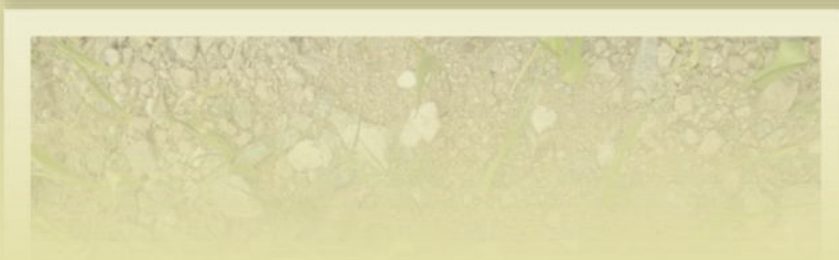


**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE
ESTABLISHMENT AND MINING OF BASE AND
RARE METALS (COPPER ORE) ON MINING CLAIM
72444 AT OTJIKONDAVIRONGO VILLAGE, OPUWO
RURAL CONSTITUENCY, KUNENE REGION.**

FINAL

HEEC /0192021






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PROJECT DETAILS

Title	ENVIRONMENTAL SCOPING REPORT FOR THE ESTABLISHMENT AND MINING OF BASE AND RARE METALS (COPPER ORE) ON MINING CLAIM 72444 AT OTJIKONDAVIRONGO VILLAGE, OPUWO RURAL CONSTITUENCY, KUNENE REGION.		
Report Status	Final		
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LIST OF ACRONYMS

AIDS	Acquired immune deficiency syndrome
CRR	Comments and response report
dB	Decibels
DEAR	Draft Environmental Assessment Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EAR	Environmental Assessment Report
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPL	Exclusive Prospecting Licence
FEAR	Final Environmental Assessment Report
GTZ	Gesellschaft für Technische Zusammenarbeit
HEEC	Healthy Earth Environmental Consultants CC
HIV	Human immunodeficiency virus
I&AP	Interested and Affected Party
IUCN	International Union for Conservation of Nature
MEFT	Ministry of Environment, Forestry and Tourism
MEFT: DEA	Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs
MME	Ministry of Mines and Energy
PPP	Public participation process
PHC	Public health and safety
SADC	Southern African Development Community
USAID	United States Agency for International Development
VMMC	Voluntary Medical Male Circumcision

1 INTRODUCTION

1.1 PROJECT

BACKGROUND

Mining contributes to 25% of the country's income. It is the largest contributor to the Namibian economy. Namibia has various natural resources including diamonds, uranium, copper, gold, lead, tin, lithium, cadmium, zinc, salt and vanadium. The proponent, Mr Otniel Kuojo intends to mine base and rare metals targeting copper ore from the mining claim 72444 situated in Otjikondavirongo village, Opuwo Rural Constituency in the Kunene Region. The Ministry of Trade and Industry regulates manufacturing, including mineral beneficiation, cement production, and semiprecious stone processing. Exploration at the moment focuses on base metals, diamond, gold, natural gas and uranium. This shows that the mining sector has great potential to grow and continue to development in the country.

The Government of Namibia recognises that the exploration and development of its mineral wealth could best be undertaken by the private sector. Government therefore focuses on creating an enabling environment through appropriate competitive policy and regulatory frameworks for the promotion of private sector investment coupled with the provision of national geo-scientific data bases essential for attracting competitive exploration and mining (Draft Minerals Policy of Namibia, MME).

It is with this background that Mr. Otniel Kuojo has decided to mine copper ore for export purposes via the Walvis Bay Port and derive the monetary benefits associated with the extraction of these natural resources as he is a holder of the application for the mining claim from the Ministry of Mines and Energy after following all the necessary procedures to satisfy the relevant Authorities enabling them to mine the copper ore from the allocated portion on the mining claim 72444.

However uncontrolled natural resource mining/ excavation has resulted in negative environmental effects in some areas of the country. This has been largely attributed to the fact that people were under no obligation to rehabilitate the affected areas and thus left behind large open pits/quarries that pose a danger to both humans and animals. From the point of view of the environmental impact created, copper ore mining is a relatively benign industry if it does not include further processing such as smelting on site. There are no emissions besides those of the diesel-powered earthmoving equipment utilised in its extraction and a small amount of blasting gases. Contamination of water resources is only likely in the event of petrochemical spillages from storage facilities and equipment, and these can largely be either prevented or cleaned up effectively. The major environmental impacts are of a visual nature, while in sensitive areas, sense of change of place and habitat destruction may become significant impacts. If the Environmental Management Plan is not adhered to copper ore mining

can do tremendous damage by destroying habitats. Drainage of water sources may be another serious problem, especially because the mining claim 72444 is located in an arid/semi-arid area.

Mr. Otniel Kuojo, hereinafter referred to as the proponent intends to carry out the following activity:

- **Environmental Impact Assessment (EIA) for the establishment and mining of base and rare metals (copper ore) on mining claim 72444 at Otjikondavirongo village, Opuwo Rural Constituency, Kunene Region.**

The objective of the intended Environmental Assessment is thus needed in order to assess the potential social and environmental impacts associated with the intended mining activities of copper ore, on mining claim 72444 at Otjikondavirongo village, Opuwo Rural Constituency, Kunene Region and also to formulate methods of rehabilitation of the quarries once the copper ore has been excavated.

The above is a listed activity in terms of the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012).

In terms of the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), the following listed activities in **Table 1** were triggered by the proposed project:

Table 1: List of triggered activities identified in the EIA Regulations that apply to the proposed project

Activity description and No(s):	Description of relevant Activity	The portion of the development as per the project description that relates to the applicable listed activity
Activity 3.1 (Mining and Quarrying Activities)	The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.	The proposed project includes the mining of copper ore for export purposes.
Activity 3.2 (Mining and Quarrying Activities)	Other forms of mining or extraction of any natural resources whether regulated by law or not.	The proposed project includes the mining of copper ore for export purposes.
Activity 3.3 (Mining and Quarrying Activities)	Resource extraction, manipulation, conservation and related activities.	The proposed project includes the mining of copper ore for export purposes.

The above activities will be discussed in more detail in Chapter 4. Healthy Earth Environmental Consultants CC (HEEC) undertook an independent Environmental Assessment (EA) in order to obtain an Environmental Clearance Certificate (ECC) for the above activities on behalf of the proponent. The competent authority is the Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs (MEFT: DEA).

The EA process was undertaken in terms of the gazetted Namibian Government Notice No. 30 Environmental Impact Assessment Regulations (herein referred to as EIA Regulations) and the Environmental Management Act (No 7 of 2007) (herein referred to as the EMA). The EA process investigated if there are any potential significant bio-physical and socio-economic impacts associated with the intended

activities. The EA process also served to provide an opportunity for the public and key stakeholders to provide comments and participate in the process, i.e. Integrated Environmental Principles were adhered to.

v

1.2 TERMS OF REFERENCE AND SCOPE OF PROJECT

The scope of this project is limited to conducting an Environmental Impact Assessment (EIA) for the establishment and mining of base and rare metals targeting copper ore on mining claim 72444 at Otjikondavirongo village, Opuwo Rural Constituency, Kunene Region and applying for an Environmental Clearance Certificate as indicated in **section 1.1** above.

1.3 ASSUMPTIONS AND LIMITATIONS

In undertaking this investigation and compiling the Environmental Assessment Report, the following assumptions and limitations apply:

- Assumes the information provided by the proponent (Mr. Otniel Kuojo) is accurate and discloses all information available.
- The unique character and appeal of the surrounding area of the Otjikondavirongo Mountains will be taken into consideration with the design & operational perspective for the intended activities. Various layout alternatives will be considered by the proponent, also taking terrain and environmental constraints into account, thus only adopting the most economically feasible & environmentally friendly result.

1.4 CONTENT OF ENVIRONMENTAL ASSESSMENT REPORT

Section 8 of the gazetted EIA Regulations requires specific content to be addressed in a Scoping / Environmental Assessment Report. **Table 2** below is an extract from EMA and highlights the required contents of a Scoping / Environmental Assessment Report whilst assisting the reader to find the relevant section in the report.

Table 2: Contents of the Scoping / Environmental Assessment Report

Section	Description	Section of FESR/ Annexure
8 (a)	The curriculum vitae of the EAPs who prepared the report;	Refer to Annexure F
8 (b)	A description of the proposed activity;	Refer to Chapter 4
8 (c)	A description of the site on which the activity is to be undertaken and the location of the activity on the site;	Refer to Chapter 3
8 (d)		Refer to Chapter 3

Section	Description	Section of FESR/ Annexure
	A description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed listed activity;	
8 (e)	An identification of laws and guidelines that have been considered in the preparation of the scoping report;	Refer to Chapter 2
8 (f)	Details of the public consultation process conducted in terms of regulation 7(1) in connection with the application, including	Refer to Chapter 5
	(i) the steps that were taken to notify potentially interested and affected parties of the proposed application	Refer to Chapter 5
	(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given;	Refer to Annexures A and B for site notices and advertisements respectively.
	(iii) a list of all persons, organisations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application;	Refer to Annexure D
	(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	Refer to Annexure D

Section	Description	Section of FESR/ Annexure
8 (g)	A description of the need and desirability of the proposed listed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives have on the environment and on the community that may be affected by the activity;	Refer to Chapter 4
8 (h)	A description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any mining, construction, erection or decommissioning associated with the undertaking of the proposed listed activity;	Refer to Chapter 7
8 (i)	Terms of reference for the detailed assessment;	NA – Assessment of impacts are included in this EA Report
8 (j)	An Environmental Management Plan(EMP)	Refer to Annexure G

2 LEGAL FRAMEWORK

There are multiple legal instruments that regulate and have a bearing on good environmental management in Namibia. **Table 3** below provides a summary of the legal instruments considered to be relevant to this development and the environmental assessment process.

Table 3: Legislation applicable to the establishment and mining of base & rare metals (copper ore) on mining claim 72444 at Otjikondavirongo village, Opuwo Rural Constituency, Kunene Region.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	<p>Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.”</p> <p>Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</p>	Sustainable development should be at the forefront of management of the intended mining activities.
Environmental Management Act No. 7 of 2007 (EMA)	<p>Section 2 outlines the objective of the Act and the means to achieve that.</p> <p>Section 3 details the principles of Environmental Management</p>	The management of this project should be informed by the EMA.
EIA Regulations GN 28, 29, and 30 of EMA (2012)	<p>GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate.</p> <p>GN 30 provides the regulations governing the environmental assessment (EA) process.</p>	Activity 3.1 (Mining and Quarrying Activities) The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
		<p>Activity 3.2 (Mining and Quarrying Activities) Other forms of mining or extraction of any natural resources whether regulated by law or not.</p> <p>Activity 3.3 (Mining and Quarrying Activities) Resource extraction, manipulation, conservation and related activities.</p>
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The copper ore mining activities should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EIAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EA process should incorporate the aspects outlined in the guidelines.
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the copper ore mining activities do not lead to the degradation of the natural beauty of the area.
Water Act No. 54 of 1956	Section 23(1) deals with the prohibition of pollution of underground and surface water bodies.	The pollution of water resources should be avoided during the copper ore mining activities.
The Ministry of Environment, Forestry and Tourism (MET) Policy on HIV & AIDS	MET has recently developed a policy on HIV and AIDS. In addition it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	The proponent and its contractor have to adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with similar projects has shown that a significant health risk is created when migrant mine workers/labourers interact with local communities.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Labour Act No. 11 of 2007	Chapter 2 details the fundamental rights and protections. Chapter 3 deals with the basic conditions of employment.	Given the employment opportunities presented by the copper ore mining activities, compliance with the law is essential.
Public and Environmental Health Act of 2015	This Act (GG 5740) provides a framework for a structured uniform public and environmental health system in Namibia. It covers notification, prevention and control of diseases and sexually-transmitted infections; maternal, ante-natal and neo-natal care; water and food supplies; infant nutrition; waste management; health nuisances; public and environmental health planning and reporting. It repeals the Public Health Act 36 of 1919 (SA GG 979).	The copper ore mining activities are to comply with these legal requirements.
Nature Conservation Ordinance No. 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants.	Indigenous and protected plants have to be managed within the legal confines.
Environmental Assessment Policy of Namibia (1995)	The Policy seeks to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.	This EIA considers this term of Environment.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Minerals (Prospecting and Mining) Act, 1992 (Act 33 1 of 1992)	To provide for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over, minerals in Namibia; and to provide for matters incidental thereto. “mineral” means any substance, whether in solid, liquid or gaseous form, occurring naturally in, on or under any land and having been formed by, or subjected to, a geological process, excluding -(c) subject to the provisions of subsection (2), soil, sand, clay, gravel or stone (other than rock material specified in Part 2 of Schedule 1) if they are bona fide required for purposes of - (i) agriculture, building works, fencing or road making; (ii) the manufacture of bricks and tiles;	The intended activity involves the mining of copper ore for export purposes.
Soil Conservation Act 6 of 1969 Ministry of Agriculture, Water and Forestry	This Act covers the prevention and combating of soil erosion; the conservation, improvement and manner of use of the soil and vegetation; and the protection of water sources	Quarries left behind after copper ore mining should not be polluted or left un-rehabilitated.

This EIA process will be undertaken in accordance with the EIA Regulations. A Flow Diagram (refer to **Figure 3**) provides an outline of the EIA process to be followed.

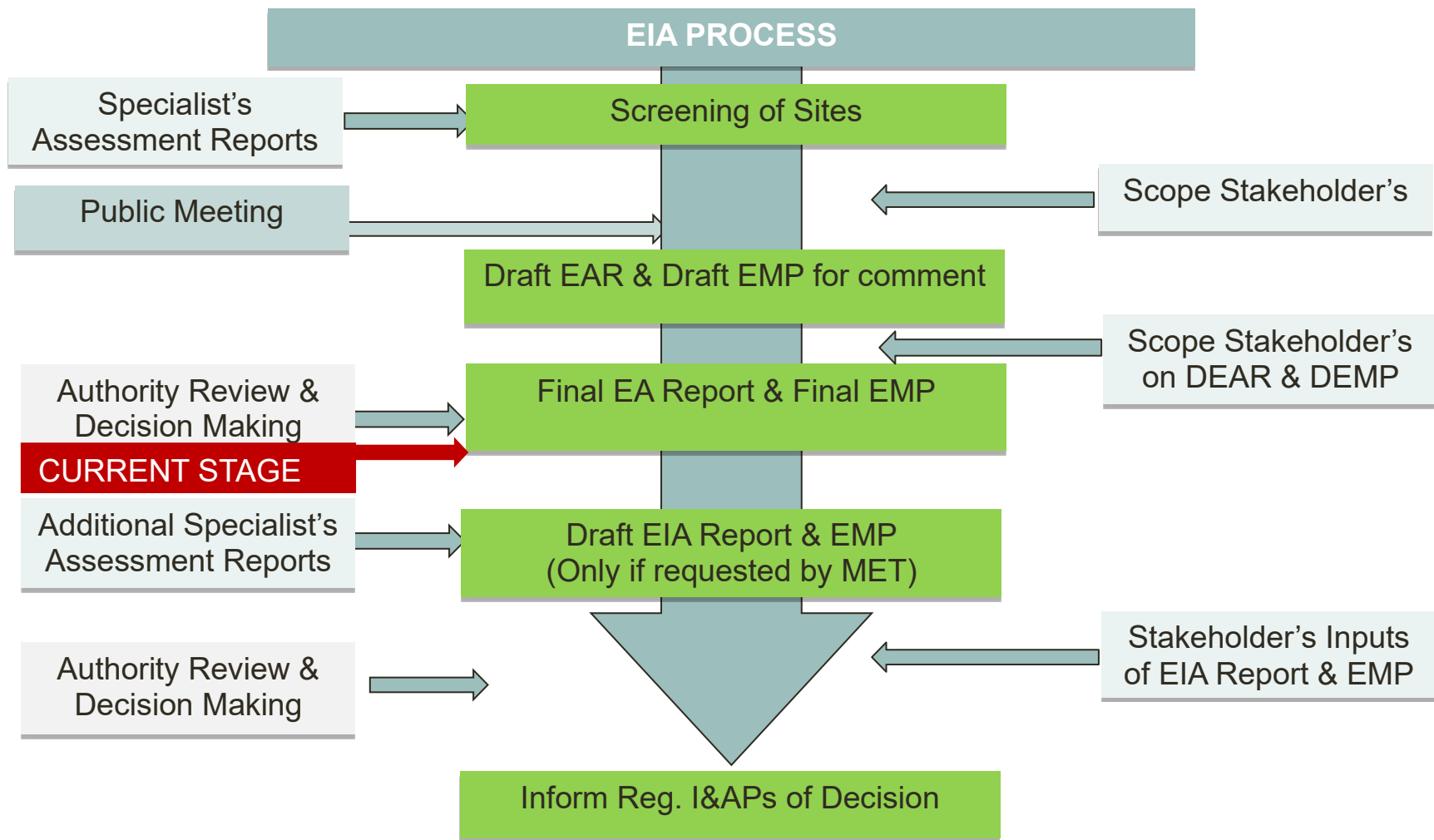


Figure 1: EIA flow Diagram

3 ENVIRONMENTAL BASELINE DESCRIPTION

3.1 SOCIAL ENVIRONMENT

3.1.1 Socio-Economic Context

Kunene Region occupies the northwest corner of Namibia. Skeleton Coast Park forms its entire West coast on the Atlantic Ocean. The Kunene River with its Epupa Falls (Herero word for falling waters) divides the region from Angola to the north. In the northeast it is bounded by Omusati Region and a small portion, the western boundary of Etosha National Park. In overall shape it resembles a thick letter L; in the south it forms the southern boundary of most of Etosha. Its southern boundary is with Erongo and Otjozondjupa Regions. Its mountains, plains and Skeleton Coast Desert cover an area of 144 255 km² – approximately 14 % of the land area of Namibia. The region is the country's second largest in terms of territory.

Kunene Region is subdivided into six political constituencies: (from north to south and then east) Epupa, Opuwo, Opuwo Rural, Khorixas, Kamanjab and Outjo. The region boasts a single municipality; Outjo, two towns, Khorixas and Opuwo and a single village, Kamanjab. Three settlements, Opuwo Rural, Fransfontein and Okangwati have been proclaimed and targeted for urban development.

In the Kunene Region the population under 5 years of age is 11%. The population ranging from the age of 5 to 14 years of age comprise 17% of the region's population. The working age population, 15 to 59 years, makes up 69% of the whole population in the region. A relatively low percentage, 6% of the population, was above 60 years of age. For every 100 females in Kunene Region there are 112 males, whereas the Khomas Region supports a 100:98 ratio, females to males, respectively. In Kunene Region the literacy rate of the age group 15 years and up, is 97%. Of the children aged 6 to 15 years, 89% are girls and 86% are boys. 6% of all people above the age of 15 have never attended school, 9% are currently attending school and 83% left school at the time.

The main languages spoken at home in the Kunene Region are the Oshiwambo language at 39%; Afrikaans language at 20%; Nama/Damara at 19% and Otjiherero language at 10% as compared to the Khomas Region where 41% communicates in Oshiwambo language, 19% in Afrikaans, 12% in Nama/Damara and 10% in Otjiherero. Approximately 79% of the population aged 15 years and up belong to the labour force (i.e. economically active) in the Kunene Region. 70% of the population is employed while 30% are unemployed. The inactive group, which consists of homemakers, 11%, students 46% and the severely disabled, retired or old age income recipients 35% makes up of the regions' population. The main source of income in this region is from wages and salaries at 73%, business and non-farming activities at 9% and farming at 3%. Cash remittance makes up 5% respectively. The older age group makes up 8% of the regions income.

3.1.2 Archaeological and Heritage Context

While there are no declared heritage sites by the National Heritage Council of Namibia on mining claim 72444 at Otjikondavirongo village in the Opuwo Rural Constituency an accidental find procedure at the subject site may be required.

3.2 BIO-PHYSICAL ENVIRONMENT

3.2.1 Climate

The climate at Otjikondavirongo village where the copper ore mining claim 72444 is located is mostly semi-arid to arid, analogous to a desert climate where annual rainfall rarely exceeds 100 mm. The area barely received any rains this past rainfall season and is drought stricken. The area is characterized by hot dry summers with day time temperature in excess of 30°C whereas the night time temperatures can go as low as 10°C, due to the desert climate (worldweatheronline, 2022) as indicated in **Figure 4**.

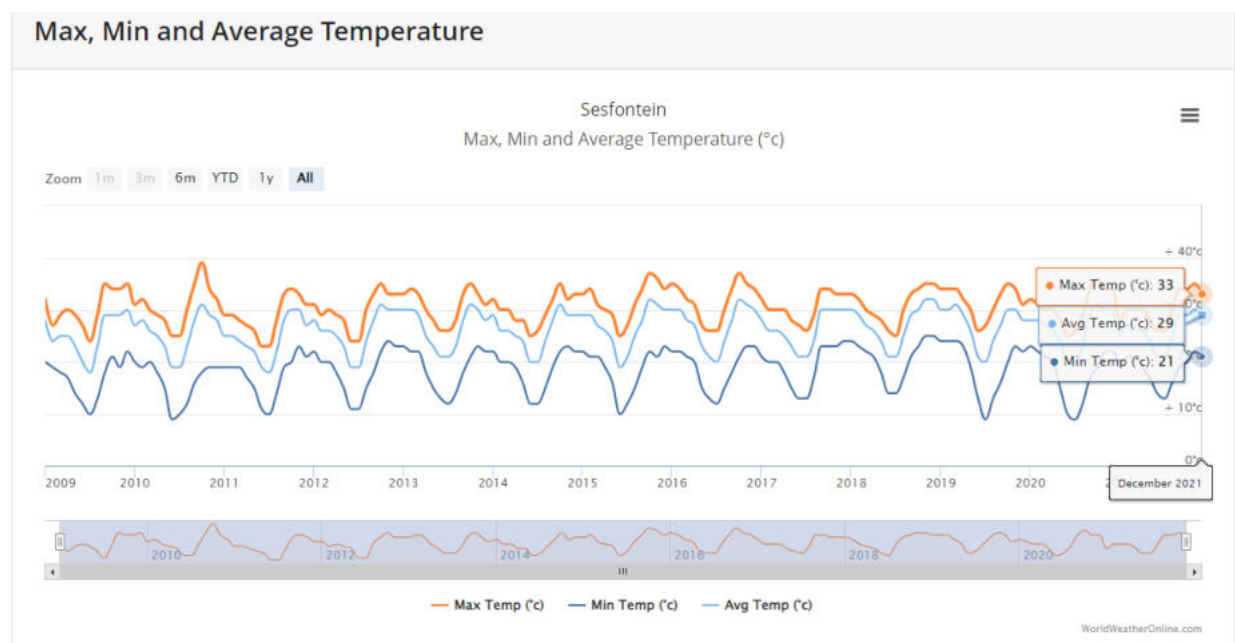


Figure 2: Temperature Graph for Sesfontein (Closest to Otjikondavirongo village, worldweatheronline, 2022).

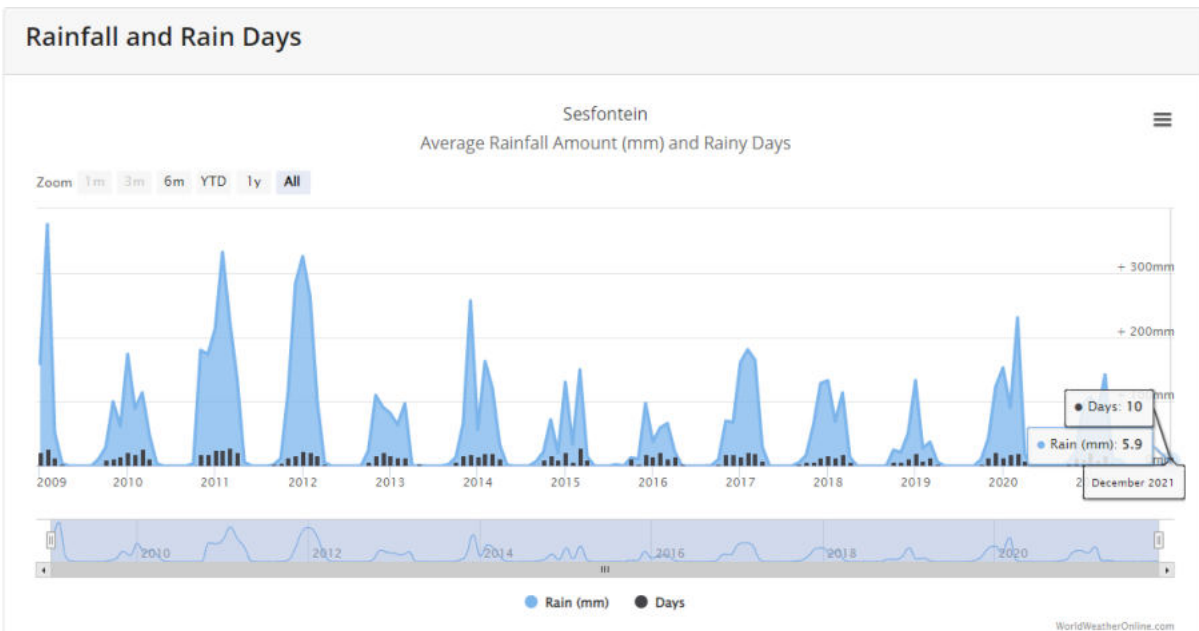


Figure 3: Rainfall Graph for Sesfontein (worldweatheronline, 2022).

An understanding of climatic conditions, in particular rainfall, is important in determining the risk of flooding of the quarries and erosion, which for this project is mostly of concern during the extraction phase. The area may be subject to summer rains in good years in the months of December to March. The total rainfall during this period rarely exceeds 100 mm. There is little rainfall throughout the year in the area, with the highest rainfall recorded in December 2021 recording about 5.9 mm over 10 rainy days as depicted in **Figure 5** above, however more rainfall is expected as the rainy season is not yet over.

3.2.2 Topography, Geology and Hydrogeology

The copper ore mining claim 72444 area falls in the Kunene Cobalt-Copper belt that comprises a very large area of favorable stratigraphy along strike to the west of the Opuwo deposit. Secondary copper mineralization over a wide area point to preliminary evidence of a regional-scale hydrothermal system. Exploration targets on EPLs held in the Kunene Cobalt-Copper belt comprise direct extensions of the DOF style mineralization to the west, sediment-hosted cobalt and copper, orogenic copper, and stratabound Zn-Pb mineralization.

Base Metals

A number of small copper, lead and zinc occurrences associated with Archaean to Paleoproterozoic gneisses of the Epupa Metamorphic Complex, metasedimentary rocks of the Neoproterozoic Damara Supergroup and volcanic rocks of the Cretaceous Etendeka Group occur in the Central and Eastern Kaoko Zones of the Sesfontein District (Ajagbe, 1999). A few copper and several copper-lead anomalies occur within schists and minor carbonate rocks of the Ugab Subgroup, close to the contact

with the underlying Nosib Group. Geochemical sampling of some poorly mineralized quartz veins have shown peak values up to 5080 ppm Cu (Charlie's Copper), 3331 ppm Pb and 3570 ppm Zn (Em-1913DA/5). It is reported that most of the lead-zinc anomalies are produced by the carbonate unit within the Ugab Subgroup, which has a high background lead and zinc content (Ajagbe, 1999).

About 10 km NNE of Sesfontein occurs a lead-copper anomaly characterized by galena and malachite staining in a chert-filled fractured zone, within a dolomitic marble unit of the Otavi Group. Rock samples over a mineralised outcrop peaked at 20188 ppm Cu, 27833 ppm Pb, 962 ppm Zn and 1394 ppm As. Stream sediment samples returned peak assay values of 63 ppm Cu, 509 ppm and 90 ppm Zn (Ajagbe, 1999).

Copper (Cu)

Sesfontein to Otjikondavirongo village

In the area west and southwest of the Sesfontein Thrust in northern Damaraland and southern Kaokoland various poorly copper-lead mineralized quartz veins are present in the Ugab Subgroup close to the contact with the underlying Nosib Group. Authors's such as Linning (1972) suggested that the copper have been originally stratiform and mobilized together with silica during metamorphism. Disseminated chalcocite of probably syngenetic origin extends over a few hundred metres in the mixtite of the Chuos Formation in the northwestern closure of the Hoaniab Syncline south of Sesfontein.

There is no bulk water supply from NamWater to the mining claim 72444 area and water for human consumption is to be fetched at the borehole to be drilled near the workers campsite. For operation purposes of the mine machinery to cool it off when extracting the copper ore water will be sourced at another borehole near the mining claim.

3.2.3 Terrestrial Ecology

3.2.3.1 Land use patterns and impact on vegetation

A thorough biodiversity (fauna and flora) assessment for mining claim 72444 at Otjikondavirongo was carried out in September 2021. Otjikondavirongo village is located approximately 46 km north of Sesfontein when using the D3705 road. The mining claim 72444 is situated about 4 km west of the Otjikondavirongo village in Opuwo rural constituency; Kunene Region and they are accessible via the track from village toward the west. According to Mendelsohn *et al* (2002) the mining claim is falling within the area with an average temperature of 20-22 degree Celsius and an average rainfall of 100-150 mm (Mendelsohn *et al* 2002). The area is characterized by the trees and shrub savanna biome and the vegetation type is typical of the western highland which is dominated by *Colophospermum mopane*, *Cyphostemma uter*, *Combretum imberbe*, *Mundulea sericea*, *Kirkia acuminata*, *Terminalia prunioides*, *Catophractes alexandri*, *Grewia flavescens*, *Acacia hebeclada*, *Ficus sycomorus*, *Dichrostachys cinerea*, *Peltophorum africanum*, *Boscia albitrunca*, *Zizphus mucronata*, *Rhigozum brevispinosum*, *Commiphora glandulosa*, *Commiphora glaucescens* and various *Commiphora* spp. The area is mountainous with Otjikondavirongo Mountain which rises from Sesfontein as the main features in the area. The area is associated with wildlife resources that entails animals such as elephants, leopards, mountain zebra, kudu, oryx, giraffes, springbok, steenbok, duiker and ostriches. The north-west of Kunene area has a high species diversity of both fauna and flora.

3.2.4 Methodology and Approach

The Field Reconnaissance and Literature Study

An extensive field work within the mining claim 72444 was carried out in September 2021, to assess the biodiversity of the area. In addition literatures on the fauna which entails; mammals, reptiles and avian fauna were explored to gather as much information as possible. Different literatures on the flora of north-west of Kunene and Otjikondavirongo area in particular were consulted.

Database

To augment flora data the botanical data for Quarter Degree Squares (QDS) 1813 DA were extracted from the Botanical Research and Herbarium Management system (BRAHMS) housed at the National Research Institute (NBRI) in Windhoek.

3.2.5 Results

3.2.5.1 Mammals

The north-west of Kunene in which the mining claim 72444 is found is associated with large mammals such as elephant, leopards, lion, cheetah, Jackals, hyena, zebra, kudu, oryx, giraffe, springbok, steenbok, giraffe, duiker and ostriches. The existences of the mammals in the north-west of Kunene are necessitated by the availability of riparian forests and intact wildlife habitats. The presences of wild-animals such as elephant and lion can results in human-wildlife conflict, hence proper mitigation measures should be in place and the human-wildlife policy and other important policies and legislation relate to promoting conservation as a land-use in wildlife zone, should be taken into account. According to Cumming & Jones (2005) Namibia, elephant population is projected to be above 15 000 and the population is distributed through the north of the country from the arid Skeleton Coast to the Tropical Savannah woodland in the north-east. The elephant population in Namibia is occurring at lower densities due to hunting and escalating pressure from human activities attributing to the reduction of elephants' ranges. Some people are killing elephants and high valued animals illicitly to get wildlife product such as trophies.

3.2.5.2 Monitoring

The proponent should liaise with the line ministry and IRDNC (Integrated Rural Development and Nature Conservation), EHRA (Elephant Human Relations Aid) to implement a well-coordinated

game count in the area to determine wild-animals population and explore scientific measures to implement proper human-wildlife conflict management.

3.2.5.3 Mitigation

To prevent infrastructural damage by wild animals such as elephants, infrastructure should be surrounded with white painted stones with a radius of two meters, since the usage of stones have yielded good results in some area to control elephants from damaging existing infrastructures. Other methods for instance the use of repellents such as chilli –oil smeared on poles can be used to control elephant from damaging the infrastructure. The workers and surrounding community members should be discouraged to walk alone at night and avoid wild-animal’s corridors such as for the elephants. If there is water points in the area the proponent should ensure that boreholes are functional. The proponent should foster conservation value in the community since nature-based tourism is imperative in the area and can contribute enormously to the community quality of life. There should be support for further implementation of human-elephants conflict mitigation strategies.

3.2.6 Reptiles

The Namib Desert has a high diversity of reptile species and some reptile species are restricted to the Namib. The following are the likely reptiles to occur in the general area.

Scientific name	Common name	Occurrence (v)	Conservation Status
Snakes			
<i>Leptotyphlops occidentalis</i>	<i>Namaqua Worm Snake</i>	√	-
<i>Dasypeltis scabra</i>	<i>Common egg-eater</i>	√	-
<i>Lycophidion namibianum</i>	<i>Namibian Wolf Snake</i>	√	-
<i>Lycophidion capense</i>	<i>Common Wolf Snake</i>	√	-
<i>Philothamnus semivariegatus</i>	<i>Spotted bush Snake</i>	√	-
<i>Prosymna frontalis</i>	<i>South-western Shovel-snout</i>	√	-
<i>Pseudaspis cana</i>	<i>Mole Snake</i>	√	-
<i>Lamprophis capensis</i>	<i>Brown House Snake</i>	√	-

<i>Python natalensis</i>	Southern African Python	√	-
<i>Xenocalamus bicolor</i>	Binocoloured Quill-snouted Snake	√	-
<i>Telescopus semiannulatus</i>	Damara Tiger Snake	√	-
<i>Pythonodipsas carinata</i>	Western keeled Snake	√	Endemic
<i>Psammophis notostictus</i>	Karoo Whip Snake	√	-
<i>Psammophis leopardinus</i>	Leopard Whip Snake	√	Endemic
<i>Psammophis trigrammus</i>	Western Whip Snake	√	Endemic
<i>Dipsina multimaculata</i>	Dwarf beaked Snake	√	-
<i>Aspidelaps scutatus</i>	Shield-nose Snake	√	-
<i>Naja nigri collis nigricincta</i>	Zebra Cobra	√	Endemic
<i>Bitis caudalis</i>	Horned Adder	√	-
<i>Bitis arietans</i>	Puff Adder	√	-
Tortoises (Geochelone)			
<i>Geochelone paradalis</i>	Leopard Tortoise	√	-
Terrapins (Pelomedusidae)			
<i>Pelomedusa subrufa</i>	Marsh or Helmented Terrapin	√	-
Lizards			
<i>Zygaspis violacea</i>	Kalahari Round Worm Lizard	√	
<i>Heliobolus lugubris</i>	Bushveld Lizard	√	-
<i>Pedioplanis namaquensis</i>	Namaqua Sand Lizards	√	-
<i>Pedioplanis undata</i>	Western Sand Lizard	√	-
<i>Cordylus subdorsalis</i>	Dwarf Plated Lizard	√	-
Skinks (Scincidae)			
<i>Mabuya acutilabris</i>	Wedge-snouted Skink	√	Endemic
<i>Mabuya capensis</i>	Cape Skink	√	-
<i>Mabuya hoeschi</i>	Hoesch's Skink	√	-
<i>Mabuya occidentalis</i>	Western Three-Striped Skink	√	-
<i>Mabuya spilogaster</i>	Kalahari Tree skink	√	-

<i>Mabuya walbergii</i>	<i>Striped Skink</i>	√	-
<i>Mabuya sulcata</i>	<i>Western Rock Skink</i>	√	-
<i>Mabuya variegata</i>	<i>Variegated Skink</i>	√	-
Agamas (Agamidae)			
<i>Agama anchietae</i>	<i>Anchietae Agama</i>	√	-
<i>Agama planiceps</i>	<i>Namibian Rock Agama</i>	√	<i>Endemic</i>
Chameleons (Chamaeleonidae)			
<i>Chamaeleo namaquensis</i>	<i>Namaqua Chameleon</i>	√	-
<i>Chondrodactylus namibensis</i>	<i>Giant Ground Gecko</i>	√	<i>Endemic</i>
<i>Lygodactylus bradfieldi</i>	<i>Bradfield's Dwarf Gecko</i>	√	<i>Near - Endemic</i>
<i>Pachydactylus bicolor</i>	<i>Velvety Thick-toed Gecko</i>	√	<i>Endemic</i>
<i>Pachydactylus capensis</i>	<i>Cape Thick-toed Gecko</i>	√	-
<i>Pachydactylus turneri</i>	<i>Turner's Thick-toed Gecko</i>	√	-
<i>Pachydactylus punctatus</i>	<i>Speckled Thick-toed Gecko</i>	√	-
<i>Pachydactylus scherzi</i>	<i>Schertz's Thick-toed Gecko</i>	√	<i>Endemic</i>
<i>Pachydactylus weberi</i>	<i>Weber's Thick-toed Gecko</i>	√	<i>Near -Endemic</i>
<i>Palmatogecko rangei</i>	<i>Web-footed Gecko</i>	√	<i>Near -Endemic</i>
<i>Ptenopus carpi</i>	<i>Carp's Barking Gecko</i>	√	<i>Endemic</i>
<i>Ptenopus maculatus</i>	<i>Common Barking Gecko</i>	√	<i>Near -Endemic</i>
<i>Rhoptropus afer</i>	<i>Common Namib Day Gecko</i>	√	<i>Endemic</i>
<i>Rhoptropus boultoni</i>	<i>Boultton's Namib Day Gecko</i>	√	<i>Endemic</i>

The north-west of Kunene is known to have a high species diversity of reptiles which some are endemic to Namibia. Among the species occurring in the general area of the mining claim, 12 species are endemic to Namibia while 4 species are Near-endemic. Numerous reptiles' species occurring in the area are of no conservation concern.

3.2.7 Avian-Fauna

It is estimated that Namibia is housing about 676 species of birds; this comprises about 30% of birds in Africa and 6% of the global avian fauna. Birdlife is relatively high in the vicinity of mining claim 72444 due to the influence of the suitable habitants found in the area. The following are

the birds recorded in the area during the site visit and it was augmented with the use of Kenneth Newman, 2000. Newmans Birds by Colour, Southern Africa Common Birds. Arranged by Colour, Struik New Holland Publishing (Pty) Ltd 2000. Since birds have no trans-boundaries this list does not restrict the occurrence of any other birds not appearing in the list below:

Helmeted Guinea Fowls

Purple Roller

African Palm Swift

Black Chested Prinia

Glossy Starling

Common quail

Grey – Backed Finchlark

Bennet’s Woodpecker

Golden-tailed Woodpecker

Laughing Dove

Monteiro Hornbill

Namaqua Dove

Namaqua Sandgrouse

Red –Eyed Bulbul

Red-Billed Francolin

Social Weavers

Long-tailed Paradise-Whydah

Southern Yellow-Billed Hornbill

Streaky – Headed Canary

Yellow Canary

The number of bird species in the general area of mining claim 72444 can supersede and there is a possibility of to have a high number of bird species in the area because birds have no boundaries. The expected impact on birdlife includes breeding and nesting sites likely to be destroyed and this affect the potential breeding of the birds.

3.2.7.1 Monitoring

Any bird mortality should be recorded by the environmental control officer (s) on-site or the project manager. There should be a proper record on the number of bird nests disturbed or removed and if possible the bird’s species should be identified and the environmental control officer (s) should be notified. If possible, encountered bird kills and nest removal should be encoded in a data-base and information should be made available to the general public.

3.2.8 Flora Diversity

Plant species occurring in the general area of mining claim 72444 at Otjikondavirongo augmented with data from the Herbarium database (Botanical Research and Herbarium Management) in Windhoek.

Species	Occurrences	Protection Status	Conservation Categories
Trees and Shrubs			
<i>Acacia erioloba</i>	✓	-	-
<i>Acacia erubescens</i>	✓	LC	-
<i>Acacia karroo</i>	✓	LC	-
<i>Acacia mellifera subsp. detinens</i>	✓	LC	-

<i>Acacia reficiens</i>	√	-	-
<i>Acacia senegal</i>	√	LC	-
<i>Acacia tortilis</i>	√	LC	-
<i>Acacia hebeclada</i>	√	LC	-
<i>Adenolobus garipesis</i>	√	-	-
<i>Adenia pechuelii</i>	√	LC	E
<i>Brownanthus kuntzei</i>	√	-	-
<i>Blepharis grossa</i>	√	-	NE
<i>Boscia albitrunca</i>	√	-	-
<i>Boscia foetida</i>	√	LC	-
<i>Cadaba aphylla</i>	√	LC	-
<i>Cadaba schroepelli</i>	√	LC	-
<i>Calostephane marlothiana</i>	√	-	E
<i>Catophractes alexandri</i>	√	LC	-
<i>Cleome foliosa var. foliosa</i>	√	-	-
<i>Cordia sinensis</i>	√	LC	-
<i>Crotalaria kurtii</i>	√	DD	E
<i>Croton gratissimus</i>	√	-	-
<i>Colophospermum mopane</i>	√	-	-
<i>Combretum apiculatum</i>	√	-	-
<i>Combretum imberbe</i>	√	-	-
<i>Commiphora dinteri</i>	√	-	E
<i>Commiphora glandulosa</i>	√	LC	-
<i>Commiphora glaucescens</i>	√	LC	NE

<i>Commiphora krauseliana</i>	√	LC	E
<i>Commiphora pyracanthoides</i>	√	-	-
<i>Commiphora saxicola</i>	√	LC	E
<i>Commiphora tenuipetiolata</i>	√	LC	-
<i>Commiphora virgata</i>	√	LC	-
<i>Commiphora wildii</i>	√	LC	-
<i>Cyphostemma currorii</i>	√	LC	P
<i>Cyphostemma uter</i>	√	-	NE, P
<i>Dombeya rotundifolia</i>	√	-	E
<i>Ectadium rotundifolium</i>	√	LC	E
<i>Ehretia alba</i>	√	-	-
<i>Engleria africana</i>	√	-	-
<i>Euclea pseudebenus</i>	√	-	-
<i>Euclea undulata</i>	√	-	-
<i>Euphorbia damarana</i>	√	LC	NE
<i>Euphorbia guerichiana</i>	√	LC	-
<i>Euphorbia virosa</i>	√	LC	-
<i>Euphorbia phylloclada</i>	√	LC	-
<i>Elephantorrhiza suffruticosa</i>	√	-	-
<i>Euphorbia phylloclada</i>	√	LC	-
<i>Faidherbia albida</i>	√	LC	-
<i>Felicia clavipilosa subsp. clavipilosa</i>	√	-	-
<i>Ficus cordata</i>	√	-	-
<i>Ficus illicina</i>	√	-	-

<i>Ficus sycomorus</i>	√	LC	-
<i>Forsskaolea viridis</i>	√	LC	-
<i>Frankenia pulverulenta</i>	√	-	-
<i>Gisekia africana var. africana</i>	√	-	-
<i>Grewia bicolor</i>	√	-	-
<i>Grewia flava</i>	√	-	-
<i>Grewia flavescens</i>	√	-	-
<i>Grewia tenax</i>	√	-	-
<i>Grewia villosa</i>	√	-	-
<i>Gymnosporia senegalensis</i>	√	-	-
<i>Gossypium anomalum</i>	√	-	-
<i>Gossypium triphyllum</i>	√	-	-
<i>Hermbstaedtia spathulifolia</i>	√	-	E
<i>Helichrysum roseo-niveum</i>	√	-	-
<i>Heliotropium tubulosum</i>	√	-	-
<i>Hermannia amabilis</i>	√	LC	E
<i>Hoodia pedicellata</i>	√	-	-
<i>Hypertelis caespitosa</i>	√	-	-
<i>Indigastrum argyroide</i>	√	-	-
<i>Lotononis schreiberi</i>	√	LC	E
<i>Lycium bosciifolium</i>	√	-	DD
<i>Lycium tetrandrum</i>	√	-	-
<i>Manuleopsis dinteri</i>	√	-	E
<i>Maerua gilgii</i>	√	LC	NE

<i>Maerua parvifolia</i>	✓	LC	-
<i>Melianthus comosus</i>	✓	-	-
<i>Moringa ovalifolia</i>	✓	LC	NE, P
<i>Montinia caryophyllacea</i>	✓	-	-
<i>Monsonia umbellata</i>	✓	-	NE
<i>Mundulea sericea</i>	✓	-	-
<i>Myxopappus hereroensis</i>	✓	LC	E
<i>Ornithogalum stapffii</i>	✓	-	E
<i>Orthanthera albida</i>	✓	LC	-
<i>Ozoroa crassinervia</i>	✓	-	-
<i>Parkinsonia africana</i>	✓	-	-
<i>Phaeoptilum spinosum</i>	✓	-	-
<i>Rothea myricoides</i>	✓	-	-
<i>Senecio engleranus</i>	✓	-	E
<i>Salvadora persica</i>	✓	-	-
<i>Sesamum marlothi</i>	✓	-	E
<i>Sesamum triphyllum var. grandiflorum</i>	✓	-	-
<i>Steganotaenia araliacea</i>	✓	-	-
<i>Salsola spp.</i>	✓	-	-
<i>Sterculia africana</i>	✓	-	-
<i>Tamarix usneoides</i>	✓	-	-
<i>Terminalia prunioides</i>	✓	-	-
<i>Tinnea rhodesiana</i>	✓	-	-

<i>Tripteris microcarpa</i> subsp. <i>microcarpa</i>	✓	-	-
<i>Ximenia americana</i>	✓	LC	-
<i>Ziziphus mucronata</i>	✓	-	-
Grass			
<i>Enneapogon desvauxi</i>	✓	-	-
<i>Stipagrostis dinteri</i>	✓	-	-
<i>Stipagrostis hochstetteriana</i> var. <i>hochstetteriana</i>	✓	-	-
<i>Stipagrostis subacaulis</i>	✓	-	-
<i>Stipagrostis uniplumis</i> var. <i>uniplumis</i>	✓	-	-

KEY: LC – Least Concern; E- Endemic; NE- Near - Endemic; P-Protected, F – Forestry protected under Forestry Act (act 12 of 2001).

The north-west of Kunene region is diverse and rich in flora; with numerous plant species endemic to Namibia. A total of 16 plant species occurring in the general area of mining claim 72444 are endemic, while 7 species are near-endemic and three species namely; *Cyphostemma currorii*, *Cyphostemma uter* and *Moringa ovalifolia* are protected species.



Figure 4: *Cyphostemma uter* recorded in the general area of the mining claim

3.2.8.1 Monitoring

Regular monitoring of the general area should be implemented to ensure that there is no destruction posed on the protected plants. Areas with high flora endemism should be protected. If there are plants that cannot be avoided, the translocation approach should be explored, specialists should be engaged in the translocation and monitoring programs. Cleared vegetation should be compensated by planting more than cleared, these plants should be mapped, and their co-ordinates recorded to continue monitoring and ensure that they are in good health. If there is any difficulties encountered in vegetation growth professional routes should be taken to ensure effective replacement of the plants in the area. The local people should be given an opportunity to propagate indigenous plants, this can be done by rendering training to the locals and engage them in all levels of the replacement program. The viability of establishing a nursery in Otjikondavirongo area should be explored.

3.2.8.2 Mitigation

Special consideration should be taken for the protected plants in the area. This can be done through the process of identifying all the protected plant species that will be cleared, if it is deemed possible translocation of the affected protected plants and endemic species should be considered. If translocation is not possible the re-placement approach of all protected, endemic and high valued plants species that will be cleared should be enforced. If there will be any translocation of the protected plant species a specialist should be involved to ensure that the correct procedures are in place. A proper and feasible vegetation management plan should be in place and a local nursery in the region should be approached to source indigenous plants to replace the cleared vegetation. If possible protected and endemic plant species should be avoided or alternative sites with plants considered.

3.2.9 Alien Plants Assessments

A thorough alien plant was taken into consideration during the botanical assessment. *Datura inoxia* and *Ricinus communis* were recorded in the area envisaged for this project.

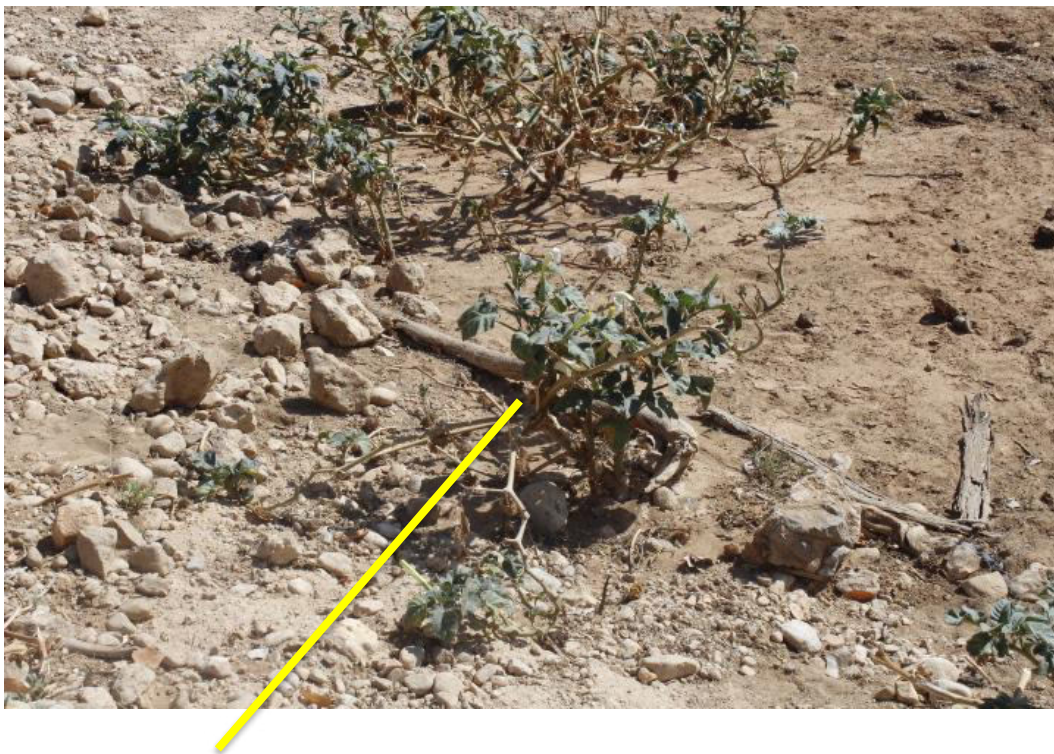


Figure 5: *Datura inoxia* recorded in the general area of the mining claim

3.2.9.1 Mitigation

The proponent should implement an alien plants awareness campaign to educate the employees and local people of the dangers of planting alien plants. Educational materials should be distributed and made available at Otjikondavirongo Primary Schools and schools in Sesfontein.

3.2.9.2 Monitoring

There should be a continuous monitoring of alien plants in the area. If possible, the proponent and local community should establish an alien plant task force to ensure that there is no planting of alien plants in the area. The proponent should encourage and support the implementation of an annual alien plants clearing campaign.

3.2.10 Conclusion and Recommendation

The proposed area for the project is a habitat to both fauna and flora, which play vital ecological aspects, some of the vegetation in the proposed area are endemic and some are protected however most of the plant species are least concern due to their wide distribution around the country. The impact of the project on vegetation in the area can be rated moderate and localized to the mining claim 72444 area only. The concern with regards to vegetation in the proposed area is the possible chopping down of protected plant species and endemic plant species, although they are least concern, their ecological value is quite imperious. To mitigate this impact a replacement approach should be taken into consideration by planting more of the chopped down trees in the vicinity and all the protected and endemic species should be re-introduced in the area. Local nurseries in Kunene region and the Directorate of Forestry under the Ministry of Environment, Forestry and Tourism (MEFT) should be approached for the acquisition of indigenous trees for replacement purposes. No alien plants should be allowed on the site and alien invasive task force should be enforced. This project will have a moderate negative impact to the avian fauna population such as trampling, nesting, and breeding site destruction hence proper measures should be enforced. Avoid the killing of species viewed as dangerous such as various snakes – when encountered on site.

The presence of wild-animals such as elephant can easily emanate into human-wildlife conflicts. Human-wildlife conflict is becoming a huge problem in many parts of the country therefore the human wildlife policy should be the guiding document to ensure that all relevant policies are considered. Control measures such as the laying of white painted stones around the infrastructure should be enforced especially in the area considered to be elephant and wild-animal's corridors and illegal hunting should be avoided at all costs. Some of the high valued species occur in the area and to some extend will be negatively affected by the proposed project activities. Off road driving should not be allowed and only existing tracks should be used to avoid

trampling of intricate organisms. Where new tracts have to be created appropriate environmental consideration should be made and new tracks should be rehabilitated, and the base camp should be set up in a less ecological sensitive area.

4 PROJECT DESCRIPTION

4.1 PROJECT COMPONENTS

As previously outlined in Section 1.1, the proposed project involves conducting an EIA for the establishment and mining of base & rare metals targeting copper ore on mining claim 72444 at Otjikondavirongo village, Opuwo Rural Constituency, Kunene Region.

4.2 COPPER ORE MINING

4.2.1 Surface Excavation of base and rare metals- Copper Ore

Copper has the atomic number 29, and it is found between Ni (atomic number 28) and zinc (atomic number 30) on the periodic table. It has a melting point of 1083° C and a boiling point of 2567° C. Copper is usually found in nature in association with sulphur with which it forms sulphide minerals, the most important being chalcopyrite (CuFeS_2), bornite ($\text{Cu}_5\text{Fe}_4\text{S}_2$) and chalcocite (Cu_2S). Pure copper metal is generally produced from a multistage process, beginning with the mining, and concentrating of low-grade ores containing copper sulphide minerals, and followed by smelting and electrolytic refining to produce a pure copper cathode. However, an increasing share of copper is produced from acid leaching of oxidized ores containing malachite, azurite and chrysocolla (Dr. Sam Nujoma, 2009).

There will be no processing or testing plant at this mining claim site, activities will be limited only to extraction. The Proponent intends to mine for base and rare metal mineral resources for commercial purposes. The targeted mineral resource is mainly copper, other minerals that could be found in the area include Lead-Zinc, Cobalt-Nickel deposits. Copper is by far the most abundant mineral commodity in Namibia. This is reflected not only in the fact that there are several copper mines in the country, but official data reveals that Namibian copper deposits have been exploited for centuries. Speculative resource availability is estimated to be sufficient to provide this project with a lifespan of approximately 10 years. The proposed development provides employment for 5 permanent skilled people and up to 15 locals who will be involved in the extraction/mining phase and thus contributing to the local economy of the Otjikondavirongo Village area.

Thus, the Environmental Assessment assessed the potential social and environmental impacts associated with the intended base and rare metals exploration activities and also to provide methods of rehabilitation of the quarries once the mining activities cease.

This mining operation can be classified as quarrying the open or surface excavation of base & rare metals. Quarrying starts from the earth's surface and maintains exposure to the surface throughout the extraction period. For both access and safety, the excavation usually has stepped or benched side slopes as shown in Illustration 1 below.

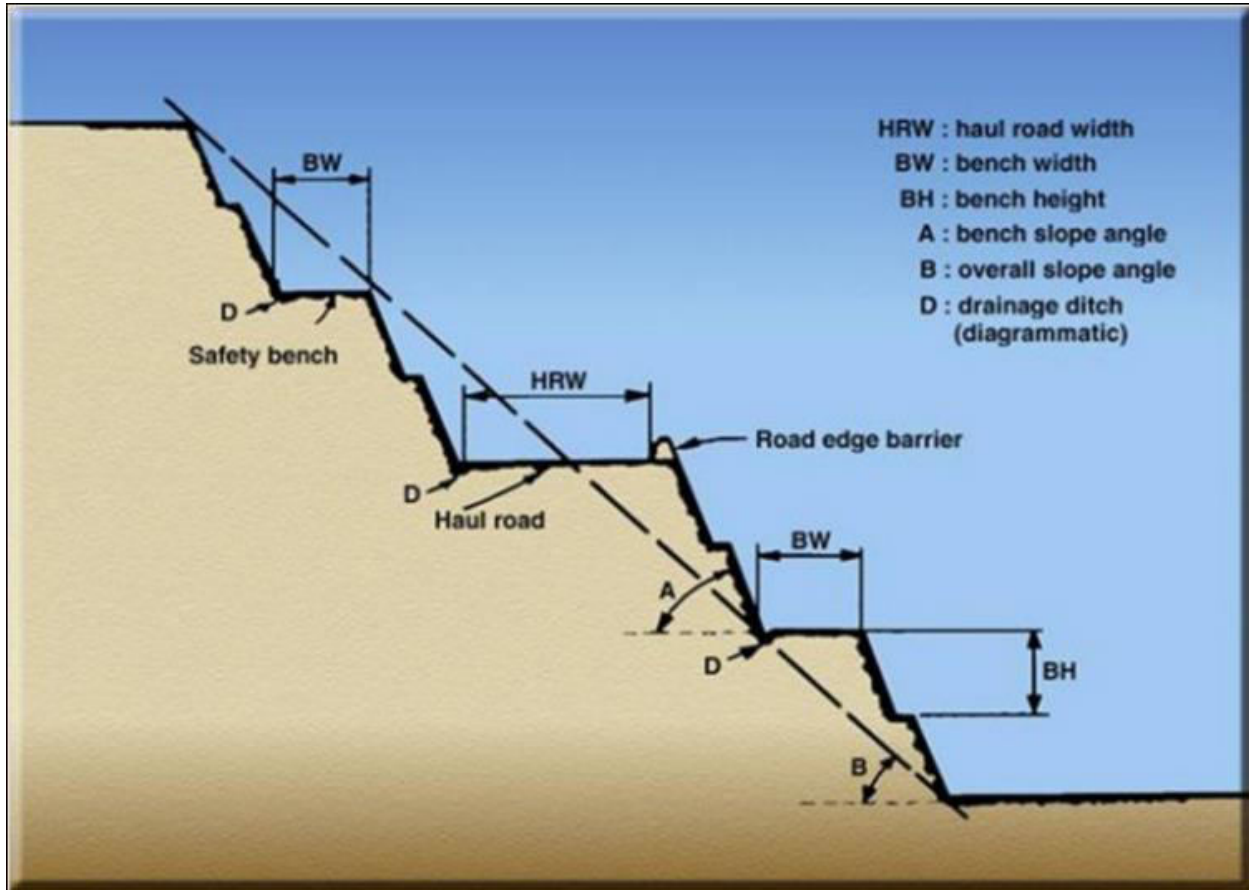


Illustration 1: A simple diagram showing different design parameters



Figure 6: Copper ore will be extracted using both handheld tools and automated machines such as jack hammers and compressors, excavators and hauled with tipper trucks (HEEC, 2021).

The main soil type in the area is arenosol, which is a soil type consisting mainly of sand, with little humus or clay, found typically in deserts and arid tropical regions. Efforts of rehabilitation in terms of the provided Environmental Management Plan has to be made to ensure that the ground attains the surrounding topography of contour levels after the activities cease thus reducing these negative impacts.

The proponent is in possession of valid mining registration applications from the Ministry of Mines & Energy enabling them to excavate the natural copper ore from the allocated portion after obtaining an Environmental Clearance Certificate. **Figure 8** above shows the exploration activities carried out to determine the resource quality, availability, and estimated quantity to ensure feasibility of the mining operations. Efforts will be made to revegetate these quarries once they are no longer in use and the land can be reclaimed for other purposes, such as small stock farming as detailed in the Environmental Management Plan (**Annexure G**).

4.3 ALTERNATIVES

As pointed out in Section 1.4 above various mining claim alternatives were initially considered by the proponent, ultimately resulting in the final development of the most financially viable claims.

4.3.1 No – Go Alternative

The no-go alternative is the baseline against which all alternatives are assessed. The no-go alternative would essentially entail maintaining the current situation, whereby the copper ore mining activities will not go on. Additionally, the copper ore mining activities may cease to take place which would have a negative social impact as the Otjikondavirongo village would forfeit the economic benefits associated with the development. In addition, if the intended development does not commence, the

residents will also not be able to benefit from the employment opportunities created from the mining activities and they will be no supply of the much-needed copper ore to the international markets.

4.4 SURROUNDING LAND USE

The mining claim 72444 are both located in a mountainous range not near any human settlements, so the surrounding land is made up of vast tracts of land endowed with desert vegetation typical of the Ojikondavirongo Mountains. Livestock grazing occurs in the surrounding land parcels.

4.5 ENGINEERING SERVICES

The mining claim are located about about 11 kms off the C43 road from Opuwo and you drive about 120km along the D3705 road to arrive at the mining claim at Otjikondavirongo Village. A borehole is to be drilled for the provision of water however electricity on the site is not connected to the national grid via the Kunene regional distributor as yet and use will be made of diesel & solar power at the buildings and mobile containers for site office and secure storage area; Pre-fabricated buildings for personnel accommodation and amenities for the 20 to 25 people staying onsite. Sewage is to be removed from the site mobile toilets by means of an ecologically friendly sewage system (**ECO-WISE**) to be installed that will biodegrade the sewerage and produce non-potable water that can be used for dust suppression around the operational mine claim site.

5 PUBLIC PARTICIPATION PROCESS

5.1 PUBLIC PARTICIPATION REQUIREMENTS

In terms of Section 21 of the EIA Regulations a call for open consultation with all I&APs at defined stages of the EIA process is required. This entails participatory consultation with members of the public by providing an opportunity to comment on the proposed project. Public Participation has thus incorporated the requirements of Namibia's legislation, but also takes account of international guidelines, including Southern African Development Community (SADC) guidelines and the Namibian EIA Regulations. Public participation in this project has been undertaken to meet the specific requirements in accordance with the international best practice. Please see **Table 4** below for the activities undertaken as part of the public participation process. The public was given time to comment from **27 September 2021 to 18 October 2021**.

Table 4: Table of Public Participation Activities

ACTIVITY	REMARKS
Placement of site notices/posters at Otjikondavirongo Village shop	See Annexure A
Placing advertisements in two newspapers namely the New Era & Confidante	See Annexure B
Written Background Information Document for interested & affected parties	See Annexure D
Written notice to Interested and Affected Parties via Email	See Annexure D

Comments received during the first phase of the public participation process are summarised in the Annexure D.

5.1.1 Environmental Assessment Phase 2

The second phase of the PPP involved the lodging of the Draft Environmental Scoping Report (DESR) to all registered I&AP for comment. Registered and potential I&APs were informed of the DESR availability for public comment *via* a letter/email dated **25th October 2021**. An Executive Summary of the DESR was also included in the communication to the registered I&APs. I&APs had until **8th November 2021** to submit comments or raise any issues or concerns they may have with regard to the proposed project.

The purpose of this chapter is to describe the assessment methodology utilized in determining the significance of the management, location and operational impacts of the copper ore mining, and where applicable the possible alternatives, on the biophysical and socio-economic environment.

Assessment of predicted significance of impacts for copper ore mining activities that are not yet operational is by its nature, inherently uncertain – environmental assessment is thus an imprecise science. To deal with such uncertainty in a comparable manner, a standardised and internationally recognised methodology has been developed. Such accepted methodology is applied in this study to assess the significance of the potential environmental impacts of the proposed development, outlined as follows in **Table 5**.

Table 5: Impact Assessment Criteria

CRITERIA	CATEGORY
Impact	Description of the expected impact
Nature Describe type of effect	<p>Positive: The activity will have a social / economical / environmental benefit.</p> <p>Neutral: The activity will have no effect</p> <p>Negative: The activity will have a social / economical / environmental harmful effect</p>
Extent Describe the scale of the impact	<p>Site Specific: Expanding only as far as the activity itself (onsite)</p> <p>Small: restricted to the site's immediate environment within 1 km of the site (limited)</p> <p>Medium: Within 5 km of the site (local)</p> <p>Large: Beyond 5 km of the site (regional)</p>
Duration Predicts the lifetime of the impact.	<p>Temporary: < 1 year (not including construction)</p> <p>Short-term: 1 – 5 years</p> <p>Medium term: 5 – 15 years</p> <p>Long-term: >15 years (Impact will stop after the operational or running life of the activity, either due to natural course or by human interference)</p> <p>Permanent: Impact will be where mitigation or moderation by natural course or by human interference will not occur in a particular means or in a particular time period that the impact can be considered temporary</p>
Intensity Describe the magnitude (scale/size) of the Impact	<p>Zero: Social and/or natural functions and/ or processes remain unaltered</p> <p>Very low: Affects the environment in such a way that natural and/or social functions/processes are not affected</p> <p>Low: Natural and/or social functions/processes are slightly altered</p> <p>Medium: Natural and/or social functions/processes are notably altered in a modified way</p> <p>High: Natural and/or social functions/processes are severely altered and may temporarily or permanently cease</p>
Probability of occurrence Describe the probability of the Impact <u>actually</u> occurring	<p>Improbable: Not at all likely</p> <p>Probable: Distinctive possibility</p> <p>Highly probable: Most likely to happen</p> <p>Definite: Impact will occur regardless of any prevention measures</p>

<p>Degree of Confidence in predictions State the degree of confidence in predictions based on availability of information and specialist knowledge</p>	<p>Unsure/Low: Little confidence regarding information available (<40%) Probable/Med: Moderate confidence regarding information available (40-80%) Definite/High: Great confidence regarding information available (>80%)</p>
<p>Significance Rating The impact on each component is determined by a combination of the above criteria.</p>	<p>Neutral: A potential concern which was found to have no impact when evaluated Very low: Impacts will be site specific and temporary with no mitigation necessary. Low: The impacts will have a minor influence on the proposed development and/or environment. These impacts require some thought to adjustment of the project design where achievable, or alternative mitigation measures Medium: Impacts will be experienced in the local and surrounding areas for the life span of the development and may result in long term changes. The impact can be lessened or improved by an amendment in the project design or implementation of effective mitigation measures. High: Impacts have a high magnitude and will be experienced regionally for at least the life span of the development, or will be irreversible. The impacts could have the no-go proposition on portions of the development in spite of any mitigation measures that could be implemented.</p>

*NOTE: Where applicable, the magnitude of the impact has to be related to the relevant standard (threshold value specified and source referenced). The magnitude of impact is based on specialist knowledge of that particular field.

For each impact, the EXTENT (spatial scale), MAGNITUDE (size or degree scale) and DURATION (time scale) are described. These criteria are used to ascertain the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The decision as to which combination of alternatives and mitigation measures to apply lies with Mr. Otniel Kuojo as the proponent, and their acceptance and approval ultimately with the relevant environmental authority.

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. Such significance is also informed by the context of the impact, i.e. the character and identity of the receptor of the impact.

6.1 MITIGATION MEASURES

There is a mitigation hierarchy of actions that can be undertaken to respond to any proposed project or activity (See **Figure 9** below). These cover avoidance, minimization, restoration and compensation. It is possible and considered sought after to enhance the environment by ensuring that positive gains are included in the proposed activity or project. If negative impacts occur then the hierarchy indicates further steps.

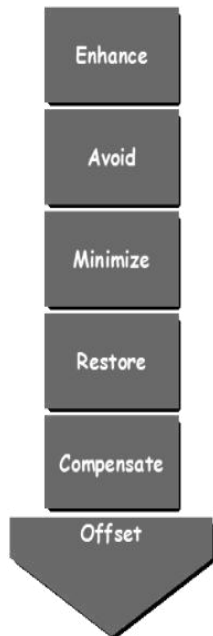


Figure 7: Mitigation Hierarchy

Impact avoidance: This step is most effective when applied at an early stage of project planning. It can be achieved by:

- not undertaking certain projects or elements that could result in adverse impacts;
- avoiding areas that are environmentally sensitive; and
- putting in place preventative measures to stop adverse impacts from occurring.

Impact minimization: This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

- scaling down or relocating the proposal;
- redesigning elements of the project; and
- taking supplementary measures to manage the impacts.

Restoration: This step is taken to improve degraded or removed ecosystems following exposure to impacts that cannot be completely avoided or minimised. Restoration tries to return an area to the original ecosystem that occurred before impacts. Restoration is frequently needed towards the end of a project’s life-cycle, but may be possible in some areas during operation.

Impact compensation: This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

- **rehabilitation** of the affected site or environment, for example, by habitat enhancement;
- **restoration** of the affected site or environment to its previous state or better; and
- **replacement** of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.
- **offsets** are often complex and expensive; it is therefore preferable to pay attention to earlier steps in the mitigation hierarchy.

7 ASSESSMENT OF POTENTIAL IMPACTS AND POSSIBLE MITIGATION MEASURES

7.1 INTRODUCTION

This Chapter describes the potential impacts on the biophysical and socio-economic environments, which may occur due to the operational activities described in Chapter 4. These include potential impacts, which may arise during the operation of the copper ore mine (i.e., long-term impacts) as well as the potential related impacts (i.e., short to medium term) during the internal road construction to access the copper ore with ease on the quarry. The assessment of potential impacts will help to inform and provide a clear picture to MEFT: DEA regarding the management of environmental aspects considered. In turn, MEFT: DEA's decision on the environmental acceptability of the operation of the copper ore mining activities at the Otjikondavirongo Village and the setting of conditions of authorisation (should the operation be authorised) will be informed by this chapter, amongst other information contained in this EA Report.

The baseline and potential impacts that could result from the operation of the copper ore mining activities are described and assessed with potential mitigation measures recommended. Finally, comment is provided on the potential cumulative impacts that could result should this mining operation be approved.

7.2 IMPACTS DURING COPPER OREMINING

During the copper ore mining phase, a considerable area of land in the Otjikondavirongo mountain range will be transformed to make way for the mining/quarrying operations in the subject area. There is need to prepare waste rock dumping areas, dispatch yards for the excavated copper ore, accommodation, and other logistics areas. As mentioned earlier, there is no processing plant at this site. There is only the mining of the raw copper ore that will be smelted and further processed after it has been exported.

Note:

- The waste rock dump area must be an existing disturbed area.
- The dispatch yard/ holding warehouse will require clearing of vegetation.
- Accommodation and logistics will require clearance of vegetation.

7.2.1 Surface and Ground Water Impacts

The risk of polluting water resources may be created if excavations are not covered after copper ore mining has ceased. Open pits that become filled with water from heavy rain may become contaminated or polluted which may seep into the underground water table thus polluting it. Otherwise, these standing water bodies can be death traps for both humans and animals that may fall and drown in the uncovered quarries. These may also be breeding grounds for waterborne disease vectors such as the malaria larvae or if the contaminated water (by human/livestock fecal

matter) is used for consumption it can spread waterborne diseases such as cholera/dysentery to the immediate communities.

7.2.2 Visual and Sense of Place Impacts

The creation of large open quarries results when (base and rare metals) - copper ore is mined in an area. This often leaves the landscape in a visually unpleasant state/compromised aesthetic state. There is thus very likely to be a change in visual characteristics of the site since the site will now have a different landscape due to the copper ore being excavated. Piles of waste rock and pits where copper ore has been excavated will result. The extent of this disturbance will depend on how highly the interested and affected parties valued the initial aesthetic quality of the site.

7.2.3 Noise Impacts

The operation of various types of machinery utilised during copper ore mining activities will result in associated noise impacts of normally more than the recommended 85dB exposure to employees during working hours for extended periods, therefore employees are to be provided for with ear protecting gear and given sufficient breaks to protect their hearing ability. The loading and off-loading of copper ore onto the tipper trucks and operation of machinery such as the jack hammer, heavy duty forklift, excavator, grader and air compressor may result in associated noise being generated.

7.2.4 Dust and Emission Impacts

The air quality in the area is considered to be fairly good within the mining claim 72444 area. Dust may result during the copper ore mining activities when the excavations are dug out with the jack hammer and associated machinery. Additional dust and emissions associated with the copper ore mining activities will mostly be generated by vehicle movement of the excavator and heavy duty fork lift to and from the copper ore excavation areas on the mining claim. The entire activity needs to be controlled and managed as required by the Public Health Act of 2015 and Atmospheric Pollution Prevention Ordinance (**No. 11 of 1976**).

7.2.5 Impacts on biodiversity

The mining claim site have not been disturbed by human activity from the excavation of copper ore since the mining claim 72444 is a greenfield site, located on the Otjikondavirongo Mountain range and thus efforts are to be made to maintain the natural environmental state of the immediately surroundings. However, at the claim site the removal of copper ore during the operational phase will thus ultimately result in the limited removal of vegetation in the subject mining claim area. This in turn will have an impact on the habitats of the fauna located within the subject areas. Particularly for birds as the copper ore mining operations may result in disturbance of bird nesting.

Quarries that are left open become hazardous sites for animals that frequent the area, especially during the good rainy seasons when these can become filled with water in which they can drown. Thus there is need to erect a perimeter fence around the active quarries to avoid such risks. Hence it is very necessary for the quarries to be rehabilitated (phytoremediation) once excavation has ceased at this particular mining claim site.

7.2.6 Heritage impacts

There are no declared heritage sites by the National Heritage Council of Namibia on the subject site. An accidental find procedure should however be provided for.

7.2.7 Impacts of Flooding

Groundwater inflow in surface mining operations can flood the lower sections of the pit – provided that the pit has surpassed the depth to the water table. High pore pressures in sidewalls can trigger collapse, leading to catastrophic events. However, most rocks mined for copper ore are aquitards/karsts and this situation is therefore highly unlikely especially for copper ore mining. Flooding may also occur as a result of water accumulating in the quarries after heavy rains in a good season. Thus, it is essential to ensure that the trenches are refilled with soil and rubble after excavation has occurred as the open pits/quarries pose a threat to animals and humans in terms of health and safety.

7.2.8 Social Impacts

Unemployment is widely experienced across the country including in the Opuwo Rural Constituency. There is an increased demand for job opportunities due to the rapid population growth. The copper ore mining activities contributes towards addressing this need, by providing employment to the local people in the area. In total Mr. Otniel Kuojo will employ about 25 people on either permanent or casual basis for the mining operations. The intended activity also contributes towards the national economy and thereby attracts more investors into the country.

7.3 IMPACTS DURING COPPER ORE TRANSPORTATION TO THE PORT

7.3.1 Traffic Impacts

Traffic is not expected to increase significantly during the copper ore mining activities however it may be slightly impacted due to the types of vehicles (i.e., heavy duty trucks) being utilised for the transportation of the copper ore to the port of Walvis Bay for export. However, if the excavation and transportation is done according to a schedule and the vehicles strictly abide to using the demarcated right of ways the impact is expected to be of very low significance as the loads are done on a scheduled basis which do not conflict with peak periods. Peak periods are to be avoided as the passenger/commercial vehicles bringing supplies to the area also make use of this district road

(D3705). Impacts on soil may result from vehicle traffic, drilling and materials storage resulting in soil erosion; impacts on soil structure (mainly compaction) and soil chemistry (as a result of petrochemical spills).

7.3.2 Existing Service Infrastructure Impacts

The subject area intended for the associated copper ore mining activities is remote and therefore is currently provided for with underground borehole water from the nearby village and a diesel generator for electricity.

7.3.3 Surface and Ground Water Impacts

The heavy vehicles operating at the mining site should be regularly monitored for leaking hydrocarbon fuels (petrol or diesel) and must be fitted with drip trays while they are parked to avoid contamination of surface and groundwater. If a refuel station (fuel containers) is on site it must either be a tank mounted on stilts so that any leaks are easily detectable and if it is underground it should be lined with heavy duty geomembranes such as polyvinyl chloride (PVC) or high density polyethylene (HDPE) to prevent groundwater contamination.

7.3.4 Health, Safety and Security Impacts

Due to a relatively high demand of employment during the copper ore mining activities, this may involve the establishment of a temporary workforce at the Otjikondavirongo Village. Experience with other projects in a developing-world context has shown that, where migrant workers have the opportunity to interact with the local community, a significant risk is created for the development of social conditions and sexual behaviors that contribute to the spread of HIV and AIDS.

In response to the threat the pandemic poses, MEFT has recently developed a policy on HIV and AIDS. This policy, which was developed with support from USAID, GTZ and the German Development Fund, provides for a non-discriminatory work environment and for workplace programs managed by a Ministry-wide committee. The MEFT has also recently initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.

In addition the workers should be provided for with Protective Personal Equipment such as overalls, hard boots, gloves, goggles, dust masks and sun hats to be protected from the weather elements and associated work hazards. A fully stocked first aid kit with unexpired medicines must always be on site.

7.3.5 Noise Impacts

The copper ore mining activities may result in associated noise impacts. These noise impacts will mainly be associated with use of the jack hammer machine, excavators, graders and noise from the heavy duty forklift transporting the rocks to the nearby (<1.0km) loading site. The residents of the nearby village and those that frequent the existing area will be impacted however only minimally as the mining claim are located at a distance from any human settlements within the boundaries of

mining claim 72444. The impact is very low and is limited to the excavation period only that utilises heavy-duty tools.

7.3.6 Municipal Service Impacts

The copper ore mining activities will result in additional people on-site, who will require provision of the following services:

- Potable water for domestic (ablution and drinking) purposes.
- Temporary toilets during the mining operations.
- Solid waste management (domestic waste).
-

Workers will be housed on an identified residential land parcel within the Otjikondavirongo village to be allocated by the Otjikaoko Traditional Authority so as to build temporary houses and provide the necessary amenities for the employees including a renewable source of energy in the form of solar panels to ensure a reasonable standard of living.

7.3.7 Storage and Utilisation of Hazardous Substances

Hazardous substances are regarded by the Hazardous Substance Ordinance (No. 14 of 1974) as those substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances. It covers manufacture, sale, use, disposal and dumping as well as import and export. During the mining operations, the use; storage and disposal of these types of hazardous substances, such as explosives, shutter oil, curing compounds, types of solvents, primers and adhesives and diesel, on-site could have negative impacts on the surrounding environment, if these substances spill and enter the environment therefore these should be put in a lockable bunded store room.

7.4 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) is contained in **Annexure G** of this report. The purpose of the EMP is to outline the type and range of mitigation measures that should be implemented during the copper ore mining activities and decommissioning phases of the project to ensure that negative impacts associated with the copper ore mining are avoided or mitigated.

7.5 CUMULATIVE IMPACTS

The cumulative impact of the mining operations of copper ore are not yet known and therefore are very difficult to rate. If all proposed mitigation measures and suggestions brought forward are however in place to minimise the overall impacts, then the cumulative impact can be expected to be rated as **Medium-Low (negative)** for the operation and management of the mining activities.

7.6 SUMMARY OF POTENTIAL IMPACTS

A summary of the significance of the potential impacts from the copper ore mining activities assessed above is included in **Table 6**. The **Tables 7 – 8** provide a summary of the mitigation measures proposed for the impacts. While some difference in magnitude of the potential impacts would result from the proposed alternatives this difference was not considered to be significant for any of the potential impacts. As such, the table below applies to all proposed alternatives.

Table 6: Summary of the significance of the potential impacts

Description of potential impact	Project alternative	No mitigation / mitigation	Extent	Magnitude	Duration	SIGNIFICANCE	Probability	Confidence	Reversibility	Cumulative impact
COPPER OREMINING IMPACTS										
1. Surface and Ground Water Impacts	Copper ore mining activities	No mitigation	Local	Very-High	Medium term	Medium	Probable	Certain	Reversible	Medium (-ve)
		Mitigation	Local	Medium-Low	Medium term	Medium-Low	Probable	Certain	Reversible	Medium-Low
	No go	No mitigation	Local	Low	Medium term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Low	Medium term	Neutral	Probable	Certain	Reversible	Neutral
2. Visual Sense of Place Impacts	Copper ore mining activities	No mitigation	Local	Medium-Low	Medium term	Medium	Probable	Certain	Reversible	Medium-Low (-ve)
		Mitigation	Local	Low	Medium term	Medium - Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
3. Noise Impacts	Copper ore mining activities	No mitigation	Local	Medium-Low	Medium term	Medium-Low	Probable	Certain	Reversible	Medium-Low (-ve)
		Mitigation	Local	Low	Medium term	Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral

Description of potential impact	Project alternative	No mitigation / mitigation	Extent	Magnitude	Duration	SIGNIFICANCE	Probability	Confidence	Reversibility	Cumulative impact
		Mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
4. Dust and Emission Impacts	Copper ore mining activities	No mitigation	Local	Medium-Low	Short term	Medium	Probable	Certain	Reversible	Medium (-ve)
		Mitigation	Local	Low	Short term	Medium-Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
5. Biodiversity (Fauna and Flora)	Copper ore mining activities	No mitigation	Local	Low	Short term	High	Probable	Certain	Reversible	Low (-ve)
		Mitigation	Local	Very low	Short term	Medium-Low	Probable	Certain	Reversible	Very low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
6. Heritage Impacts	Copper ore mining activities	No mitigation	Local	Medium	Short term	Medium	Probable	Certain	Reversible	Medium (-ve)
		Mitigation	Local	Low	Short term	Low	Probable	Certain	Reversible	Medium - Low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral

Description of potential impact	Project alternative	No mitigation / mitigation	Extent	Magnitude	Duration	SIGNIFICANCE	Probability	Confidence	Reversibility	Cumulative impact
7. Impacts of Flooding	Copper ore mining activities	No mitigation	Local	Medium	Short term	Medium	Probable	Certain	Reversible	Medium – low (-ve)
		Mitigation	Local	Low	Short term	Medium-Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
8. Social Impacts	Copper ore mining activities	No mitigation	Local	Very low	Short term	High++	Probable	Certain	Irreversible	Very low(-ve)
		Mitigation	Local	Negligible	Short term	High++	Probable	Certain	Irreversible	Negligible (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
TRANSPORTATION & GENERAL OPERATION IMPACTS										
1. Traffic Impacts	Copper ore mining activities	No mitigation	Local	Medium-Low	Short term	Low	Probable	Certain	Reversible	Medium-Low (-ve)
		Mitigation	Local	Low	Short term	Very Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral

Description of potential impact	Project alternative	No mitigation / mitigation	Extent	Magnitude	Duration	SIGNIFICANCE	Probability	Confidence	Reversibility	Cumulative impact
2. Existing Service Infrastructure Impacts	Copper ore mining activities	No mitigation	Local	Low	Short term	Low	Probable	Certain	Reversible	Low (-ve)
		Mitigation	Local	Very low	Short term	Very low	Probable	Certain	Reversible	Very low
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
3. Surface and Ground Water Impacts	Copper ore mining activities	No mitigation	Local	Medium	Short term	Medium - low	Probable	Certain	Reversible	Medium - Low (-ve)
		Mitigation	Local	Low	Short term	Low	Probable	Certain	Reversible	Very low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
4. Health, Safety and Security Impacts	Copper ore mining activities	No mitigation	Local	Medium	Short term	Medium	Probable	Certain	Reversible	Medium - Low (-ve)
		Mitigation	Local	Low	Short term	Medium-Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
5. Noise Impacts		No mitigation	Local	Medium	Medium term	Medium	Probable	Certain	Reversible	Medium (-ve)

Description of potential impact	Project alternative	No mitigation / mitigation	Extent	Magnitude	Duration	SIGNIFICANCE	Probability	Confidence	Reversibility	Cumulative impact
	Copper ore mining activities	Mitigation	Local	Low	Medium term	Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
6. Municipal Service	Copper ore mining activities	No mitigation	Local	Medium	Medium term	Medium	Probable	Certain	Reversible	Medium (-ve)
		Mitigation	Local	Low	Medium term	Low	Probable	Certain	Reversible	Low (-ve)
	No go	No mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Medium term	Neutral	Probable	Certain	Reversible	Neutral
7. Storage and Utilisation of Hazardous Substances	Copper ore mining activities	No mitigation	Local	Low	Short term	Medium	Probable	Certain	Reversible	Low (-ve)
		Mitigation	Local	Very low	Short term	Low	Probable	Certain	Reversible	Very low (-ve)
	No go	No mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral
		Mitigation	Local	Neutral	Short term	Neutral	Probable	Certain	Reversible	Neutral

Table 7: Proposed mitigation measures for the copper ore mining activities

COPPER ORE MINING IMPACTS	
IMPACT	MITIGATION MEASURES
Surface and Ground Water-Storm water and Erosion Control	<ul style="list-style-type: none"> • Ensure that surface water accumulating on-site are channelled and captured through a proper storm drainage trench. • Disposal of waste at the mining claim site should be regulated and properly managed. • Regular preventative maintenance should be carried out on the quarry infrastructure. Earth embankments to prevent erosion will be established where appropriate. • The surface water accumulated in the open trenches must be channelled along the natural tributaries of area. • It is recommended that copper ore mining takes place outside of the rainy season in order to limit flooding on site and surface water pollution. • Storm water Management Plans should be developed for each quarry/claim site and should include the management of storm water during excavation, as well as the installation of storm water and erosion control infrastructure and management thereof after completion of mining. • Storm water management systems will be installed to prevent storm water from entering or exiting the quarry, which could result in silt laden surface water from draining into any ephemeral river systems that may be in proximity to the mining claim site. • Quarry slopes should be profiled to ensure that they are not subjected to excessive erosion but capable of drainage run-off with minimum risk of scour (maximum 1:3 gradient). • If necessary, diversion channels should be constructed ahead of the open cuts as well as above emplacement areas and stockpiles to intercept clean run-off and divert it around disturbed areas into the natural drainage system downstream of the quarry. • All mined areas (where works will take place) will be rehabilitated to control erosion and sedimentation. • Existing vegetation must be retained as far as possible to minimise erosion problems.

COPPER ORE MINING IMPACTS	
IMPACT	MITIGATION MEASURES
	<ul style="list-style-type: none"> • Rehabilitation of quarry shall be planned and completed on a continuous basis in such a way that the run-off water (if any) will not cause erosion. • Visual inspections shall be done on a regular basis with regard to the stability of water control structures, erosion and siltation (if required).
Soil Aspects	<ul style="list-style-type: none"> • Topsoil shall be removed from all areas where physical disturbance of the surface will occur, prior to the disturbance occurring. Topsoil refers to that layer of soil covering the earth and which provides a suitable environment for the germination of seeds, allows the penetration of water, and is a source of micro-organisms, plant nutrients and in some cases seed. • The topsoil shall be stored so that it can be placed on the exposed subsoil as soon as the mining of the excavation or the relevant section of it has been completed and its slopes have been finished off to the acceptable gradient as part of the rehabilitation process. • Topsoil shall be stockpiled only in the areas dedicated for only that purpose, even if the topsoil is only partially cleared. • The topsoil removed, shall be stored in a bund wall on the high ground side of the quarry and in such a way that it will not cause damming up of water or washaways, or wash / blow away itself. Stockpiles will not exceed a height of two meters. • Stockpiles shall be managed so as to maintain the regrowth potential of the topsoil. Should the stockpiles stand for too long (greater than 12 months) it can be considered barren from a seed bank point of view. In this case reseedling may be required. Stockpiles should ideally be stored for no longer than six months. • The overburden, i.e., that layer of soil immediately beneath the topsoil, will be removed and stored separately from the topsoil. • Transport waste to waste rock dump. • No chemical pollution shall be allowed to contaminate the soils; any plant equipment found to be attributing to this shall be removed from the site and repaired.

COPPER ORE MINING IMPACTS	
IMPACT	MITIGATION MEASURES
	<ul style="list-style-type: none"> • In the event of a petrochemical (diesel, oil, fuels, etc.) spill, the Proponent must take suitable measures to contain the pollution and prevent it from spreading or seepage. Once the spill has been contained, contaminated material (soil, etc.) shall be removed and disposed of at a registered hazardous waste disposal site.
Visual and Sense of Place	<ul style="list-style-type: none"> • Visual pollutants can further be prevented through mitigations (i.e. keep existing trees, introduce tall indigenous trees). • The quarry should be levelled once copper ore mining activities cease so as to restore the visual sense of place of the area to its natural state. • The remains of all structures that may have been erected at the quarry shall be demolished and removed on completion of the project. • Care must be taken to ensure that all rehabilitated areas are similar to the immediate environment in terms of visual character, vegetation cover and topography and any negative visual impacts will be rectified to the satisfaction of the environmental consultant (HEEC CC) or MEFT officials. • Overburden will be placed back into excavation as part of the rehabilitation programme
Noise	<ul style="list-style-type: none"> • Continuous monitoring of noise levels should be conducted to make sure the noise levels at the copper ore mining site does not exceed acceptable limits. • No activity having a potential noise impact should be allowed after 18:00 hours if possible. • In the event that activities continue outside the stipulated hours the contractor will communicate such occurrences to potentially affected communities prior to commencing such activities.
Dust and Emission	<ul style="list-style-type: none"> • Vehicles used on site to only use designated roads. • The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used. • During high wind conditions the proponent must make the decision to cease works until the wind has calmed down. • Cover any stockpiles with plastic to minimise windblown dust. • Provide workers with dust masks and other necessary PPE (gloves, work suits, sun hats etc.).

COPPER ORE MINING IMPACTS	
IMPACT	MITIGATION MEASURES
	<ul style="list-style-type: none"> • Maintenance of the road leading to the mining claim site so as to minimise the dust released when heavy trucks are travelling on the road.
Fauna and Flora	<ul style="list-style-type: none"> • Prevent the destruction of protected tree species. • Encourage the regeneration and regrowth of trees with exposed roots in the area. • Do not clear cut the entire mining claim sites, but rather keep the few individuals and/or clumps of trees/shrubs as part of the landscaping especially important for shade in the hot climate. • The trees that are to be kept should be clearly marked with “danger tape” to prevent accidental removal. Regular inspection of the marking tool should be carried out. • The very important trees should be “camped off” to prevent the unintended removal or damage to these trees. • Recommend the planting of local indigenous species of flora as part of the landscaping as these species would require less maintenance than exotic species and have important ecological functions in terms of carbon sequestration from decomposing materials at the site. • Transplant removed trees where possible, or plant new trees in lieu of those that have been removed. • Prevent contractors who will be doing the mining from collecting wood and veld food such as amphibians, migrating birds, etc. during the copper ore mining phase. • Prevent contractors from fishing in the local ephemeral rivers or catching aquatic species. • No workers will be allowed to collect any plant or snare, hunt or otherwise capture any wild animal. All animal life, vegetation, firewood etc., will remain the property of the Ministry of Environment, Forestry & Tourism or the custodian thereof and will not be disturbed, upset or used without their express consent. • No domestic animals will be permitted on the quarry site by means of erecting a perimeter fence, small stock should graze at designated areas. • No animals shall be harmed during the course of copper ore mining. Should snakes or dangerous wildlife be encountered, an expert must be called out to safely relocate them.

COPPER ORE MINING IMPACTS	
IMPACT	MITIGATION MEASURES
Access roads to the site	<ul style="list-style-type: none"> • Roads shall be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported mining materials which may hamper regrowth of vegetation must be removed and disposed of in an approved manner prior to rehabilitation. • If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the ECO may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation, be corrected and the area be seeded with a seed mix to the suitable specifications.
Heritage	<ul style="list-style-type: none"> • The project management should be made aware of the provisions of the National Heritage Act regarding the prompt reporting of archaeological finds (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artifacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials or other categories of heritage resources are found during mining activities. • In the event of such finds, mining must stop and the project management or contractors should notify the National Heritage Council of Namibia immediately.
Flooding	<ul style="list-style-type: none"> • Copper ore mining activities should be minimised during the rainy season to reduce the impacts of flooding at the mining site.
Existing Service Infrastructure	<ul style="list-style-type: none"> • It is recommended that alternative and renewable sources of energy be explored and introduced into the employees' housing development to reduce dependency on the grid. • Solar geysers and panels should be considered to provide for general lighting and heating of water and buildings. • Water saving mechanisms should be incorporated within the copper ore extraction infrastructure design and plans in order to further reduce water demands. • Re-use of treated waste water should be considered wherever possible to reduce the consumption of potable water.

COPPER ORE MINING IMPACTS	
IMPACT	MITIGATION MEASURES
Social Impacts	No specific mitigation measures are required, only that the local community be consulted in terms of possible job creation opportunities and must be given first priority if unspecialised job vacancies are available.

Table 8: Proposed mitigation measures for the transportation and operational phase

TRANSPORTATION & GENERAL OPERATION IMPACTS	
IMPACT	MITIGATION MEASURES
Traffic & Equipment	<ul style="list-style-type: none"> • Limit and control the number of access points to the quarry site. • Ensure that road junctions have good sightlines. • Vehicles' need to be in a road worthy condition and maintained throughout the copper ore mining phase. • Transport the materials in the least amount of trips as possible. • Adhere to the speed limit. • Implement traffic control measures where necessary. • All mining equipment used for the excavation must be securely stored on rails when not in use.
Surface and Ground Water Impacts	<ul style="list-style-type: none"> • No dumping of waste products of any kind in or in close proximity to surface water bodies. • Heavy mining vehicles should be kept out of any surface water bodies and the movement of vehicles should be limited where possible to the existing roads and tracks. • Ensure that oil/ fuel spillages from vehicles transporting the stones and machinery are minimised and that where these occur, that they are appropriately dealt with. • Drip trays must be placed underneath vehicles when not in use to contain all oil that might be leaking from these vehicles. • Contaminated runoff from the mining claim sites should be prevented from entering the surface and ground water bodies. • All materials on the site should be properly stored.

TRANSPORTATION & GENERAL OPERATION IMPACTS	
IMPACT	MITIGATION MEASURES
	<ul style="list-style-type: none"> • Disposal of waste from the sites should be properly managed and taken to the designated spaces for each particular type. • Workers should be given ablution facilities at the sites that are located at least 30 m away from any surface water and they should be regularly serviced. • Washing of personnel or any equipment should not be allowed on the mining claim site. Should it be necessary to wash equipment these should be done at an area properly suited and prepared to receive and contain polluted waters.
Health, Safety and Security	<ul style="list-style-type: none"> • All vehicular equipment operators must have valid licences for that particular vehicle class. • Personnel should not overnight at the mining claim site, except the security personnel. • Ensure that all mining personnel are properly trained depending on the nature of their work. • Provide for a first aid kit and a properly trained person to apply first aid when necessary. • A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases as described above. • Provide free condoms in the workplace and to local community throughout the copper ore mining period and promote their usage. • Facilitate access to Antiretroviral (ARV) medication. • Encourage HIV counselling and testing. • Encourage Voluntary Medical Male Circumcision (VMMC). • Provide awareness on the prevention of mother to child HIV Transmission. • Restrict unauthorised access to the mining claim site and implement access control measures. • Clearly demarcate the mining claim site boundaries along with signage of “no unauthorised access”. • Clearly demarcate dangerous areas and no go areas on site. • Staff and visitors to the mining claim site must be fully aware of all health and safety measures and emergency procedures.

TRANSPORTATION & GENERAL OPERATION IMPACTS	
IMPACT	MITIGATION MEASURES
	<ul style="list-style-type: none"> • The contractor must comply with all applicable occupational health and safety requirements. The workforce should be provided with all necessary Personal Protective Equipment where appropriate. • The contractor must comply with all applicable occupational health and safety requirements as stipulated by the Covid19 regulations. The workforce should be provided with all necessary Personal Protective Equipment such as Face Masks, alcohol based hand sanitisers and practice social distancing and regular body temperature checks where appropriate.
Noise	<ul style="list-style-type: none"> • Install technology such as silencers on the excavation machinery. • Do not allow the use of horns as a general communication tool, but use it only where necessary as a safety measure. • No amplified music should be allowed on site. • Inform immediate residents of the nearby village/farm/settlement about the dimension mining activities to commence and provide for continuous communication between the residents and contractor. • Limit mining times to acceptable daylight hours.
Municipal Services	<ul style="list-style-type: none"> • Poor waste management practices at this stage are particularly extensive due to a lack of established waste disposal facilities, ignorance of how to dispose of certain waste streams and failure to train the mining workforce in appropriate waste disposal. <ul style="list-style-type: none"> ➤ The types of waste that need to be disposed of at this point are waste rock, packaging material, oils and greases from mining fleet/plant, tyres and domestic refuse (since there will be camps near the mining claim sites). • It is recommended that waste from the temporary toilets be pumped out and disposed of at the designated eco- friendly waste treatment site that is to be installed. • A sufficient number of waste bins should be placed around the quarry site for the soft refuse.

TRANSPORTATION & GENERAL OPERATION IMPACTS	
IMPACT	MITIGATION MEASURES
	<ul style="list-style-type: none"> • The overburden and waste rock should be deposited at designated spaces at quarry to allow for easy access by people who would want to sell this waste rock to people interested in the other occurring non-target base and rare metals. • Solid waste will be collected and disposed of on a regular basis at the designated spaces.
Hazardous Substances	<ul style="list-style-type: none"> • Storage of the hazardous substances in a bunded area, with a volume of 120 % of the largest single storage container or 25 % of the total storage containers whichever is greater. • Refuel vehicles at a designated area that has a protective surface covering/geomembrane lining and utilise drip trays for stationary plant.
Social Impacts	No specific mitigation measures are required, only that the local community be consulted in terms of possible job creation opportunities and must be given first priority if unspecialised job vacancies are available.

8 CONCLUSION AND RECOMMENDATIONS

The purpose of this Chapter is to briefly summarise and conclude the FESR and describe the way forward.

8.1 COPPER ORE MINING PHASE IMPACTS

With reference to **Table 6**, only one of the negative mining phase impacts was deemed to have a high significant impact on the environment i.e., impact on biodiversity. This impact was assessed to a **Medium to Low (negative)** with mitigation. The cumulative copper ore mining impacts were assessed to a **Medium to Low (negative)** significance, without mitigation measures. With the implementation of the recommended mitigation measures in Chapter 7 as well as in the EMP, the significance of the copper ore mining phase impacts is likely to be reduced to a **Low (negative)**.

The most significant impact **high (positive)** is the social impact directly associated with the increasing provision of job opportunities and the social upliftment accompanied by economic development through investing in the Otjikondavirongo village through supporting the local shops since the people will have an increased disposable income and buying power. The intended activity further aims to promote local economic development through attracting more investors that want to import copper ore for various uses.

8.2 LEVEL OF CONFIDENCE IN ASSESSMENT

With reference to the information available at the project planning cycle, the confidence in the environmental assessment undertaken is regarded as being acceptable for the decision-making, specifically in terms of the environmental impacts and risks. The Environmental Assessment Practitioner believes that the information contained within this FESR is adequate to allow MEFT: DEA to be able to determine the environmental acceptability of the proposed project.

It is acknowledged that the operational details will evolve during the detailed mining operations. However, these are unlikely to change the overall environmental acceptability of the operation of the copper ore mining activities and any significant deviation from what was assessed in this FESR should be subject to further assessment. If this were to occur, an amendment to the Environmental Authorisation might be required in which case the prescribed process would be followed.

8.3 MITIGATION MEASURES

With the implementation of the recommended mitigation measures in Chapter 7 as well as in the EMP, the significance of the copper ore mining phase impacts is likely to be reduced to a **Low (negative)**. **It is further extremely important to include an Environmental Control Officer (ECO) on site during the relevant phases of the intended activity to ensure that all the mitigation measures discussed in this report and the EMP are enforced.**

The copper ore extraction process is considered to be a relatively benign type of mining since no further processing is to be carried out on the mining claim site, if smelting is to be carried out the copper ore will be taken to already established smelters within the country such as Dundee precious Metals (Pty) Ltd to limit the ecological footprint associated with the gases emitted. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the mining activities progress. It is advised that the proponent strictly engages the guidelines outlined within the EMP with regards to the rehabilitation of the quarries once copper ore excavation at the mining claim sites has ceased so as to restore the area to its near natural state and to reduce the associated negative environmental impacts.

It is noted that where appropriate, these mitigation measures and any others identified by MEFT: DEA could be enforced as Conditions of Approval in the Environmental Authorisation, should MEFT: DEA issue a positive Environmental Authorisation.

8.4 OPINION WITH RESPECT TO THE ENVIRONMENTAL AUTHORISATION

Regulation 15(j) of the EMA, requires *that the EAP include an opinion as to whether the listed activity must be authorised and is the opinion is that it must be authorised, any condition that must be made in respect of that authorisation.*

It is recommended that the base & rare metal targeting copper ore mining operations be authorised, as the activities provide employment for the local people and contribute to local & national economic development through attracting more investors to the Otjikondavirongo village and surrounding settlements/villages and additionally increasing people's livelihoods through job creation.

The significance of the social impact on the residents of Otjikondavirongo village was deemed to be **High (positive)**. The significance of negative impacts can be reduced with effective and appropriate mitigation provided in this Report and the EMP attached in **Annexure G**. If authorised, the implementation of an EMP should be included as a condition of approval.

8.5 WAY FORWARD

The Final Environmental Scoping Report will be submitted to MEFT: DEA for consideration and decision making. If MEFT: DEA approves or requests additional information / studies all registered I& APs and stakeholders will be kept informed of progress throughout the assessment process.

Branch, B. 1998. Field guide to snakes and other reptiles of Southern Africa. Struik publisher. Cape Town.

Herbarium of Namibia (WIND). 2015. BRAHMS Database. National Herbarium of Namibia (WIND), National Botanical Research Institute, MAWF, Windhoek, Namibia.

Klaassen, E. & Kwembeya, E. 2013. A Checklist of Namibian Indigenous and Naturalised Plants. National Botanical Research Institute: Windhoek.

Mannheimer, C. & Curtis, B. 2018. Le Roux and Muller's Field Guide to Trees and Shrubs of Namibia; 2nd ed. Windhoek. Namibia Publishing House.

Mannheimer, C. & Curtis, B. A. (eds) 2009. Le Roux and Müller's Field Guide to the Trees and Shrubs of Namibia. Windhoek: Macmillan Education Namibia.

Marais, J. 2004. A Complete guide to the snakes of Southern Africa. Struik Nature. Cape Town.

Mendelsohn, J., Jarvis, A., Roberts, C. & Robertson, T. 2003. Atlas of Namibia. David Phillips Publisher. Cape Town.

Ministry of Environment, Forestry and Tourism, 2002. Atlas of Namibia. Comp. J. Mendelsohn, A. Jarvis, T. Roberts and C. Roberts, David Phillip Publishers, Cape Town

Müller, M.A.N. 1984. Grasses of South West Africa/Namibia. John Meinert Publishers (Pty) Ltd, Windhoek, Namibia.

Newman, K. 2000. Newmans Birds by Colour, Southern Africa Common Birds. Arranged by Colour, Struik New Holland Publishing (Pty) Ltd.

Van Oudtshoorn, F. 1999. Guide to grasses of southern Africa. Briza Publications, Pretoria, South Africa.

Van Wyk, B. and Van Wyk, P. 1997. Field guide to trees of Southern Africa. Cape Town: Struik Publishers.

G&K Environmental Consultants, 2014. The Environmental Impact Assessment for New Quarrying, Karibib Windhoek: Report.

Kunene regional poverty profile based on village-level participatory poverty assessment in Kunene Region, Namibia. Also available from: UNICEF Namibia Information Centre, P.O. Box 1706, Windhoek, gkolling@unicef.org. Tel: +264 61 204 6275.

Mendelsohn, J., Jarvis, A., Roberts, C. & Robertson, T., 2009. Atlas of Namibia. 3rd ed. Cape Town: Sunbird Publishers.

Namibia Statistics Agency (NSA), 2011. Namibia 2011 Population and Housing Census Main Report. Available at: <http://nsa.org.na/page/publications>.

Nicole Grünert: Namibia Fascination of Geology (2003), Gabi Schneider: The Roadside Geology of Namibia (2004).

World Weather online, 2019. Available at: <https://www.worldweatheronline.com/sesfontein-weather-averages/kunene/na.aspx> [Accessed on 10/01/2022].

World Weather online, 2019 a. Available at: <https://www.worldweatheronline.com/sesfontein-weather-averages/kunene/na.aspx> [Accessed on 10/01/2022].

<https://www.bdo.com.na/en-gb/industries/natural-resources/mining-in-namibia>
[Accessed on 18/10/2021].