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ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE GOBOBOSEB SMALL-SCALE MINING (SSM) HOTSPOT IN ERONGO REGION

ENVIRONMENTAL SCOPING REPORT

OCTOBER 2020

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DOCUMENT DESCRIPTION

Project Title:	Environmental Impact Assessment and Environmental Management Plan for Goboboseb Small-Scale Mining Hotspot in Erongo Region.
Report type:	Environmental Scoping Report
Proponent:	Ministry of Mines and Energy (MME)
Project Location:	Farm Goboboseb, Erongo Region
EAP:	Joseph Kondja Amushila
Date of Assessment:	October 2020
Application No:	APP002348 (initial)
Application No:	APP001328 (resubmission)

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LIST OF ACRONYMS

BID:	Background Information Document
CBO:	Community Based Organization
DWSSC:	Directorate of Water Supply and Sanitation Coordination
EAP:	Environmental Assessment Practitioner
ECC:	Environmental Clearance Certificate
EIA:	Environmental Impact Assessment
EMA:	Environmental Management Act
EMP:	Environmental Management Plan
ERSMA:	Erongo Regional Small-scale Miner's Association
GDP:	Gross Domestic Product
I&APs:	Interested and Affected Parties
IC:	Independent Consultant
IUCN:	International Union for Conservation of Nature
MAWLR:	Ministry of Agriculture, Water and Land Reform
MC:	Mining Claim
MEFT:	Ministry of Environment, Forestry and Tourism
MME:	Ministry of Mines and Energy
MoHSS:	Ministry of Health and Social Services
NBRI:	National Botanical Research Institute
NEPL:	Non-Exclusive Prospective Licence
NGO:	Non-Governmental Organizations
PPP:	Public Participation Process
QDS:	Quarter Degree Square
SSMs:	Small-Scale Miners
TA:	Traditional Authority
ToR:	Terms of Reference
UNDP:	United Nations Development Programme

EXECUTIVE SUMMARY

The Ministry of Mines and Energy (MME) has recognized the need to enhance the quality of life for artisanal and small-scale miners working outside of formal legal and economic systems. Although it is recognized that small-scale mining creates employment opportunities for many and encourages entrepreneurship, majority of the small-scale mining activities have been taking place illegally. Farm Goboboseb is one of the hotspots in Erongo Region where small-scale mining activities have been taking place for many years without Environmental Impact Assessment (EIA) studies done and Environmental Management Plans (EMPs) in place. Small-scale miners (SSMs) have in the past been issued with Environmental Clearance Certificates (ECCs) upon completion of the Environmental questionnaire and signing a pro-forma Environmental Contract. In terms of the Environmental Management Act No. 7 of 2007, all mining and quarrying activities cannot be undertaken without an EIA being carried out and ECC being obtained, hence this study.

The MME took a decisive step to assist SSMs to transition to the formal system and to enhance the contribution of the small-scale mining sub-sector to sustainable development. As such, the MME with assistance from the United Nations Development Programme (UNDP) is facilitating the development of the EMP and subsequent issuing of ECC for SSMs based at Farm Goboboseb in Erongo Region.

The EIA study was conducted in a systematic approach, as outlined in the EIA Regulations of February 2012. The objective of the EIA is to identify the potential impacts associated with the small-scale mining activities and to provide mitigation measures and ensure that potential impacts to the environment are managed effectively and that positive impacts are enhanced.

This report contains a full description of the small-scale mining activities, description of the receiving or affected environment in terms of the biophysical aspects of climate, water, vegetation, geography, topography, and the socio-economic environments. The report is to be read in conjunction with the Environmental Management Plan (EMP) appended to this report.

1. INTRODUCTION

1.1 Background

Small-scale mining activities at Farm Goboboseb mainly include artisanal and semi-mechanized methods which are used in extracting a wide range of gemstones such as such amethyst, topaz, smoky quartz, rock crystals, etc. Although mining activities have been taking place for many years in this area, there has not been any EIA study done. Thus, in the past, SSMs have been issued with ECCs upon completion of an environmental questionnaire and signing a pro-forma Environmental Contract.

In terms of the Environment Management Act (EMA) No. 7 of 2007, all activities listed under Schedule 1 of the EIA Regulations of 2012, cannot be undertaken without an EIA being carried out and ECC being obtained. The small-scale mining activities at Farm Goboboseb has triggered several listed activities, hence this study.

In order to facilitate the development of EMPs, and subsequent issuance of ECCs by the Environmental Commissioner, the MME in collaboration with the UNDP has appointed an Individual Consultant (IC) to carry out the Environmental Scoping study and prepare an EMP to assist SSMs in this area to comply with the statutory requirements.

1.2 Terms of Reference

These Terms of Reference (ToR) are aligned with the requirements of the Environmental Management Act No. 7 of 2007 and its 2012 Regulations. The IC is therefore required to.

i. Identify, investigate and evaluate all potential impacts of the mining activities on the physical environment, social, cultural and economic environment.
ii. Review relevant and applicable legislations
iii. Consult relevant stakeholders and potential Interested and Affected Parties (I&APs)
iv. Prepare an Environmental Scoping report.
v. Compile an Environmental Management Plan.
vi. Submit the Environmental Scoping Report and Environmental Management Plan (EMP) to MEFT as per EMA Regulations of 2012.

1.3 Independent Consultant

Mr. Joseph Kondja Amushila, hereby referred to as an IC, is a qualified Environmental Assessment Practitioner in terms of Section VII of the EIA Regulations of February 2012 and has over eight years' experience in carrying out Environmental Impact Assessment studies.

Full name	Joseph Kondja Amushila
Qualifications	• Master of Science in Environmental Management (University of the Free State, South Africa) • Bachelor Honours Degree in Agriculture (Polytechnic of Namibia) • Bachelor's Degree in Agriculture (Polytechnic of Namibia) • National Diploma in Agriculture (University of Namibia)
Experience	Up to ten years' experience in Environmental consulting industry, most of which includes Strategic Environmental Assessment (SEA), Environmental Impact Assessment, Environmental Management Plans (EMPs) and Specialist studies.
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2. METHODOLOGY

The study was conducted in a multidisciplinary approach as outlined in the EIA Regulations (Government Notice No 30 of 2012). The methods used in the collection of information and assessment are explained below.

2.1 Field Inspection and Baseline Data Collection

The consultant conducted a field inspection at the small-scale mining sites at Farm Goboboseb. During the field inspection, the consultant interviewed SSMs that were found onsite on issues related to their operations and livelihoods. The consultant also conducted a walk-through-survey across the sites to record various plants and animal species observed. The data collected during the site visit can be summarized as follows:

- A list of all plant species observed at the site. This was verified with Quarter Degree Square (QDS) of vegetation from the National Botanical Research Institute (NBRI).
- Description and composition of the diverse habitats and plant communities observed on site.
- A list of all mammals, reptiles and amphibians directly or indirectly observed at the site.
- Maps of sensitive areas identified in the field and delineated on satellite imagery of the site.
- GPS coordinates of significant point-location biodiversity features.
- Photographs of various habitats, environments and biodiversity features present.

2.2 Collection and Review of Existing Information

Previous studies and surveys were reviewed for collection of relevant secondary information. Information on the ecological setting of the area was collected from sources such as Tree Atlas of Namibia and Vegetation Survey of Namibia and the NBRI. The list of plants species of the area was derived from the NBRI data portal using a QDS method. The QDS of the area are 2114AA, 2114AC, 2114BA, 2114BB. The conservation status of the species in the list was extracted from the database of the Ministry of Agriculture, Water and Land Reform and the Red Data Book Namibian Plants. Information on fauna were obtained from direct observation and counter checked with important sources such as the Birds in Namibia, IUCN Red list of Threatened species of Namibia, and other relevant reports.

2.3 Legal and Policy Review

Relevant legislations were reviewed, and their applicability are outlined in Section 5 of this document.

2.4 Public and Stakeholder Consultation

The study was subjected to a Public Participation Process (PPP) as defined in the Environmental Management Act, No. 07 of 2007 and EIA Regulations of February 2012. The process that was followed is summarized below.

2.4.1 Stakeholders Consultations

The project was formally introduced to key stakeholders such as Government Ministries, Regional and Local Government, Traditional Authorities, and NGOs/CBOs. The aim of these consultations was to ensure that all relevant stakeholders are aware of the development and to obtain consent and input (See Appendix F: List of Registered IAPs).

2.4.2 I&APs Consultations

SSMs were also given an opportunity to give their inputs and contributions toward the study. These inputs are contained in the Issue Response Report and incorporated in the Scoping Report. Potential IAPs were invited to register through newspaper advertisements that were published in two (2) local newspapers: New Era (24 & 29 September 2020), and The Namibian (25 & 29 September 2020). Several public notices were placed at public places i.e., government offices, conservancy offices. Relevant authorities were informed through notification letters sent to them, while the public was informed through the Traditional Authority.

Figure 1: A group of SSMs at Farm Goboboseb during the consultation

2.4.3 Public Meetings

A public meeting was held on Friday, the 30th of September 2020 at the Community Hall in Uis. The meeting was attended by some SSMs, community members, members of the Traditional Authorities, representatives of Conservancy etc. During the meeting, participants were introduced to the project and informed on the purpose of the study and the purpose of the consultation and their rights towards the study.

Figure 2: Public Meeting held at Uis community hall.

2.4.4 Summary of Issues raised from Public Participation.

The PPP has discovered an array of issues affecting small-scale mining activities, most of which relate to the socio-economic and land use issues. All issues collected during the PPP have been outlined in the Issue Response Report appended to this report (Appendix F).

3. SMALL-SCALE MINING

3.1 Definition of small-scale mining

The common definition for the small-scale mining sector has not been legally adopted as its legal status, defining criteria, and local definitions vary from country to country. In some countries, the sector is referred to as, Artisanal and Small-Scale Mining (ASM) which is defined as formal or informal operations with predominantly simplified forms of exploration, extraction, processing, and transportation.

In Namibia, the term small-scale mining is broadly used to define mining activities based on the area size or licence type and on the level of mechanization.

3.2 Mining Rights for small-scale mining

The Minerals (Prospecting and Mining) Act, No.33 of 1992 provides the overarching legal control of rights related to reconnaissance, prospecting, mining sale/disposal in Namibia. In the case of small-scale mining activities, the following mining rights are applicable:

- **Non-Exclusive Prospecting Licence (NEPL)** -This is a gateway licence to pegging mining claims but does not permit the holder exclusive rights for any specific mineral group i.e., semi-precious stones or area of mining.
- **Mining Claim (MC)** – gives rights to prospect and mine. It must be registered within 21 days from the date on which such claim is pegged. Procedures for the application of MCs are detailed on Section 16-45 of the Minerals (Prospecting and Mining) Act, No.33 of 1992.

According to MME, about 64 MCs have been so far registered or applied for in the Goboboseb area. Some of the SSMs have also acquired their NEPLs and are in the process of registering their MCs. There are no illegal miners that are known to be operating at Farm Goboboseb. Hence, majority of SSMs are either working in group collaborations or contracted by MCs holders. These SSMs are currently not organized in a formal association, however, they have a local committee which handles all the operational issues.

3.3 Scales of Mining at Farm Goboboseb

Farm Goboboseb is known to produce a range of gemstones such as amethyst, topaz, smoky quartz, rock crystals. There are two types of small-scale mining methods used at Farm Goboboseb, namely Artisanal or Manual method and Semi-mechanized method. The two methods considerably differ in nature, scale, and types of equipment utilized as well as in their environmental footprints.

a) Artisanal method

The artisanal method is commonly used by SSMs who are self-employed and working in group collaborations and are lacking support of machineries and equipment. The method involves manual digging and excavations of identified pegmatite veins or reefs using pick mattocks and spades and extraction of gemstones by chisel and hammer or by hand picking. The size of the mining area/site under the artisanal method range from 500m^2 to 2500m^2 while the depths of the excavations range from 1m – 1.5m. The size of the mining areas and excavations largely depend on the potentiality of the site, after which the site can be abandoned for a more promising one. Rehabilitation of excavations is hardly done while some excavations are intentionally left uncovered for future explorations when the need arises.

Figure 3: Overview of artisanal mining activities at Farm Goboboseb

b) Semi-mechanized methods

Semi-mechanized method is used mostly by SSMs with good resource base or with assistance from middlemen for earthmoving machineries and equipment such as Tractor-Backhoe-Loader (TLB), Excavators, Air compressors etc. Extraction of gemstones is done manually with a chisel and hammer or by hand picking. Larger-scale blasting is occasionally done by some SSMs to initiate large-scale rock fragmentation.

Figure 4: Overview of Semi-mechanized mining activities at Farm Goboboseb

As depicted in Figure 4 above, the environmental damages caused by Semi-mechanized method is quite huge compared to the impacts caused by artisanal or manual digging method. The size of the mining area ranges from 0.5ha to 1ha for a given site whereas the depths of the excavations range from 3m to 5m. The rehabilitation of the damaged area is hardly done.

3.4 Blasting in small-scale mining

Given the two forms of small-scale mining operations, the scale and type of blasting technique used in each method also differs considerably.

3.4.1 Blasting in artisanal operations

The most common explosives used on an artisanal operation are homemade explosives made of a mixture of gunpowder and smokeless propellant as depicted in Figure 5 below.

Figure 5: Composition of a homemade explosive

The blasting area is prepared by drilling few shots holes and loading explosives in each shot hole. Explosives are denoted by igniting the detonator cords. The explosion usually causes a few fragmentations of the rock bodies.

This blasting method is completely illegal since the manufacturing, storage, usage, and transportation of the homemade explosives is not in accordance with the Arms and Ammunition Act (Act No.7 of 1996). The method is equally dangerous to the public, animal and to the users.

3.4.2 Blasting in semi-mechanised operations

Large scale blasting is often conducted by a registered blasting company or individual. The blasting technique normally follows six main steps as depicted in Figure 6 below.

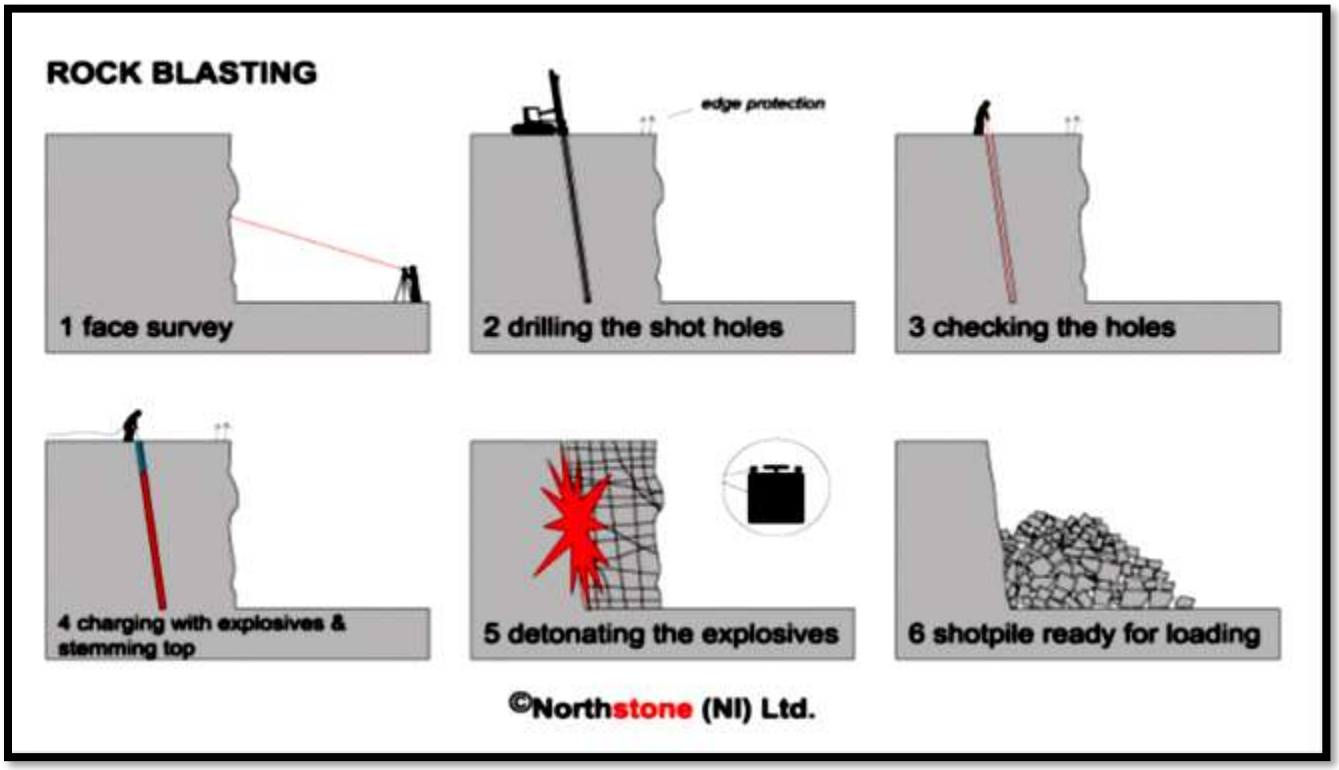

Figure 6: Typical example of the blasting process

Step 1: The first step is a three-dimensional survey of the mining area to allow the explosives engineer to design the blast and to plot where the shot holes should be drilled so that the blast can be carried out safely and efficiently. The survey will also indicate the presence of bulges or hollows in the face and determine the number of explosives required.

Step 2: After the profiling survey, shot holes are drilled using an air or hydro operated driller at the marked spots corresponding to the hole positions on the blast design and at the angles and depths required (9 meter). The number of shot holes will depend on the size of the area to be blasted. This usually range from 10-30 shot holes per occasion.

Step 3: The area is then prepared for blasting and humans and animals are removed from the site. The placement of explosives is professionally planned to ensure that the required fragmentation of the rock is achieved with the minimum environmental impact. Detonator cord is placed in each hole and loaded with explosives within a few metres of the top.

Step 4, 5 & 6: After blasting, the area is inspected to check that all the shot holes have fired correctly. This followed by extraction of gemstone using chisel and hammer or by hand picking. Steps 5 & 6 are only applicable in some cases when crushing is necessary i.e., extraction of garnet. Currently there is no one that does crushing at Farm Goboboseb.

Due the fact that large scale blasting is often carried out by registered companies or individuals, it was difficult to determine the exact amount of explosive kept or used at each MC. The manufacturing, storage and transportation of explosives remain a responsibility of the blasting company. The quantity of explosives used in blasting largely depend on the number and sizes of shot holes as well as types of abrasives at a given blasting site.

3.4.3 Blasting Explosives

Table 1: Most common mining blasting explosive used in Small-scale mining.

Explosive	Compositions	Classifications	Possible Risks
Homemade Small scale rock breaking	Alliant Power and Smokeless propellant	Hazardous substances	Highly flammable,
Emulsion Blasting in opencast mines	Oil emulsion	Hazardous substance, Class 5.1 oxidizing substances.	Oxidizing and toxic substances
Cartridge Suitable for underground mining applications, blasting in opencast mines, and civil blasting operations	Water and oil emulsion	Classified as hazardous substances and dangerous goods	Shock, Fire
Ammonium Nitrate-Fuel Oil (ANFO) Used in dry blast holes for surface and underground operations	Ammonium Nitrate and Fuel Oil	Hazardous substances	Emit hazardous gases (nitrogen oxides and carbon oxide)
Gunpowder Blasting in opencast mines	Sulphur (S), Charcoal (C), and Potassium nitrate (Saltpetre, KNO3).	Hazardous substance	Highly flammable, oxidizing, and toxic substances.

All explosives must be manufacture, stored, and transported in accordance with Arms and Ammunition Act (Act No.07 of 1996).

3.5 Workforce

Although there are many MCs registered in the area, only a few were found to be operational at the time of the study. Operations at many MCs have either ceased or have not yet commenced.

Table 2: Number of SSMs at Farm Goboboseb

MC holders	Scale of Mining	No. of groups	Total No. of employees per group or MC
Jody L Raaths	Sem-mechanized	1	5
Alexdra Raaths	Sem-mechanized	1	5
Jan Koekmoer	Sem-mechanized	1	6
Jaco F Smith	Sem-mechanized	1	4
Vincent Anthony	Sem-mechanized	1	5
Riaan Fraser	Sem-mechanized	1	5
Alfred Lukas	Artisanal	1	16
Victor Johannes	Artisanal	1	20
Erastus Mengela	Artisanal	1	8
Jeremia Shimweneni	Artisanal	1	6
Totals			**80**

There are about 80 SSMs operating at Farm Goboboseb. About 50 SSMs are self-employed and working in groups of 6 to 20 people per group and in collaborations with MC holders. About 30 SSMs are employed by MC holders and are working in groups of 4-6 people per MC. However, the exact number of SSMs operating per MC is hard to determine due to the informality of employment and the frequent movement of SSMs between mining sites in search for more promising opportunities.

3.6 Temporary accommodation facilities

Most of the miners reside at the mining area in tents and houses made of corrugated iron sheets. However, most of the SSMs are permanent residents of Uis settlement and surrounding villages, while few of them originate from other parts of the country and occasionally travel back especially during the festive season.

Figure 7: SSMs at campsite (A) and Temporary accommodations facility (B) at Farm Goboboseb

3.7 Water requirements

Water and other amenities are sourced from Uis settlement which is located about 80 km away. A group of about 50 SSMs residing at Farm Goboboseb receive water from the Uis settlement office on a commission. About 30,000 litre of water is used for a period of six months and is stored in two (2) tanks (10,000 litre). Water is mainly used for domestic purposes such as cooking, washing and no water is required for mining purposes. The alternative water source is a borehole located west of the Brandberg Mountain, however water from this source is not best suited for human consumption.

Figure 9: Water Storage tanks at Farm Goboboseb

SSMs using semi-mechanized operations also collect water from Uis at their own cost and normally use between 2000 litre to 2,500 litre per site/MC on a monthly basis. The amount of water used under semi-mechanized operations differs from that of artisanal operations. This is due to the difference in the number of people involved and the size of operations.

Table 3: Water requirements for Small-scale mining activities

Uses	Monthly water demand (estimated)			
	Average demand (per site/group)		Peak demand (per site/group)	
	Artisanal	**Semi-mechanized**	**Artisanal**	**Semi-mechanized**
Domestic	±800L	±1800L	±1000L	±2,000L
Mining operations	-	±200L	-	±500L
Total	**±800L**	**±2 000L**	**±1000L**	**±2500L**

3.8 Waste Management

Mining activities produce two types of waste, namely: mining waste i.e., waste rocks and general waste i.e., litter etc. The artisanal method only produces a limited amount of waste rocks which in most cases is unnoticeable on site and could easily be backfilled in trenches. On the other hand, the semi-mechanized method produces a large quantity of visible piles of waste rocks because of mass removal of overburden and excavations.

Figure 10: Waste rocks from different Small-scale mining activities

General waste is mainly produced from domestic activities such as cooking, old clothes, and abandoned housing materials etc. Collection of general waste is practiced by some SSMs and waste is disposed of at the Uis disposal site. However, the issue of general waste management is still of great concern among many SSMs, especially with regards to abandoned housing structures, discarded vehicles, or obsolete tools and equipment.

Figure 11: General waste at Farm Goboboseb

3.9 Summary of Small-scale mining activities at Farm Goboboseb

Table 4: Small-scale mining activities at Farm Goboboseb

<table>
<tr><th>Aspects</th><th>Artisanal</th><th>Semi-mechanized</th></tr>
<tr><td>Description of the mining process</td><td>This method is more labour intensive and uses limited technology. The operation starts with the identification of crystalized miarolitic veins or reef, followed by manual digging of open pits and/or drilling holes in granite rock bodies with a generator powered driller.
The depth of an excavation or hole depends on the quality and quantity of crystals found, after which an excavation/pit/drill site can be abandoned for a more promising site.</td><td>This method includes using of semi-mechanized technologies with a combination of equipment such as excavators, bulldozers, and loaders to remove overburden and air compressor or jack hammer to break rock bodies.</td></tr>
<tr><td>Current workforce</td><td>• No. of groups: 4
• No. of people per group: 6-20
• Total No. of SSMs: ±50</td><td>• No. of groups: 6
• No. of people per group: 4-6
• Total No. of SSMs: ±30</td></tr>
<tr><td>Energy requirements</td><td>Fuel: ±40-60 litre/group/month of Petrol
Wood: ±10-20 kg/group/month</td><td>Fuel: ±800-1000 litre/group/month
Wood: ±20-50 kg/group/month</td></tr>
<tr><td>Tools and Equipment</td><td><table><tr><th>Equipment</th><th>Uses</th></tr><tr><td>Pick mattock and Shovel</td><td>Excavation</td></tr><tr><td>Jackhammer</td><td>Rock breaking</td></tr><tr><td>Driller</td><td>Drill holes/rock breaking</td></tr><tr><td>Generator</td><td>Power</td></tr><tr><td>Chisel, Hammer</td><td>Extraction</td></tr></table></td><td><table><tr><th>Equipment</th><th>Uses</th></tr><tr><td>Hydro Compressor</td><td>Rock breaking</td></tr><tr><td>Excavator, TLB</td><td>Excavation</td></tr><tr><td>Spade, Chisel, Hammer</td><td>Extraction</td></tr></table></td></tr>
<tr><td>Supporting infrastructures</td><td>• Temporary accommodation/campsite
• Water storage tanks
• No ablution facilities
• Convenient tuck-shop</td><td>• Temporary accommodation/campsite
• Access Roads
• Vehicle maintenance workshop
• Crusher plant</td></tr>
<tr><td>Environmental damages</td><td>• Excavations: 1m - 1.5m deep
• Use of existing and limited routes.
• Open fire
• Wood collection
• Localized dust emission
• Waste rocks (0.5-1ton per excavation)</td><td>• Excavations: 3m - 5m deep
• Creation of several new routes
• Open fire
• Wood collection
• Noise, vibrations, dust etc.
• Waste rocks (>10ton per excavation)</td></tr>
</table>

3.10 Occupational Health and Safety

Like large scale mining activities, small-scale mining activities also poses several occupational health hazards which could result into serious health risks such as injuries, diseases, or death. The exposure to these hazards could be aggravated by risk factors such as the lack of experience & limited knowledge, nature of work and non-compliance to health safety standards. The common hazards include physical, chemical, biological, radiological, agronomical, and behavioural hazards.

Table 5: Baseline Hazard Assessment of small-scale mining activities

Occupational Hazard	Hazard type	Potential Risks	Likelihood (1-4)	
			Artisanal	Semi-mechanized
Dust	Ergonomic	Lung diseases, skin irritation and eye damage	2	4
Noise	Physical	Insomnia	2	4
Vibration	Ergonomic	Insomnia	1	4
Noxious gases	Chemical	Lung diseases, cancer, respiratory diseases etc.	2	3
Falling rocks	Physical	Injuries, death	3	4
Flying rocks	Physical	Injuries	2	1
Heights	Ergonomic	Falling, injuries, death	2	4
Toxic and hazardous substances	Radiological	Poisoning	2	4
Explosions	Physical	Fire, damage, injuries, death	2	4
Heavy loads	Ergonomic	Fatigue	4	2
Long distances	Physical	Physical fatigue	4	1
Long working hours	Ergonomic	Physical fatigue, insomnia	4	4
Poisonous plants	Biological	Poisoning	4	2
Predators	Biological	Injuries, death	4	2
Snake bites	Biological	Injuries, death	4	4
Harsh weather	Physical	Fatigue	4	4
Conflicts	Behavioural	Injuries	4	4

Likelihood scale: 1-unlikely/improbable, 2 –likely, 3 –most likely, 4 – definite/certainly

3.11 Processing and Marketing of Gemstones

Economic gains from small-scale mining activities are not guaranteed as weeks and months can go-by without extracting valuable gemstones. The Goboboseb area occasionally produces high concentrations of exceptionally good quality crystals in “pockets” with the most sought-after gemstones being the aqua-marine crystals.

High quality gemstones are sold to established buyers in nearby towns such as Uis, Henties Bay and Swakopmund, while lower value gemstones, e.g., black tourmaline, are sold locally to collectors and tourists. SSMs are also occasionally given opportunity to sell their products at international trade fairs in countries like Germany, India, and USA.

The processing methods used in small-scale mining activities consist of hand sorting with the aid of the visual characteristics of the gems (fluorescence, shine, and colour) and no equipment is used in this process. Prices of gemstones are determined based on the artworks, aesthetics, rarity, condition, and size of crystals, and are set on individual specimens without any guidance. Namibia has very few regulations on gemstones trading except for 2% of the gemstone value that is payable to the state through the MME. As such, some of the high value gemstones often get exported without their true value being declared (Amunkete and Nyambe 2009).

3.12 Gender aspects

All the small-scale miners at Farm Goboboseb are men, women and other household members are mostly involved in the sorting and selling of gemstones. More than fifty (50) women are involved in selling of gemstone at the Henties Bay-Uis roadside markets.

3.13 Challenges faced by SSMs

Small-scale miners are faced with several challenges which affects their daily operations and their environmental due diligences.

3.13.1 Lack of capital

Majority of the SSMs lack capital to acquire machineries and mining equipment. Financial support from local financial institutions is hard to come by as the small-scale mining business is regarded as a risky business. This lack of funding makes it difficult for the SSMs to operate efficiently as well as carrying out rehabilitation of the mining areas.

3.13.2 Harsh and risky working conditions

Goboboseb is a remote area and lacks basic social services such as primary health care facilities, clean water, and sanitation. The closest urban centres are the Uis settlement (80km) and Henties Bay town (+-150km). Hence, SSMs are required to travel long distances to acquire basic social services. Due to the remoteness of the area and nature of activities carried out, SSMs are at risk of physical fatigue and exhaustion which is contributed by lugging heavy loads, working long hours, walking long distances, and engaging in other heavy duties.

3.13.3 Limited expertise

Majority of the small-scale miners are self-employed and did not go through a formal recruitment process or received proper training. Hence, they lack proper understanding of the legislative requirements and have limited awareness on environmental due diligence.

3.13.4 Lack of market information

Due to the informal status of the small-scale mining industry, there is a lack of information related to the potential markets and latest market prices for gemstones. This has made small-scale miners to be price takers and losing out on well-deserved profits.

3.13.5 Long distance support services

Since most of the administrative support for small-scale miners is only done in Windhoek, some SSMs often find it difficult to obtain legal requirements such as NEPLs, MCs, transport permits, etc. This has greatly affected the efficiency of their operations, discouraged them, and forced some SSMs to engage in illegal mining activities.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

Below is the baseline of the affected environment. It entails a description of various environmental receptors that are likely to be affected by small-scale mining activities. This includes both the socio-cultural-economic and biophysical aspects.

The impacts on socio-cultural-economic aspect will affect a greater geographical area e.g. constituency, regional and national. Hence, the description of the socio-cultural-economic baseline provided for the study area corresponds to the extent of the community in which the activities are taking place.

Alternatively, the baseline study area chosen for physical and ecological data collection is mainly the area which is in the direct zone of influence of the small-scale mining activities, its process facilities and supporting infrastructures.

4.1 Socio-economic Environment

4.1.1 Study area

Farm Goboboseb is located approximately 80 km west of Uis and is accessible through the D2342 road and can be located on co-ordinates 21°15'00" South and 14°10'30" East. Farm Goboboseb is a communal land under the Daure Daman Traditional Authority. Politically, the area falls under the Dâures Constituency of the Erongo Region.

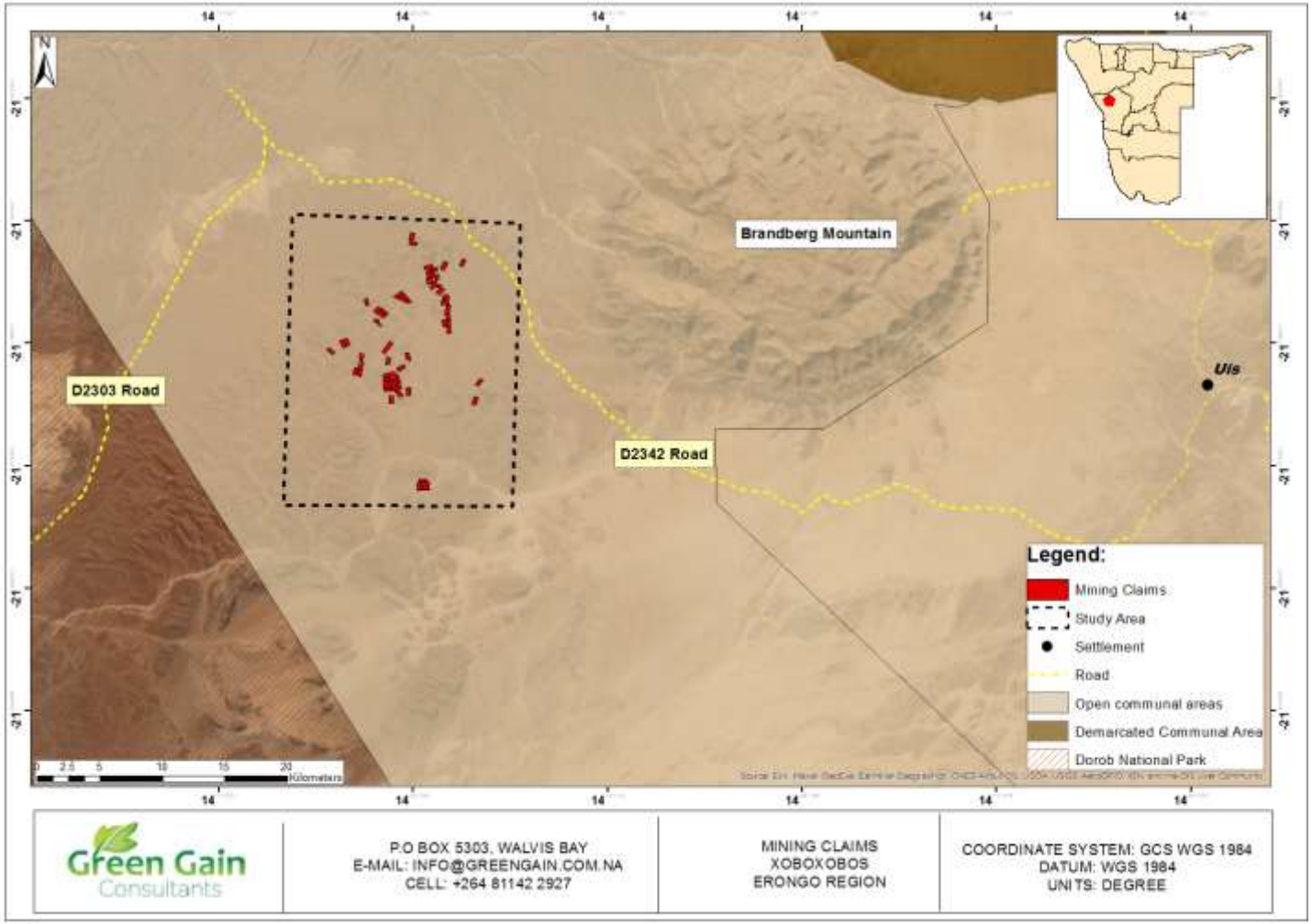

Figure 12: The Study Area

4.1.2 Surrounding land use patterns

The most notable surrounding land uses are the Brandberg National Monument, Messum Crater, and the White Lady Paintings. The Brandberg National Monument was declared in 1995 and has a core area of 450 square kilometres and a buffer zone of 10 square kilometre.

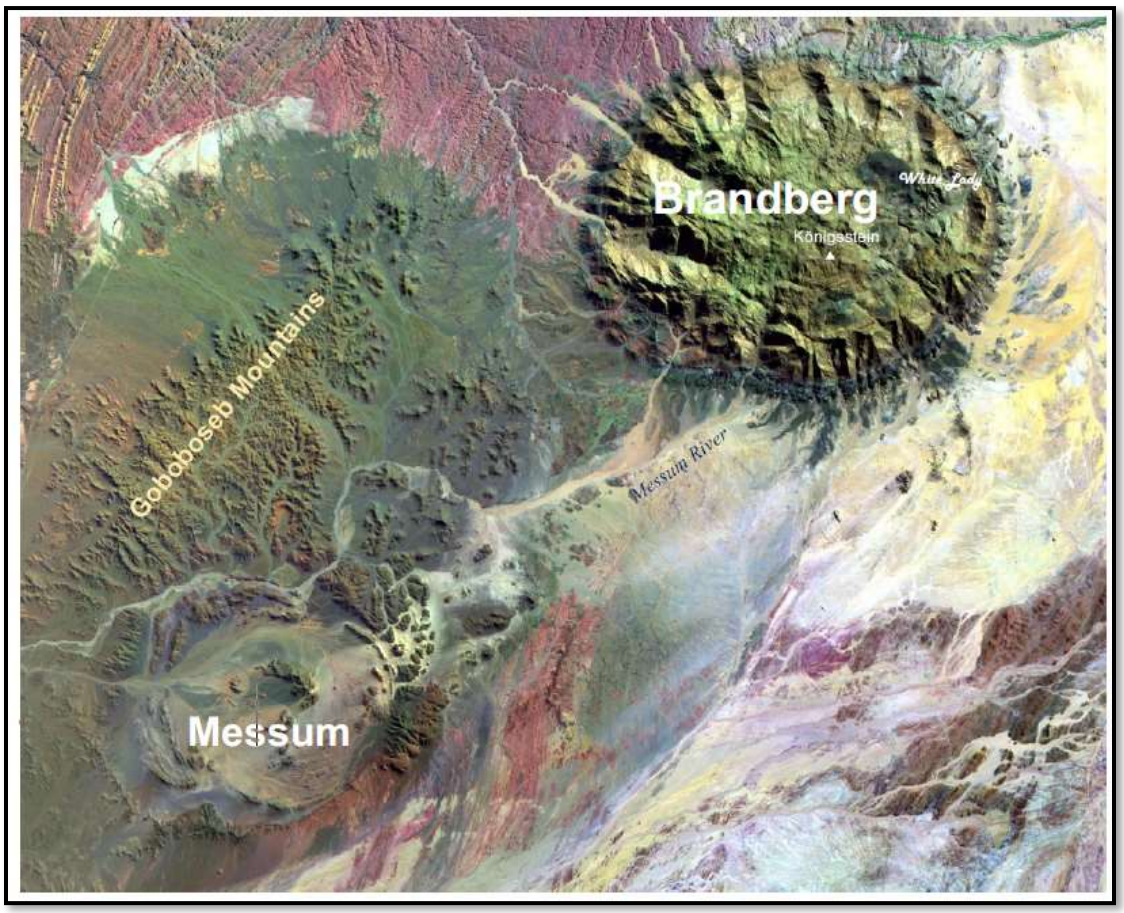

Figure 13: Surrounding land uses (Source: Geological Society of Namibia)

Due to the arid nature of the landscape, the area has very little agricultural potential and only a limited number of deserts adapted wildlife occurs in the area. The main activities in the area apart from small-scale mining is tourism due to the presence of the Brandberg Mountain, Messum Crater, the White Lady Rock Painting and other small rock overhang and rock paintings in the Tsisab Ravine at the foot of the Brandberg Mountain. There are no settlements within the Goboboseb apart from the small-scale miners' temporary camps. However, the area is slowly turning into a village and currently it is home to about 80 small-scale miners, of which all are men.

From the conservation perspective, Farm Goboboseb falls under the jurisdictions of the Tsiseb Conservancy which covers approximately 7,913 km^2 of land and support a population size of about 2,636 people. In terms of the conservancy land use zoning map (see Figure 14 below), the small-scale mining activities are concentrated mainly on the sensitive area zone and slightly on wildlife and mining and tourism zones. There are several tourism activities within the conservancy such as lodges, trophy hunting, semi-precious stone market, own use hunting etc.

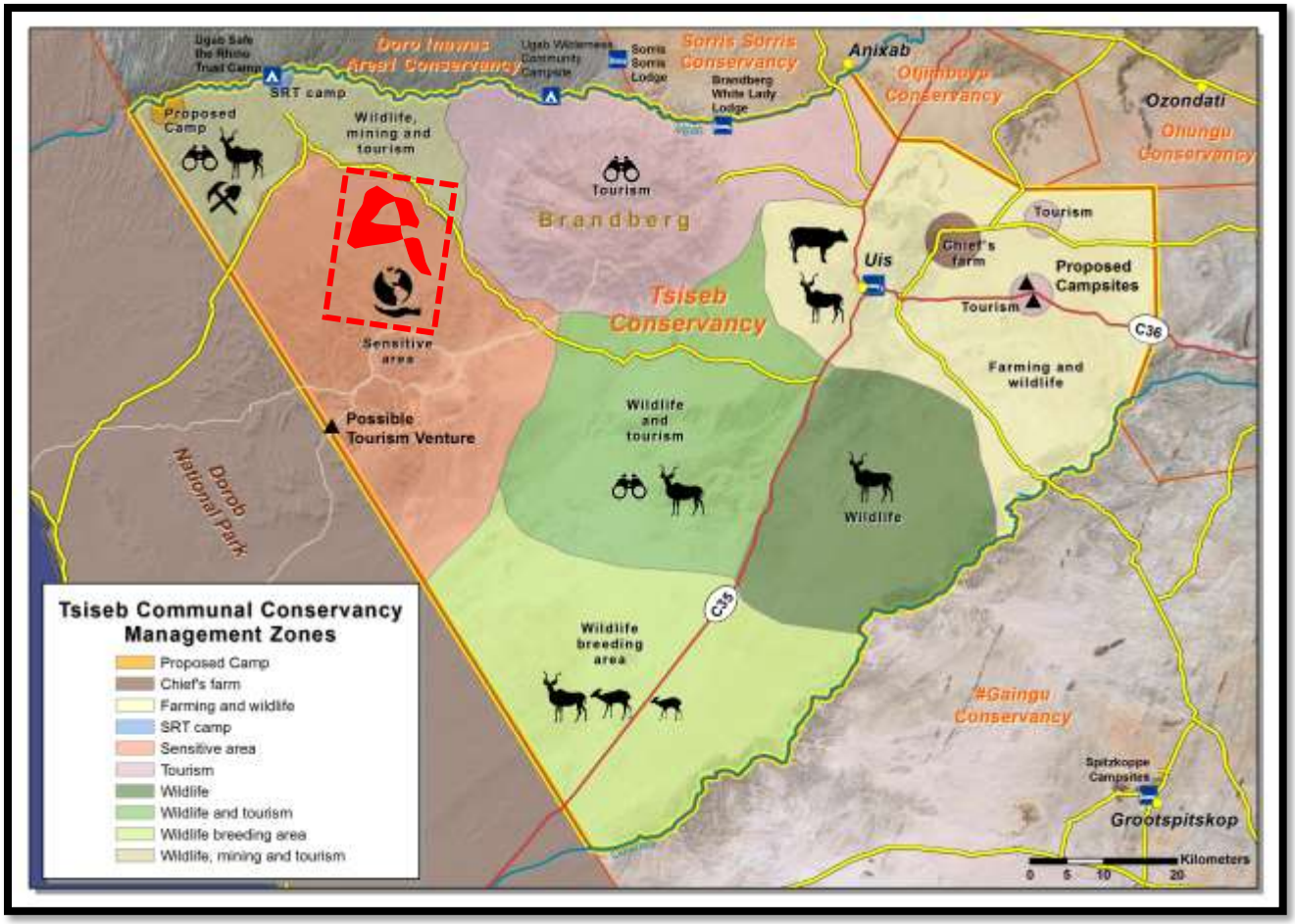

Figure 14: Conservancy land use zoning map (Source: Tsiseb Conservancy, 2020)

It is expected that the existing and future small-scale mining activities will be conducted in line with the conservancy land use zoning map. This can be achieved through effective communication with the Conservancy Management Committee. This arrangement will help to avoid any land use conflicts and maintaining the existing environmental management priorities of the area.

4.1.3 Demographic characteristics of the area

The Dâures Constituency in which Goboboseb area falls, is the largest constituency in Erongo Region covering an area of 13,490 km^2. According to the National Census of 2011, the population of Dâures is estimated at 11,350 people, of which majority (60%) are males between the age of 15-59 years old. The closest urban centre is the settlement of Uis (about 80 km) with an urban population of approximately 3,600people (NSA, 2011).

4.1.4 Livelihoods

Erongo Region is one of the most affluent regions in Namibia, with the second highest per capita income of N$ 16,819 per annum. About 80% of the population in Erongo lives in urban areas while only 20% live in rural areas. Majority of the rural communities in Erongo Region depend on communal subsistence livestock farming for their livelihoods. The region has the highest unemployment rate of 34%, with the main source of income being wages and salaries. However, due to its arid nature, the area has very little agricultural potential. Mining is one of the biggest economic contributors in the region and it has been estimated that the small-scale mining activities alone provide employment for about 1600 and 3000 people in Erongo Region (National Planning Commission, 2010) and Farm Goboboseb provides a source of livelihood to more than 80 families.

4.1.5 Regional social and economic development

The region has the second highest level of development and the second lowest rate of human poverty of 7.1% compared to the National poverty level of 28.7%. About 65% of the rural community of Dâures Constituency has access to fresh water, while 61% of the population have no access to toilet facilities (NSA, 2011).

Erongo Region has an extensive network of tarred roads and various gravel roads which connects the region to the transport corridors and the rest of the country. The region is connected to the well-developed national power grid through the Erongo Regional Electrical Distributor (ERONGO RED). Telecom Namibia and Mobile Telecommunication (MTC) are the main network providers in the region. However, the network coverage remains a big challenge to many remote areas in the region.

4.1.6 Health and education

In terms of social development, there are 24 state health facilities in Erongo region which include 4 district hospitals, 4 health centres, and 18 primary health care clinics. The closest health facilities to Farm Goboboseb are primary health care clinics in Uis, the Henties Bay health centre and the Swakopmund state hospital. The main health concerns in the region are high prevalence of HIV/AIDS and TB. HIV prevalence is high in productive age group between the ages of 30-39.

The main contributing factors to this high prevalence are flourishing of certain trades such as liquor selling, commercial sex and seasonal employment opportunities (MoHSS, 2012). The government through the MoHSS runs different programmes aimed at improving the health standards and community health education. One such interventions was the establishment of District AIDS Committees to mobilize communities to curb the spread of the disease. Communities also received trainings such as senior Window of Hope, My Future is My Choice, Motivational speaking etc.

In terms of education, the literacy rate in Erongo is at 82% with more than 80% those at the ages of 6 -15 attending school, while those older than ages of 15, 79% has left school, 9% are still at school, and only 8% has never attended schools (MEAC, 2015).

4.1.7 Community vulnerability

There are no indigenous or vulnerable groups of people in Erongo Region. Some of the Ovahimba women that are found in the Uis area are believed to be origins of the south Kunene Region and only come to Uis for marketing their products and often travel back.

Due to the aridity nature of the Erongo Region, most rural communities in Erongo Region, especially those reliant on livestock and crop farming are extremely vulnerable to the impact of climate change. Hence, the communities are likely to be vulnerable to any action that may contribute to land degradation in the area.

4.2 Biophysical Environment

4.2.1 Climate and meteorology

According to Köppen Climate Classification, the climate of the Goboboseb area can be classified under Eastern zone and Middle zone. The average annual rainfall is very limited and can range between 0-100mm. There has not been any rainfall received in the area for almost seven consecutive years.

Temperatures ranging from hot to very hot during the day in summer and cold to very cold in winter nights are experienced due to outgoing solar radiation under typically clear skies. The prominent wind directions are southerly and south-westerly during the summer, and north-easterly during winter.

4.2.2 Topography

The topography of the area ranges from very high, about 2559 m.a.s.l (Brandberg Mountain) to very low, about 55 m.a.s.l. As depicted in Figure 13 below, mining areas represented by mining claims (in red) are concentrated on areas with moderate to low topography.

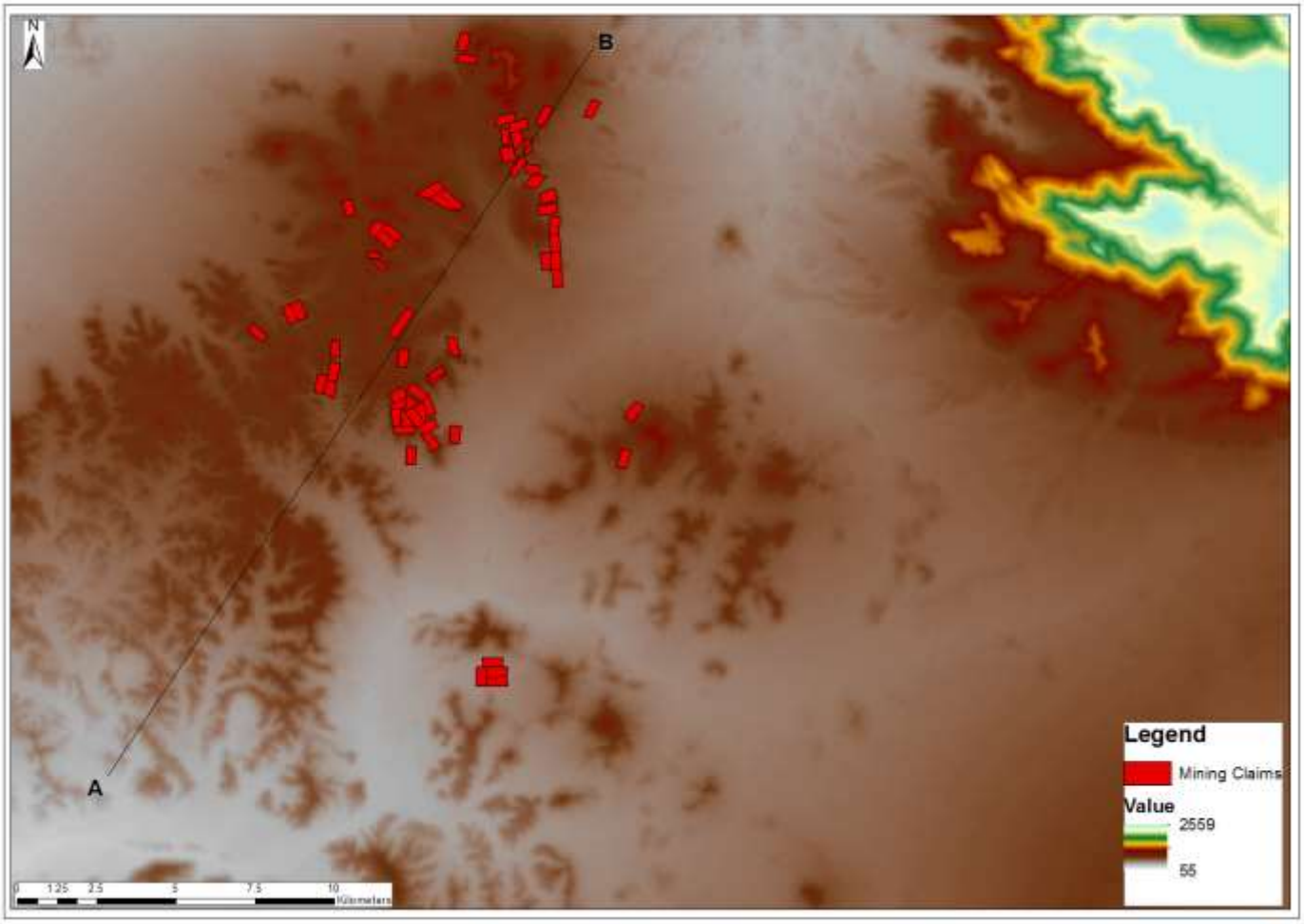

Figure 15: Topography of the area (Source: Excel Dynamics, 2020)

4.2.3 Landscapes of the affected area

Goboboseb area is made up of the prominent geological formation of the Etendeka lavas of which the Brandberg Mountains is the major feature. The mineralization of the mining area is made up mainly of mica schist, minor quartzite, graphic schist, marble, mudstone, sandstone, siltstone, shale, and limestone.

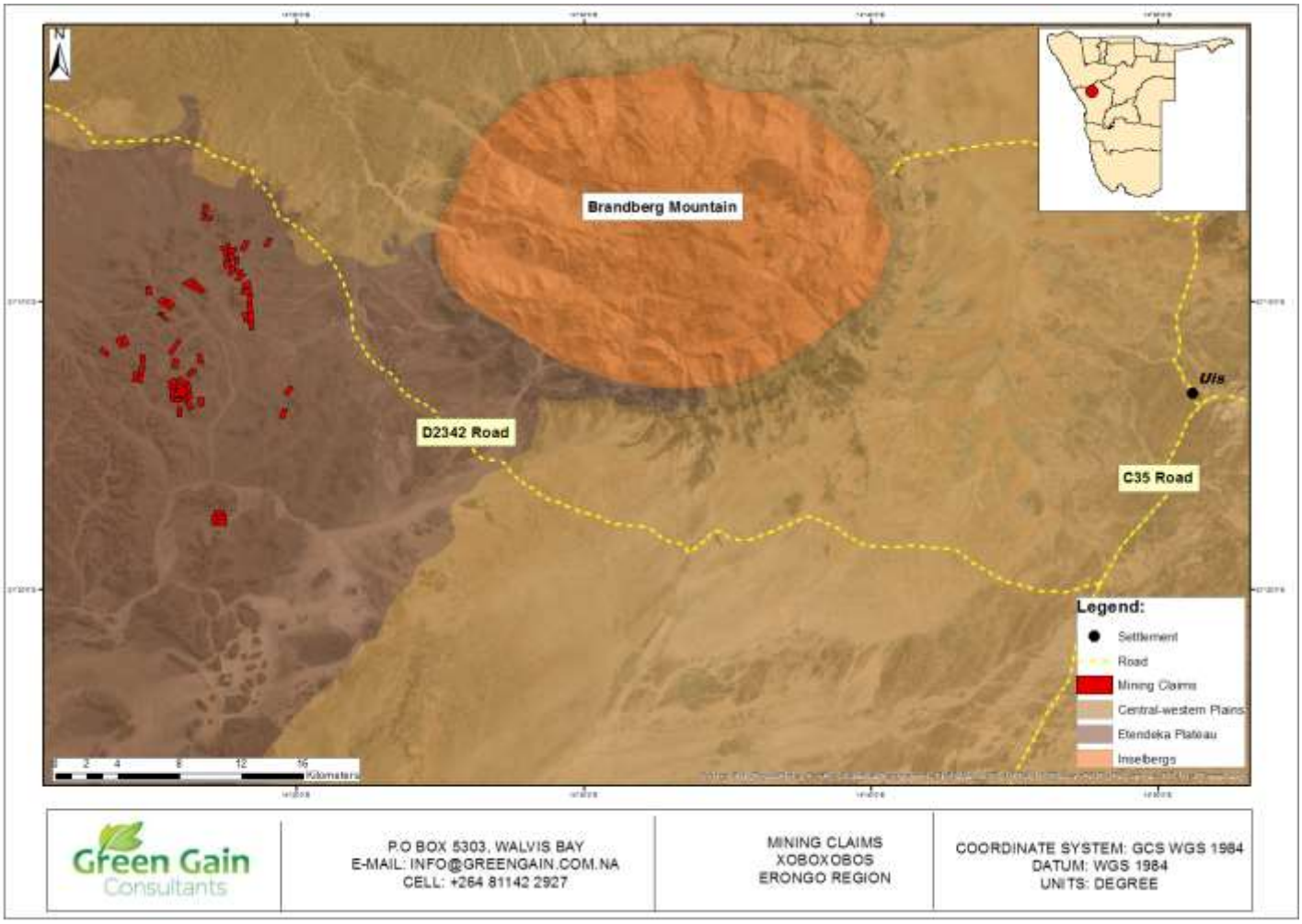

Figure 14: Landscapes of the area

4.2.4 Habitats and local flora

Most of the habitats affected by the small-scale mining activities include open gravel plains, rocky outcrops, inselbergs, caves, and incised valleys.

The local flora is mainly the Karoo-Namib which is characterized by a variety of species most of which are succulent types and endemic to the area. Typical flora of the area is *Welwitschia mirabilis, Zygophyllum cylindrifolium Schinz, Aloidendron dichotomous, Stipagrostis damarensis, Danthoniopsis ramose, Acacia montis-ustii* etc.

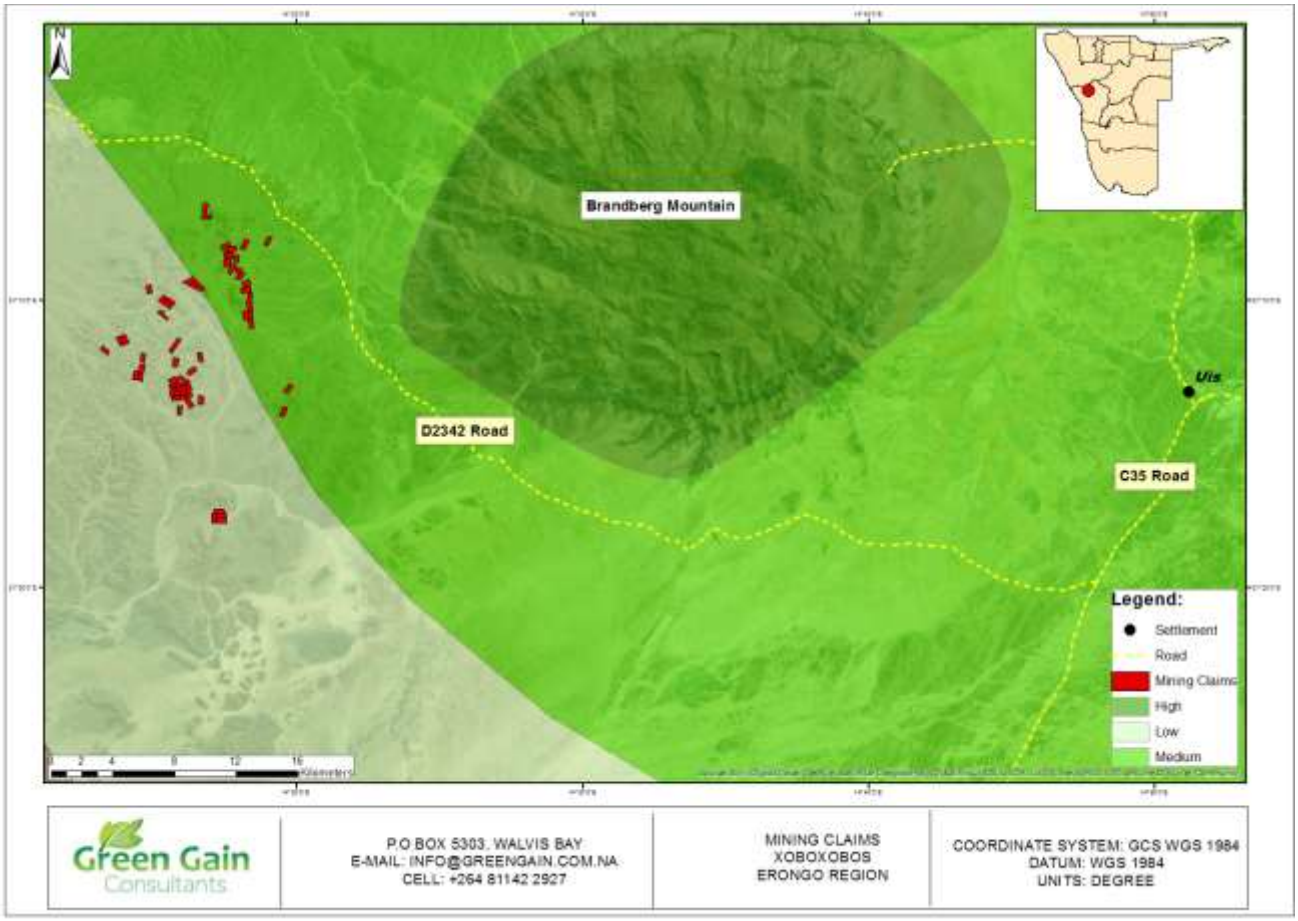

Figure 15: Vegetation Distribution of the Area

A complete list of vegetation that are known to occur in the area was obtained from the Namibia Botanical Research Institute (NBRI) (see Appendix A).

4.2.5 Fauna and their habitats

The notable local occurring fauna are displayed in the table below.

Table 6: Locally occurring fauna

Category	Types	Category	Types
Wildlife	Elephant, Black Rhino, Leopard, Cheetah, Mountain Zebra, Kudu, Oryx, Ostrich, Springbok, Steenbok, Jackal, Klipspringer.	**Mammals**	Baboons Bats
Reptiles	Snakes, Geckos, Lizards Chameleons, Tortoise	**Birds**	Yellow Eagle, Owls, Swift birds
Amphibians	*Pyxicephalus adspersus* (near threatened but is widely spread across Namibia	***Others***	Squirrels, Rats & Mice, Rodents, Insects and Scorpions etc.

The most sensitive local fauna at Goboboseb area are the desert elephant and the rare black rhino which both prefer incised valleys for habitation. Other local fauna prefers mountainous, rocky, hill, caves, and other remote habitats.

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Figure 16: The Namibia's Black Rhino

The impacts of small-scale mining activities are likely to pose minimal risks to the occurrence of local fauna in exception of elephants and rhinos. However, potential threats could occur through illegal hunting, trapping, poaching and veld fire.

4.2.6 Conservation priorities

- **Protected species**

Due to its desert environment, proximity to the Brandberg Mountain and the coastal zone, the area can be considered a pristine environment with high to very high vulnerability.

As depicted in Figure 17 below, mining activities are taking place in the area surrounded by sensitive habitats which are characterized by an abundance of protected species such as the *Welwistchia mirabilis*, *Citrullus lanatus* and *Aloe ramossissima (Giant's Quiver tree).*

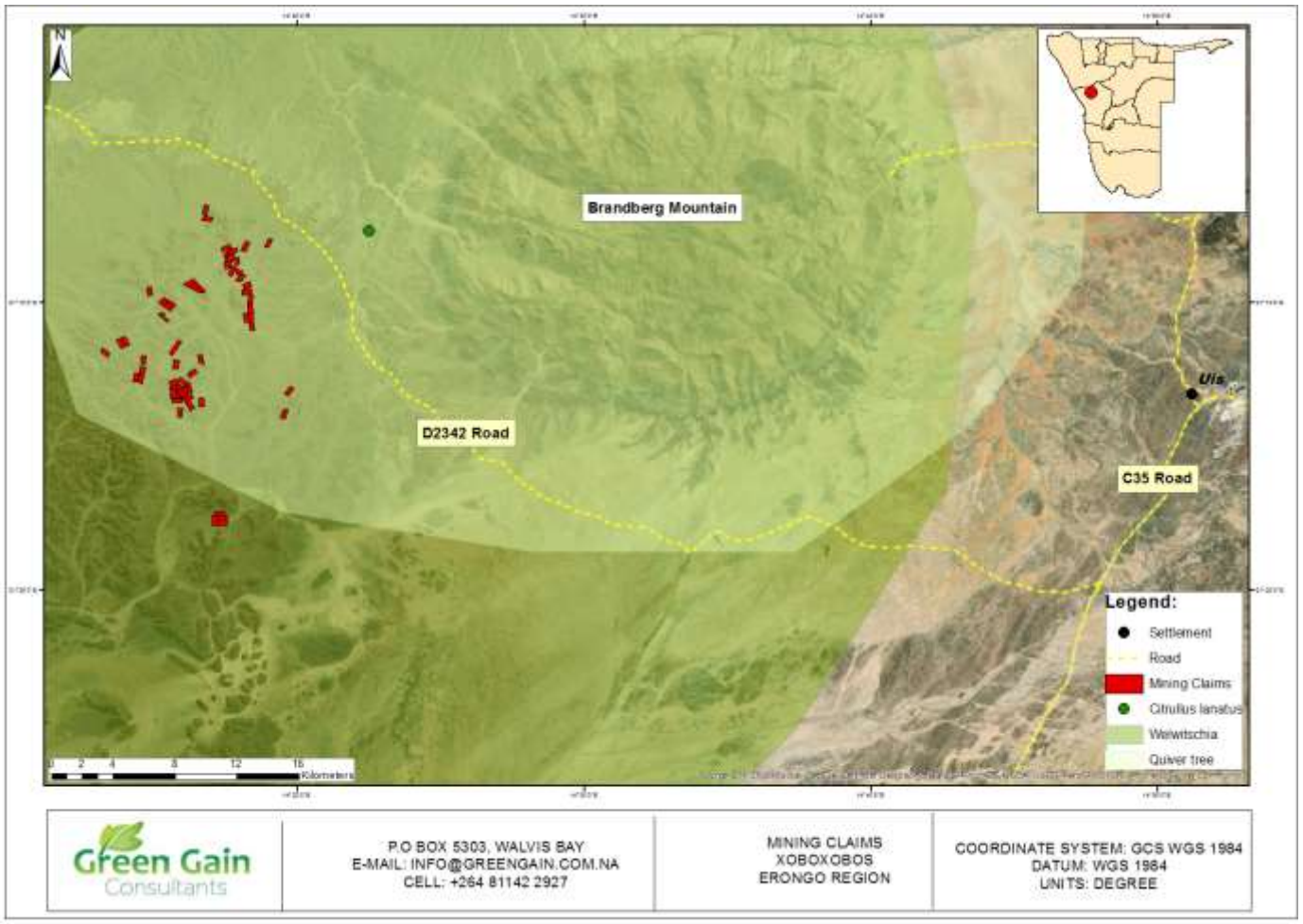

Figure* 17*: Vegetation sensitive sites in the area

Below is a list of some of the protected species that were observed and are known to occur in the study area.

Table 7: List of Protected species in the area

English name/Local name	Scientific name	Occurrence
Quiver tree or kokerboom	*Aloidendron dichotomum*	Hilly slopes
Welwitschia	Welwitschia *mirabilis,*	Valleys and open plains
Stinky-shepherd tree	*Boscia Foetida*	Open plains
"Ghaap" or "Bobbejaanghaap	*Hoodia montana*	Rocky slope
Resurrection plant	*Myrothamnus flabellifolius*	Mountainous
Red bush willow	*Combretum apiculatum*	Valleys
Sand commiphora	*Commiphora Angolensis*	Valleys
Three thorn/Driedoring/okatakambindu	*Rhigozum Brevispinum*	Open plains
Clusterleaf/Omugolo	*Teminalia sericea*	Open plan

Sources: Forestry and Environmental Authorizations Process for Bush Harvesting projects; NBRI, 2020)

Generally, all harvesting of trees and wood, anywhere in Namibia should be subject to a harvesting permit, as prescribed under the Forestry Act (2001) and Regulations (2015). Collection, harvesting or transportation of protected species is prohibited and punishable by law.

- **Species of IUCN importance**

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species (also known as the IUCN Red List or Red Data List), is the world's most comprehensive inventory of the global conservation status of biological species. The list uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. The aim is to convey the urgency of conservation issues to the public and policy makers, as well as help the international community to mitigate species extinction.

The IUCN Red List threat categories are as follows:

- *Extinct or Extinct* in the Wild
- *Critically Endangered, Endangered and Vulnerable*: species threatened with global extinction.
- *Near Threatened*: species close to the threatened thresholds or that would be threatened without ongoing conservation measures.
- *Least Concern*: species evaluated with a lower risk of extinction.
- *Data Deficient*: no assessment because of insufficient data

The study area is known to have a high endemism of some of the species classified under the IUCN list as listed below.

Table 8: Local species found on IUCN Red List

Scientific name(s)	Local name(s)	Habitats	IUCN category
Diceros bicornis	Black Rhino	River valleys, grassland	Endangered
Equus zebra hartmannae	Mountain Zebra	Rocky slopes	Endangered
Laephotis namibensis	Namib Long eared Bat	Caves	Least concern
Felis lybica	African Wild Cat	Rocky areas	Vulnerable
Vulpes chama	Cape Fox	Woodland	Vulnerable
Otocyon megalotis	Bat-eared Fox	Woodland	Vulnerable
Polemaetus bellicosus	Martial Eagle	Large trees in riverbeds	Endangered
Bufo capensis	Cape Eagle-Owl	River valleys	Near Threatened
Aquila verreauxii	Verreauxs' (Black) Eagle	Mountains	Near Threatened
Falco peregrinus	Peregrine Falcon	Cliff	Near Threatened

Sources: Namibia Biodiversity Database and Red Data List

4.2.7 Water resources management

- Surface water availability

Due to its arid climate, water is a very scarce commodity in the Goboboseb area. As depicted in Figure 18 below, several small ephemeral rivers such as Orawab, Messum, Numas and Amis are found in the area and all drain toward the skeleton coast in the west. These rivers are characterized by dry, sandy, or rocky riverbeds and occasionally flow after heavy rains.

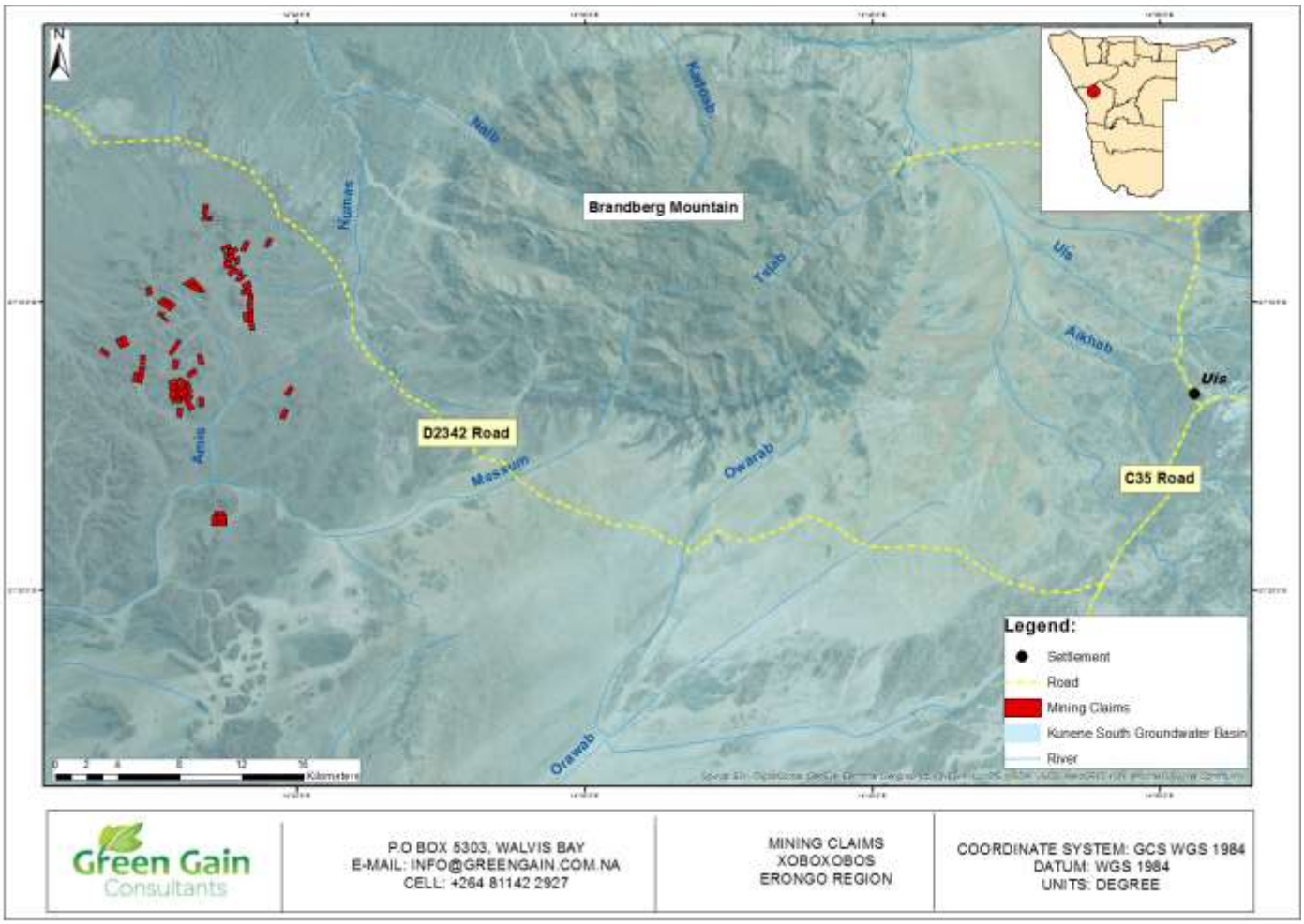

Figure 16: Hydrology of the Area

There are no boreholes in the Goboboseb area, the only source of surface water in the area is a fountain in the Brandberg Mountain. However, the quality of water from this source is considered not fit for human consumption.

- Hydro-geological setting

The aquifer of the area is of aquitard and aquiclude type with very limited to generally low groundwater potential.

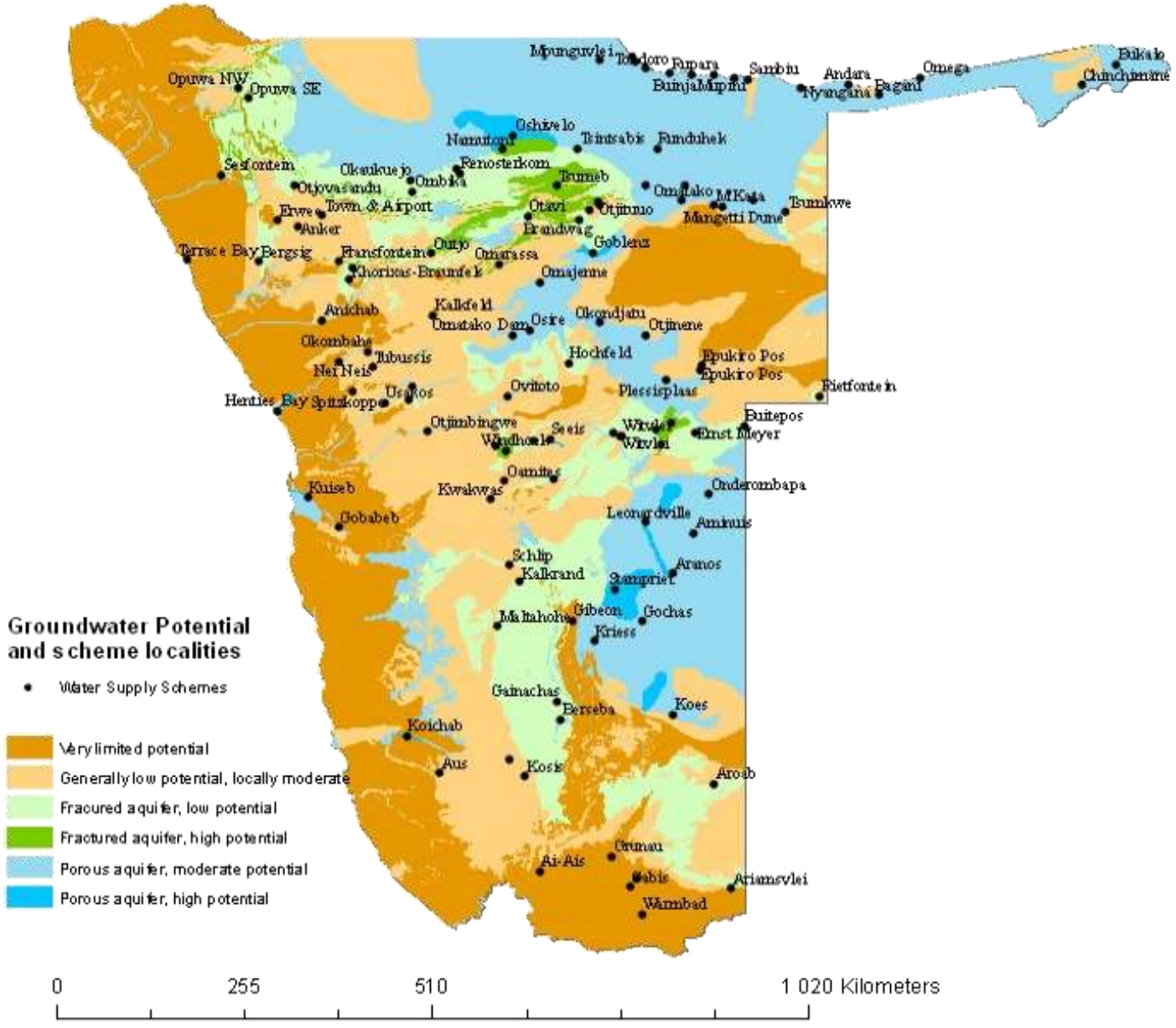

Figure 19: Groundwater map of Namibia (Source: MAWLR, 2020)

Various fractures and faults are the main source of aquifer recharge during heavy rainfalls. However, the reachability of the local aquifer is very low given the limited rainfall of the area.

- ❖ Integrated water resource management

Water resources management in Namibia is carried out at the lowest management level, known as the basin level. To broaden the management process, the country is divided into twelve hydrogeological regions based mainly on geological structure and groundwater flow. As per Figure 20 below, Farm Goboboseb falls under the Ugab-Huab River Basin.

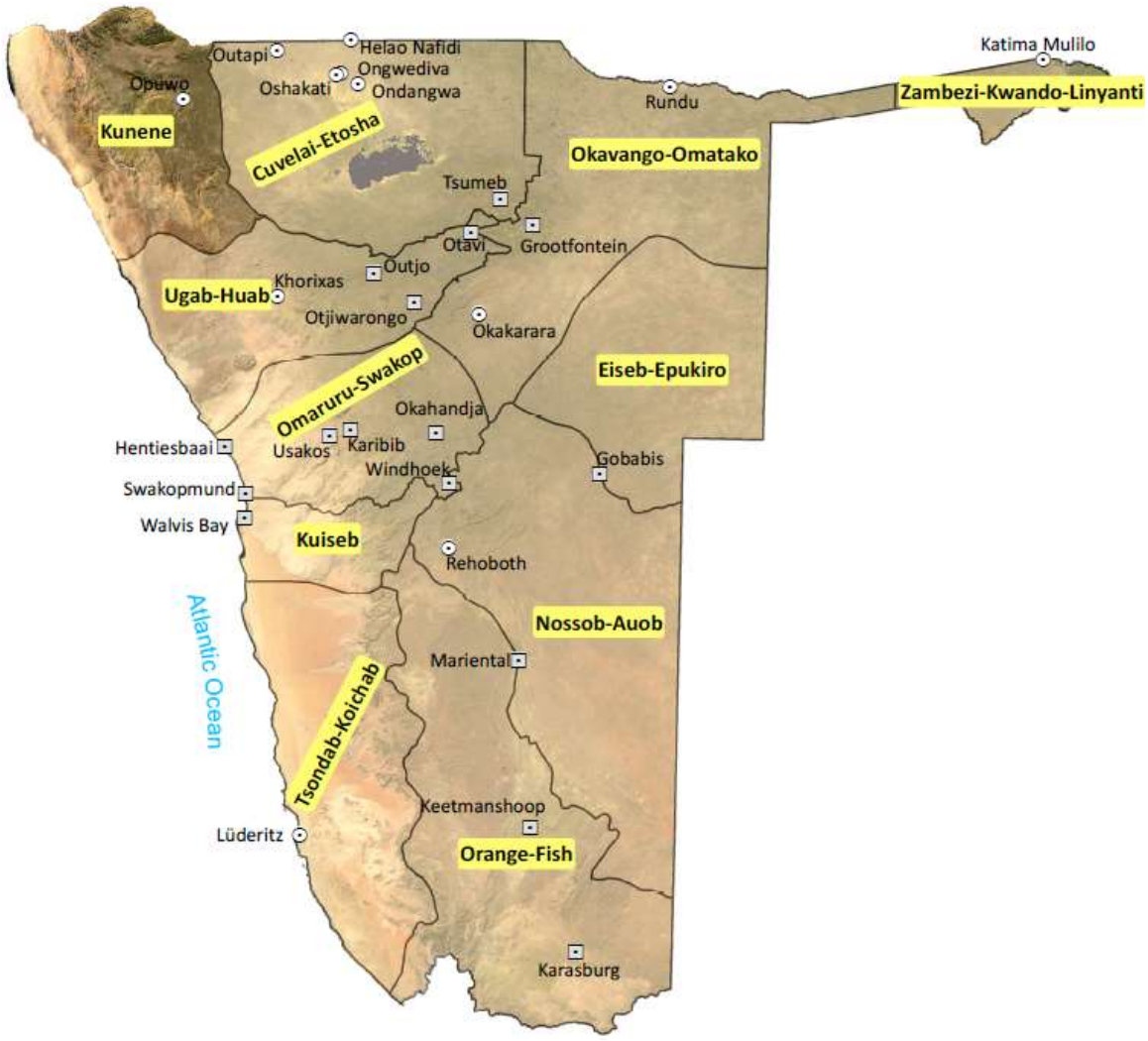

Figure 20: Hydro-geological map of Namibia (Source: Central Bureau of Statistics, 2010)

Groundwater is the main source of water in the basin and is mostly provided through boreholes and pipeline schemes. The MAWLR and NamWater are the main institutions responsible for management of water resources and ensuring efficient and effective bulk water supply to rural areas and urban areas, respectively. Water at Farm Goboboseb is supplied by the Uis settlement office on a commission and is stored in two (2) tanks (10,000 litre).

4.2.8 Soil

The soils of the mining area are mostly eutric regosoils and lithic leptosoils which are generally thin and poorly developed. These soils have limited potential for agricultural production.

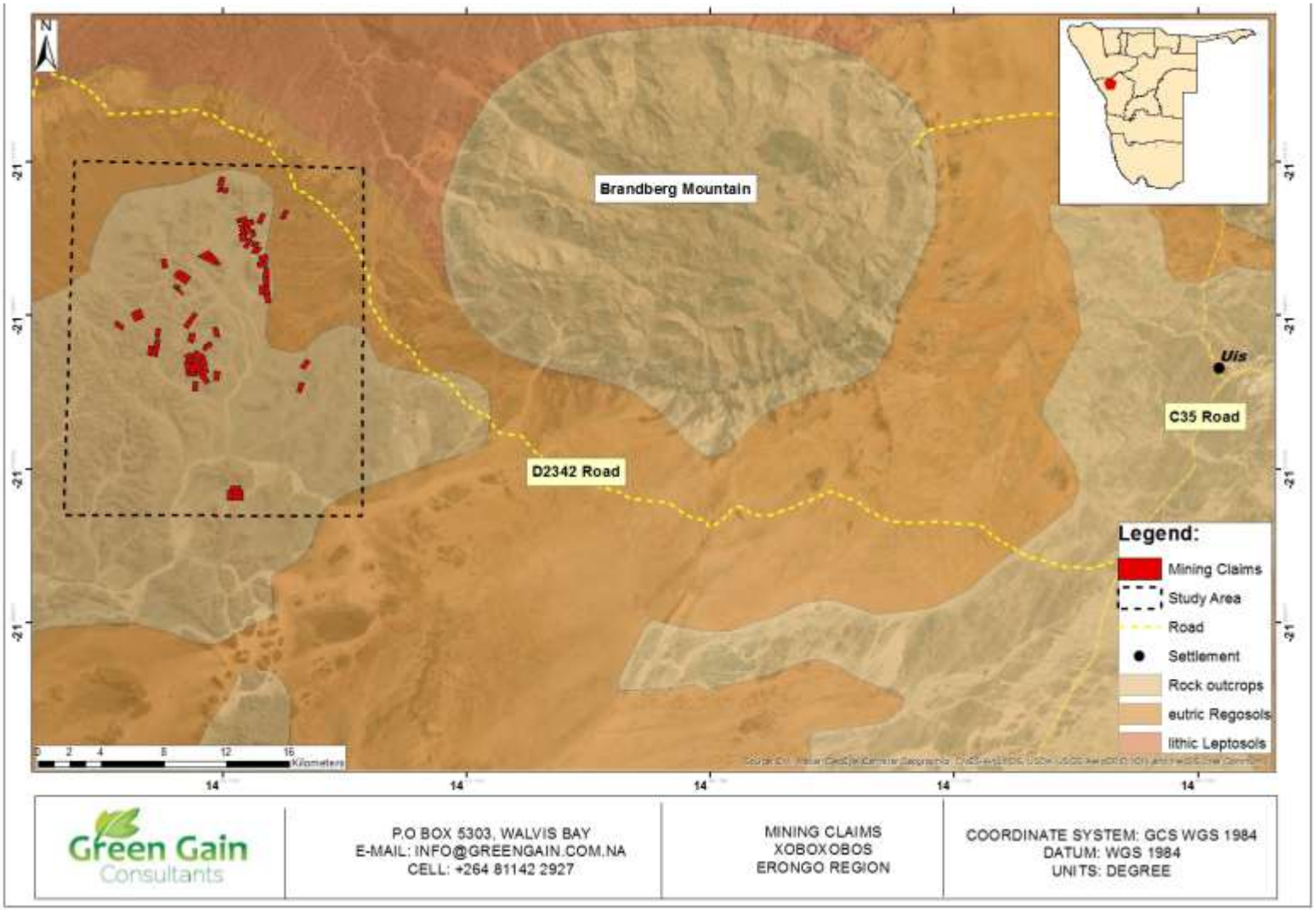

Figure 21: Local soils in the area

4.2.9 Geology

The geology of the area is complex and diverse and is dominated by older rocks of the Damara Sequence. The area is known for its recent intrusive and extrusive episodes that have resulted in the creation of lava sequences of the Etendeka Plateau, the Messum Crater and the Brandberg (Kotze, 2002). The lava flow of the Etendeka Group give rise to “pockets” of semi-precious stones and rare metals mined in the area (National Planning Commission, 2010). The semi-precious stones that occur in the area include aquamarine, tourmaline, amethyst, rose quartz, smoky quartz, other crystals, prehnite, tin and tantalum.

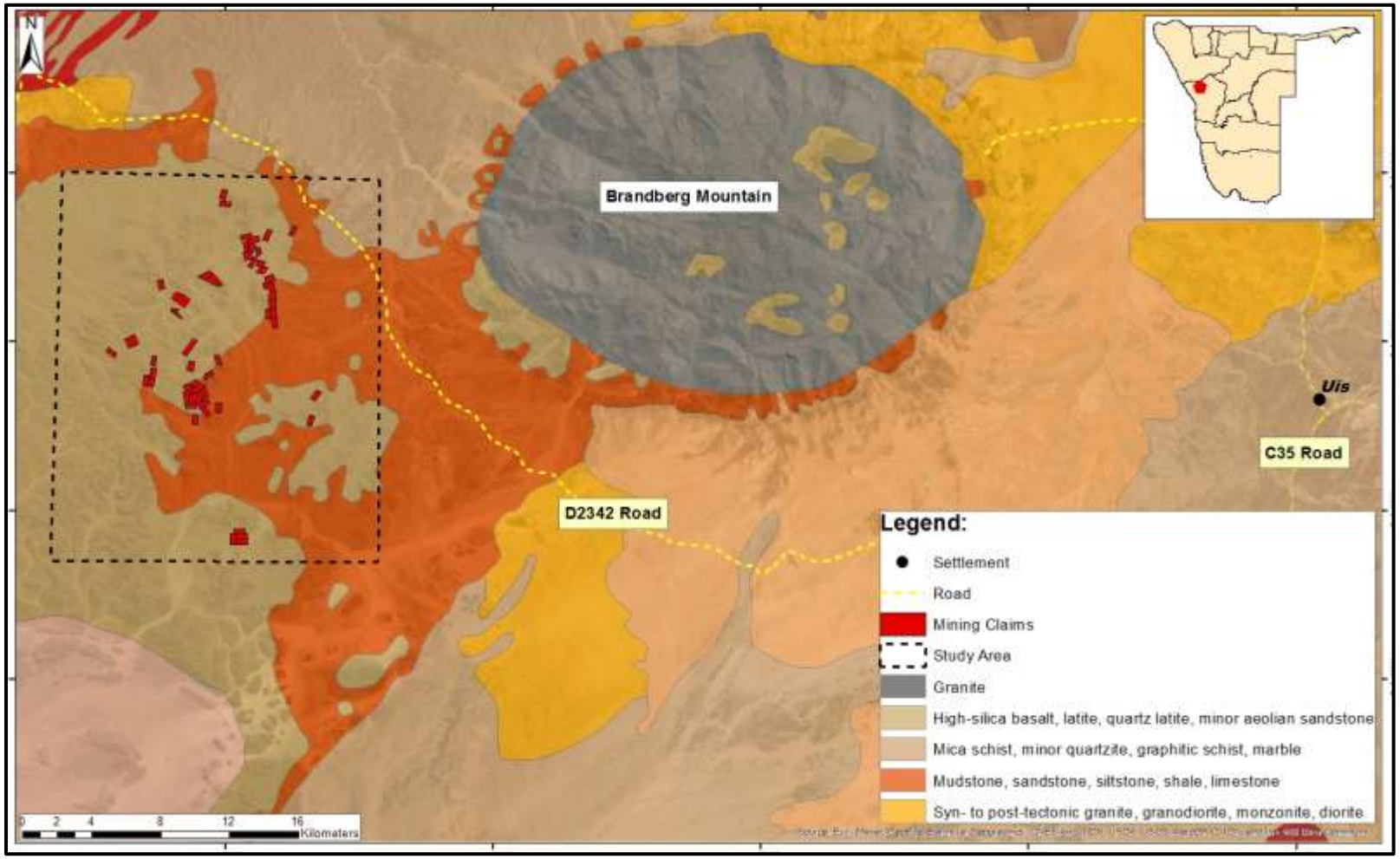

Figure 22: Geology of the study area

4.2.10 Archaeology

According to the National Heritage Council (NHC, 2020), Erongo region at large, hosts an extensive wealth of heritage resources; hundreds of archaeological sites (documented and undocumented). As for Goboboseb mining area, there are about 900 artefacts which are found in the Brandberg.

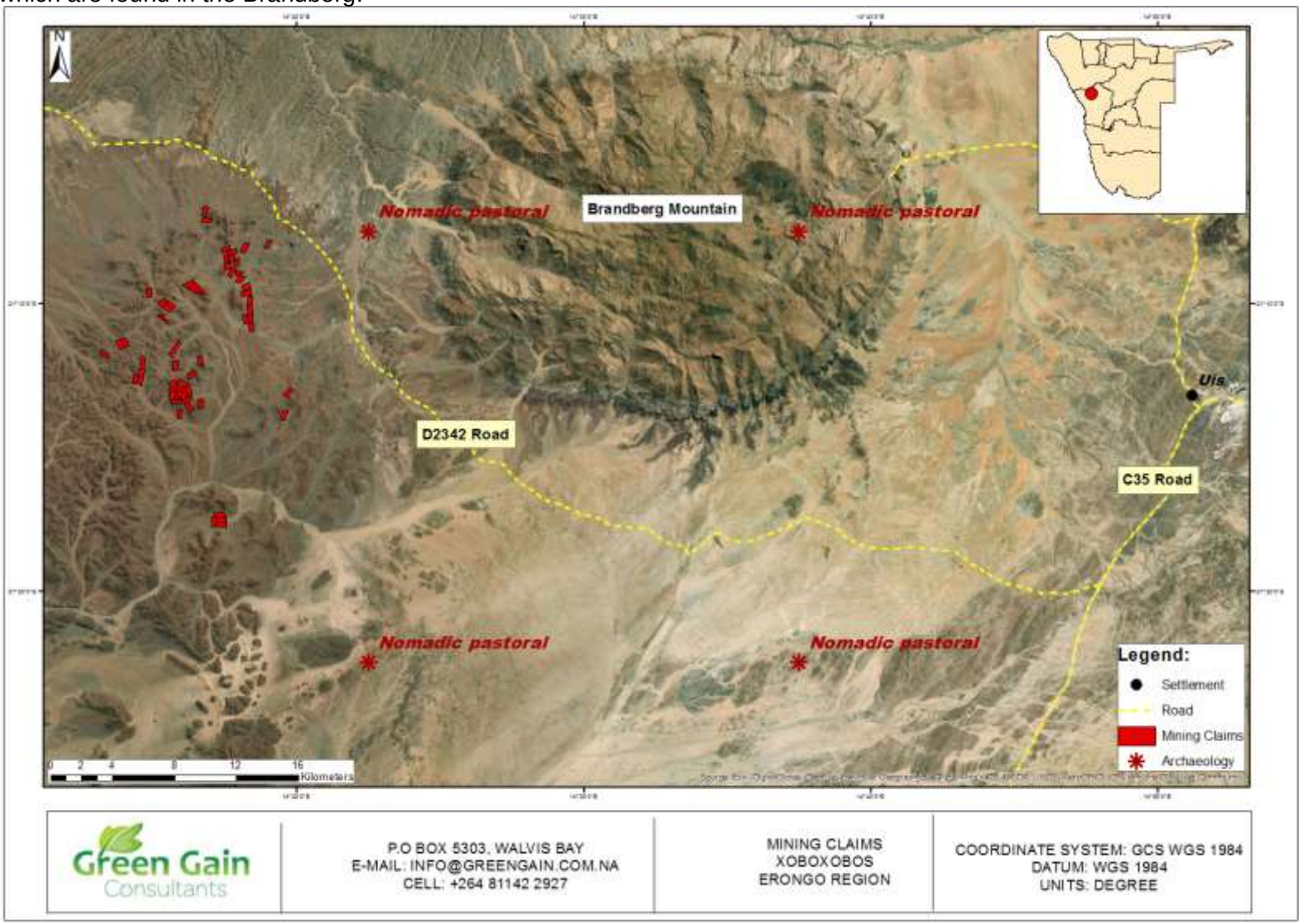

Figure 23: Archaeological sites in the area

5. LEGISLATIVE FRAMEWORK

5.1 Environmental Management Requirements

The Environmental Management Act No.7 of 2007 and the Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1995) set the guiding policy/legal framework for environmental management in Namibia. The small-scale mining activities triggers activities listed under the EMA Regulations of 2012, thus cannot be undertaken without an EIA being conducted and an ECC being obtained. The listed activities triggered by small-scale mining are as follows.

- **Section 2: Waste Management, Treatment, Handling and Disposal**
  - 2.1 The construction of facilities for waste site treatment or waste and disposal of waste
  - 2.2 Any activity entailing a scheduled process referred to in the atmospheric pollution prevention Ordinance of 1976.
  - 2.3 The import, processing, use and recycling, temporary storage, transportation, or export of waste.

- **Section 3: Mining and Quarrying Activities**
  - 3.1 The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining act), 1992.
  - 3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not.
  - 3.3 Resource extraction, manipulation, conservation, and related activities.
  - 3.5 The extraction of peat.

- **Water Resource Developments**
  - 8.1 The abstraction of ground or surface water for industrial or commercial purposes.

- **Hazardous Substance Treatment, Handling and Storage**
  - 9.1 The manufacturing, storage, handling, or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.
  - 9.4 The storage and handling of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.

5.2 Applicable National Legislation

One of the most important components of an Environmental Assessment process is the review of applicable and relevant legislations. Below is a review of relevant legislations and applicable provisions in respect of the small-scale mining activities.

Table 9: Applicable National Legislation

LEGISLATION	PROVISIONS APPLICABLE TO SSMs ACTIVITIES	IMPLEMENTING AGENCY
Namibian Constitution	The legislative and regulatory foundation for protection and management of the environment and its natural resources is governed by the Namibian Constitution. Article 95(i) of the constitution clearly emphasizes the promotion of the welfare of the people, whereby *the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future*.	**GRN of Namibia**
Environmental Management Act (Act No.07 of 2007)	The purpose of this Act is to promote the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment; to provide for a process of assessment and control of projects which may have significant effects on the environment; and to provide for incidental matters. The Act also provides procedures for adequate public participation during the environmental assessment process for the interested and affected parties to voice and register their opinions and concern about the proposed project.	**Ministry of Environment, Forestry and Tourism**
National Forestry Act, 2001	Provide for the establishment of a Forestry Council and the appointment of certain officials; to consolidate the laws relating to the management and use of forests and forest produce; to provide for the protection of the environment and the control and management of forest fires; to repeal the Preservation of Bees and Honey Proclamation, 1923 (Proclamation No.1 of1923), Preservation of Trees and Forests Ordinance, 1952 (Ordinance No. 37 of 1952) and the Forest Act, 1968 (Act No. 72 of 1968) and to deal with incidental matters Deforestation of natural forests has important implications for soil erosion, biodiversity loss and global warming. *This Forest Act 12 of 2001 requires that*	**Ministry of Environment, Forestry and Tourism**

	tree species and any vegetation within 100m from a watercourse may not be removed without a permit (S22 (1)). The Act also prohibits the removal of and transport of various protected plant species. The Act further requires any project activity that will result in clearance of certain forests to obtain a forest permit beforehand.	
Public Health and Environmental Act, 2015	Section 119 of this Act prohibits the existence of a nuisance on any land owned or occupied by SSMs. The term nuisance is important for the purpose of this EIA, as it is specified, where relevant in Section 122 as follows: a) any dwelling or premises which is or are of such construction as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease. b) any dung pit, slop tank, ash pit or manure heap so foul or in such a state or so constructed as to be offensive or to be injurious or dangerous to health. c) any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable, or preventable disease or injury or danger to health; or d) Any other condition whatever which is offensive, injurious, or dangerous to health. Furthermore, in terms of Section 8 of the Public Health Proclamation 16 of 1936, where a Regional authority is of the opinion that a nuisance is seriously offensive or a serious menace to health, it may serve a notice on the owner or occupant of the nuisance to immediately remove the nuisance. Failure to abide by this provision is an offence. Of relevance is the location of the mine, and the fact that mining activities will overlap with the activities of the community currently on the land.	**Ministry of Health and Social Services**
Minerals (Prospecting and Mining) Act 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. *Part 1: Rights in relation to the minerals*	**Ministry of Mines and Energy**

	Subject to any right conferred under any provision of this Act, any right in relation to the reconnaissance or prospecting for, and the mining and sale or disposal of, and the exercise of control over, any mineral or group of minerals vests, notwithstanding any right of ownership of any person in relation to any land in, on or under which any such mineral or group of minerals is found, in the State. Also deals with prohibition on carrying on certain operations without licence, and transfer of certain licences or grant, cession, or assignment of interests in such licences, and joinder of persons as joint holders of such licences or interests. *Part VI: Rights of holders of non-exclusive prospecting licences.* (a) to carry on prospecting operations on any land for any mineral or group of minerals. (b) to remove any mineral or group of minerals other than a controlled mineral or sample of such mineral or group of minerals, for any purpose other than she or disposal, from any place where it was found or incidentally won in the course of prospecting operations referred to in paragraph (a) to any place within Namibia. (c) with the permission of the Commissioner previously obtained generally or in every case in writing and subject to such conditions as may be determined by the Commissioner or subject to be conditions of an exemption granted under section 137 – **Section 109 (1): Minerals Ancillary Rights.** The holder of NEPL or MC may obtain rights. a). to enter upon land to carry on operations authorized by such licence or mining claim on such land. (b) to erect or construct accessory works on any land for purposes of such operations.	

	(c) to obtain a supply of water or any other substance in connection with such operations. (d) to dispose of water or any other substance obtained during such operations. (e) To do anything else in order to exercise any right conferred upon him or her by such licence or mining claim.	
Communal Land Act, of 2015	To provide for the granting of occupational land rights in respect of portions of communal land to institutions providing public services; and to provide for incidental matters. The Act gives power to Traditional Authorities to handle all land occupation and customary rights under the communal land. SSMs shall obtain Consent Letters from Traditional Authority prior to pegging and registering any claim. Further, a leasehold should be applied for those wish to erect temporary or permanent residential properties. In terms of Section 31. (l) An application for a right of leasehold in respect of communal land must be made in the prescribed manner to the board in whose area the land in question is situated. (2) A right of leasehold may not be granted in respect of a portion of land which another person holds under a customary land right, unless such person agrees to relinquish his or her right in respect of the land, subject to the payment of compensation as agreed to by such person and suitable arrangements for his or her resettlement on alternative land. Section 17B provides Restriction on right of access of foreign national to customary land right or right to leasehold and Section 18 Prohibition against fences.	**Ministry of Agriculture, Water and Land Reform**
Traditional Authorities Act 25 of 2000	The Act establishes the legal framework for the recognition of Traditional Authorities. It allows for a community to designate one person to be their Traditional Authority (in accordance with customary law), who must then be approved by the Minister responsible for Regional and Local Government.	**Ministry of Urban and Rural Development**
Waste Management Bill	This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The bill provide framework for a multitude administration on pollution control and waste management in the country. Each authority identified by the bill shall play its respective roles.	**Ministry of Environment, Forestry and Tourism**

Atmospheric Pollution Prevention Ordinance no. 11 of 1976	This Ordinance generally provides for the prevention of the pollution of the atmosphere and for matters incidental thereto. The Ordinance deals with administrative appointments and their functions; the control of noxious or offensive gases; atmospheric pollution by smoke, dust control, motor vehicle emissions; and general provisions. Part IV of this ordinance deals with dust control. The Ordinance is clear in requiring that any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance. Of applicability to the SSMs activities, is dust generated by vehicles or equipment as well as dust generated during mining. The risk of dust generation is high at the envisaged site. This deals with air pollution as it affects occupational health and safety, and no consideration is given to the natural environment.	**Ministry of Environment, Forestry and Tourism**
Soil conservation Act 76, 1969	The objectives of the Soil conservation Act 76, 1969 are to make provision for the combating and prevention of soil erosion, and for the conservation, protection and improvement of the soil, the vegetation and the sources and resources of the water supplies. Part II, deals with soil conservation works and it further states that in section 4(1) The Minister may by means of a direction order the owner of land to construct the soil conservation works referred to in such direction either on land belonging to such owner or on land belonging to another person, in such manner and within such period as may be mentioned in such direction, if the Minister is of the opinion that the construction of such soil conservation works is necessary in order to achieve any object of this Act in respect of the land belonging to such owner. Of relevance is the fact that the area has very little disturbances. SSMs should ensure that when new areas will be mined, all the topsoil should be stored separately to ensure the seedbeds are conserved and can be used when rehabilitation of the area is conducted after mining has been completed.	**Ministry of Agriculture, Water and Land Reform**

Hazardous Substance Ordinance 14 of 1974	This Ordinance provides for the control of toxic substance and thus also relevant for pollution control. It covers for the manufacturing, sale, use, disposal, dumping, importing, and exporting of hazardous waste. Of relevance to the SSM are the use of Blasting Abrasives and any other substance or mixture of substances classified under Group I Group II or Group III of hazardous substances. The sale of Group I, and use, operation, application, and installation of Group III hazardous substances are subjected to the provisions of subsection (2).	**Ministry of Environment, Forestry and Tourism**
Water Resources Management Act (Act 24 of 2004)	The Water Resources Management Act (Act 24 of 2004) governs the quality of both fresh- and seawater used for industrial purposes. Restrictions imposed on users are as follows: Any water used for industrial purposes must be purified to standards prescribed by the Minister. Purified or treated effluent must be returned to the source from which it was originally drawn. This may, however, be changed subject to ministerial intervention. Part 9-10 deals with the Water Supply and Licensing of Water Abstraction. The Ministry of Agriculture, Water and Land Reform has the overall responsibility to regulate, control, manage and regulate water resources and to supply water to rural areas through its Directorate of Water Supply and Sanitation Coordination (DWSSC). The Namibia Water Cooperation (NamWater) is responsible for bulk water supply from primary water sources (dams, aquifers, rivers etc.) to communities whereas private consumers (commercial farmers, mines, tourism operators etc.) have private boreholes for water abstraction. Abstraction of water for domestic use. Section 38 (1) Subject to subsection (3), a person who abstracts water from a water resource for own domestic use is exempted from the requirement for a licence to abstract and use water. Part 13 (70) of the WRA states that no person shall discharge or cause to discharge any substance industrial effluent or any other liquid or substance other than soil water or wastewater or unpolluted water for the purpose of testing the function of the drainage installation or any part thereof during or upon completion construction.	**Ministry of Agriculture, Water and Land Reform**

	Any occupier of a premise from which industrial effluent is discharge into a public sewer, shall: provide overflow detection devices, pre-treatment where necessary to comply with regulations and ensure that no prohibited discharges enter public sewer systems. Since connection to public sewer is not an option in this case, SSMs, shall before occupation make provision for a conservancy tank or a septic tank and absorption field on site. Sanitary systems must be constructed and located in such a way as to prevent a causation of any nuisance or unhygienic or offensive conditions. Sewage or other prohibited discharges should not enter storm water drains or roads. The occupier of any premises shall provide for facilities necessary to prevent any discharge, leakage or escape of such liquids onto any street or any premises or into any storm water drains or watercourse. No person shall cause or permit any storm water to enter any drainage installation on any premises. Inspections may be carried out at any time by the Department for Water Affairs (or a nominee). The Secretary has the power to suspend or restrict operations which may be causing water pollution and to impose certain conditions on the offender.	
Petroleum Products and Energy Act 13 of 1990	Regulations made under the Petroleum Products and Energy Act 13 of 1990 states that: A license or certificate is required for purposes of storing or keeping fuel in a quantity of 200 litters or less in any container kept at a place within a local Authority area or fuel in a quantity of 600 litters or less in any container kept at a place outside a local authority area. These regulations apply, in the case of an above-ground tank, to a storage tank with a capacity of 2,200litres or more and in the case of all below-ground tank, to a capacity with a capacity of 4,560 litters or more. Every license-holder or certificate holder shall about any replacement or installation of a storage tank, or a remaining storage tank, which this regulation applies, and which is in the possession of such license-holder or certificate holder, annually not later than 28 February, duly complete Form PP/10 as set out in Annexure B and shall submit such form together with the information	**Ministry of Mines and Energy**

	requested therein by the Ministry of Mines and Energy.	
National Heritage Act 27 of 2004	The National Heritage Act 27 of 2004 provide provisions for the protection and conservation of places and objects of national heritage significance, and to register places and objects under that framework. Small-scale miners must ensure that should any archaeological objects defined in the Act be found while mining operations are ongoing, it will be communicated to the National Heritage Act. Cultural heritage is defined as "*monuments, [as] architectural works (…), cave dwellings and combinations of features, (…) [but also] sites, as works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.*" Natural heritage is "*natural features (…), geological and physiographical (…) [and] natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation and natural beauty*." Heritage sites, whether included in UNESCO list (World Heritage Site, WHS), are composed of cultural and natural elements of aesthetic and scientific value. Natural and cultural capital in the Brandberg Heritage site is of great scientific, aesthetic and tourism value. Multiple groups of users compete for these assets and resources. They have different interests at stake, and this leads to conflicts over use of resources.	**National Heritage Council**
Labour Act (No 11 of 2007)	To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. Regulate basic terms and conditions of employment; ensure the health, safety, and welfare of employees; to protect employees from unfair labour practices; to regulate the registration of trade unions and employers' organisations; to regulate collective labour relations; to provide or the systematic prevention and resolution of labour disputes. Some of the notable Sections under this Act are.	**Ministry of Labour and Employment Creation**

	Health and Safety Procedures Section 17 (1) The employer shall prepare any health and safety procedure referred to in sub regulation (1) in consultation with the work-place safety committee concerned. Section 21. (1) Any person who intends to commence any mining operation shall give 30 days' notice of such intention to the Minister. Section 22. (1) In the event of an accident or dangerous occurrence in or in connection with a workplace, including a mine, or if an employee dies, or suffers a serious injury because of such an accident or dangerous occurrence, the employer shall notify and report such accident to the Chief Inspector of Labour of the area. Notification of Occupational Diseases, Section 23. If a medical practitioner finds that any person is suffering from any occupational disease listed in Annexure A.2(1), or of any other disease that he or she believes was caused by that person's current or past employment, he or she shall immediately and in the form of Form OD. 1, report this fact to the Chief Medical Officer of Occupational Health and Safety. It shall be an unfair dismissal, or unfair disciplinary action, in terms of section 45 by an employer if such employer terminates the services of, or takes disciplinary action against, such employee, if such employee has contracted an occupational disease listed in Annexure A.2 (1), or any other disease, because of his or her past or present employment with such employer. Section 210, states that an employer shall ensure that an employee wears or uses, to the satisfaction of an inspector, suitable and adequate personal protective equipment. All employment issues should be handled in accordance with relevant Sections of the Labour Act.	
Human Wildlife Conflicts Policy	The policy defines Human Wildlife Conflicts as Human "conflicts between wild animals and humans. This ranges from the destruction of crops and water installations to loss of livestock, homes and in some cases loss of human lives.	**Ministry of Environment Forestry and Tourism**

	Human Wildlife Conflict occurs throughout Namibia on communal as well as freehold land and involves a variety of species. The main problems occur on the land where the most elephants and predators are found outside protected areas and where people are least able economically to bear the costs of damage and losses. The Policy objectives is to manage human wildlife conflict in a way that recognizes the rights and development needs of local communities, recognizes the need to promote biodiversity conservation, promotes self-reliance and ensures that decision-making is quick, efficient, and based on the best available information. The Revised National Policy on Human Wildlife Conflict Management is based on several fundamental principles as stated under Section 5.1 to 5.13.	
Nature Conservation Act (No.05 of 1996)	The Act provides amendments to various Sections of the Nature Conservation Ordinance of 1975. One such amendments was the requirements to be complied with for the recognition of conservancy committees and the declaration of conservancies, and any restrictions and conditions to which a conservancy committee shall be subject. The Act provides for and promote the maintenance of ecosystems, essential ecological processes, and Namibia biodiversity and to promote the mutually beneficial co-existence of humans with wildlife as well as to give effect to Namibia's international obligations to legal instruments such as the Convention on Biological Diversity. The Act also recognizes that biodiversity must be maintained, and where necessary, rehabilitated and that essential ecological processes and life support systems must be maintained.	**Ministry of Environment Forestry and Tourism**
Arms and Ammunition Act 7 of 1996.	To provide for control over the possession of arms and ammunition; to regulate the dealing in, importation, exportation, and manufacture of, arms and ammunition; and to provide for incidental matters. <u>The relevant provisions under this Act are as follows.</u> According to this Act an "ammunition" means any cartridge or percussion cap intended for use in the discharge of an arm. CHAPTER 5: Manufacture of Arms and Ammunition **Prohibition of unauthorized manufacture of ammunition**	**Ministry of Safety and Security**

	26. (1) Subject to subsection (2), no person shall manufacture ammunition or any explosive component of ammunition except - (a) in an explosives factory licensed under the Explosives Act, 1956 (Act 26 of 1956); and (b) under the authority of and in accordance with a permit issued under section 27. (2) Subsection (1) shall not apply to the loading or reloading of cartridges by the holder of a licence to possess an arm, for use in such arm.	
Explosives Act 1956 (Act No. 26 of 1956)	Provides for authorization of certain group of explosives, manufacture, storage, use and licensing of explosives. <u>Authorized explosives in Namibia</u> *gunpowder, nitro-glycerine, dynamite, guncotton, blasting powders, fulminate of mercury or of other metals, coloured fires, and every other substance, whether like those herein mentioned or not, which is used or manufactured with a view to produce a practical effect by explosion or a pyrotechnic effect.* Most of the products listed here are old fashioned and have been replaced with modern generation products such as emulsions, watergels and cartridge products. <u>Prohibition of storage or possession of unauthorized explosives save in accordance with section three</u> Section (1) states that No person shall keep, store or be in possession of any unauthorized explosive unless it has been manufactured as provided by sub-section (1) of section three and is kept, stored or possessed in such manner and in such quantities as have been approved in writing by an inspector. <u>Prohibition of storage of authorized explosives except in licensed premises</u> No person shall keep, store or be in possession of, any authorized explosive in or on any premises unless authorized thereto by a permit issued by an inspector and the explosive be kept in quantities not exceeding 500 kilograms in weight and be stored in an isolated place approved by an inspector and under conditions prescribed in writing by an inspector.	**Ministry of Safety and Security**

	<u>Licence necessary to deal in explosives</u> (1) No person, other than the manufacturer, shall sell or deal in any explosive unless he is in possession of a licence granted under the regulations, which shall be in addition to any other licence which may be required in terms of any other law.	
Controlled Wildlife Products and Trade Act 9 of 2008	Aim: To provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; and to provide for incidental matters. Of relevance to the Small-scale mining activities is Section 4: Possession of and dealing with controlled wildlife products. (1) Any person who - (a) possesses any controlled wildlife product the possession of which is unlawful in terms of Schedule 1; (b) deals in any controlled wildlife product if the dealing therein is unlawful in terms of Schedule 1; (c) manufactures anything from a controlled wildlife product if such manufacture is unlawful in terms of Schedule 1; commits an offence unless he or she has been issued with a permit contemplated in subsection (3) authorising the act in question and unless he or she complies with the conditions specified in the permit. SCHEDULE 1: CONTROLLED WILDLIFE PRODUCTS (Section 1). Subject to paragraph 2 and 3 no person may possess, manufacture any object from, deal in, import into, or export from Namibia any tusk, horn, head, ear, trunk, skin, tail or foot or any part thereof, of any elephant or rhinoceros, or any part of any species or other specimen mentioned in Appendix I unless the action in question is authorised by a permit.	**Ministry of Environment, Forestry and Tourism**

5.3 Legislation of International Significance

a) Convention on Wetlands and Biological Diversity

The Convention on Wetlands of International Importance, especially as Waterfowl Habitat, 1971 (Ramsar) aims primarily to prevent the loss of wetlands, to promote the wise use of these, and to give special protection to listed wetlands. The Convention stresses a habitat-type approach rather than a species-specific approach.

The primary goal of the Convention on Biological Diversity, 1992, is the conservation of biodiversity. The causes of threats to biodiversity should be anticipated and prevented, and the precautionary principle should be applied. Parties to the convention are obliged to:

- Establish a network of protected areas.
- Create buffer areas adjacent to these protected areas using environmentally sound and sustainable development practices; and
- Rehabilitate degraded habitats and populations of species.

b) Convention on Combat Desertification (CBD)

The convention recognized that the conservation of biological diversity is “a common concern of humankind” and is an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use.

The objectives of the CBD are:

- The conservation of biological diversity,
- The sustainable use of its components and
- The fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding**.**

Conservation of species and ecosystem to combat the increasing rate of loss of biological diversity is one of Namibia’s challenges due to a heavy reliance on natural resources and ecosystem goods and services. In the interest of the welfare of the people, the state has adopted policies aimed at maintaining ecosystems, ecological processes, and biodiversity for the benefit of present and future generations. Direct impact on biodiversity is minimal but a precautionary approach is necessary to ensure those disturbances are avoided.

6. ASSESSMENT OF ENVIRONMENTAL IMPACTS

6.1 Rating of Environmental Impacts

A summary of the potential impacts associated with the SSMs activities are presented in this chapter, as well as the suggested mitigation measures required to ensure impacts are managed effectively. Within the accepted broad definition of the term “environment” that applies to Environmental Impact Assessments, it is required to assess potential impacts of both socio-economic and biophysical aspects.

Table 10: Assessment Criteria

CRITERIA	DESCRIPTION			
EXTENT	**National (4)** The whole country	**Regional (3)** Erongo region and neighbouring regions	**Local (2)** Within a radius of 2 km of the mining site	**Site (1)** Within the mining site
DURATION	**Permanent (4)** Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	**Long-term (3)** The impact will continue/last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.	**Medium-term (2)** The impact will last for the period of the operation phase, where after it will be entirely negated	**Short-term (1)** The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the operation phase
INTENSITY	**Very High (4)** Natural, cultural, and social functions and processes are altered to extent that they permanently cease	**High (3)** Natural, cultural, and social functions and processes are altered to extent that they temporarily cease	**Moderate (2)** Affected environment is altered, but natural, cultural, and social functions and processes continue albeit in a modified way	**Low (1)** Impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected
PROBABILITY	**Definite (4)** Impact will certainly occur	**Highly Probable (3)** Most likely that the impact will occur	**Possible (2)** The impact may occur	**Improbable (1)** Likelihood of the impact materialising is very low
SIGNIFICANCE	Is determined through a synthesis of impact characteristics. Significance is also an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.			

Table 11: Impacts Significance Rating

Low impact	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction, or operating procedure.
Medium impact	Mitigation is possible with additional design and construction inputs.
High impact	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very high impact	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw.
Type	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse
It is important to note that the status of an impact is assigned based on the status quo – i.e. should the project not proceed. Therefore, not all negative impacts are equally significant.	
Significance Rating Scale Points 1-4 Insignificant/low Points 5-8 Significant /Moderate Points 9-12 Very significant/High Points 13-16 Highly significant /Very high	

6.2 Anticipated Biophysical Impacts

Below are possible negative impacts of the SSMs activities on the biophysical environment. The significance of each impact has been rated under each small-scale mining method used at Farm Goboboseb. The significance of each impact has been rated before and after mitigations measures. The implementation of mitigations is expected to reduce the significance of impacts by means of at least two (2) scales.

➢ Vegetation loss or destruction

Small-scale mining activities pose serious negative impacts to the local flora through vegetation clearance, trampling, dust generation, soil disturbance and veld fire.

Mitigation measures

Only plants that are directly affected by the mining activities may be cleared. Areas with abundance of protected flora such as quiver tree and welwistchia mirabilis must be avoided. SSMs should also by all means reduce the excessive dust generation, vegetation trampling and control the occurrence of veld fire. Excavations should be backfilled with the original topsoil as far as possible.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*3*	*1*	*1*	*6*	*4*
Semi-mechanized		*2*	*4*	*4*	*4*	*14*	*12*

➢ Loss or reduction of local fauna

Potential impacts of the local fauna will be the fragmentation of habitats, risk of falling in the un-rehabilitated excavations, excessive dust, noise and vibration, disturbance of grazing areas and reduction of the availability of fodder. Human-wildlife conflicts could also occur because of poaching, hunting, or trapping of animals.

Mitigation measures

Mining activities should be avoided in the wildlife core zones or areas with high grazing potentials. Poaching of both small and large wildlife is prohibited and is a punishable act. No mining activities should take place within the proximity of waterholes (wildlife drinking spots). Rehabilitation of the disturbed areas should be encouraged as far as possible. Only use existing and designated access roads and a minimum driving speed of 40km/hr should be adhered to within the conservancy area. The possession of and dealing with controlled wildlife products is prohibited under the Controlled Wildlife Products and Trade Act 9 of 2008.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*2*	*2*	*6*	*4*
Semi-mechanized		*2*	*3*	*3*	*2*	*10*	*8*

➢ Destruction of topography, landscape, and drainage

The area is consisting of different landscapes and varying topographies. These landscapes serve as source of attractions and landmarks in the area. Uncontrolled mining activities, especially by semi-mechanized methods have potential to cause surface disturbances of the natural landscapes, reduce the aesthetic view thus, degrading the sense of the place.

Mitigation measures

Important local viewpoints and landscape features should be identified and protected from mining activities. Waste matrix should be properly and carefully disposed of and where possible excavations caused by the mining activities should be backfilled with waste rocks.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*3*	*2*	*2*	*8*	*6*
Semi-mechanized		*2*	*4*	*4*	*3*	*13*	*11*

➢ Ecological degradation and habitat fragmentation

Ecological settings refer to the processes and interconnectedness which support a variety of life and functioning of the natural ecosystem. Ecological settings are vital for sustaining life of trees, wild animals, livestock, and people. Small-scale mining activities are likely to cause fragmentations of natural habitats, disturb soil profile, pollute the environment, and disrupt ecological processes and the entire ecosystem functioning. Habitats affected by the SSMs activities are open gravel plains, inselberg, rocky ridges, and incised valleys.

Mitigation measures

Sensitive areas such as incised valleys, caves, fountains, and areas with abundance of protected vegetation species should be avoided and designated as “No-go-zone areas”. SSMs should also reduce their ecological footprint by minimizing disturbances and sustainable utilization of natural resources such as water, wood etc.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*2*	*1*	*5*	*3*
Semi-mechanized		*3*	*4*	*3*	*3*	*13*	*11*

➢ Soil erosion and contamination

Soil disturbances occurs through the removal of topsoil and overburden during the mining process. De-vegetation of the area due to mining will increase soil erosion by wind or water and increase suspended sediment loads in nearby streams and rivers.

Other impacts on soil is the possible contamination from spillage, leakages, and direct discharge of pollutant in the soil.

Mitigation measures

The topsoil should be properly and securely stockpiled and not be mixed with overburdens and should be backfilled after mining. Avoid trampling of highly vegetated areas by making use of existing routes instead of creating new ones. Soil conservation measures such as berms, gabions should be used on-site to help reduce erosion and any erosion incidence should be contained as soon as possible.

Vehicles and Equipment with oil leaks should be properly maintained. Spillage or leakage should be contained, and contaminated soil should be carefully removed and disposed of at the nearest dumpsite.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*1*	*3*	*3*	*3*	*10*	*8*

➢ Disturbance of geology

Most of the small-scale mining activities are based on traditional and limited indigenous knowledge. As such, mining activities are likely to cause unintended disturbances to the local geology and geomorphology.

Mitigation measures

SSMs should seek technical support i.e., geo-data, maps etc. from the Geological Society of Namibia or from local geologists. This will help them to make informed decisions when conducting their explorations and mining activities.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*2*	*1*	*5*	*3*
Semi-mechanized		*3*	*4*	*3*	*3*	*13*	*11*

➢ Water resources pollution and increased demand

Due to the limited availability of freshwater in the area, the presence of SSMs in the area has already put immense pressure on the available water resources. The situation is likely to become untenable should the number of SSMs in the area increase.

Mitigation measures

Although SSMs activities do not necessarily use fresh water in their mining operations, domestic use of water should be closely monitored by keeping records of monthly water usage. Water should also be used sparingly and when necessary recycled for other least essential activities i.e. dust suppression. SSMs who intend to drill borehole(s) in the area should obtain an Abstraction Permit from the Directorate of Water Supply and Sanitation Coordination (DWSSC).

Since the targeted mineral deposits are not necessary found in riverbeds or drainage, it is not expected for any mining activity to take place within these areas. As such pollution to surface water sources is unlikely. However, waste rocks and overburdens from excavations should not be placed within the drainage areas to avoid sedimentation of streams.

Contamination of water sources both surface and groundwater should be avoided at all costs. Mining areas and camping sites should be provided with portable toilets connected to septic tanks. Permits to install septic tanks should be obtained from the Ministry of Agriculture and Land Reform (Directorate of Sanitation). Spillage or leakage should be contained, and contaminated soil should be carefully removed and disposed of.

SSMs activities	**Impact Type**	**Ratings (before mitigation/measures)**				**Significance**	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*1*	*2*	*2*	*2*	*7*	*5*

➢ Groundwater contamination and over-abstraction

The impacts of excavations may influence the direct loss of stream reserve habitat, cause disturbances of species attached to streambed deposits, reduce light penetration, reduce primary production, and reduce groundwater recharge opportunities.

Potential pollution of groundwater can also occur through Acid Mine Drainage, poor sanitation, contamination of soil and uncontrolled discharge of mining waste and other pollutants in the ground.

Mitigation measures

Care must be taken when selecting and locating the waste handling facilities. Avoid locating waste facilities in riverbeds or slope areas or area with heavy drainage. All mining areas must be rehabilitated upon mine closure and all discharge must be properly disposed as per the Minerals (Mining and Prospecting Act), of 1992 and the Environmental Management Act, of 2007.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*2*	*2*	*3*	*2*	*9*	*7*

- **Air pollution**

The major sources of air pollution are fugitive dust from excavations, loading, transportation, hauling of waste rocks, as well as wind erosion of open pits and silt heaps from the processing operation.

Exposure to dust is a potential health risk because inhalation of fine dust particles can damage the lungs and lead to chronic obstructive pulmonary disease. Wind can disperse inhalable dust from the project site over settlements and farming areas that are nearby.

Another impact of dust deposition is on the environment. The most obvious effect will be observed on vegetation next to the roads or in the vicinity of the mining areas. Dust covers the surfaces of leaves, blocking stomata, reducing plant photosynthesis thus causing retard growth of local vegetation.

Mitigations measures

The first step to control dust is to identify and monitor all dust emission sources. An inventory for all dust generation sources should be established and mitigation measure from each potential source should be proposed. Proper maintenance of equipment should also be ensured at contractual basis. Visual observations and dust monitoring should be used to identify additional problem areas and quantify dust emissions levels.

Another important part of air quality management is the collection of climate data on wind direction. This is because wind patterns determine the extent and direction of dust plumes. The prevailing wind directions in the area are southerly, south-westerly, and north-easterly. Controlling of dust emission is also a legal requirement in terms of certain legislations as outlined below.

Legal compliance aspects

The following compliance standards are applicable to dust emission:

- The Atmospheric Pollution Prevention Act (No 45 of 1965), which is still applicable in Namibia requires that *"any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance."*

- The Namibian Labour Act's Health & Safety Regulations set the following limits for personal exposure over 8 hours' time-weighted average:
    - Total particulates of **10 mg/m^3**.
- The Public Health and Environmental Act, Act No. 01 of 2015, requires preventing the occurrence of a health nuisance, unhygienic condition, an offensive condition, or any condition which could be harmful or dangerous to the health of a person.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*1*	*1*
Semi-mechanized		*2*	*2*	*3*	*3*	*10*	*8*

➢ Land degradation

Land degradation is one of the most significant impacts associated with any mining activities. Given the limited climatic conditions of the area, a further decline in vegetation cover can affect the availability of fodder and carrying capacity of the area. The impacts of land degradation would not be limited to the mining but could be felt in the whole region.

Mitigation measures

The waste matrix generated during the mining operation should be back filled in the mined area to prevent soil erosion. Rehabilitation of mined out areas should be done on a continuous basis, i.e. as soon as the mining in an area has been completed. Only designated access routes should be used to reduce trampling on vegetation and fragmentation of sensitive habitats.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*1*	*2*	*3*	*3*	*9*	*7*

6.3 Anticipated Socio-Economic Impacts of the Project

Small-scale mining activities is also associated with several negative impacts to the socio-economic environment. Unlike the biophysical impacts, the socio-economic impacts are likely to affect greater geographic area i.e., constituency, regional and national.

- **Public health and safety**

Public health hazards associated with Small scale mining activities are such as Blasting, Excavation and Nuisance.

Blasting

Blasting in mining operations produces critical health hazards such as noise, dust, noxious gases, vibration etc. Other public health and safety concerns of blasting is explosions, from premature or delayed detonation of blasting explosives, damage to properties and danger of flying or falling rocks from poor handling of explosions.

Mitigation measures

- Only use explosives listed under the Explosives Act 1956.
- Use abrasives that can be delivered with water (slurry) to reduce dust.
- Blasting should ONLY be carried out by a registered company/person.
- No major blasting should take place for sites within 1000m from residential areas.
- Do not keep explosions more than 500kg at any site.
- Explosions must be kept and transported by licenced persons only.
- Explosions must be kept at cool, dry, and well-ventilated magazines.
- Keep people and animal away from the blasting area.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*2*	*2*	*3*	*3*	*10*	*8*

Excavations

Uncovered excavations, pits and trenches from mining activities are safety hazards for animal and humans. People and animals are at risk of falling or being trapped into the un-rehabilitated pits and trenches.

Mitigation measures

- Excavated areas must be backfilled and properly rehabilitated.
- If possible, avoid wildlife migration corridors.
- Sensitive areas should be avoided.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*2*	*2*	*6*	*4*
Semi-mechanized		*2*	*3*	*3*	*3*	*11*	*9*

Nuisance

Nuisances are broadly defined as any condition which is offensive, injurious, or dangerous to health. This impact is subjective based on the public perceived views. It will also depend on the concerned person's perception of what constitutes a nuisance. According to the National Labour Act, No.11 of 1992) a nuisance is described as noise, dust, vibration, and odour.

Mining activities that may contribute to nuisance include excavation, backfilling, blasting and the operation of heavy equipment.

Exposure to excessive noise levels can lead to:

- Prevention of sleep, insomnia, and fatigue.
- Decrease in speech reception, communication, distraction, and diminished concentration thus adversely affecting job performance efficiency.
- Chronic psychological disturbance including impaired hearing.
- Irreparable cardiovascular, respiratory, and neuralgic damages in certain extreme cases.

Mitigation measures

- Large scale blasting should not be conducted at places closer to residential areas, otherwise residents should be informed prior to blasting.
- Noise level at semi-mechanized sites should not exceed 85db (Health and Safety Regulations No.156).
- Provide regular maintenance of all equipment/ machines to reduce noise generation.
- All affected community should be informed in advance.
- Activities should not be carried out during odd hours and should be limited to daylight.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*2*	*2*	*2*	*2*	*8*	*6*

➢ Explosions and fire outbreaks

The most critical issues regarding impacts on energy resources is the use and storage of fuel for mining purposes. Fuel is regarded as a hazard and if not properly handled, could cause fire outbreaks and damage to properties, especially if stored in large quantity.

The other energy related impact is the collection of firewood for domestic use. Uncontrolled firewood collection could lead to deforestation and may result into conflicts with the local communities.

Mitigation measures

SSMs are advised to keep less than 200L of fuel at the site as per the Petroleum Products Regulations of 2000. Petrol should be stored in underground sources while diesel should be kept at properly secured site.

Collection of firewood should be minimized, and permission should be obtained from the local Forestry office (Walvis Bay office) in case a large quantity of wood is required. SSMs should not venture into collection and selling of firewood.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*4*
Semi-mechanized		*2*	*1*	*2*	*2*	*7*	*5*

- **Visual appeal and aesthetics**

Mining activities generate excessive dust which causes visual intrusion in the area. Structures, temporary housing, and excavated pits may also be visible from the road and not necessarily visually attractive to tourists or visitors to the area.

Mitigation measures

Temporary structures should be made of locally available materials and should be comparable to the local landscapes. If lighting is to be used onsite, it should be installed in such a manner that it does not cause annoyance to the local wildlife, residents, and visitors.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*2*	*2*	*6*	*4*
Semi-mechanized		*2*	*2*	*2*	*3*	*9*	*7*

- **Waste generation**

Small-scale mining activities generate a variety of waste matrix such as waste rocks, litter, scrap metals, and sewage waste. Improper handling of these waste matrix is likely to cause a range of environmental impacts i.e., contamination of fresh water sources, soil contamination, sedimentation of river streams, pollution of the surrounding environment and many more.

Mitigation measures

Waste rocks and overburdens should not be placed in riverbeds or on areas with high grazing potential. General waste generated on site should be gathered, collected regularly and properly dumped at the nearest Municipal or approved disposal site (Uis). Hazardous waste i.e. used oil, batteries generated should be collected and transported to specialized waste collectors i.e. WESCO or to Walvis Bay landfill site for proper dumping. No dumping or littering should be allowed. Unwanted and old temporary structures not in use must be removed from the site and disposed of by the responsible person.

All mining sites and camping sites must be equipped with portable ablution facilities connected to septic tanks. SSMs shall enter into agreement with contractors for the emptying of septic tanks whenever required. No spillage or discharge of sewage should be allowed in the environment and in case of accidents, corrective actions should be implemented to remedy such spillages.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*2*	*2*	*2*	*2*	*8*	*6*
Semi-mechanized		*2*	*2*	*3*	*2*	*9*	*7*

- **Land use conflicts and competition**

The intensification of mining activities in the area is likely to encroach on community settlements and grazing lands and interfere with the community livelihoods. As such, it will result in land use conflicts especially with the conservancy.

Mitigation measures

The Traditional Authority must be consulted prior to any pegging of mining claims. TA, Conservancy and SSMs should hold regular meetings to resolve conflicts and maintaining a healthy working relationship.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*2*	*1*	*2*	*2*	*7*	*5*
Semi-mechanized		*2*	*2*	*3*	*2*	*9*	*7*

- **Impacts from temporal housing for employees.**

Majority of the SSMs reside at their place of work and only few reside in nearby farms and villages. SSMs use temporary structures such as tents and corrugated iron sheets for accommodation. Open fire cooking is a common practice among the SSMs. Most of the SSMs camps and mining sites lack proper sanitation. Some SSMs reside in the jurisdiction of the conservancy which is home to dangerous predators such leopards etc. Hence, settling in wildlife zones could cause conflicts and leads to illegal hunting of both small and large wildlife. SSMs residing in remote areas might be tempted to resort to poaching as a source of livelihood.

Mitigation measures

Establishment of temporary housing should be done in consultation with the Conservancy Management Committee. No settlement should be allowed in wildlife corridors or hunting/concession areas. The housing areas should be at secured sites and movement of people during night hours should be limited. Fireplaces should be at secure sites and the fire should be put out after use.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*2*	*1*	*2*	*2*	*7*	*5*
Semi-mechanized		*2*	*2*	*3*	*2*	*9*	*7*

➢ Influx of people to the area

SSMs activities is likely to attract an influx of people from different parts of the country in search for better opportunities. The influx of people could result into secondary impacts such as spread of HIV/AIDS, theft, poaching etc. Uncontrolled movement of people could also result in pressure on local available resources such as land, water, energy.

Mitigation Measures

All SSMs who are employed or seeking employment in the area should be registered with the Traditional Authority and the local SSMs committee. SSMs sites should not be a place of abodes, hence only people who are actively involved in mining should be allowed to stay there. Establishment of permanent residence at mining sites is prohibited and application for a leasehold should be obtained from TA and the Communal Land Board.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*2*	*1*	*1*	*2*	*6*	*4*
Semi-mechanized		*2*	*1*	*3*	*2*	*8*	*6*

➢ Traffic related impacts

The affected area is frequented by several people other than SSMs such as tourists, government officials etc. Thus, whether the SSMs activities exists or not, traffic volumes on the roads are expected to increase and this is not an aspect that can be controlled by the SSMs alone.

Mitigation measures

All vehicles are required to make use of existing access routes and abide to the speed limit of 40km/hr within the Conservancy area. If there is a need for new access routes it should be done in consultation with the Conservancy and Traditional Authority. All access routes joining in district roads should be approved by the Roads Authority.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*1*	*1*	*4*	*2*
Semi-mechanized		*2*	*1*	*3*	*3*	*9*	*7*

➢ Occupational safety and health impacts

Like in other mining activities, SSMs are exposed various occupational health during operations. The most common hazards associated with small-scale mining activities are listed under item 3.7 of this document. The exposure to these hazards can be aggravated by certain risks factors such as lack of the experience & limited knowledge, nature of work and non-compliance to health and safety standards.

Mitigations measures

The first step in preventing occupational health safety risks is to identify the potential hazards. To eliminate potential hazards and reduce the likelihood of potential risks the following measures should be implemented.

- All explosives must be transported, stored, and used by an experienced person in accordance with relevant regulations.
- SSMs should cease the manufacturing of homemade explosives as it is against the Arms and Ammunition Regulations.
- SSMs must be provided with training on occupational health and safety standards.
- SSMs should also register themselves with the Social Security Commission (SSC).
- SSMs should go for regular health check-ups at the nearest health centre.
- SSMs must have proper PPE suitable for each job.
- Consider the use of available technologies to reduce the workload.
- Regular inspections by the relevant inspectors such as Labour, Mines and NAMPOL.
- SSMs should adhere to hazard exposure limits as listed under the National Labour Act No.11 of 2007 as follows.

Potential hazard	Legal exposure limits/daily
Dust	0.1 mg/m^3
Noise	85dB
Vibration	5 m/s^2
Working time	8hrs.

SSMs activities	**Impact Type**	**Ratings (before mitigation/measures)**				**Significance**	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*1*	*1*	*2*	*3*	*7*	*5*
Semi-mechanized		*1*	*1*	*3*	*2*	*7*	*5*

➢ Impacts on archaeology, culture, and heritage

According to the NHC, there are about 900 archaeological sites marked and several unmarked archaeological sites in the Brandberg Area. Unmarked sites are at risk of being removed, damaged, and tempered with by small-scale mining activities.

Mitigation measures

Small-scale mining activities should be limited to 10km^2 zone from Brandberg and no mining claims should be registered within this zone. Should there be sites or materials of archaeological importance uncovered during mining, such incidences should be reported to the National Heritage Council (Brandberg Office).

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Negative***	*2*	*1*	*1*	*1*	*5*	*3*
Semi-mechanized		*2*	*1*	*3*	*3*	*9*	*7*

➢ Impacts on gender roles

Small-scale mining activities are likely to contribute to the increase in female headed households as small-scale mining activities are carried out mostly by men. Thus, most men leave their villages and homesteads for temporary settlements at mining sites. Although, females and other members of households also participates in the sector through cleaning, polishing, and marketing of gemstones they are not considered as “miners”. Consequently, the roles of women in small scale-mining have been largely overlooked by researchers and policy makers.

SSMs activities	Impact Type	Ratings (before mitigation/measures)				Significance	
		Extent	Duration	Intensity	Probability	Without measures	With measures
Artisanal	***Neutral***	*2*	*1*	*1*	*1*	*5*	*3*
Semi-mechanized		*2*	*1*	*3*	*3*	*9*	*7*

Mitigation measures

Develop targeted trainings for women especially with regards to polishing and trading of gemstones. This will encourage and sustain participation of women in the industry, hence improving the gender ration for this sector.

6.4 Potential Cumulative Impacts

Although, many of the effects of small-scale mining are of less significance, when they occur simultaneously, their significance may increase by order of magnitude. The greater the number of small-scale miners in an area, the greater the cumulative impacts are on the environment.

Possible cumulative impacts of SSMs are as follows.

- Goboboseb is a remote area and lacks basic social services such as sanitation, waste collection etc. Migration of more people in the area will result in serious environmental pollution.
- Unemployed family members of SSMs residing at mining sites are likely to resort to other activities such as poaching, collection of wild flora, animal theft etc.
- Water is a scarce commodity in the area, hence an increase in the number of people in the area will also increase water demand which in turn will result into over-abstraction, poor sanitation etc.
- The higher the number of SSMs at the mining site, the bigger the disturbance of the area (ecological footprint). The increased footprint could result into serious negative repercussions such as deforestation, trampling of vegetation and land degradation.

Possible measures

- At least three (3) portable ablution facilities should be established at Goboboseb for the group of 75 SSMs. All other SSMs camp sites in the area should be equipped with portable ablution facilities.
- Due to the absence of a sewer line, the use of a communal tank or septic tank is encouraged.
- SSMs should not be allowed to bring or stay with family at mining sites for an extended period. Only those people who are directly involved in the mining activities may stay on site. This measure is already being enforced by the local committee. As such, all SSMs are registered with the local SSMs committee and the local Traditional Authority.
- Poaching of wildlife and collection of wild flora or mining in sensitive areas is prohibited and is punishable by law.
- No permanent residence should be established at mining sites without prior approval from TA and the Communal Land Board.
- Permits should be obtained from the MAWLR-DWSSC before drilling any borehole.

6.5 Potential Positive Impacts

Apart from the identified negative impacts, the small-scale mining sub-sector also provides an array of socio-economic benefits. However, certain enhancement measures should be implemented to fully realize these benefits.

- **Employment opportunities**

According to the National Planning Commission (2010), the small-scale mining sub-sector provides employment opportunities to about 1600-3000 people in Erongo region. As for Goboboseb hotspot, there are about 100 SSMs who are directly employed most of which are youth (about 80%). This is a significant contribution, considering the current unemployment rate (20.27%) in the country.

Despite the above, SSMs are still finding it difficult to operate efficiently due to high input costs, lack of appropriate tools and uncompetitive prices for their products. This underdevelopment trend of the small-scale sub-sector continues to deny many jobseekers employment opportunities they hoped to find.

Enhancement measures

Notwithstanding the support the government continues to provide to this industry, it is recommended that the SSMs be supported with machineries and the latest mining technologies. This will allow them to operate efficiently and with high due diligence. SSMs should also be provided with the latest market information to determine fair prices for their gemstones and enable them to generate profits.

- **Secondary opportunities**

Small-scale mining activities at Farm Goboboseb has resulted to about 50 indirect employment opportunities. This mostly include women who are involved in polishing and selling of gemstones at the Henties-Bay-Uis road and in the surrounding towns (Uis, Khorixas, Henties bay, Swakopmund). However, due to very little processing in the country, high-quality crystals are usually sold as raw products to tourists and international customers. On the other hand, lower quality crystals and gemstones are not fully utilized and sometimes only get polished into simple jewelleries (Amunkete and Nyambe, 2009). If properly supported, the sector has potential to generate secondary spin off jobs in the off-site service.

Enhancement measures

The government should discourage the export of unprocessed gemstones and should promote the establishment of value addition factories in the country.

- **Livelihood**

Farm Goboboseb is a source of livelihood and economic wellbeing for more than 150 families. These benefits are realized through employment opportunities (both direct and indirect) and income generation.

However, the income generation from Goboboseb operations is sporadic, as weeks or months can go by without generating any income. As such, the actual contribution of the small-scale mining sub-sector to the livelihoods and to the country's economy at large has not been fully realized.

Enhancement measures

Concerted efforts by all government entities must be used to sustain and expand this important sub-sector of the economy. Hence, doing so will ensure livelihood for many Namibians who could languish in poverty and unemployment.

- **Foreign Exchange and GDP Contribution.**

Small-scale mining operations have potential to contribute to the mainstream economy through Gross Domestic Product (GDP), and earn foreign exchange through international markets. Although the area is known for producing unique crystals which are in the international markets, some high value gemstones are still exported without their true value being declared. This is because most of the gemstones are sold locally to international tourists at prices below their market values. Since most of the gemstones are sold as raw products and only get processed abroad, the finished products are often not marketed as Namibian products.

Enhancement measures

It is important that Namibia's "brand" in terms of gemstones and crystals is protected by ensuring a consistent supply of high-quality product mined at low environmental and social cost, and maximum benefit to communities. Moreover, the Government should assist SSMs in collecting market information on potential market niches and best prices for gemstones to make this sector profitable.

6.6 Summary of Identified Negative Impacts

Below is a summary of identified potentials impacts and their significance after mitigation measures.

Table 12: Significance of impacts (after mitigations)

Potential Impacts on Environmental Receptors	Significance of impacts under different SSM scale (after mitigation)	
	Artisanal	**Semi-mechanized**
A. Impacts on Biophysical environment		
Impacts on Flora	Insignificant	Very significant
Impacts to Fauna	Insignificant	Significant
Impacts on Landscapes and Surface Disturbance	Significant	Very significant
Impacts on Ecological Settings	Insignificant	Very significant
Impacts on Soil	Insignificant	Significant
Impacts on Geology	Insignificant	Significant
Impacts on Water Resources	Insignificant	Significant
Impacts on Groundwater	Insignificant	Significant
Impacts on Air Quality	Insignificant	Significant
Impacts on Land Degradation	Insignificant	Significant
B. Impacts on Socio-economic Environment		
Impacts on Public Safety: Blasting	Insignificant	Significant
Impacts on Public Safety: Excavations	Insignificant	Very significant
Public and Health Safety: Nuisance	Insignificant	Significant
Impacts on Energy	Insignificant	Significant
Impacts on Visual Amenity	Insignificant	Significant
Impacts on Waste Management	Significant	Significant
Impacts on Temporary Infrastructures	Significant	Significant
Influx of People	Insignificant	Significant
Impacts on Traffic congestion	Insignificant	Significant
Occupational Health Impacts	Significant	Significant
Impacts on Archaeological, Culture and Heritage	Insignificant	Significant
Impacts on Gender roles	Significant	Significant

7. CONCLUSIONS AND RECOMMENDATIONS

The objective of this EIA study was to establish the baseline of the affected environment, solicit inputs from stakeholders and Interested and Affected Parties in order to define the range of the environmental impact assessments and determine any gap of information that require further studies. It is believed that this objective has been achieved and adequately documented in this report. All possible environment aspects associated with the small-scale mining activities have been adequately assessed and necessary control measures have been formulated to meet statutory requirements, hence the following conclusion and recommendations.

7.1 Assumptions and Conclusion

- Small-scale mining activities at Farm Goboboseb is taking place in two forms, namely, the artisanal or manual and semi-mechanized operations. The impacts caused by these two methods differs significantly in nature, scale, and intensity.

- Most of the environmental impacts caused by artisanal method are manageable with minimum measures and limited to the area of operations, whereas environmental impacts caused by semi-mechanized ranges from highly significant to very significant, thus requires extensive mitigation measures.

- The implementation of mitigation measures should be accompanied by compliance monitoring of certain environmental parameters. This will ensure continual improvement in environmental performance and reduce adversity of potential negative impacts.

- Small-scale mining activities at Farm Goboboseb is a source of livelihoods for more than 80 families through employment creation and income generation. Hence, the Government should continue giving the necessary support to expand and sustain the small-scale mining sub-sector.

7.2 Recommendations

- All Mining Claim holders should obtain consent letters from the local Traditional Authority and conduct their activities in line with Section 30 of the Communal Land Act of 2005.

- Consent must also be obtained from the Conservancy Management Committee for all mining activities taking place within the Conservancy area. This will avoid land-use conflicts and maintain the existing environmental management priority of the area.

- No establishment of residential properties should be allowed on any communal land without prior approval from the Communal Land Board as per the Communal Land Act of 2005.

- SSMs should be advised to cease the manufacturing, storage and use of homemade explosives as it is against the Arms and Ammunition Act No.07 of 1996.

- Due to the archaeological sensitivity of the Brandberg and area surrounding the Goboboseb small-scale mining hotspot, it is highly recommended that the MME commission a site-specific Heritage Impact Assessment (HIA) study. The HIA study is expected to identify the potential impacts of small-scale mining operations to mark and unmarked archaeological objects in the area.

- Lastly, it is also recommended that training should be given to all small-scale miners and mining claim holders at the study area. The purpose of this training will be to create awareness among the SSMs on the content and requirements of the EMP to ensure successful implementation and promote environmental due diligence.

8. REFERENCES

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9. APPENDICES

9.1 Appendix A: List of Flora as per NBRI database

9.2 Appendix B: Background Information Document (BID)

9.3 Appendix C: List of Mining Claims in the study area

9.4 Appendix D: I&AP Register

9.5 Appendix E: Proof of Consultations

9.6 Appendix F: Issue Response Report

9.7 Appendix G: Curriculum Vitae of the EAP

9.8 Appendix H: Environmental Management Plan (EMP)