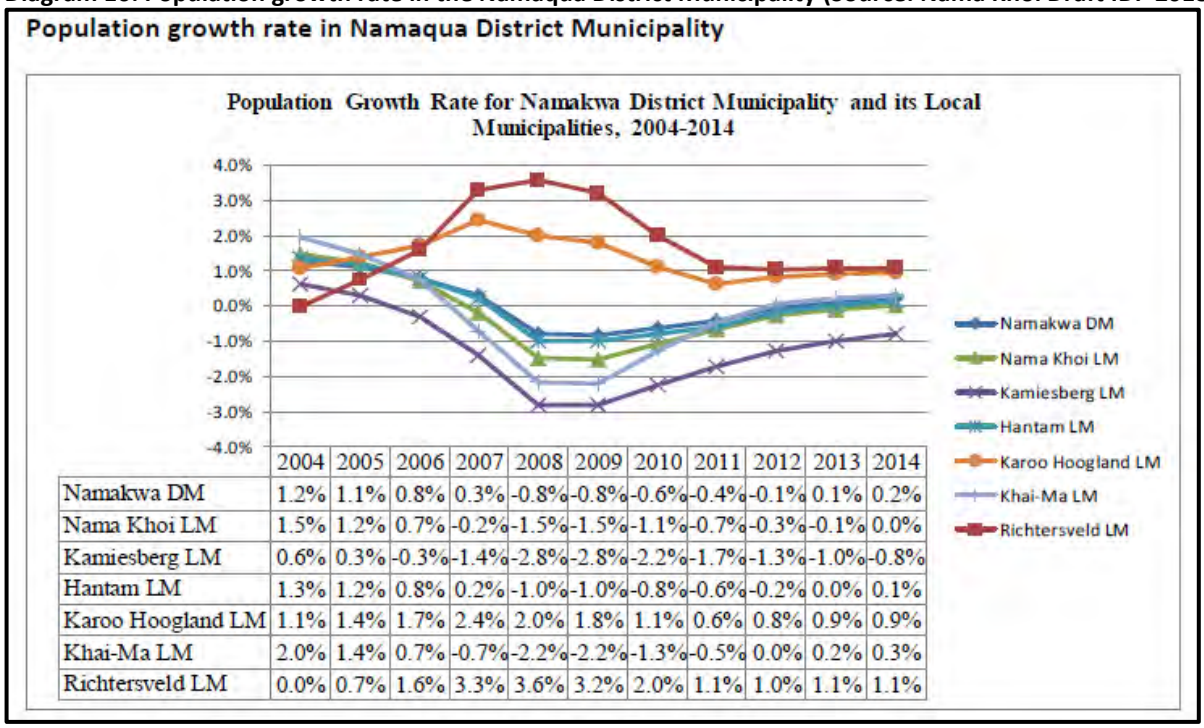
The project site falls within the Namakwa District Municipality, and the Local Municipality of Nama Khoi. The socio-economic profiles are referenced from the IDPs and included below.

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.

The population growth rate of the Nama Khoi Local Municipality located within the Namakwa District is shown as improving from a negative growth rate to 0%, as illustrated in **Figure 6** below (sourced from the Nama Khoi Draft IDP 2018 2019).

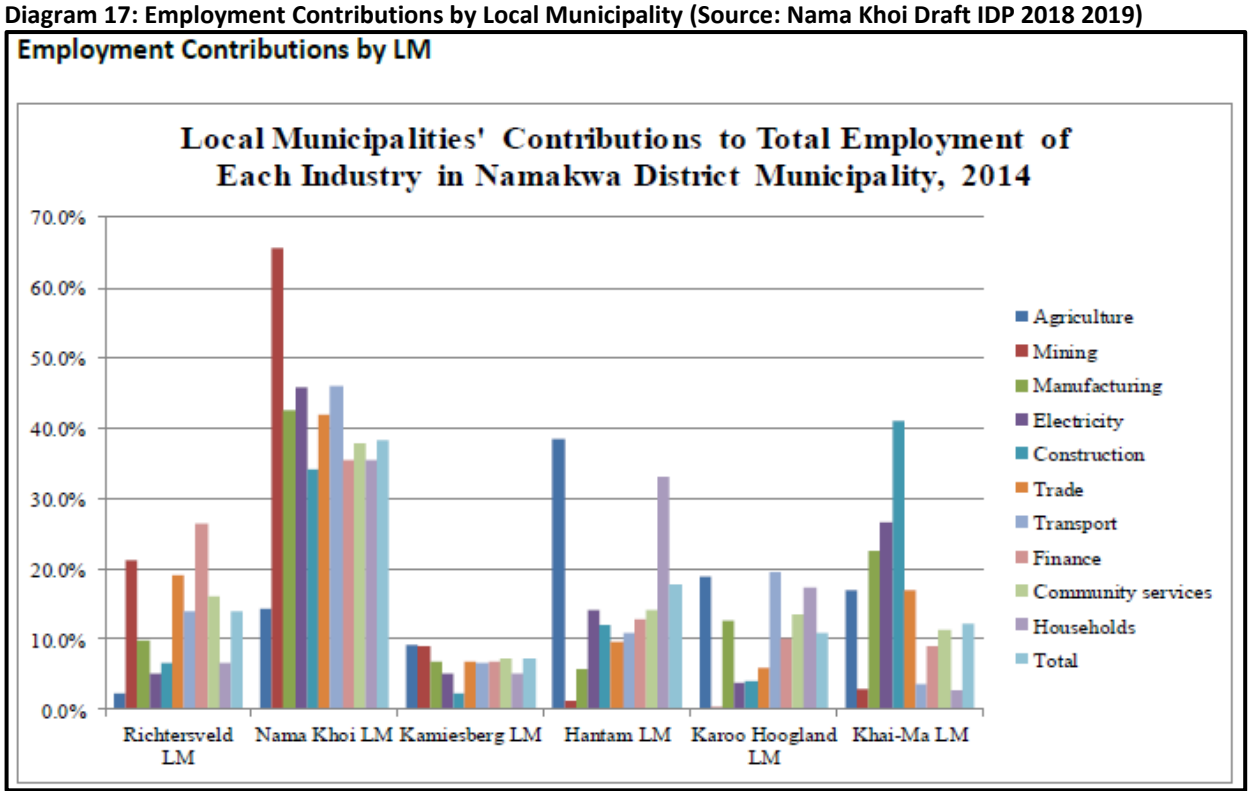
Diagram 16: Population growth rate in the Namaqua District Municipality (Source: Nama Khoi Draft IDP 2018 2019)



	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%

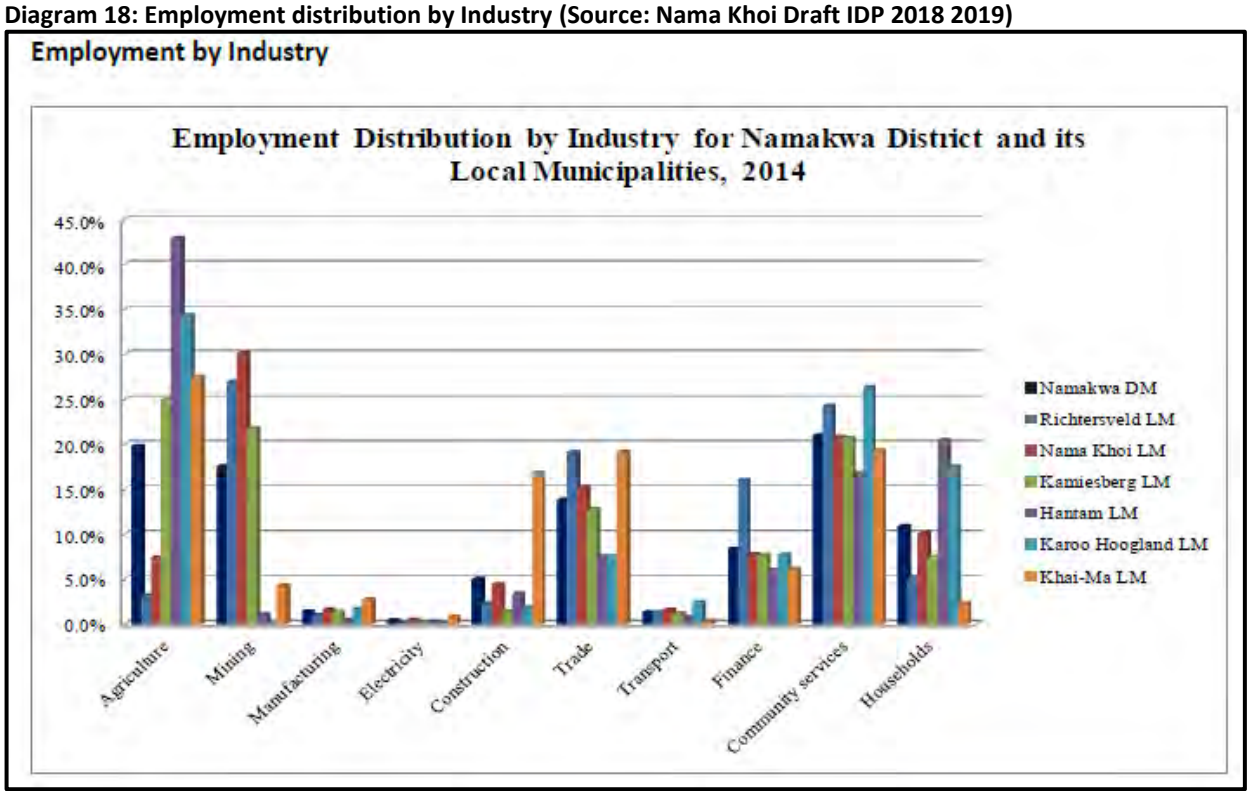
Nama Khoi had the largest number of people employed, unemployed, economically active and not economically active in 2004 and 2014. In 2014 Nama Khoi made the largest contribution to employment in the following industries (**Diagram 16**): mining (65.6%), manufacturing (42.6%), electricity (45.7%), trade (42.0%), transport (46.0%), finance (35.4%), community services (37.9%) and households (35.3%). This municipality also employed the largest proportion of people in the district, accounting for 38.2 per cent of the people in formal employment.

Diagram 17: Employment Contributions by Local Municipality (Source: Nama Khoi Draft IDP 2018 2019)



Mining was the largest employing industry in 2014 in the Nama Khoi Local Municipality as illustrated in **Diagram 18** below.

Diagram 18: Employment distribution by Industry (Source: Nama Khoi Draft IDP 2018 2019)



8.1.12 Cultural, Heritage and Palaeontological Resources

8.1.12.1 Heritage Impact Assessment

The specialist Heritage Impact Assessment prepared by Dr. Jayson Orton of ASHA Consulting (Pty) Ltd (November 2019) is attached at **Appendix C**. Appendix C includes a Palaeontological Statement and historical study.

A range of heritage resources were located during the fieldwork with almost all being historical. These relate to two aspects of heritage: historic copper mining and living heritage. The historic copper mining dates back to the mid-19th century and the finds include structures, the railway line berm and associated features, and the general mining landscape. The repeated growth and decline of the copper mining industry has been crucial in shaping the region's history with the present application forming another chapter in this history. Many small stone structures, largely in ruin, were located and these refer to the traditional herding practices of the Namaqua people that have been continued into recent times. These structures consist of kraals, house foundations, kookskerms[16] and a variety of other indeterminate features. Some graves were also present. An informal graveyard was found within the Jubilee Mine area, and a built structure lies within the Houmeep area. Stone Age resources were surprisingly rare but one site of some cultural significance was found along the haul road between Jubilee and Houmeep. The edge of the site was just off the road.

The report found that significant heritage resources occur in all three study areas (these being the Rietberb, Jubilee and Homeep mines). The main issues relate to the natural environment, which has widely recognised aesthetic value (of concern at Rietberg because of its exposure to the N7), and the historical copper mining landscape of the region. The repeated growth and decline of the copper mining industry has been crucial in shaping the region's history with the present application forming another chapter in this history. Archaeological traces related to the mining landscape occur widely with all of them linked by the 19th century railway line which is represented by the raised berm on which its tracks once lay as well as various associated structures like culverts, bridges and water towers. While buffers are not specifically required, features that may be impacted should be evaluated on a case-by-case basis. Specific significant issues are as follows:

- A historical informal graveyard in the Jubilee Mine area (Waypoint 111 as shown in Figure 88 in **Appendix C**) is of concern because of its proximity to the mine. It will need to be protected with a buffer of at least 30 m around it and declared a no-go area.
    - This site will not be impacted on by mine logistics or waste rock dumps. It is located within the blast radius, which is shown on Diagram 3c by the mine boundary. A blast radius is stipulated by the mine health and safety regulations regarding structural damage to buildings from vibration and flying rock. Any flying rock pieces would be small and easily removal from the graveyard if required.

[16] Definition of "kookskerm" as provided in Appendix C is an Afrikaans word for a small walled enclosure, often slightly separated from a dwelling that is used for cooking.

- A historical structure and associated threshing floor occurs in the Homeep Mine (as shown in Figure 90 of **Appendix C**) and will require protection as a no-go area.
    - Refer to **Diagram 3d**, which indicates the location of this heritage site to the south of the Homeep office complex and has been excluded from the mine's fenced off area.

Although there will be impacts to heritage resources, it is likely that these can be managed in such a way as to keep them within acceptable limits. With reporting of any accidental finds, including historical underground mine workings, there is the potential to learn more about the historical mining which would create a benefit to heritage.

Orton (2019) recommended that the reopening of the Rietberg, Jubilee and Houmeep Mines should be authorised but the following conditions should be included in the approval if granted:

- All haul roads must make use of existing roads as far as possible (including where they cross or follow the historic copper mining railway).
- All upgrades to haul roads must be centered on the existing roads as far as possible so as to minimize impacts to features located close to these roads.
- Any alteration to the overall project footprint (i.e. mine fences and haul road locations) must be subjected to further assessment as may be required.
- All surface activities must be contained within the three mine fences to avoid impacts to unsurveyed areas.
- The final layout of each of the three mines must be considered by an archaeologist or heritage consultant to determine whether any specific mitigation measures or no-go areas not anticipated in the present assessment might be required prior to construction.
- The graveyard in the Jubilee Mine (Waypoint 111) must be fenced with a 30 m buffer and declared a no-go area. A gate should be provided for potential visitors and to allow cleaning of any wind-blown litter.
- The historical stone-built mining-related structures in the Jubilee Mine must be preserved. They can be reused if required but their modification must be approved by SAHRA to ensure that their heritage significance is not diminished (this may require the services of a heritage architect).
- The stone house and threshing floor in the Houmeep Mine (Waypoint 163) must be avoided and declared a no-go area. A 30 m buffer should be imposed if possible but this is not required. The structure should not be used for mining-related activities.
- All ruins, livestock enclosures and structures related to local herder activity and hence living heritage) must be avoided as far as is possible.
- If any herder enclosures or structures will need to be removed or will be covered by mine dumps then this must be done in consultation with their owners (if traceable) or other community members.
- If any historical underground mine workings are opened then these must be inspected (insofar as it is safe to do so) for historical traces such as hand tools, mining equipment, graffiti or other features. A report including a photographic record must be submitted to SAHRA for approval prior to modification or destruction of the historical workings.
- A chance finds procedure for recording and recovering isolated fossil finds must be incorporated into the environmental management program for the project. (Included as Table 21 in Part B: EMPr of this report).
- If any Stone Age, historical or industrial archaeological material (e.g. stone tools, historical rubbish dumps, historic mining equipment or tools) or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

It is further recommended that SAHRA pursue the declaration of the historic copper mining landscape as at least a PHS (Provincial Heritage Site). This should be in the form of a serial declaration, rather than declaration of individual features, so as to ensure equal protection and management of the entire landscape.

8.1.12.2 Palaeontological Statement

A Palaeontological Statement (Almond; 2019) is included in the Heritage Impact Assessment (**Appendix C**) as Appendix 2. The report concludes that the overall palaeontological impact significance of the proposed copper mining project near Concordia, Namaqualand, is considered to be very low due to the following reasons:

- The Precambrian metasedimentary and igneous basement rocks underlying this region at depth are entirely unfossiliferous.
- The overlying Late Caenozoic superficial deposits are generally of low palaeosensitivity.
- The project footprint is comparatively small, and for the most part is already highly disturbed by previous mining activities, roadworks etc.
- Small water courses traversed by the haul roads and pipeline routes are unlikely to be associated with substantial deposits of consolidated, potentially-fossilferous older alluvium.

The report recommends that, pending the potential exposure of significant new fossils during development and mining, exemption from further specialist palaeontological studies and mitigation is granted for this development.
There are no objections on palaeontological heritage grounds to authorisation of the proposed mining development. Should any substantial fossil remains (e.g. vertebrate bones and teeth, shells) be encountered during development, however, these should be reported to SAHRA for possible mitigation by a palaeontological specialist.

8.2 Description of the current land uses

Refer to **Diagram 10** and Section 8.1.2 above. Photographs 1 to 7 illustrate the historical mining footprint of the mine sites at Rietberg, Jubilee and Homeep.
Diagram 15 provides an overview of the status of existing mines in the local area as sourced off BGIS Map Viewer. Rietberg, Jubilee and Homeep mines are in areas where mining occurred before, as shown by the red dots representing deposits exploited. The ore bodies that are included in this Mining Right Application were not fully exploited historically and therefore the opportunity to apply for a mining right for these mineral resources.

8.3 Description of specific environmental features and infrastructure on the site

Refer to the Mine Site Plans (**Diagrams 3b, 3c** and **3d**) that provide an overview of the project site and the existing and proposed infrastructure of each mine site, with the bulk services infrastructure shown in **Diagram 4.**
Diagrams 10 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 three mine site footprints and associated routes for 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 underground and in an open quarry pit

- Safety of personnel mining underground.
- Use of explosives and requirement to provide a blast radius for Mine Health and Safety reasons.
- Management of dust, noise and vibration associated with blasting of ore both underground at Rietberg and Homeep, and in the open pit at Jubilee, in relation to surrounding communities.
- Ventilation required.
- Dewatering of groundwater required, which could be contaminated requiring treatment or disposal in an effluent management system such as an evaporation dam.
- Potentially dangerous areas like deep mine shafts or equipment left behind and uncontrolled access to a potentially unsafe post-mining area.

9.1.2 Potential risk of impacts on surface water resources, groundwater quality and quantity

- Potential for watercourse pollution due to oil spills during routine maintenance of equipment, and potential for polluted run-off into nearby watercourses during construction, operation and decommissioning.
- Ephemeral watercourses located at the Rietberg Mine and the processing facility, TSF and logistics are at risk from the location of the proposed mining activities impacting on their ecological functioning.
- The water pipeline from the Henkries line will cross watercourses using existing historical plinths to reach the Rietberg Mine, with the potential risk of impacting on these watercourses.
- Ongoing impact of mining activities on the ephemeral watercourse (Koeries river) located to the north of the Jubilee Mine historically impacted on by mine waste rock dumps.
- Lack of stormwater run-off management will result in clean water entering polluted water systems.
- Any watercourse crossings for haul roads not correctly designed will impact on the water resource.
- Potential contamination of groundwater from tailings, unmanaged use of hydrocarbons on site, and incorrect storage of hazardous substances.
- Groundwater abstraction from mines and boreholes normally results in a local water level decline in the abstraction borehole/shaft/mine and its surrounding area.
- Dewatering of the mine shafts is a potential risk as the water quality is not suitable for discharge into water resources. As referenced from Appendix E (Section 5.6): "Values of the water from the three mines under consideration exceeding the DWA (2013) general limits for discharging domestic and industrial wastewater into water resources are copper and EC[17] at Homeep and Jubilee, and fluoride at Rietberg, Homeep and Jubilee."

9.1.3 Potential risk of impacts on biodiversity of the mining activities

- 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 agricultural land.
- Waste classes not kept in separate streams and incomplete removal of waste.
- Large volumes of waste rock that requires waste rock dump sites at each mine site.
- Creation of a Tailings Storage Facility with the potential for infiltration of leachate and groundwater contamination due to inadequate lining or leakage from sealed pollution control facilities at the Rietberg Mine.
- Stockpiles and leftover product remaining after mining.
- Loss of indigenous vegetation due to mining footprints at ore deposits.
- 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 the Tailings Storage Facility at the Rietberg Mine.
- 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.

[17] EC is Electrical Conductivity

- Inadequate capping or sealing of boreholes can lead to infiltration of potentially contaminated surface water leading to chemical or biological contamination of groundwater.
- Pumping of process water can discharge poor quality water exceeding minimum standards for watercourses.
- 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.

9.1.4 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.

9.1.5 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.

9.1.6 Potential Risks associated with the socio-economic environment

- Disturbance of local communities in urban and rural areas 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.
- The drawdown of the groundwater from dewatering the mine shafts is described in Section 7.7 of **Appendix E**. Potable water will need to be supplied to the Apollis Guest House during mining at the Homeep Mine and for approximately 30 years thereafter.
- 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.

9.1.7 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.
- Blasting causes noise and vibration, and fly-rock poses a safety concern, therefore a blast radius is required around the Jubilee Mine.
- Noise disturbance and light pollution would result from night-time activities in close proximity to communities.

9.1.8 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 the Heritage Impact Assessment (Appendix C).
- Progressive development can encroach upon or disturb archaeological sites, cultural heritage sites or graves.

9.2 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 3b, 3c, 3d and Diagram 4**. The potential impacts and risks associated with this preferred and only alternative are listed in Table 12 below.

Table 12: Preferred Alternative: Potential Impacts and Risks per Phase per Activity

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 • Access roads	Topsoil stripping and stockpiling, soil erosion and soil compaction (land capability)	Medium (-)	Definite	Short-term
		Surface and ground water resource pollution	High (-)	Possible	Short-term
		Biodiversity (wildlife and vegetation) disturbance from activities and vehicles	Low (-)	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	High (-)	Definite	Short-term
		Lack of socio-economic impact on job security, employment creation and economic spin-offs (i.e. prior to mine construction)	High (-)	Definite	Short-term
		Social impact on community	Medium (-)	Possible	Short-term
		Impact on heritage artefacts, heritage sites or graveyards	Low (-)	Possible	Long-term
OPERATIONAL PHASE	Services and associated infrastructure Primary Processing operation Water and wastewater management Waste generation and management	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 Henkries line; process water to be trucked in and recycled during operation; watercourses impacted on by adjacent activities; dewatering of mine shafts; potential for groundwater pollution from hydrocarbons; impact on groundwater availability for other land uses or developments.	High (-)	Definite (water requirements) Possible (water pollution)	Long-term
		Biodiversity (wildlife and vegetation) disturbance from activities	Low (-)	Definite	Long-term
		Soil contamination and waste management	High (-)	Possible	Short-Term

	Fine Residue Deposit Waste rock dumps Access roads				
		Visibility of mining operations	Medium (-)	Definite	Long-term
		Dust, vehicle, noise and light emissions from site activities and haul trucks	High (-)	Definite	Long-term
		Lack of socio-economic impact on job security, employment creation and economic spin-offs (i.e. prior to mine operating)	High (-)	Definite	Long-term
		Social impact on community	Medium (-)	Possible	Long-term
		Impact on heritage artefacts, heritage sites and graves	Low (-)	Unlikely	Long-term
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 employment opportunities in an area and sector identified for opportunities for job provision and economic growth. There is a renewed demand for copper due to advances in technology, resulting in the potential for re-investment in an existing copper mine. This potential would not be reached with the "no-go" option.

9.4 Methodology used in determining significance of potential impacts

Refer to Table 13 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 13: Impact Assessment Criteria (GDSC Table)

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or 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 copper for local and international markets.
- Access road upgrading.
- Reduction in development footprint by placing infrastructure on historical mining footprints.

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.
  - Blasting noise and vibration, and fly-rock.
  - Visibility of the mining operations.
  - Dust emissions from general site activities (vehicle entrained dust).
  - Disturbance of biodiversity from vehicles.
  - Water use for processing to be trucked in.
  - Dewatering of mine shafts and disposal of water that could be contaminated.
  - Contamination of soil from hydrocarbon spills and compaction on access tracks.
  - Contamination of groundwater through unmanaged boreholes and use of machinery, explosives and chemicals in underground mines.
  - Contamination of surface water resources with the need to separate dirty water from clean water systems on the mine site.
  - Storage and use of hazardous chemicals in processing.
  - Disposal of tailings in a Tailings Storage Facility.
  - 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 has been prepared (**Appendix C**) and will be submitted to the South African Heritage Resources Agency (SAHRA) during the 30-day public participation comment period. Any additional recommendations and/or mitigation measures stipulated by SAHRA will be included in the Final EIA 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 14 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 1a, 1b, and Diagram 3a** for the overall mining right area, and **Diagrams 3b, 3c** and **3d** for the site plan for each mine, and **Diagram 4** indicating the bulk services required for the overall Mine Complex. These are is presented for comment as part of the Scoping Phase stakeholder engagement process. A site selection process will be detailed in the specialist Tailings Storage Facility Report to be included in the DEIR, and a Final Site Layout will be included in the FEIR following the public consultation 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 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 each mine shaft 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 3b (Rietberg), 3c (Jubilee)** and **3d (Homeep) and Diagram 4 (Bulk Services Infrastructure)**. The existing access roads will be utilised, and existing historical waste rock dump sites expanded where indicated.

In summary therefore:

- The referred and only **activity** alternative is the mining and primary processing of copper (and other metals) within the Mining Right area demarcated in **Diagram 3a, 3b, 3c and 3d**.
- The preferred and only **location and layout alternatives** of the mining activities are on the earmarked sites shown on the Mine Site Plans as per **Diagram 3b (Rietberg), Diagram 3c (Jubilee), Diagram 3d (Homeep)** and **Diagram 4** for the bulk infrastructure.
    - 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, to avoid watercourses and sites of heritage significance considered to be “no-go” areas.
    - The original location of the Tailings Storage Facility (TSF) has been moved out of the watercourses and is now proposed in a location further to the north-west. The specialist report addressing the TSF location and design is attached at **Appendix D**.
    - The new section of haul road has been identified to by-pass the main centre of the town of Concordia as shown in **Diagram 4: Bulk Infrastructure**. The proposed haul routes are shown in **Diagram 4**, and an alternative haul road has been identified to the east, to avoid the 600m section of residential area on the outskirts of Concordia.
    - The potable water supply pipeline will connect to the Henkries line adjacent to the N7 and follow a direct line to the proposed Rietberg Mine Site as shown in **Diagram 3b and Diagram 4**.
    - As shown in the mine site layouts and in **Diagram 4**, the electricity supply routes will connect to the existing power grid. Investigations are currently underway with Eskom regarding the supply of power to the mines.
- The preferred and only **technology** alternative is the underground mining, extraction, processing, waste and water management, design of the Tailings Storage Facility with a Class C containment system (**Appendix D**) and use of electricity with backup generators are those described in Section 6.5 below.
- The preferred and only **operational** alternative is the highly mechanised underground mining method of long-hole open stoping, open-cast mining, and the above-ground primary processing activities (crushing and screening; milling; reagent make-up and conditioning; flotation; and, product handling) as illustrated in the Plant Process Flow (**Diagram 6**).

The preferred and only alternatives described above have been included the impact assessment, together with the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline, as detailed in the Impact Tables attached at **Appendix F**.

9.10 Full Description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout plan) through the life of the activity

Refer to the Impact Assessment Methodology detailed in Section 9.4 above and employed in the rating of impacts detailed in **Appendix F**. The broad level impacts and aspects are summarised in Table 14 below.

Table 14: Assessment of each identified potentially significant impact and risk for the Preferred & Only Alternative

NAME OF ACTIVITY	PHASE In which impact is anticipated	POTENTIAL IMPACT	ASPECTS AFFECTED	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
POST APPROVAL ACTIVITIES						
Access to be discussed with landowner regarding roads and gates	Planning and design	• Loss of vegetation and associated biodiversity • Loss of livestock (gates left open)	• Biodiversity • Community assets	Low (-)	• Unnecessary destruction of vegetation avoided by ensuring that traffic and personnel movement is restricted to demarcated areas. No traffic should be allowed on the rehabilitated areas. • Ensure all gates are kept closed and locked as required by the landowner.	• Low (-)
Demarcate mining area		• Non-compliance	• Legal compliance	High (-)	• Ensure that mining activities are contained within approved boundaries.	• Low (-)
SITE ACCESS & SITE ESTABLISHMENT ACTIVITIES						
Conduct Environmental Induction training of staff	Construction	• Poor management of environmental impacts	General environmental management	• Medium (-)	• Hydrocarbon and waste management • Dust control • Traffic safety	• Low (-)
Upgrading of existing access roads	Construction	• Soil compaction • Dust generation • Traffic increase • Waste generation • Stormwater control • Altering the characteristics of a watercourse. • Material stockpiling	• Land capability • Air quality • Community safety • Ground and water pollution • Water resources • Visual landscape	• Low (-) • Medium (-) • Medium (-) • Low (-) • Medium (-) • Low (-)	• Minimise compaction • Dust reduction • Traffic safety • Hydrocarbon and waste management • Water resource management • Construction site management	• Low (-) • Low (-) • Low (-) • Low (-) • Low (-) • Low (-)
Constructing new access roads	Construction	• Soil Erosion • Loss of biodiversity • Emissions (dust, vehicles & noise) • Traffic increase • Topsoil and overburden removal and stockpiling • Stormwater run-off and altering the	• Land capability • Biodiversity • Air quality • Community safety • Change in topography • Water quality and water resources • Biodiversity and visual landscape	• Medium (-) • Medium (-) • Medium (-) • Medium (-) • Medium (-) • High (-) (water) • Medium (-) • Medium (-) • High (-) [no jobs & no local spinoffs]	• Topsoil management • Demarcate areas for development footprints • Dust reduction • Traffic management • Height of stockpiles • Water resource management • Hydrocarbon and waste management, and mobile ablution facilities	• Low (-) • Low (-) • Low (-) • Low (-) • Low (-) • Low (-) (water) • Low (-) • Low (-) • High (+)
Constructing electrical supply	Construction					
Constructing water and wastewater infrastructure	Construction					
Prepare areas for development footprints as per	Construction					

Diagrams 3b, 3c and 3d: mine logistics; processing plant; RoM stockpile areas; waste rock dump site; Tailings Storage Facility (TSF); Hydrocarbon storage; water pipelines; electricity powerlines and substations		characteristics of a watercourse and impeding flow. • Hydrocarbon & waste management • Material stockpiling • Mobile ablution facilities • Job creation	• Visual landscape • Socio-economic spin-offs (+)		• Construction site management and housekeeping • Job creation (+) & local economic spin-offs (+)	
OPERATIONAL PHASE ACTIVITIES						
Underground Mining	Operational	• Noise and vibration during blasting • Hazardous materials storage and usage • Dust generation • Pollution of groundwater resources • Water use • Waste management • Effluent/sewage control • Power supply	• Groundwater resources • Waste generation • Energy supply • Community safety (blasting & vibrations)	• High (-) • High (-) • High (-)	• Dust control • Traffic safety below ground associated with heavy machines • Hydrocarbon management • Material management; Mobile ablution facilities Waste management • Groundwater management (dewatering) • Groundwater pollution prevention • Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM: AQA.	• Low (-) • Low (-) • Low (-) • Low (-) • Medium-Low (-)(water quantity) • Low (-) (water quality) • Low (-)
Processing activities	Operational	• Management of emissions (dust & noise) • Water use • Light Pollution • Water pollution • Waste management • Visual impact • Light pollution • Hazardous materials storage and usage • Job creation	• Land capability • Emissions • Water resources • Waste generation • Air quality • Visual landscape • Social upliftment and economic spin-offs	• Medium (-) • High (-) • High (-) • Medium (-) • Medium (-) • Medium (-) • High (-)	• Mine Health and Safety Regulations and Dust Control Regulations in terms of NEM: AQA. • Water management: Integrated Water and Wastewater Management Plan (IWWMP) Action Plan (component of iWULA) and DHSWS Best Practice Guidelines for Stormwater Management • Hydrocarbon and waste management • Screening where possible • Employment created	• Low (-) • Low (-) • Low (-) • Low (-) • High (+)
Transporting hard rock materials (RoM ore to Rietberg from Jubilee and Homeep)	Operational	• Management of emissions (dust, and noise) • Waste generation	• Air quality • Waste management • Community safety	• Medium (-) • Medium (-) • Medium (-) • High (-)	• Dust and emissions control • Hydrocarbon and waste management • Traffic safety control • employment created	• Low (-) • Low (-) • Low (-) • High (+)

		• Access roads compaction and erosion • Traffic increase • Job creation	• Social upliftment and economic spin-offs			
Use of all facilities and amenities associated with mine logistics	Operational	• Management of emissions (dust, noise & light) • Water usage and pollution • Waste and effluent generation • Access roads compaction and erosion	• Air quality • Visual landscape • Waste management • Soil erosion and stormwater control	• Medium (-) • Medium (-) • Medium (-)	• Dust and emissions control • Water management: Integrated Water and Wastewater Management Plan (IWWMP) Action Plan (component of iWULA) and DWS Best Practice Guidelines for Stormwater Management • Waste rock dump management, and hydrocarbon and waste management. • Road maintenance.	• Low (-) • Low (-) • Low (-) • Low (-)
DECOMMISSIONING PHASE ACTIVITIES						
Secure mine shafts and open pit and fence off access securely	Decommissioning Rehabilitation	• Security	• Community safety	• High (-)	• Rehabilitation, Decommissioning and Closure Plan (**Appendix G**)	Low (-)
Rehabilitate TSF. Cover waste rock dump leading edge with sand removed prior to extension.	Decommissioning Rehabilitation	• Topography • Visual • Vegetation re-establishment	• Land capability • Landscape • Biodiversity	• Medium (-) • Medium (-) • Medium (-)	• Waste rock dumping management and rehabilitation • Rehabilitation according to Rehabilitation, Decommissioning and Closure Plan (**Appendix G**)	Low (-)
Rip all hardened areas and remove all structures	Decommissioning Rehabilitation				• Allow to revegetate naturally	Low (-)

10 SUMMARY OF SPECIALIST REPORTS

Table 15: 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
Heritage Impact Assessment	A Heritage Impact Assessment (HIA) was prepared by Asha Consulting dated 4 November 2019 (attached as **Appendix C**) Refer to Section 8.1.12.1 above for a description of the findings. The following recommendations are made: • All haul roads must make use of existing roads as far as possible (including where they cross or follow the historic copper mining railway). • All upgrades to haul roads must be centered on the existing roads as far as possible so as to minimize impacts to features located close to these roads. • Any alteration to the overall project footprint (i.e. mine fences and haul road locations) must be subjected to further assessment as may be required. • All surface activities must be contained within the three mine fences to avoid impacts to unsurveyed areas. • The final layout of each of the three mines must be considered by an archaeologist or heritage consultant to determine whether any specific mitigation measures or no-go areas not anticipated in the present assessment might be required prior to construction. • The graveyard in the Jubilee Mine (Waypoint 111) must be fenced with a 30 m buffer and declared a no-go area. A gate should be provided for potential visitors and to allow cleaning of any wind-blown litter. • The historical stone-built mining-related structures in the Jubilee Mine must be preserved. They can be reused if required but their modification must be approved by SAHRA to ensure that their heritage significance is not diminished (this may require the services of a heritage architect). • The stone house and threshing floor in the Houmeep Mine (Waypoint 163) must be avoided and declared a no-go area. A 30 m buffer should be imposed if possible but this is not required. The structure should not be used for mining-related activities. • All ruins, livestock enclosures and structures related to local herder activity and hence living heritage) must be avoided as far as is possible. • If any herder enclosures or structures will need to be removed or will be covered by mine dumps then this must be done in consultation with their owners (if traceable) or other community members. • If any historical underground mine workings are opened then these must be inspected (insofar as it is safe to do so) for historical traces such as hand tools, mining equipment, graffiti or other features. A report	**X** **All recommendations included**	Section 8.1.12.1 PART B: EMPr **Appendix F**: Impact Tables **Appendix G**: Closure Plan

	including a photographic record must be submitted to SAHRA for approval prior to modification or destruction of the historical workings. • A chance finds procedure for recording and recovering isolated fossil finds must be incorporated into the environmental management program for the project. (Included as Table 21 in Part B: EMPr of this report). • If any Stone Age, historical or industrial archaeological material (e.g. stone tools, historical rubbish dumps, historic mining equipment or tools) or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.		
A Definitive Feasibility Study Design of the Rietberg Tailings Storage Facility for the SHIP Copper Mining Right (prepared by epoch dated October) Attached as **Appendix D**.	**Conclusions** Based on the design of the proposed Rietberg TSF as described it is concluded that: • A preferred site for the establishment of the TSF has been identified to the north of the planned processing plant location that can store the required 7.2Mt of tailings at the expected rate of 480ktpa • The site has been arranged to minimize the environmental impacts associated with its development, particularly with regard to surface drainage lines, the presence of protected tree species, and a site of archaeological interest • The TSF would be considered a High Hazard Based facility on the prescribed hazard classification criteria (SANS 0286:1998, 1998) which show it's Zone of Influence (ZOI) extending to the N7 national road and bridge to the west • A geotechnical investigation of the site of the proposed TSF has been carried out and has concluded that the site is suitable for development, with an area of borrow material also having been identified for use in the construction of the starter embankment to the facility • Based on detailed assessment of the waste classification and a review of the reports on groundwater conditions and usage, it is believed that a case could be made for the risk-based relaxation of the requirements for the containment barrier system to the TSF • Notwithstanding the potential for relaxation of the requirements for the installation of the containment barrier system to the TSF, it has been designed to include for the installation of a Class C containment barrier system comprising a 1.5mm HDPE geomembrane to be installed on top of a Geosynthetic Clay Liner (GCL) • Based on analyses of the TSF water balance it has been concluded that: o Between 45 and 50% of the slurry water pumped to the facility would be available for return to the plant o While stormwater runoff to the basin of the facility would supplement the water available for reuse during the rainy season, it is unlikely that such water would ever entirely negate the need for plant make-up water to be sourced elsewhere o Average monthly rainfall and storm events of up to 7 days duration and 200 years recurrence interval are unlikely to result in the storage of more than 50 000m3 on the facility o Given the limited requirement for storage of runoff on the TSF, and the demand for make-up water in the plant, it is proposed that excess water on the facility be returned directly to the plant, negating the need for the construction of a storm water control dam • Seepage and slope stability models of the TSF have been constructed to illustrate that the Factors of Safety (FoS) against failure of the facility are within accepted norms for a range of scenarios including: o Failure of the drainage systems	**X** **All recommendations included**	**Appendix D: TSF Report by Epoch** Section 3.3.10: Description of TSF Section 6.2.3: Site location alternatives **Appendix F**: Impact Tables **Appendix G**: Closure Plan

	o Failure of the containment barrier systems o The effects of seismicity • The TSF will be constructed as an upstream self-raised facility, with deposition commencing from the crest of a compacted earth fill starter embankment. The outer slope of the facility will be maintained at a slope of 1V:3H and it will be developed to a height of 39m above datum at which time it will have a rate of rise of 1.83m/yr. • The costs associated with the construction, operation, and rehabilitation and closure of the facility have been estimated and are provided in **Appendix D**. **Recommendations** Based on the Definitive Feasibility Design of the TSF and the conclusions arising as described above it is recommended that subsequent phases of the project focus on: • Confirmation of the life of mine tailings production plan based on the approved mining and processing plans • Verification of the preferred site and layout of the of the TSF to include: o Confirmation of the volumes of waste rock and borrow pit material available for construction of preparatory construction works o Confirmation that environmental/ archaeological constraints to the development of the site have been addressed • Assessment of the liquefaction potential of the tailings material and updating of the hazard / risk classification of the facility as necessary • Verification of the geotechnical properties of the tailings by laboratory analysis of representative samples • Verification of the seepage and slope stability models based on laboratory testing of the preferred materials to be used in the construction of the containment barrier system to confirm their interface shear values • Consideration of the requirements of the recently published Global Industry Standard on Tailings Management with specific reference to: o Detailed dam break and flow slide analyses and updating of the zone of influence / inundation and the Hazard Classification of the facility o Consideration of the potential effects of longer recurrence interval weather events on the facility, as appropriate to its Hazard Classification o Consideration of the potential effects of seismicity on the facility as appropriate to its Hazard Classification.		
Hydrogeological Assessment Report (**Appendix E)** Prepared by SRK, dated May 2020.	Based on the data and information discussed in this report, the following can be concluded regarding the geohydrology at the site: • Groundwater in the area is naturally of poor quality and generally unfit for long term human consumption unless treated; • Groundwater quality of water abstracted from Jubilee mine and O'Kiep mine, if the latter is to be used for water supply, is of very poor quality with many constituents exceeding the DWA (2013) permissible limits for discharging wastewater to water resources; • High sulfate concentrations, fluoride and salinity, and above background trace-metal concentrations, especially uranium, of groundwater abstracted from Jubilee and O'Kiep mines are indicative of pollution from the old mines and associated remnants of their sulfide orebodies. The water from O'Kiep mine is particularly poor with very high metal concentrations, including uranium, sulfate, salinity and a low pH;	**X** **All recommendations included**	PART B: EMPr **Appendix F**: Impact Tables **Appendix G**: Closure Plan

	• Aquifers in the area are predominantly of the fractured-rock type and are generally low yielding with very low transmissivities, poorly developed fracture systems of limited extent and are classified as minor aquifers. In many areas of the site, the bedrock is solid with no fractures and hence no groundwater is present. Boreholes drilled in these areas remain dry with no evidence of groundwater ingress; • Groundwater usage in the study area is very low and mostly for livestock watering; • Modelled groundwater ingress rate at the three mines over the LoM are low ranging from 26 KL/a to 40 KL/a at Rietberg mine, from 55 KL/a to c.218 000 KL/a at Jubilee mine and from c.2 000 KL/a to c.7 200 KL/a at Homeep mine. Total groundwater ingress over LoM is c.180 KL at Rietberg mine (excluding the initial dewatering of c.11 000 KL from the old mine voids), c 219 000 KL at Jubilee mine and c.24 000 KL at Homeep mine. Note: Initial ingress of c.218 000 KL/a at Jubilee mine in year 9 includes water stored in the old mine pit. • The post mitigation impact of the proposed mine on the groundwater quantity and quality over 15 years LoM is deemed to be: o insignificant during the construction phase; o medium (quantity) to low and very low (quality) during the operation phase; and o very low to insignificant during the de-commissioning phase. • During the post-operational phase, the groundwater level will slowly recover from its maximum drawdown to its pre-project state. Model results indicate recovery after 30 years post-operation (indicated as drawdown below pre-abstraction levels) likely to be <5 m at Rietberg mine, 36 m at Jubilee mine and 563 m at Homeep mine. Full (100%) recovery is likely after c.40, 52 and 114 years, respectively. These times may be much reduced should exceptionally good rain season/s occur; • The contaminant plume originating from an unlined TSF (worst case scenario) is likely to cease expanding post-operation and groundwater quality will slowly improve due to recharge dilution and attenuation; • The potential contaminant plume from the unlined TSF is very localised, with the maximum concentration of c.65% of the contaminant concentration infiltrating <10 m in the upper aquifer at the end of the actual 15 years LoM. A mixing zone (1 to 2% of the leachate) exists 30 years post mining in the centre of the TSF footprint and extends c.800 m southwest from the TSF and WRD footprints; • The model results indicate that only Apollis Guesthouse's private borehole water supply is highly likely to be impacted by the water level zone of drawdown at Homeep mine. • No water boreholes or springs are likely to be impacted by the potential contaminant plume; and • From a hydrogeological perspective, there is no obvious reason why the proposed mine should not be authorised provided the recommendations in this report are implemented and adhered to. Based on the data and information discussed in this report, the following is recommended regarding the groundwater resources at the site: • Mine dewatering can be utilised to fully supply the 130 KL/d required during the 12 months construction period, but not 453 KL/d required during the 15 years of operations; • Boreholes are highly unlikely to supply the required 453 KL/d operational water demand over the 15-year LoM;		

	• To prevent existing water supply borehole SHIP-BH3 from collapsing, it will have to be reamed to 215 mm diameter and fully sleeved with steel casing. Should any additional water supply boreholes be drilled, these should also be fully cased down to the deepest water strike; • O'Kiep mine, which reportedly has c.4.5 MKL of water stored in its mine voids, theoretically should be able to supply the operational demand of c.2.5 MKL over the 15 years LoM. However, this water cannot be used in untreated form due to its very poor quality, high metal concentrations and low pH posing a high contamination risk. Much better-quality water (lower salinity and metal concentrations) can be sourced from the O'Kiep and the Concordia Municipal WWTWs, each of which treats c.1 000 KL of wastewater per day. Alternatively, drinking quality water could likely be sourced from Sedibeng Water's Orange River bulk pipeline, which passes c.4 km west of the Rietberg site; • The groundwater quality from the three mines is poor, especially Jubilee with high salinity (TDS) and sulfate as well as elevated levels of fluoride and trace metal concentrations. The water from Jubilee is not suitable for mixing of concrete due to sodium and sulfate exceeding recommended SANS 51008:2006 limits. The groundwater has a corrosive tendency, especially for Mild Steel; • A groundwater monitoring and management plan should be implemented; and • All essential mitigation measures listed in this report (subsection 8) should be implemented (and are included in the EMPr)		

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 shown per phase in the following tables.

Table 16: Significance Ratings of Impacts after Mitigation during the Construction Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. IMPACT 1: SOIL EROSION AND COMPACTION The clearing of areas for mining logistics, the waste rock dump site and TSF at Rietberg and all other infrastructure not located on an existing historical mining footprint will result in the removal of existing vegetation and topsoil. This 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**
2.1 IMPACT 2.1: SURFACE WATER RESOURCES Potential for watercourse pollution due to oil spills during routine maintenance of equipment, and potential for polluted run-off into nearby watercourses during construction. Ephemeral watercourses are located at the Rietberg Mine and the processing facility, TSF and logistics have been located to avoid these wherever possible. The water pipeline from the Henkries line will cross watercourses using existing historical plinths to reach the Rietberg Mine. Construction activities will need to be managed to avoid pollution of watercourses. An ephemeral watercourse is located to the north of the Jubilee Mine historically impacted on by mine waste rock dumps. Management of stormwater run-off will be required to keep clean water from entering polluted water systems. Any watercourse crossings for haul roads will be designed to minimise impact on the water resource.	**Low** **Insignificant Risk**	**N/A**
2.2 IMPACT 2.2: GROUNDWATER QUALITY Limited use of groundwater during site establishment due to poor quality that will require treatment prior to use for construction purposes, such as mixing with cement. Potential for groundwater pollution due to oil spills during routine maintenance of equipment.	**Low** **Insignificant Risk**	**N/A**
3.3 IMPACT 2.3: GROUNDWATER QUANTITY Limited use of groundwater during site establishment due to poor quality.	**Low** **Insignificant Risk**	**N/A**
4. IMPACT 3: LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN CBA 1 AND CBA 2 Rietberg TSF, WRD and processing plant has been moved out of a CBA1 and are now located in a CBA2. Jubilee mine is located on an existing mining footprint surrounded by a CBA1 associated with the Koeries River corridor. Homeep mine is located on an existing mining footprint surrounded by a CBA2. The expansion of the mine footprints into critical biodiversity areas is limited by using the existing historical mine footprints wherever possible.	**Medium-Low** **Medium Risk**	**N/A**
4. IMPACT 4: POTENTIAL FOR SOIL CONTAMINATION AND WASTE GENERATION DURING CONSTRUCTION PHASE	**Low** **Insignificant Risk**	**N/A**
5. IMPACT 5: VISUAL INTRUSION Caused by machinery, topsoil stockpiles, cleared areas, and movement of trucks on site during preparation of site establishment. The 3 mining sites are located on existing mining footprints, and existing waste rock dumps will be utilised at Jubilee and Homeep. The TSF and waste rock dump at Rietberg will be located adjacent to the mountain slope (Diagram 3b), where the visual intrusion is less compared to its original location on the flat plain located to the west of the mine.	**Medium-Low** **Insignificant Risk**	**N/A**
6. IMPACT 6: EMMISSIONS (DUST, VEHICLES, NOISE & LIGHT): Noise and dust will be created by site establishment equipment (e.g. front-end loaders), blasting (if required during construction), and vehicles (emitting Greenhouse Gases & other fugitive emissions). Light pollution will occur from safety lighting at the construction camp, etc.	**Very low** **Insignificant Risk**	**N/A**
7. IMPACT 7: PALAEONTOLOGICAL AND CULTURAL IMPACTS Refer to **Appendix C**. The heritage resources identified as no-go area have been demarcated at the Homeep mine where the mine footprint will not impact on it, and at the Jubilee mine the graveyard is outside the mine footprint. There are no expected impacts on palaeontological resources.	**Medium-Low** **Insignificant Risk**	**N/A**
8. IMPACT 8: CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS	**Medium (+)**	**Medium (-)**

Table 17: Significance Ratings of Impacts after Mitigation during Operational Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. IMPACT 1: CHANGE IN TOPOGRAPHY ABOVE GROUND & GEOLOGY BELOW GROUND: Ore removed below ground at the mines will leave voids. Mined ore will be stored as Run of Mine rock stockpiles prior to processing; existing historical waste rock dumps will be utilised at Jubilee and Homeep. Existing historical mine footprints will be utilised. A self-raising Tailings Storage Facility (TSF) at Rietberg impacting on the site's topography. Change in topography and below ground geology is associated with mineral extraction.	**Medium-Low Insignificant Risk**	**N/A**
2. IMPACT 2: SOIL EROSION & SOIL COMPACTION The potential for soil erosion by wind and stormwater run-off; soil compaction from repeated use of access tracks inside mining area.	**Low Insignificant Risk**	**N/A**
3.1 IMPACT 3.1: SURFACE WATER RESOURCES Ephemeral watercourses are located at the Rietberg Mine and the processing facility, TSF and logistics have been located to avoid these wherever possible. The water pipeline from the Henkries line will cross watercourses to reach the Rietberg Mine. An ephemeral watercourse is located to the north of the Jubilee Mine historically impacted on by mine waste rock dumps. Management of stormwater run-off will be required to keep clean water from entering polluted water systems. Any watercourse crossings for haul roads will be designed to minimise impact on the water resource and maintained during operation.	**Low Insignificant Risk**	**N/A**
3.2 IMPACT 3.2: GROUNDWATER RESOURCES: QUALITY The TSF at Rietberg is to be lined with a class c containment system preventing pollution of groundwater. Generic mitigation measures to prevent pollution from mining activities will be implemented as per the EMPr (as per Impact 5 below).	**Low Insignificant Risk**	**N/A**
3.3 IMPACT 3.3: GROUNDWATER RESOURCES: QUANTITY Process water is to be obtained from dewatering the mine shafts, and potentially off-site from the O'Kiep open pit which will need to be treated and trucked in. Water is to be recycled from the mining operations. Dewatering of the Rietberg mine will not impact on the local spring in the valley. Dewatering of Jubilee and Homeep mine will have drawdown that will impact on the Apollis Guest house, and potable water of a better quality than the borehole water on the property (which has high salinity), will be supplied to compensate.	**Medium-Low Insignificant Risk**	**N/A**
4. IMPACT 4: LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING IN A CBA1 AND CBA2 Rietberg TSF, WRD and processing plant has been moved out of a CBA1 and are located in a CBA2. Jubilee mine is located on an existing mining footprint surrounded by a CBA1 associated with the Koeries River corridor. Homeep mine is located on an existing mining footprint surrounded by a CBA2. All mine infrastructure will be operated in accordance with the EMPr to avoid impacting on the surrounding areas during the operational phase.	**Low Insignificant Risk**	**N/A**
5. IMPACT 5: POTENTIAL FOR SOIL CONTAMINATION, AND WASTE GENERATION DURING OPERATIONAL PHASE Waste rock dump; overburden; industrial waste (hazardous wastes, oil & greases); domestic waste; wastewater, including effluent & sewage sludge and the TSF. All mine infrastructure will be operated in accordance with the EMPr to avoid impacting on the surrounding areas during the operational phase.	**Low Insignificant Risk**	**N/A**
6. IMPACT 6: VISUAL IMPACT Mining activities during the operational phase will have a visual impact associated with mining machinery, topsoil and run of mine stockpiles, waste rock dumps, TSF, logistics and movement of trucks on site and on access and haul roads. Mining activities are located in areas historically mined.	**Low Insignificant Risk**	**N/A**
7. IMPACT 7: EMMISSIONS (DUST, VEHICLES, NOISE & LIGHT) Blasting will generate noise, vibration and dust. Hauling vehicles emit Greenhouse Gases and other fugitive emissions. Dust will be generated on access roads, and in rock dumping. Lighting impacts on surrounding communities and fauna.	**Low Insignificant Risk**	**N/A**
8. IMPACT 8: HERITAGE, PALAEONTOLOGICAL AND CULTURAL IMPACTS Refer to **Appendix C**. The heritage resources identified as no-go area have been demarcated at the Homeep mine where the mine footprint will not impact on it, and at the Jubilee mine the graveyard is outside the mine footprint. There are no expected impacts on palaeontological resources.	**Medium-Low Insignificant Risk**	**N/A**
9. IMPACT 9: CREATION OF EMPLOYMENT & JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS Including Improvement in road infrastructure, and safety of community from haul trucks due to by-pass routes.	**Medium (+)**	**Medium (-)**

Table 18: Significance Ratings of Impacts after Mitigation during Decommissioning Phase

IMPACTS AND ASPECTS	PREFERRED AND ONLY ALTERNATIVE	NO-GO ALTERNATIVE
1. IMPACT 1: REHABILITATION OF MINED AND CLEARED AREAS As per Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**)	**Low Insignificant Risk**	**N/A**
2. IMPACT 2: GROUND WATER RESOURCES As per **Appendix E** and Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**)	**Medium-Low Insignificant Risk**	**N/A**
4. IMPACT 3: CREATION OF EMPLOYMENT, JOB SECURITY WITH LOCAL AND REGIONAL ECONOMIC SPIN-OFFS DURING DECOMMISSIONING & CLOSURE PHASE Including improved road infrastructure.	**Medium (+) Insignificant Risk**	**N/A**

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, and the specialist findings have provided mitigation measures which are included in the EMPr and Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**). There is a correlation between cumulative impacts post mitigation, and significance rating of impacts after mitigation as indicated in **Appendix F.**

11.2 Final Site Map

Refer to **Diagram 3b: Rietberg; Diagram 3c: Jubilee** and **Diagram 3d: Homeep** for the location and layout of the Mining Site Layouts within the Mining Right Application Area.

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

Refer to Tables 12, 14, 16, 17 and 18.

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.
  - Ensure safe mining area with no potentially dangerous areas like deep excavations.
  - Topsoil to be stockpiled and replaced during decommissioning and closure, and rehabilitation.

- Objective 2 - To minimise pollution or degradation of the environment
  - Design, construct and manage the MRDSF according to the specialist report (**Appendix E**) and legislative requirements.
  - Provide sufficient information and guidance to plan the mining activities in a manner that would reduce impacts as far as practically possible.
  - Limit residual environmental impact on surface water and soil by ensuring that no fuel or oil spills occur in the mining area causing contamination.
  - Access groundwater in a sustainable manner according to the hydrogeological report (Appendix 2 in **Appendix E**) conditions of the IWUL to be provided by DWS.
  - Ensure that no solid waste or rubble is dumped on the site.
  - Ensure that portable toilets are used in places far from the logistics area (where permanent ablution facilities are provided). 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.

- Objective 3 – To minimise impacts on the community and to provide optimal post-mining social opportunities
  - Ensure that workers remain within the mining right area.
  - Operate during normal working hours only.
  - Minimise the generation of noise and dust.
  - Respond rapidly to any complaints received.
  - Minimal negative aesthetic impact.
  - Optimised benefits for the social environment.

11.4.2 Outcomes

- By providing sufficient information to strategically plan the mining activities, unnecessary social and environmental impacts will be avoided.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.
- A well-managed compliant MRDSF that contains the mine residue without causing unacceptable environmental degradation.
- 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 unpaved 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 site.

11.5 Final Proposed Alternatives

Refer to Section 6.

11.6 Aspects for inclusion as conditions of authorisation

- As per the heritage recommendations in **Appendix C**.
    - All haul roads must make use of existing roads as far as possible (including where they cross or follow the historic copper mining railway).
    - All upgrades to haul roads must be centered on the existing roads as far as possible so as to minimize impacts to features located close to these roads.
    - Any alteration to the overall project footprint (i.e. mine fences and haul road locations) must be subjected to further assessment as may be required.
    - All surface activities must be contained within the three mine fences to avoid impacts to unsurveyed areas.
    - The final layout of each of the three mines must be considered by an archaeologist or heritage consultant to determine whether any specific mitigation measures or no-go areas not anticipated in the present assessment might be required prior to construction.
    - The graveyard in the Jubilee Mine (Waypoint 111) must be fenced with a 30 m buffer and declared a no-go area. A gate should be provided for potential visitors and to allow cleaning of any wind-blown litter.
    - The historical stone-built mining-related structures in the Jubilee Mine must be preserved. They can be reused if required but their modification must be approved by SAHRA to ensure that their heritage significance is not diminished (this may require the services of a heritage architect).
    - The stone house and threshing floor in the Houmeep Mine (Waypoint 163) must be avoided and declared a no-go area. A 30 m buffer should be imposed if possible but this is not required. The structure should not be used for mining-related activities. (Refer to **Diagram 3d** which shows that this area located to the south of the office complex has been excluded from the mine boundary and will not be impacted on.)
    - All ruins, livestock enclosures and structures related to local herder activity and hence living heritage) must be avoided as far as is possible.
    - If any herder enclosures or structures will need to be removed or will be covered by mine dumps then this must be done in consultation with their owners (if traceable) or other community members.
    - If any historical underground mine workings are opened then these must be inspected (insofar as it is safe to do so) for historical traces such as hand tools, mining equipment, graffiti or other features. A report including a photographic record must be submitted to SAHRA for approval prior to modification or destruction of the historical workings.
    - A chance finds procedure for recording and recovering isolated fossil finds must be incorporated into the environmental management program for the project. (Included as Table 21 in Part B: EMPr of this report).
    - If any Stone Age, historical or industrial archaeological material (e.g. stone tools, historical rubbish dumps, historic mining equipment or tools) or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may

require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

- Based on the Definitive Feasibility Design of the TSF (refer to Table 14 and **Appendix D**) and the conclusions arising the specialists recommended that subsequent phases of the project focus on:
  - Confirmation of the life of mine tailings production plan based on the approved mining and processing plans.
  - Verification of the preferred site and layout of the of the TSF to include:
    - Confirmation of the volumes of waste rock and borrow pit material available for construction of preparatory construction works
    - Confirmation that environmental/ archaeological constraints to the development of the site have been addressed
  - Assessment of the liquefaction potential of the tailings material and updating of the hazard / risk classification of the facility as necessary
  - Verification of the geotechnical properties of the tailings by laboratory analysis of representative samples.
  - Verification of the seepage and slope stability models based on laboratory testing of the preferred materials to be used in the construction of the containment barrier system to confirm their interface shear values.
  - Consideration of the requirements of the recently published Global Industry Standard on Tailings Management with specific reference to:
    - Detailed dam break and flow slide analyses and updating of the zone of influence / inundation and the Hazard Classification of the facility.
    - Consideration of the potential effects of longer recurrence interval weather events on the facility, as appropriate to its Hazard Classification.
    - Consideration of the potential effects of seismicity on the facility as appropriate to its Hazard Classification.
- The groundwater management recommendations (refer to Table 14) contained in **Appendix E** needs to be implemented.
- Potable water is to be supplied to the Apollis Guesthouse as soon as mining commences at the Homeep Mine, for the duration of the mining activities at the Homeep Mine (from year 8 to 15) and thereafter for an additional estimated 30 years due to the long term effect of the dewatering drawdown as modelled by SRK (Section 7.7 of **Appendix E**).
- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix G**).
- Concurrent mining and rehabilitation must be undertaken wherever 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 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 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.
- Access via the public access roads shall be managed to avoid traffic impacts and road surface deterioration. The access road shall be maintained during operational activities and the life of the mine.
- 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 public access road where local speed limits will be applicable for hauling trucks.
- Haul roads to be upgraded and the mine site farm boundary to be fenced during the LoM.
- The fence around the TSF and Jubilee open pit shall be maintained to ensure community safety.

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 to be 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 G**) and any annual rehabilitation plans as part of production, will be implemented and adhered to.
- DHSWS will assess the Water Use Application and the decision to grant of refuse the license with any conditions of the WULA that needs to be implemented by the Applicant will be determined by DWS. Obtaining a WUL will however be one of the conditions for granting of the Mining Right.

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 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, and to provide acceptable mitigation measures.
- The role of specialists are important in providing the necessary understanding to identify key impacts, such as the heritage resources (**Appendix C**), groundwater quality and quantity (**Appendix E**), and the TSF Design (**Appendix D**) required by legislation to follow specific planning and design parameters.
    - Even though there is the potential for the relaxation of the requirements for the installation of a containment barrier system, the Applicant has requested that the design of the TSF must include the installation of a containment barrier system to ensure the environmental sustainability of the mine.
    - The TSF has been designed to include the installation of a Class C containment barrier system comprising a 1.5mm HDPE geomembrane to be installed on top of a Geosynthetic Clay Liner (GCL) as detailed in **Appendix D**.
- Potable water supply will be provided via a pipeline from the Henkries Line to the Rietberg Mine and trucked from there to the other mines when they become operational.
- Potable water will be supplied to the Apollis Guest House located within the groundwater drawdown zone from the dewatering of the Homeep Mine.
- The groundwater from the dewatering of the mines will be used for primary processing, which will be recycled in a closed loop system. The dewatering of the Jubilee open cast pit will be treated at the existing oxidation ponds located in close proximity to the Jubilee Mine. The upgrading of the oxidation ponds has been identified as the Social and Labour Plan project (described in **Appendix H**).
- 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 G**).
- DHSWS will assess the Water Use Application and the decision to grant of refuse the license with any conditions of the WULA that needs to be implemented by the Applicant will be determined by DHSWS. Obtaining a WUL will however, be one of the conditions for granting of the Mining Right.
- The activity has been assessed to have a positive socio-economic impact, especially in terms of the creation of employment and the provision of copper and tungsten for the local and international market. Existing roads to be used as haul roads will be upgraded and maintained during the life of the mine.
- Haul roads have been realigned to avoid the community of Concordia as far as possible.
- 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 G**), the potential negative impacts associated with the implementation of the preferred alternative can be reduced to acceptable levels.

11.8.2 Conditions that must be included in the authorization

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

As per section 11.6 above:

- As per the heritage recommendations in **Appendix C**.
  - All haul roads must make use of existing roads as far as possible (including where they cross or follow the historic copper mining railway).
  - All upgrades to haul roads must be centered on the existing roads as far as possible so as to minimize impacts to features located close to these roads.
  - Any alteration to the overall project footprint (i.e. mine fences and haul road locations) must be subjected to further assessment as may be required.
  - All surface activities must be contained within the three mine fences to avoid impacts to unsurveyed areas.
  - The final layout of each of the three mines must be considered by an archaeologist or heritage consultant to determine whether any specific mitigation measures or no-go areas not anticipated in the present assessment might be required prior to construction.
  - The graveyard in the Jubilee Mine (Waypoint 111) must be fenced with a 30 m buffer and declared a no-go area. A gate should be provided for potential visitors and to allow cleaning of any wind-blown litter.
  - The historical stone-built mining-related structures in the Jubilee Mine must be preserved. They can be reused if required but their modification must be approved by SAHRA to ensure that their heritage significance is not diminished (this may require the services of a heritage architect).
  - The stone house and threshing floor in the Homeep Mine (Waypoint 163) must be avoided and declared a no-go area. A 30 m buffer should be imposed if possible but this is not required. The structure should not be used for mining-related activities. (Refer to **Diagram 3d** which shows that this area located to the south of the office complex has been excluded from the mine boundary and will not be impacted on.)
  - All ruins, livestock enclosures and structures related to local herder activity and hence living heritage) must be avoided as far as is possible.
  - If any herder enclosures or structures will need to be removed or will be covered by mine dumps then this must be done in consultation with their owners (if traceable) or other community members.
  - If any historical underground mine workings are opened then these must be inspected (insofar as it is safe to do so) for historical traces such as hand tools, mining equipment, graffiti or other features. A report including a photographic record must be submitted to SAHRA for approval prior to modification or destruction of the historical workings.
  - A chance finds procedure for recording and recovering isolated fossil finds must be incorporated into the environmental management program for the project. (Included as Table 21 in Part B: EMPr of this report).
  - If any Stone Age, historical or industrial archaeological material (e.g. stone tools, historical rubbish dumps, historic mining equipment or tools) or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.
- Based on the Definitive Feasibility Design of the TSF (refer to Table 15 and **Appendix D**) and the conclusions arising the specialists recommended that subsequent phases of the project focus on:
  - Confirmation of the life of mine tailings production plan based on the approved mining and processing plans.
  - Verification of the preferred site and layout of the of the TSF to include:
    - Confirmation of the volumes of waste rock and borrow pit material available for construction of preparatory construction works
    - Confirmation that environmental/ archaeological constraints to the development of the site have been addressed
  - Assessment of the liquefaction potential of the tailings material and updating of the hazard / risk classification of the facility as necessary
  - Verification of the geotechnical properties of the tailings by laboratory analysis of representative samples.
  - Verification of the seepage and slope stability models based on laboratory testing of the preferred materials to be used in the construction of the containment barrier system to confirm their interface shear values.
  - Consideration of the requirements of the recently published Global Industry Standard on Tailings Management with specific reference to:
    - Detailed dam break and flow slide analyses and updating of the zone of influence / inundation and the Hazard Classification of the facility.

    - Consideration of the potential effects of longer recurrence interval weather events on the facility, as appropriate to its Hazard Classification.
    - Consideration of the potential effects of seismicity on the facility as appropriate to its Hazard Classification.
- The groundwater management recommendations (refer to Table 15) contained in **Appendix E** are to be implemented.
- All mining and rehabilitation to be conducted as per the approved EMPr, and Rehabilitation, Decommissioning and Closure Plan (**Appendix G**).
- Concurrent mining and rehabilitation must be undertaken wherever possible.
- The mine 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 off the N14 where after the national speed limits will be applicable for hauling trucks. The access road will be maintained during operational activities.

11.8.2.2 Rehabilitation requirements

- At final closure geotechnical investigations will identify unstable rock conditions, slopes that require support in the short, medium and long-term. Geotechnical slope stabilisation methods including concreting (gunnite), rock bolting, wire mesh restraint, bench wrecking to lower highwalls, rehabilitative blasting etc. which will be investigated and implemented during decommissioning.
- Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff.
- The rehabilitation, closure and aftercare of the Tailings Storage Facility as detailed in **Appendix D** are required to be implemented.

11.9 Period for which the environmental authorisation is required

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

11.10 Undertaking

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the report and is applicable to both the Impact Assessment Report (EIR) and the Environmental Management Programme Report (EMPr).

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 G**.

The calculation below is for the environmental costs. The financial guarantee will be prepared according to the NEMA Financial Regulations. This operation is still in the greenfields stage and no itemisation is possible. Only the total estimate is available as indicated in Table 19 below and itemisation will take place as the development continues.

Table 19: Table of Costs for Final Rehabilitation, Decommissioning and Closure of the Mining Operations

Cost category	Year 1	Year 2	Year 3
Final rehabilitation, decommissioning and closure of the operation at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan. Reg 6(b) NEMA Financial Regulations.	R500 000	R500 000	R1 000 000

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 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 will be addressed by the specialists who will prepare the Social and Labour Plan which will be completed after the EIA process due to the nature of the process involved. Socio-economic impacts and mitigation measures are included in Table 20 and in **Appendix F**: Impact Tables.

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. Concerns raised during the Scoping Phase were captured and addressed within the public participation section of this report. The 30-day comment period on the Draft EIR and any subsequent comments will be included in the PPP chapter, attached as **Appendix B** to the FEIR, to inform the decision-making process.

2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act
The specialist heritage resources report is attached at **Appendix C** and the Palaeontological Statement is included in **Appendix C** with recommendations included under section 8.1.12 above, is submitted to the South African Heritage Resources Agency (SAHRA) during the 30 day public participation comment period. The recommendations and/or mitigation measures provided by the specialist has been included in the DEIR, EMPr, Impact Tables (**Appendix F**), and Closure Plan (**Appendix G**). Any additional measures stipulated by SAHRA will be included in the Final EIR.

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 5.9 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
- 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
  - Polluter bears remediation costs.

This EIA process complies with the principles set out in section 2 of NEMA through its adherence to the EIA Regulations, 2014, 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 Alternative and No-Go Alternative has been detailed (see Section 6).

- The potential social and environmental impacts of the project have been identified, assessed and evaluated using Green Direction's impact assessment methodology (Section 9.4) to understand the significance of each positive and negative impact.
- An EMPr has been compiled to ensure that potential environmental impacts are prevented or minimised.
- Mitigation measures have been recommended to allow for unavoidable impacts on the environment and people's environmental rights to be minimised and remedied.
- Opportunities for public participation are allowed for in the EIA process.
- The needs and interests of I&APs have been taken into account.
- All relevant information is being made available for public comment before submission to DMR, as part of the public participation process.
- Comments made by the relevant government departments 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 11.6, Table 16, 17 and 18, and **Appendix F**.

15.3 Composite Map
This is addressed in Section 8.

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
  - No potentially dangerous areas, secured if required
- Limited residual environmental impact
  - Rehabilitate the TSF as per the Recommendations in **Appendix D.**
  - 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, 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 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.
  - Providing opportunities for skills transfer for ongoing employment in mining sector.
  - 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 if required.

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 the EMPr (Part B) and in **Appendix F** 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

The risk of acid mine drainage is to be contained with the Tailings Storage Facility, which is to be lined with a Class C containment system (as per the Definitive Feasibility Design Report attached at **Appendix D**). The hydrogeological report (**Appendix E**) provides modelling of a potential groundwater pollution plume should the Tailings Storage Facility not be lined. This potential risk of acid mine drainage is therefore understood, and the risk of contamination of the environment is therefore mitigated through the engineering design of the mine infrastructure.

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

The risk of acid mine drainage is to be contained, as described in the Definitive Feasibility Design of the Tailings Storage Facility (**Appendix D**) for the Life of Mine (LoM) including decommissioning, closure and rehabilitation and ongoing monitoring during the post-operational management phase. The groundwater monitoring requirements are provided in **Appendix E** and are included in the EMPr.

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

Refer to the Definitive Feasibility Design of the Tailings Storage Facility (**Appendix D**).

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

Refer to the Definitive Feasibility Design of the Tailings Storage Facility (**Appendix D**).

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

Refer to the Hydrogeological report attached as **Appendix E**.

15.5.8 Has a water use license been applied for?

The iWULA will be submitted as a separate application. Refer to Section 8.1.8.1 above. Clarity has been sought from the Department of Water and Sanitation during the site visit that took place on the 12th November 2018.

The following water use activities need to apply for in the Integrated Water Use License (iWULA):

- Section 21(a): Taking water from a resource (in the event that borehole water will be abstracted)
- Section 21(b): Storing water (return water dams; stormwater dams, additional storage of water for shaft water)
- Section 21(c): Impeding or diverting the follow in a watercourse (
- Section 21(g): Disposing of waste in a manner which may detrimentally impact on water resource
- Section 21(i): Altering the beds, banks, course or characteristics of a watercourse.
- Section 21(j): Removing, discharging or disposing of water found underground.

In addition, Section 704 Exemptions[18] will need to be applied for, for various mining activities located within 100m of delineated watercourses where the location of the mining activity is based on the proximity to the ore body being extracted.

[18] In terms of the "Regulations on use of water for mining and related activities aimed at the protection of water resources" in GN 704 dated 4 June 1999.

15.6 Impacts to be mitigated in their respective phases

Table 20: 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**	The mining areas including infrastructure will be fenced and the estimated footprint for each mining area is as follows: Rietberg mine: 425Ha Jubilee mine: 100Ha Homeep mine:40Ha **Total is approx. 565Ha** The main infrastructure will be developed at Rietberg mine covering an estimated area of 50 Ha. At the Jubilee and Homeep mine only satellite infrastructure with a footprint of less than 5Ha will be developed.	**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. • Topsoil 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. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation.	NEMA Section 2 Principles Environmental Authorisation Water Use License	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
			Impact 2.1 : Surface Water Resources **Generic mitigation measures for surface water resources** • Manage any road widening activities and construction of culverts and pipelines within watercourses and (National Water Act Regulated Area), to prevent an increase in suspended solids, turbidity and pollution from machinery entering the watercourse habitat. • Oils and lubricants must be stored within sealed containment structures. • 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 and treated in the bio-cells (soil farms) which are located on the adjacent mine.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• 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. • Provide a bin at the site and provide a mobile ablution facility. **Site Specific Mitigation measures** • Plan the location of the processing facility, TSF, waste rock dump and logistics at Rietberg to be outside the active river channel of the ephemeral watercourses wherever possible. • Make use of the existing historical plinths to raise the water pipeline from the Henkries line above the watercourses to reach the Rietberg Mine. • Avoid further impact on the Koeries River (ephemeral watercourse) located to the north of the Jubilee Mine historically impacted on by mine waste rock dumps. • Management of stormwater run-off will be required to keep clean water from entering polluted water systems. • Any watercourse crossings for haul roads will need to be designed to minimise impact on the water resource. **Stormwater management** • Ensure that soil erosion berms are placed in locations to prevent stormwater run-off eroding unconsolidated exposed soil. • Ensure that stormwater runoff is not contaminated and can enter watercourses.		
			Impact 2.2 Groundwater quality **Groundwater quality mitigation measures during Construction Phase** (**Appendix D**) **Essential** groundwater mitigation measures during construction are as follows: • Take care that onsite sanitation facilities are well maintained and serviced regularly. • Ensure that good housekeeping is implemented and followed. • Ensure that the design of the TSF and WRD complies with GN R632 published in terms of the NEM:WA: the Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits, unless motivation for an alternative design is accepted by the regulatory authorities. • Establish facilities posing a risk to groundwater contamination as far as possible away from known fault zones and perched intergranular aquifers associated with the dry drainage channels of the Koeries River. • 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. • 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. **Best practice** groundwater mitigation measures during construction are as follows: • Implement a monitoring system to record the abstraction point's water level and volume abstracted on a regular basis, i.e. at least monthly, preferably weekly;		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Monitor water levels at the proposed new monitoring boreholes (see section 9 on page 73 for details) and Rietberg Natural Spring on a regular basis, i.e. at least monthly, preferably weekly; • Collect water samples at the new monitoring boreholes and Rietberg Natural Spring every three months and submit to SANAS accredited laboratories for analysis of pH, EC, macro-chemistry (Na, Mg, K, Ca, NH4, Cl, SO4, Total Alkalinity, PO4, F, NO3), TPH, TOC and selected trace-metals (Fe, Al, Se, Cu, Pb, Zn, Cd, As, Sb and U) and microbiology. • Minimise storage of hazardous substances onsite during construction; • Service construction vehicles at a commercial service station if possible; • Maintain vehicles to limit the potential for accidental hydrocarbon spillages; • Encourage contractors to report, react and manage all spills and leaks so that any subsequent spills can be cleaned up immediately to prevent contamination of the groundwater; and • Maintain and service onsite sanitation facilities regularly.		
			Impact 2.3 Groundwater quantity <u>Groundwater quality mitigation measures during Construction Phase</u> (**Appendix D**) **Essential** groundwater mitigation measures during construction are as follows: • If boreholes are used to augment construction water supplies, limit abstraction from these to 130 KL/d over an eight hour per day schedule, followed by 16 h recovery, before the next pumping schedule commences. • Implement and follow water saving procedures and methodologies.		
			Impact 3: Impact on Biodiversity • Manage any road widening activities and construction of culverts and pipelines within the watercourse and (National Water Act Regulated Area), to prevent an increase in suspended solids, turbidity and pollution from machinery entering the watercourse habitat. • 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. • Topsoil is to be stockpiled and replaced during the Decommissioning and Closure Phase.		
			Impact 4: Contamination & Pollution • Oils and lubricants must be stored within sealed containment structures. • 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. • Provide all workers with environmental awareness training.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• 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 mobile ablution facilities.		
			Impact 5: Visual landscape • 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. • Place shade cloth around the construction site camp to demarcate the area.		
			Impact 6: Emissions • The Applicant shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. • The Applicant 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. • Provide lighting to ensure safety standards are met, and direct light away from public areas (such as the public access road). • Ensure workers are supplied with Health and Safety equipment for noise and dust where applicable. • Apply safety standards for blasting.		
			Impact 7: Heritage resources • All haul roads must make use of existing roads as far as possible (including where they cross or follow the historic copper mining railway). • All upgrades to haul roads must be centered on the existing roads as far as possible so as to minimize impacts to features located close to these roads. • Any alteration to the overall project footprint (i.e. mine fences and haul road locations) must be subjected to further assessment as may be required. • All surface activities must be contained within the three mine fences to avoid impacts to unsurveyed areas. • The final layout of each of the three mines must be considered by an archaeologist or heritage consultant to determine whether any specific mitigation measures or no-go areas not anticipated in the present assessment might be required prior to construction. • The graveyard in the Jubilee Mine (Waypoint 111) must be fenced with a 30 m buffer and declared a no-go area. A gate should be provided for potential visitors and to allow cleaning of any wind-blown litter.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• The historical stone-built mining-related structures in the Jubilee Mine must be preserved. They can be reused if required but their modification must be approved by SAHRA to ensure that their heritage significance is not diminished (this may require the services of a heritage architect). • The stone house and threshing floor in the Houmeep Mine (Waypoint 163) must be avoided and declared a no-go area. A 30 m buffer should be imposed if possible but this is not required. The structure should not be used for mining-related activities. (This has been demarcated on Figure 3d and is excluded from the mine site boundary.) • All ruins, livestock enclosures and structures related to local herder activity and hence living heritage) must be avoided as far as is possible. • If any herder enclosures or structures will need to be removed or will be covered by mine dumps then this must be done in consultation with their owners (if traceable) or other community members. • If any historical underground mine workings are opened then these must be inspected (insofar as it is safe to do so) for historical traces such as hand tools, mining equipment, graffiti or other features. A report including a photographic record must be submitted to SAHRA for approval prior to modification or destruction of the historical workings. • A chance finds procedure for recording and recovering isolated fossil finds must be incorporated into the environmental management program for the project. (Included as Table 21 in Part B: EMPr of this report). • If any Stone Age, historical or industrial archaeological material (e.g. stone tools, historical rubbish dumps, historic mining equipment or tools) or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.		
			Impact 8: Socio-economic • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling). • Employment of skilled labour.		
Services and associated infrastructure Primary Processing operation Water and wastewater management Waste generation and management	**OPERATION**	As per Construction phase above	**Impact 1: Change in Topography** • The waste rock dumps must be designed to meet minimum slope stability and safety standards and vegetated to reduce erosion and runoff. • The "valley fill" natural angle of repose of 37° for rock waste dumps is compatible with the natural rocky terrain with steep slopes and no terracing will be required. • The ongoing management of the self-raising TSF shall be in accordance with the relevant regulations and as per the Definitive Feasibility Design Report contained in **Appendix D**. • 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.		
			Impact 2: 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 vegetation should take place to avoid unnecessary exposed surfaces.	NEMA Section 2 Principles	During the estimated 15-year lifespan of the mine.

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Tailings Storage Facility (TDF) Waste rock dumps Access roads			• Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and storm water run-off. • 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. • Provision must also be made for efficient storm water control to prevent erosion. • Soil erosion and compaction on the section of public road, should it remain unsurfaced, used by the Applicant is required to be monitored and timeously repaired. • Soil erosion on private haul roads is to be regularly monitored and repaired.	Environmental Authorisation Water Use License	Start of activity and continuous as mining progresses during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.
			Impact 3.1: Surface water resources • Ensure that an effluent purification (biozone or similar system) and recycling system is installed. • Implement an integrated waste management system on site. • Ensure all hazardous substances are stored correctly. • Ensure stormwater berms divert stormwater away from infrastructure in the mine area. • Adhere to the management of the TSF as per the Definitive Feasibility Study Design report (**Appendix D**) to ensure that this waste disposal facility does not pollute surface water resources, and ensure the ongoing maintenance of the stormwater diversion trenches associated with the TSF. • Ensure all pipelines and powerlines located within close proximity to the water course are maintained and erosion of support structures does not occur to compromise the integrity of the infrastructure, resulting in water pollution or riverbank erosion.		
			Impact 3.2 Ground Water Resources Quality Mitigation Measures during Operational Phase (**Appendix D**): **Essential** groundwater mitigation measures during operations are as follows: • Take care that onsite sanitation facilities are well maintained and serviced regularly. • Ensure that the design of the TSF and WRD complies with GN R632 published in terms of the NEM:WA: the Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits, unless motivation for an alternative design is accepted by the regulatory authorities. • Design and construct the RWD and SWD with adequate liners. • Slope the WRD and RoM Stockpiles to prevent rainwater ponding and maximise storm water runoff. • Channel stormwater runoff to the SWD. • Draw-up and strictly enforce procedures for the storage, handling and transport of different waste materials. • 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.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• Draw-up and strictly enforce procedures to handle accidental spillage and leaks on process water pipelines and incorporate adequate leakage detection and spill control measures in the facility's design and construction. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Ensure that good housekeeping rules are applied, and emergency spill clean-up procedures and equipment are in place. **Best practise groundwater mitigation measures during operation:** • Reduce salinity of groundwater derived process water from mine dewatering and possibly the O'Kiep mine, by blending with better quality water, e.g. less saline treated wastewater from the O'Kiep and/or Concordia Municipal WWTW, or Sedibeng Water's pipeline; • Install a groundwater monitoring system with monitoring boreholes drilled upstream and downstream of facilities where potential groundwater risk is highest, i.e. TSF, RWD, SWD and Treatment Plant. Suggested number of monitoring boreholes are as follows: o TSF and RWD – one upstream and two downstream; and o SWD – one upstream and one downstream. • Install a monitoring borehole upstream and downstream of each mine site to monitor groundwater levels and chemistry in the fractured-rock aquifers; • Monitor groundwater dewatering discharge and water quality at the three SHIP mines, i.e. Rietberg, Jubilee and Homeep; • The groundwater monitoring should include the following: o The water levels at all monitoring boreholes and the three mines must be recorded on at least a monthly basis – best results are obtained if automatic water level recorders set to take hourly readings are installed; o Volumes abstracted must be measured and recorded on at least a monthly basis; o Water samples must be collected at all monitoring boreholes and the three SHIP mines on a three-monthly basis and submitted to a SANAS accredited laboratory for analysis of pH, EC, macro-chemistry (Na, Mg, K, Ca, NH4, Cl, SO4, Total Alkalinity, PO4, F, NO3), COD, TPH and selected trace-metals (Fe, Mn, Al, Se, Cu, Pb, Zn, Cd, As, Sb and U); and o A SACNASP registered hydrogeologist should evaluate the monitoring data on an annual basis and compile a monitoring report. • Minimise storage of hazardous substances onsite during operation. **Impact 3.3 Ground Water Resources quantity** **<u>Mitigation Measures during Operational Phase</u>** (**Appendix E**): **Essential** groundwater mitigation measures during operations are as follows: • Implement and follow water saving procedures and methodologies and use alternative water supply sources. • Replace water supply at the impacted private borehole with an alternative water supply, e.g. municipal. **Impact 4: Impact on biodiversity** • The mining areas and stockpile areas must be demarcated and the footprint contained within the demarcated areas as shown on Diagrams 3b, 3c and 3d.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• The annual rehabilitation plan must be implemented. • Correct management of the TSF as per the Definitive Feasibility Design Report (**Appendix D**) will prevent an increase in the development footprint within the CBA2 area at Rietberg Mine • 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.		
			Impact 5: Contamination & Pollution • **Waste rock** from the mining process is to be disposed of in the waste rock dumps as shown in **Diagrams 3b, 3c and 3d**. • **Industrial waste (i.e. including hazardous wastes and oils and greases)** - Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. In order to ensure that waste classes are kept in separate streams, training will be undertaken. - Petrochemical spillages to be collected in a drip tray and drum to store; excavate spill affected soil for disposal at a registered hazardous waste facility. - Hazardous waste is to be disposed of at Vissershoek Landfill. • **Domestic waste (i.e. waste that is generated from the offices)** - Domestic waste - separated at source into recyclable products. These must then be removed and recycled by recognised contractors. (Note that the mine is responsible for the waste from cradle to grave). - Disposal at a registered and officially permitted commercial or municipal landfill site is the most cost-effective option for materials that cannot be recycled. - Domestic waste generated by workers needs to be sorted and all biodegradable waste must be stored in separate drums provided for. • **Tailings Storage Facility (TSF)** - Manage the TSF according to the Definitive Feasibility Study Report (**Appendix D**) to ensure that the waste disposal facility complies with relevant legislation. • **Wastewater** - Equipment used in the mining process will be adequately maintained 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. - Slow storm water runoff with contoured, low-gradient drains and channels, as well as retention ponds. A series of ponds may also be used to remove sediment and other contaminants from water before reuse or reintroduction into the mining process. - Ensure that a purification and recycling sewage and effluent management system is installed.		
			Impact 6: Visual landscape • 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. • Mitigation of the visual impact of “heaped fill dumps” and “sidehill dumps” will include limited topsoil application to the slope and revegetation on the top of the dump. • The visual impact of the TSF will be mitigated during rehabilitation.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			Impact 7: Emissions • Health and safety equipment are required for workers. • Wetting helps reduce dust generation. • 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. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • Provide lighting to ensure safety standards are met, and direct light away from public areas (such as the public access road). • Use energy efficient bulbs that do not attract insects. • Ensure workers are supplied with Health and Safety equipment for noise and dust where applicable. • Apply safety standards for blasting. • Ensure dust suppression on TSF if required.		
			Impact 8: Heritage Resources • All haul roads must make use of existing roads as far as possible (including where they cross or follow the historic copper mining railway). • All upgrades to haul roads must be centered on the existing roads as far as possible so as to minimize impacts to features located close to these roads. • Any alteration to the overall project footprint (i.e. mine fences and haul road locations) must be subjected to further assessment as may be required. • All surface activities must be contained within the three mine fences to avoid impacts to unsurveyed areas. • The final layout of each of the three mines must be considered by an archaeologist or heritage consultant to determine whether any specific mitigation measures or no-go areas not anticipated in the present assessment might be required prior to construction. • The graveyard in the Jubilee Mine (Waypoint 111) must be fenced with a 30 m buffer and declared a no-go area. A gate should be provided for potential visitors and to allow cleaning of any wind-blown litter. • The historical stone-built mining-related structures in the Jubilee Mine must be preserved. They can be reused if required but their modification must be approved by SAHRA to ensure that their heritage significance is not diminished (this may require the services of a heritage architect). • The stone house and threshing floor in the Houmeep Mine (Waypoint 163) must be avoided and declared a no-go area. A 30 m buffer should be imposed if possible but this is not required. The structure should not be used for mining-related activities. • All ruins, livestock enclosures and structures related to local herder activity and hence living heritage) must be avoided as far as is possible. • If any herder enclosures or structures will need to be removed or will be covered by mine dumps then this must be done in consultation with their owners (if traceable) or other community members.		

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			• If any historical underground mine workings are opened then these must be inspected (insofar as it is safe to do so) for historical traces such as hand tools, mining equipment, graffiti or other features. A report including a photographic record must be submitted to SAHRA for approval prior to modification or destruction of the historical workings. • A chance finds procedure for recording and recovering isolated fossil finds must be incorporated into the environmental management program for the project. (Included as Table 21 in Part B: EMPr of this report). • If any Stone Age, historical or industrial archaeological material (e.g. stone tools, historical rubbish dumps, historic mining equipment or tools) or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.		
			Impact 9: Socio-economic • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling). • Ongoing maintenance of haul roads used by trucks during the life of the mine.		

Final Rehabilitation and removal of temporary infrastructure	DECOMMISSIONING	As per Construction phase above	**IMPACT 1: REHABILITATION OF MINED AND CLEARED AREAS** • Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix G**). • 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 must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. • Compacted areas shall be scarified after use during decommissioning and rehabilitation. • Any stored topsoil shall be spread over the scarified surfaces. • Rehabilitation of the TSF as per **Appendix D,** which includes: - The reclamation of stripped and stockpiled topsoil from the site for use in the rehabilitation and closure process. - The covering of the outer slopes of the TSF with waste rock for the prevention of windblown erosion. - The progressive replacement of topsoil and waste rock to the outer slopes and crests of the various embankments. - Aftercare and maintenance of the site is expected to comprise the repair of localised erosion gulleys and the maintenance of vegetation for a period of 3 to 5 years or until it becomes self-sustaining after completion of the rehabilitation and closure works, therefore minimisng the visual impact on the landscape. • **Other mitigating with regards to residual environmental impact** - Implementing screening as part of the cleaning activities before materials is moved from the mine. - The infrastructure area will be screened for petrochemical spills and cleaned and waste from the temporary storage facility will be removed and the area cleaned. - Unwanted steel, sheet metal and equipment 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 steel structures and reinforcing will be discarded or sold as scrap. - All equipment and other items used during the mining operation needs to be removed from the site. - 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. - 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 disposed 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. These liquid wastes cannot be disposed of on the waste dumps. - 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 and footings. - Building rubble will be used as backfill in excavations or removed from site in the absence of excavations. - Remove all power and water supply installations not to be retained by landowner in terms of section 44 of the MPRDA.	NEMA Section 2 Principles Environmental Authorisation Water Use License	During decommissioning. Upon cessation of each activity where applicable. Immediately in the event of spills

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
			- Removing underground infrastructure to one meter below surface. - Excavations created by removing subsurface infrastructure needs to be filled, levelled and compacted. - Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site. • As part of this phase training of personnel in the implementation of the Closure Plan will be done and the implementation of the environmental awareness plan will be an ongoing process.		
			IMPACT 2: GROUNDWATER Mitigation measures during Decommissioning Phase (**Appendix D**) **Essential** groundwater mitigation measures during decommissioning are as follows: • Take care that onsite sanitation facilities are well maintained and serviced regularly. • Ensure that good housekeeping rules are applied. • 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. • 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. • Limit rainwater infiltration by topsoiling and vegetating the TSF. • Continue to collect and return leachate from the under drainage and seepage collection facilities to the RWD until dry. • Maintain RWD until leachate from the under drainage and seepage collection facilities of the TSF are dry before decommissioning the RWD. • Continue with groundwater monitoring. **Best practice** groundwater mitigation measures during decommissioning are as follows: • Maintain the groundwater monitoring system and procedures described in subsection 8.2.3; • The groundwater monitoring should include the following: o The water levels at all monitoring boreholes, wells, spring and the three mines, if possible, must be recorded on at least a three-monthly basis. Best results are obtained if automatic water level recorders set to take hourly readings are installed; o Water samples must be collected at all monitoring boreholes and the three SHIP mines, if possible, on a three-monthly basis and submitted to a SANAS accredited laboratory for analysis of pH, EC, macro-chemistry (Na, Mg, K, Ca, NH4, Cl, SO4, Total Alkalinity, PO4, F, NO3), COD, TPH and selected trace-metals (Fe, Mn, Al, Se, Cu, Pb, Zn, Cd, As, Sb and U); and o A SACNASP registered hydrogeologist should evaluate the monitoring data on an annual basis and compile a monitoring report.	Water use license	

ACTIVITIES	PHASE	SIZE AND SCALE OF DISTURBANCE	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Final Rehabilitation and removal of temporary infrastructure	DECOMMISSIONING	As per construction phase	**IMPACT 3: EMPLOYMENT OPPORTUNITIES** • Ongoing employment of local previously disadvantaged labour wherever possible to assist with the decommissioning activities.		
Groundwater monitoring	POST-OPERATIONAL	As per monitoring system.	**IMPACT 1: GROUNDWATER** **Mitigation Measures in Post-Operational Phase** (**Appendix D**) Best practice groundwater mitigation measures during post-operational decommissioning are as follows: • Maintain the groundwater monitoring system and procedures described in subsection 8.2.3 for five years, or as indicated by the regulatory authorities; • Groundwater monitoring should include the following, and the monitoring system detailed in Section 9 of **Appendix E** is required to be adhered to: o The water levels at all monitoring boreholes and the three mines must be recorded on at least a six-monthly basis. Best results are obtained if automatic water level recorders set to take hourly readings are installed; o Water samples must be collected at all monitoring boreholes, wells, Rietberg Natural Spring and the three SHIP mines, if possible, on a six-monthly basis and submitted to a SANAS accredited laboratory for analysis of pH, EC, macro-chemistry (Na, Mg, K, Ca, NH4, Cl, SO4, Total Alkalinity, PO4, F, NO3), TPH, COD and selected trace-metals (Fe, Mn, Al, Se, Cu, Pb, Zn, Cd, As, Sb and U); and o A SACNASP registered hydrogeologist should evaluate the monitoring data on an annual basis and compile a monitoring report.	Water use license	During post-operation

15.7 Chance Fossil Finds Procedure

Included in Table 21 below is the "Chance Fossil Finds Procedure" included in the EMPr as requested by the palaeontologist and included in **Appendix C** as a mitigation measure.

Table 21: Chance Fossil Finds Procedure

<table>
<tr><td colspan="3">CHANCE FOSSIL FINDS PROCEDURE: Copper Mine Project area on Erf 946 and part of Erf 1251 near Concordia, Northern Cape</td></tr>
<tr><td>Province & region:</td><td colspan="2">Northern Cape, Namakwaland Magisterial District</td></tr>
<tr><td>Responsible Heritage Resources Agency</td><td colspan="2">SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa.
Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za</td></tr>
<tr><td>Rock unit(s)</td><td colspan="2">Late Caenozoic alluvium, calcretes along water courses and calcrete hardpans</td></tr>
<tr><td>Potential fossils</td><td colspan="2">Bones, teeth and horn cores of mammals, freshwater molluscs, calcretised termitaria and other trace fossils</td></tr>
<tr><td rowspan="5">ECO protocol</td><td colspan="2">1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (N.B. safety first!), safeguard site with security tape / fence / sand bags if necessary.</td></tr>
<tr><td colspan="2">2. Record key data while fossil remains are still in situ:
• Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo
• Context – describe position of fossils within stratigraphy (rock layering), depth below surface
• Photograph fossil(s) in situ with scale, from different angles, including images showing context (e.g. rock layering)</td></tr>
<tr><td>3. If feasible to leave fossils in situ:
• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
• Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume</td><td>3. If not feasible to leave fossils in situ (emergency procedure only):
• Carefully remove fossils, as far as possible still enclosed within the original sedimentary matrix (e.g. entire block of fossiliferous rock)
• Photograph fossils against a plain, level background, with scale
• Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags
• Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist
• Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation</td></tr>
<tr><td colspan="2">4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.</td></tr>
<tr><td colspan="2">5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency</td></tr>
<tr><td>Specialist palaeontologist</td><td colspan="2">Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (e.g. museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.</td></tr>
</table>

15.8 Impact Management Outcomes

Table 22: 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 a CBA1 and CBA2	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 in a CBA 1 and CBA 2		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	Impact avoided
Removal of ore, loading and hauling, primary processing, 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 a CBA1 and CBA2.		Remedy through restriction and rehabilitation	
	Soil erosion and compaction	Soil resource		Remedy through restriction and rehabilitation & control through monitoring and management.	
	Use of groundwater water for mining processes.	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 avoided
Removal of temporary infrastructure and site rehabilitation Rehabilitation of TSF	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			

15.9 Impact Management Actions

Table 23: 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 ore, loading and hauling, primary processing, waste generation ad 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, and Water Use License.
	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 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 G**) 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 G**), 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 G**.

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 G**.

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 19 of this report.

16.6 Confirm that the financial provision will be provided as determined

Refer to Part A, Section 12 of this report.

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

Table 24: 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	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, NWA 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 EIA & 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 include:

- 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 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 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

The EAP herewith confirms

(a) The correctness of the information provided in the reports;	**X**
(c) The inclusion of comments and inputs from stakeholders and I&APs (from the Scoping Phase);	**X**
(c) The inclusion of inputs and recommendations from the specialist reports where relevant; and	**X**
(d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein (from the Scoping Phase, and will be included following the comment period after the Draft EIA Report).	**X**

Signature of the environmental assessment practitioner:

Green Direction Sustainability Consulting (Pty) Ltd

Name of company:

15 October 2020

Date

19 REFERENCES

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Munica, L. and Rutherford, M.C. (Eds) (2006.) The Vegetation of South Africa, Lesotho and Swaziland.

Nama Khoi Draft Integrated Development Plan (IDP) 2020/2021.

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Orton, J. (ASHA Consulting (Pty) Ltd). 4 November 2019. Heritage Impact Assessment: Proposed reopening of three copper mines at Concordia, Namakwaland Magisterial District, Northern Cape.

South African National Biodiversity Institute: BGIS Map Viewer databases. http://bgis.sanbi.org/Projects/Detail/186.

SRK Consulting (South Africa) (Pty) Ltd. May 2020. Mining Right Application for the Rietberg, Jubilee and Homeep Cluster Copper Mining Project Hydrogeological Assessment Report for Shirley Hayes-IPK (Pty) Ltd (SHIP).

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 Interim Certification Board of South Africa in 2010, and by the Environmental Assessment Practioners Association of South Africa in 2020 (Registration No. 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:

- Lead EAP for numerous projects in most sectors conducted in KwaZulu-Natal.
- Project Manager for numerous Basic Assessments for Eskom Distribution and CapeNature in the Western Cape.
- 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), spanning both Mpumalanga and KwaZulu-Natal.
- Project Manager and Lead EAP of two SANRAL Road Upgrades on the N7, that included Borrow Pits.
- EAP for various Basic Assessments and EIAs in the Northern Cape for agricultural activities, and related Water Use General Authorisation Risk Matrices.
- ECO for Phase 2 of the Kogelberg Nature Reserve Tourism Infrastructure Upgrade, Western Cape.
- Water Use General Authorisation for a sand mining 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 Assessment for Kaoline Mining outside Garies in the Northern Cape.
- EAP for three Granite Mining Right Applications located to the north-east of Pofadder, including the Water Use License Application, and Integrated Water and Wastewater Management Plan.
- EAP for Copper Mining Right outside Nababeep, including iWULA and IWWMP (in progress).
- EAP for Mining Right for kaoline mining outside Garies, Northern Cape (in progress).
- EAP for Mining Right for granite outside Steinkopf, Northern Cape (in progress)