SCOPING REPORT:

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

FOR THE PROPOSED EXPLORATION STUDY AND SMALL-SCALE MINING OPERATION FOR INDUSTRIAL MINERALS AT MINING CLAIM NO: 70656

KARIBIB DISTRICT, ERONGO REGION, NAMIBIA

Prepared by:
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Proponent:
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Windhoek

PROJECT DETAILS

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DECLARATION

We hereby declare that:

A. We have the knowledge of and experience in conducting assessments, including knowledge of the Acts, regulations, and guidelines that are relevant to the proposed exploration project.
B. We have performed the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant.

REPORT/DOCUMENT CONTROL FORM

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<tr><td colspan="3">PROJECT NAME: EXPLORATION AND SMALL-SCALE MINING OPERATION FOR INDUSTRIAL MINERALS ON MINING CLAIM 70656</td></tr>
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Abbreviations And Acronyms

EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
EC	Environmental Commissioner
SADC	Southern African Democratic Country
RSA	Republic of South Africa
MME	Ministry of Mines and Energy
MEFT	Ministry of Environment, Forestry and Tourism
MAWF	Ministry of Agriculture Water and Forestry
DWA	Department of Water Affairs
ML	Mining License
DEA	Department of Environmental Affairs
SM	Site Manager
ENC	Environmental Coordinator
SF	Site Foreman
PS	Project Staff
PP	Project Proponent
EIA-C	Environmental Impact Assessment Consultant
I&Aps	Interested and Affected Parties
EAs	Environmental Assessments

Environmental Impact Assessment (EIA) (Scoping) Report

Executive Summary

Chrono Industrial Projects Pty Ltd (the proponent) is a wholly Namibian company that has interest in mineral exploration and development as well as mineral value addition aspirations within the Namibian Mining Industry. The Proponent is seeking to further partake in industrial mineral exploration opportunities and propose to undertake exploration activities and establish viability for a small-scale mining operation on mining claim 70656 located in the Karibib District, Erongo Region. The claim is located in farm Etiro, about 18 KM north of the Karibib town alongside the C33 road between Karibib and Omaruru. The mining claim corner beacons falls within the following coordinates:

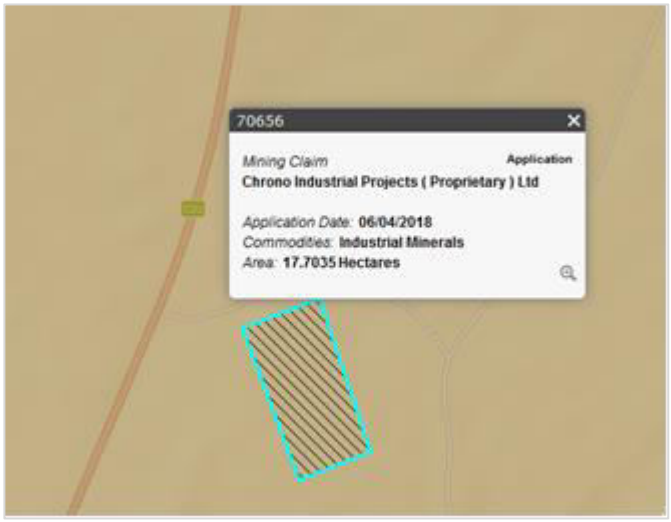

Figure 1: Mineral License Cadastre of Namibia, showing position Mining Claim 70656

Mining Claim No: 70656

A: 21°46'26"S, 015°57'02"E;

B: 21°46'23"S, 015°57'12"E;

C: 21°46'41"S, 015°57'19"E;

D: 21°46'45"S, 015°57'09"E;

The proposed project is part of the listed activities in the Environmental Management Act 7 of 2007, therefore, an environmental clearance certificate is required. As part of the environmental clearance certificate application, an environmental impact assessment has been undertaken to satisfy the requirements of the Environmental Management Act, 2007.).The proposed exploration project will involve aerial or remote sensing activities, and mineral

sampling, followed by a drilling program. If mineralization is identified, further exploration methods shall be applied; if not identified; the Claims shall be rehabilitated and returned to the government.

In view of the above, the environmental impact assessment (EIA) was undertaken by Burgundy Trading CC. Through the scoping process, a review of the site and surrounding environment was completed by undertaking a desktop review and site visitations. The assessment is considered comprehensive and sufficient to identify impacts, and it is concluded that the likely effects were not deemed significant and therefore no further assessment is required. On this basis, it is of the opinion of Burgundy Trading CC that an environmental clearance certificate could be issued, on conditions that the management and mitigation measures specified in the EMP are implemented and adhered to by the proponent.

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1. Introduction

1.1. Project Background

The proponent Chrono Industrial Projects Pty Ltd is proposing to carry out an exploration study to extract industrial minerals hosted in pegmatites within the registered mining claim 70656 in farm Etiro 50 situated near Karibib in the Erongo region.

In accordance with the Environmental Management Act (2007) and EIA Regulations (2012) an Environmental Impact Assessment (EIA) is required for any "Mining and Prospecting Activities". Burgundy Trading CC was appointed to conduct an EIA for the proposed project. Eben Tuhadeleni and Panduleni Haindongo are the Environmental Assessment Practitioners who conducted the EIA. Their CVs are attached in the appendices section.

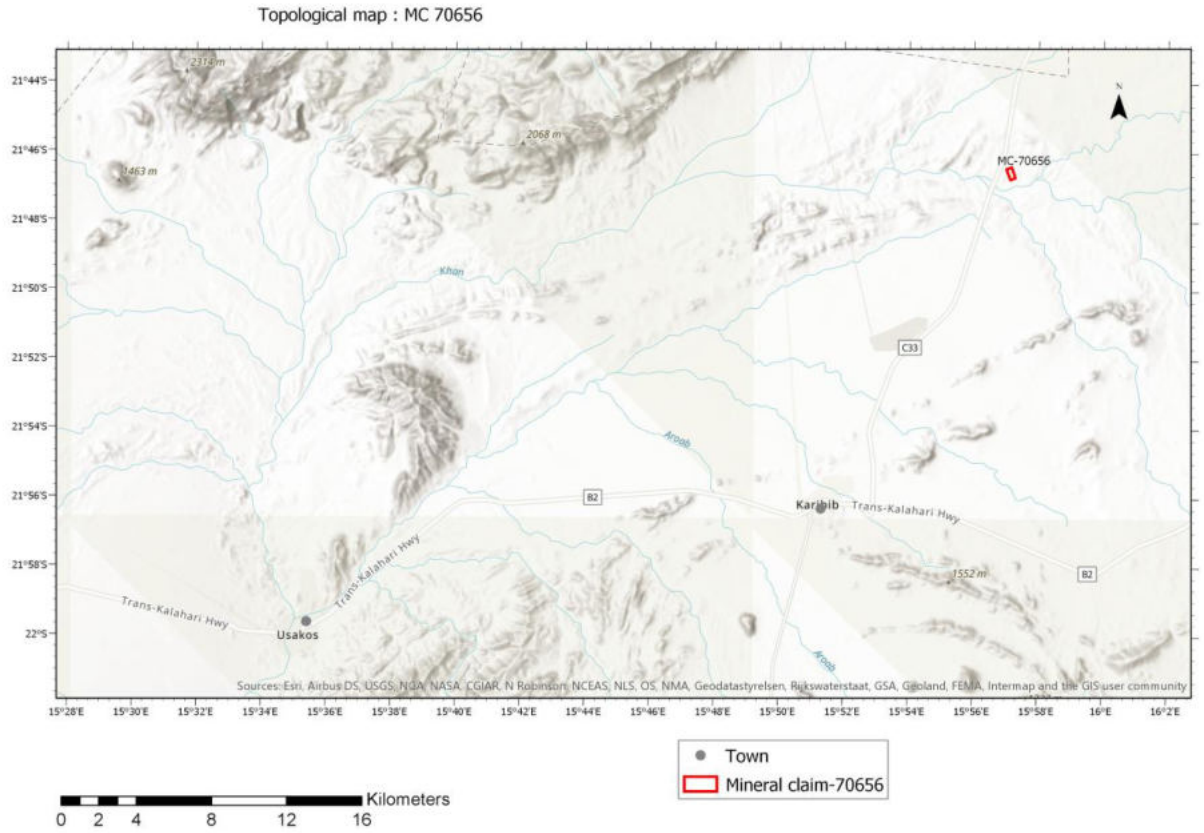

Figure 2: locality map of Mining Claim 70656 Erongo Region

1.2. The objectives of the Environmental Assessment Process

The study will involve investigation and assessment of the likely short and long-term positive and negative environmental impacts of the proposed exploration and possible testing of a quarry with the following main objectives:

- To prepare an Environmental Impact Assessment report including details of the proposed exploration and possible test a quarry mining;
- Develop an Environmental Management Plan (EMP) based on the outcomes of this study report to support the environmental management of the proposed exploration and possible test quarry mining;

1.3. Terms of Reference

Terms of reference" means a document, which forms part of a scoping report and sets out how an assessment must be carried out. The Environmental Management Act (2007) and Regulation (2012) set out the term of reference for the proposed project based on the requirement. The steps, which were followed, are described as follows:

A. A description of all tasks to be undertaken as part of the assessment process, including any specialist to be included if needed;
B. An indication of the stages at which the Environmental Commissioner is to be consulted;
C. A description of the proposed method of assessing the environmental issues and alternatives; and
D. The nature and extent of the public consultation processes to be conducted during the assessment process.

1.4. Scope of the Environmental Impact Assessment (EIA)

The particular objectives of the EIA in line with the Terms of Reference are to:

- Comply with Namibia's Environmental Assessment Policy, Environmental Management Act (2007) and its Regulations (2012).

- Confirm the justification of the project and to consider all alternatives that would meet the need;
- Consult all Interested and Affected Parties (I&APs) to ensure that their inputs are taken into account;
- Review the legal and policy framework and their relevant requirements for this project;
- Describe the biophysical and socio-economic environment of the project and determine the associated sensitivities to and suitability of the prospecting, mining, and transportation activities.
- Identify and assess impacts related to the construction, operation and decommissioning of the small scale surface exploration and to propose suitable mitigation strategies;

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2. Industrial minerals

2.1. What are industrial minerals?

For this report, industrial minerals group" means, subject to the provisions of subsection (4), a group of minerals specified in Part 3 of Schedule 1 of Namibians Minerals (Prospecting and Mining) Act 33 of 1992 which are :

"Alunite, andalusite-sillimanite-kyanite, anhydrite, aplite, asbestos, barite, beryl (excluding beryl as a source of beryllium metal or as a semi-precious stone), boron minerals, calcium carbonate, celestite, clay (including bentonite and Fuller's Earth (Palygorsite and attapulgite), ball clay, halloysite, hectorite, kaolin, refractory clay), corundum, diatomite, dolomite, epsomite, feldspar, fluorite, garnet (for industrial purposes), graphite, gypsum, heavy mineral sands, iodine minerals, leucoxene, lithium minerals, limestone and marble, magnesite, mica, nepheline syenite, nitrate, olivine, perlite, phosphate, fossil guano, quartz (for industrial purposes), picture-stone, potash, pumice, pyrophyllite, salt, sepiolite, silica sand, soapstone, soda-ash and other sodium compounds, strontianite, sulphur and pyrite, talc, vermiculite, wollastonite.":

These industrial minerals are hosted in deposits of different geological characteristics, such as pegmatitic, sedimentary hosted and evaporate environments etc. For the mining claim 70656, the project aims to focus on industrial mineral principally hosted in pegmatite bodies, which are mainly, quartz, feldspar, lithium bearing minerals (lepidolite, amblyngonite, spodumene, petalite), beryl and apatite.

Pegmatites or aplites are very coarse or finer grained felsic dikes, respectively. They intrude into the country rock as highly differentiated magma, crystallizing either very slowly (pegmatites) or relatively fast (aplites). Pegmatites are usually of limited three-dimensional extent, ranging from a few meters to several hundred meters or even kilometers in length and depth. Besides quartz, feldspar and mica, lithium bearing pegmatites may also carry other valuable minerals that contain

rare elements such as tantalum, niobium, tin, tungsten, cesium, rubidium, boron, fluorine and others. Those potential by-products may be of economic importance to some projects and mines. The most important minerals in these deposits are spodumene, petalite and lepidolite

Prospecting and Exploration and mining of •these industrial minerals would entail the following stages: Desktop Study > Field evaluation > Detailed mapping > Drilling > Geophysics > Bulk Sampling > Resources estimation > Feasibility > Mine development.

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3. Project description

3.1. The rationale for the proposed project

The mining claim 70656 covers the area which is host to a well-studied Etiro Pegmatite body, a previously exploited mine which is highly prospective area for an abundance of industrial minerals such as lepidolite, amblygonite mica and feldspar and high purity silica.

The proposed exploration and mining activities aims to establish economic viability of establishing small-scale industrial minerals mining operation from the old mine workings of the Etiro Pegmatite. The project will have good socio-economic benefits including value addition to the potential silica, feldspar and lepidolite resources in the area. The peaking global lithium prices and the dawn of establishment of green hydrogen project are the catalysts for pursuing such project because currently there is a huge demand for lithium ore as well as high purity silica raw materials. The mining claim presents an excellent opportunity for exploration activities.

3.2. Proposed locality

The proposed exploration will take place on mining claim 70656 situated in farm Etiro about 18Km north of Karibib Town along the c33 road to Oamaruru. From the C33 road, the project is about 700 meters east of the road.

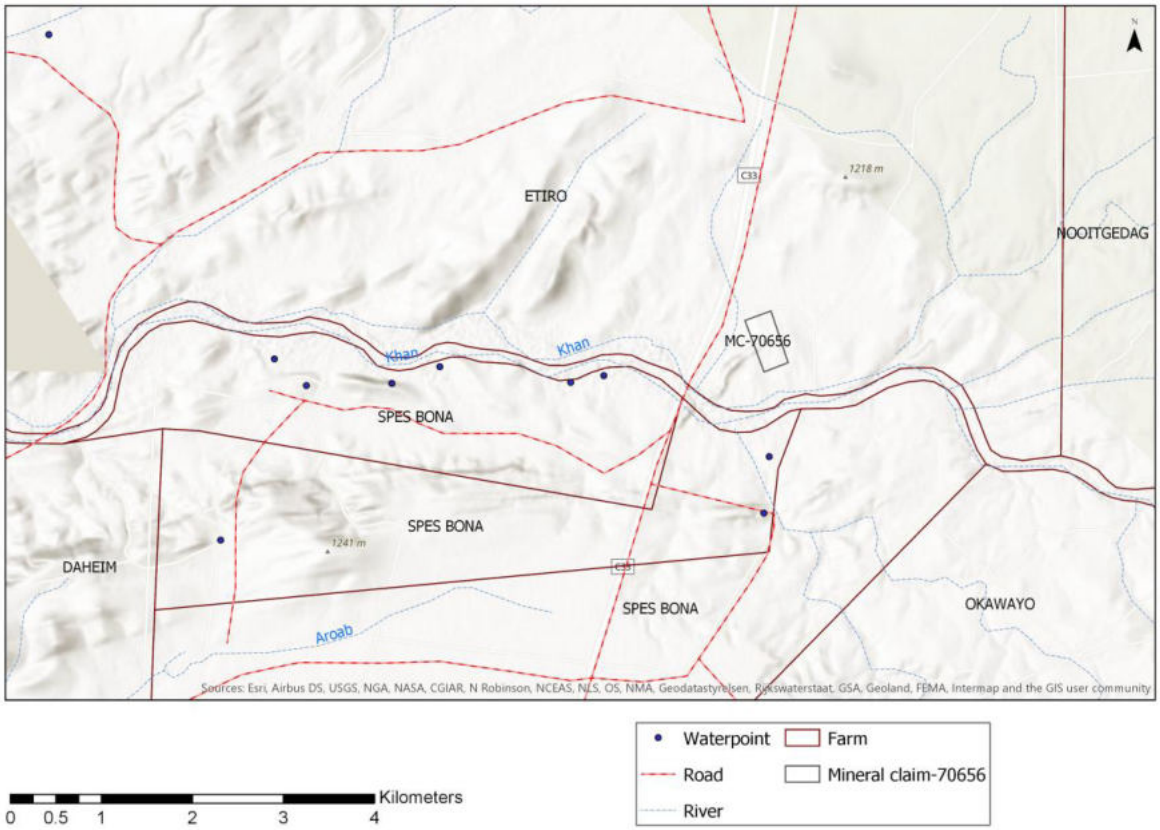

Figure 3. Locality map of mining claim 70656 in farm Etiro 50.

3.3. Geology of the area

A small stock of Salen granite has intruded sediments of the Damara System on Etiro 50, Karibib District. A younger mediun-grained granite dyke and many pegmatite dykes have been emplaced in the Salem granite. The Etiro pegmatite is the largest of the pegmatites and contains three recognisable zones; a wall zone, an intermediate zone and a core zone. Replacement bodies are also present.

The main constituents of the various zones and bodies are: **wall zone** - microcline-perthite, quartz, biotite, muscovite and schorl; intermediate zone - plagioclase, quartz, microcline-perthite, beryl, muscovite, biotite, schorl and apatite with small amounts of columbite-tantalite, monazite and topaz; **core zone** - microcline-

perthite, quartz, apatite and cleavelandite with small amounts of amblygonite, columbite-tantalite and bismuth ore; replacement bodies - lithia-muscovite with fluorite and very small amount of monazite.

3.4. Climate

Annual precipitation in the project area ranges from 150mm to 300mm. The average temperature for mining claim 70656 site is between 21°C to 22°C. The area receives very little rainfall during wet season, and thus the possession of Marble potential. The relative humidity of the area range from 16% to 39% and the wind direction is predominantly dominated by southwest wind.

3.5. Infrastructure and exploration equipment required for the project

The first stage of the project will involve a prospecting and exploration stage mainly mapping and sampling exercise during the process, which the following equipment and technology will be, used:

- Geological hammers
- Plastic sample bags
- Jack hammers
- Core drill machine (If necessary)
- Hand auger
- Generator
- Front end loader
- Excavator
- Water tank

The collected bulk samples will be dispatched to the laboratories in South Africa and China Federation for an in-depth mineralogical and metallurgical testing. No blasting activities will be conducted on the area.

3.5.1. Exploration equipment

Table 1 below shows a summary of machines/equipment that will be used during the small-scale prospecting and exploration stage process within the mining claim area.

Table 1: List of machines/equipment and quantity to be used in exploration

Item	Quantity
Geological Hammers	3
Plastic sample bags	500
Jack hammers	1
Core drill machine	1
Hand auger	1
Generator	1
Front end loader	1
Excavator	1
Water tank	1
Diesel tank	1

On site infrastructural requirements

a) Waste disposal infrastructure

Bins will be provided, and all litter will be disposed of at the nearest municipal dumping site (i.e. Karibib Town Council Dumping site). Industrial waste will be mainly wire, cable, drill bits, these items will be collected and removed from the sites. No unused machines, part will remain on site. Chemical Toilets (Mobi Loo) will be erected on sites for the use of the workers.

b) Electrical requirements

The area or sites have no access to the main electrical grid. Therefore during the exploration process, diesel generator will be used as a source of power. The diesel to be used on site will be purchased from the nearby towns such as Karibib.

c) Road proposed

The B2 and c33 will be used for transportation of equipment to and from the site and the bulk samples collected for testing. To get to the site the already existing farm tracks are sufficient for use

3.6. Decommissioning plan

The economic situation or unconvincing exploration results may force the Proponent to eventually cease with the exploration program. However, during the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place. Where necessary, stockpiling of top soil for rehabilitation at a later stage will be undertaken. Necessary landscaping of exploration areas will be undertaken upon completion of each phase of exploration

4. Legal and regulatory framework review

The national regulations governing prospecting and mining for dimension stone activities in Namibia fall within the jurisdiction of the Ministry of Mines and Energy

(MME). The Minerals (Prospecting and Mining) Act (No 33 of 1992) is the most important legal instrument governing the mining and prospecting industry in Namibia.

The Minerals (Prospecting and Mining) Act (No 33 of 1992) regulates reconnaissance license, prospecting license and mining of minerals and dimension stone or rocks. The Act details reporting requirements for monitoring of activities and compliance to environmental performance, such as disposal methods and rehabilitation. The Mining Commissioner, appointed by the Minister, is responsible for implementing the provisions of this Act as well as the associated regulations such as the Health and Safety Regulations. Several explicit references to the environment and its protection are contained in the Minerals Act, which provides for environmental impact assessments, rehabilitation of prospecting and mining areas and minimizing or preventing pollution.

4.1. Mineral Act of 1992 and the types of license it regulates

Below is an outline of the Mineral Act, linking the type of license it regulates, project activities at every license stage and the environmental requirements are **(Table 2).**

Table 2: Types of license regulated by the Mineral Act of 1992, activities and environmental requirements

Types of license	Activities	Environmental Requirements
Exclusive Reconnaissance License (ERL)	1. Project Identification, 2. Reconnaissance	None Complete Environmental Questionnaire
Exclusive Prospecting License	Prospecting based on the following steps: Desktop study, Detailed	Scoping Report, Environmental Impact Assessment (EIA)

	Mapping, Geophysical Methods, Drilling and Bulk Sampling,	
Mining Claims	Prospecting based on the following steps: Desktop study, Detailed Mapping, Geophysical Methods, Drilling and Bulk Sampling,	Scoping Report, Environmental Impact Assessment (EIA) Environmental Management Plan (EMP)
Mining License	Preconstruction and Construction, Operation and, Ongoing Monitoring, Decommissioning, Closure, Restoration and Aftercare	Full Environmental Assessment covering Scoping Environmental Impact Assessment (EIA) and the development of and Environmental Management Plan (EMP) covering the complete project lifecycle Including preconstruction, construction operation and ongoing, decommissioning and aftercare. Aspects of the Environmental Management Plan are usually incorporated into an Environmental Management Systems

4.2. Legal instruments relevant to this project

There are various legal instruments that advocates for the effects of small-scale prospecting on the environment. Table 3 below shows the summaries of the legislation that are relevant to this project:

Table 3: Legal instruments relevant to this project

Topic	Legislation	Provisions	Regulatory Authority
Small-scale Industrial mineral exploration and Mining	Mineral (Prospecting and Mining) Act of 1992	The Minerals Act of 1990 governs minerals prospecting and mining. The Act provides for the reconnaissance license, prospecting license and mining for, and disposal of, and the exercise of control	Ministry of Mines and Energy

		over minerals in Namibia,	
Environmental Impact Assessment	Environmental Management Act of 2007 and EIA regulation of 2012	Provides list of activities that require an environmental assessment, including exploration and Quarrying. Activities such as Mining or prospecting for minerals or dimension stone, mining for minerals or dimension stone. 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 a project.	Ministry of Environment, Forestry and Tourism (MEFT)
Water Supply and Effluent Discharge	Water Resources Management Act of 2004	This Act provides provisions for the control, conservation and use of water for domestic, agricultural, urban and industrial purposes. The Act states that a license or permit is required to abstract and use water, and also discharge effluent. In accordance with the Act, and due to the nature of the project, abstraction and use permits won't be required for this project as on-site water tank (500 L) will	Ministry of Agriculture, Water and Land Reform

		be used The capacity of the onsite tank is less than 20 000 m3 bench mark for water work permit. Effluent (i.e. Human Waste) from the mobile toilet will be discharge at the Karibib Municipality sewerage system. No effluent will be discharge in a water course. Waste water from dust suppression will be minimal and the water is expected to evaporate faster than it infiltrates. Therefore, no effluent discharge permits will be required for this project.	
Hazardous Substance such as used oil which (e.g. diesel)	Hazardous Substance Ordinance 14 of 1974	The Act provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; to provide for the prohibition and control of the importation, sale, use, operation, application, modification, disposal or dumping of such substance; and to provide for matters connected therewith.	Ministry of Health and Social Services

Fauna and Flora	The Nature Conservation Ordinance, Ordinance of 1975.	In the course of the Mine's activities, care must be taken to ensure that protected plant species and the eggs of protected and game bird species are not disturbed or destroyed. If such destruction or disturbance is inevitable, a permit must be obtained in this regard from the Minister of Environment, Forestry and Tourism. For this project, due to it areal extend and location outside a protected area a permit will not be required.	Ministry of Environment, Forestry and Tourism (MEFT)
Used oil	Petroleum Products and Energy Act 13 of 1990	The Act provides provisions for the any certificate holder or other person in control of activities related to any petroleum product is obliged to report any major petroleum product spill (defined as a spill of more than 200 L per spill) to the Minister. Such person is also obliged to take all steps as may be necessary in accordance with good petroleum industry practices to clean up the spill Should this obligation not be met; the Minister is empowered to take steps to clean up the spill and to	Ministry of Mines and Energy

		recover the costs thereof from the person Used oil from this project will disposed at the Walvis Bay Municipality Hazardous Waste Site. Permission will be required from the facility owner prior to the dumping of the used oil.	
Employees	The Labour Act, 2007 (Act No. 11 of 2007)	The Labour Act gives effect to the constitutional commitment of Article 95 (11), to promote and maintain the welfare of the people This Act is aimed at establishing a comprehensive labour law for all employees; to entrench fundamental labour rights and protections; to regulate basic terms and conditions of employment; to ensure the health, safety and welfare of employees.	Ministry of Labour and Social Welfare
Archaeological sites	National Heritage Act, 27 of 2004 Ministry of Youth, Sport and National Service	This Act provides provisions for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. The proposed exploration project will ensure that if any archaeological or paleontological objects, as described in the Act, are found in	Ministry of Youth, Sport and National Service

		the course of its exploration operations or closure that such find be reported to the Ministry immediately. If necessary, the relevant permits must be obtained before disturbing or destroying any heritage.	
Desertification	United Nations Convention to Combat Desertification (UNCCD), 1992	The convention objective is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of draught in affected areas in order to support poverty reduction and environmental sustainability.	United Nations Convention
Biodiversity	Convention on Biological Diversity (CBD), 1992	This convention advocates for 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.	United Nations Convention

4.3. Regulatory authorities and permitting

The environmental regulatory authorities responsible for environmental protection and management in relation to the proposed small-scale prospecting project including their role in regulating environmental protection are listed in Table 4. Table 8 below shows an extract from the legal instruments of the regulating

authorities with respect to the relevant permits/ licenses required for the proposed small-scale surface exploration project.

Table 4: The regulatory authority and permitting

Activities list	Applicable Legislation	Permitting Authority	Current Status
Small-Scale Mining Programme	Minerals (Prospecting and Mining) Act, 1992	Ministry of Mines and Energy	Field Work to follow on issue of Environmental Clearance
EIA Clearance for Exploration	Environmental Policy and Environmental Management Act, (Act No. 7 of 2007)	Ministry of Environment, Forestry and Tourism (MEFT)	To be applied on completion of this EIA and EMP Report for Exploration
EIA Clearance for Exploration	Environmental Policy and Environmental Management Act, (Act No. 7 of 2007)	Ministry of Mines and Energy	To apply if Economic Resources are Discovered and Project Advances to Feasibility and if the Feasibility Proves Positive
Construction, alteration of waterworks with capacity to hold in excess of 20 000 L. Abstraction of water other than that provided by NamWater. Discharge of effluents or construction of effluent facility or disposal site	Water Resources Management Act, 2004 (No. 284 of 2004)	Ministry of Agriculture, Water and Land Reform	To Apply when Required
Removal, disturbances or destruction of bird eggs	Nature Conservation Ordinance 4, 1975	Nature Conservation Ordinance 4, 1975	To Apply when Required
Removal, destruction of indigenous trees, bushes or plants	Forestry Act, 12 of 2001	Ministry of Agriculture, Water and Land Reform	To Apply when Required

within 100 yards of stream or watercourse			
Discarding or disposing of used oil	Petroleum Products and Energy Act 13 of 1990	Ministry of Mines and Energy (MME)	To Apply when Required
Construction of Waste Disposal sites	Environmental Policy and Environmental Management Act, (Act No. 7 of 2007)	Ministry of Environment, Forestry and Tourism (MFET)	To Apply when Required
License to Purchase, Store and Use of Explosive Magazines for Blasting	Explosives Act 26 of 1956 (as amended in SA to April 1978)	Ministry of Home Affairs, Immigration, Safety and Security in consultation with Ministry of Mines and Energy (MME).	To Apply when Required

5. Affected Environment

5.1. General description of the project

The proposed exploration project for mining claims number: 70656 involves undertaking a prospecting and exploration program and small-scale tailing mining to establish the viability of establishing a small scale mining operation of industrial minerals hosted in the tailings and in-situ within pegmatite bodies contained by the boundaries of the mining claim.

Industrial minerals group means, subject to the provisions of subsection (4), a group of minerals specified in Part 3 of Schedule 1 of Namibians Minerals (Prospecting and Mining) Act 33 of 1992 which are :

"Alunite, andalusite-sillimanite-kyanite, anhydrite, aplite, asbestos, barite, beryl (excluding beryl as a source of beryllium metal or as a semi-precious stone), boron minerals, calcium carbonate, celestite, clay (including bentonite and Fuller's Earth (Palygorsite and attapulgite), ball clay, halloysite, hectorite, kaolin, refractory clay), corundum, diatomite, dolomite, epsomite, feldspar, fluorite, garnet (for industrial purposes), graphite, gypsum, heavy mineral sands, iodine minerals, leucoxene, lithium minerals, limestone and marble, magnesite, mica, nepheline syenite, nitrate, olivine, perlite, phosphate, fossil guano, quartz (for industrial purposes), picture-stone, potash, pumice, pyrophyllite, salt, sepiolite, silica sand, soapstone, soda-ash and other sodium compounds, strontianite, sulphur and pyrite, talc, vermiculite, wollastonite.":

These industrial minerals are hosted in deposits of different geological characteristics, such as pegmatitic, sedimentary hosted and evaporate environments etc. For the mining claim 70656, the project aims to focus on industrial mineral principally hosted in pegmatite bodies, which are mainly, quartz, feldspar, lithium bearing minerals (lepidolite, amblyngonite, spodumene, petalite), beryl and apatite.

5.2. Social-Economic Environment and Archeology

5.2.1. Social Environment

According to Namibia Statistic agency, (2011), majority of the people in the area of Karibib are heavily depended on dimension stone (i.e. Marble) industry for their livelihood. The area (Karibib Town) has many small scale miners that operate mining for dimension stone at small scale. Most of the small scale miners are previous disadvantage people. Residents of Karibib Town are concerned about small miners selling their exploration or mining license to foreigner investor due to lack of startup capital for potential mining expansion. This could be seen as a threat and at the same time as an opportunity in the sense that local miners could negotiated for shareholding agreement instead of selling their licenses.

The report by Namibia Statistic agency, (2011) also revealed that the Karibib households depend mainly on wages and salaries, farming, business or non-farming activities, pension and cash remittance as their main income. About 58 % of the population depends on wages and salaries. Only a small percentage depends on farming, which is the lowest dependency in the area adding up to 6 % in the year 2011.

About 9% of the population is depended on business or non-farming activities (Namibia Statistic agency, 2011). The dependency of the residents on pension only adds up 13% of the total population. The other 7% depends on the cash remittance (Namibia Statistic agency, 2011). Comparing to the Erongo region at large, the Karibib residence has the second highest unemployment rate in the region after the Daures constituency with an unemployment rate of 44% (Namibia Statistic agency, 2011). Karibib district is also one the constituency with a high rate of no proper sanitation, ranking in second after the Daures constituency. Therefore Karibib Town is in a crisis as far as employment, and thus development of the town is concern. However, any developmental activity that is needed should not take advantage of the unemployment situation in the Town at an

expense of the environment and thus sustainable developmental project are needed for this town.

It should also be noted that, the population of the Karibib Town is about 13 320, and the town consist of only 9% of the Erongo Region population which is at 150 809 (Namibia Statistics Agency, 2011). The population growth rate is only 1%, depicting a slow growth rate which could be due to the little economic activities in the area to attract more inhabitants. According to the statistics the labor force participation rate is at 76.3% in Karibib, (Namibia Statistics Agency, 2011), were more men are economically active than women.

It anticipated that this project will have little adversely negative impacts on the communities living in Karibib and Usakos Towns, and nearby farms. Instead, the project poses a significantly positive impact to the people living in the area such Karibib and Usakos. The positive impacts are mainly, job creation, support to local retailers and payment of export tax and VAT to the government of Namibia. The little negative impacts identified are on the issues of health and safety of the employees, and the potential spread of HIV/AIDS by the employees. Mitigation measures for the negatives impacts and enhancement measures for positive impacts are all addressed in Section 8.4 of this document and in the EMP.

5.2.2. Archaeology

There are no archaeological sites within and outside the boundary of the mining claim 70656 area. The available archaeological sites in Namibia are mainly rock arts. Rock arts are of historical importance to the people it belongs to and the nation at large. These arts are protected by laws in Namibia such as the National Heritage Act of 27 of 2004, hosted under the Ministry of Youth. It is widely spread that every project operating within an area where there are many archeological sites is obliged not to destroy or temper with the sites. Therefore, should there be existing rock arts located in the boundary where this project will be operating should not be destroyed or tempered with during the duration of the project. The

mitigations measures for the protection of archeological sites are addressed in Sub-section 8.4.3 of this document and the EMP.

5.3. Biophysical Environment

5.3.1. Biodiversity (fauna and flora)

The mining claim 70656 is situated in the Namib Karoo and Western Highlands Biomes Savanah.

In the Namib Karoo Biome, tree cover is 2 to 10%, tree height is 2 to 5m, shrub height is 0.5 to 1m, grass cover is 0.1 to 1% and grass height is >1.5m. The dominant vegetation in this biome according to the ranking is acacia montis-ustii, acacia robynasiana, cyohostemma currorii, strcutia africana, and calicorema capitiatia and orthanthyera albiadia.

In the Western Highlands Biomes Savanah, tree cover is 2 to 10%, tree height is 2 to 5m, shrub cover is 2 to 10%, and grass height is >0.1m. The dominant vegetation type in this biome according to the ranking is acacia reficiens, euphorbia geuerichiana, colophospermum mopane, maerua schinzii, and ademolobius garipensis (Mendelson, 2002).

Species number for mammals in the project area is about 61 to 71 species and the area is ranked number 5 in terms of species sensitivity. The area has 75 species of biodiversity compare to Zambezi Region at 120 and the Namib Desert at 9 species. Bird's endemism is ranked number 5 with endemic species of 8 to 10.

Figure 4. Types of Vegetation on the tailings on site

5.4. Water resources

5.4.1. General hydrology of the study area

The project site is situated in the southern part of the lower Omaruru Catchment with typical lower catchment characteristics (narrow width, relatively deep soil cover, flat slope, low altitude, low runoff velocity, and a characteristic depositional sediment transport), about 65 Km south of the currently active Omaruru River channel, 13km north of the Khan River and 28km north of the Swakop River (Figure 5). The local surface drainage trends northwest, while the regional trend of surface water flow is essentially southwest. The average annual rainfall of the area is between 50 and 100 mm, therefore the area has a very limited potential for surface runoff. Although the potential is limited for surface runoff, during heavy reason seasons an area of this nature could generate runoff

for a short period, which could reach the nearby active stream of the Khan River. All in all, it can be claimed that the area is generally vulnerable to ero sion considering the less than 2 % vegetation cover and strong desert winds. However, the low runoff potential, flat overall slope and typical depositional sediment transpor t character of lower catchments tend to moderate the area's vulnerability to erosion. The mining claims are located within the Erongo underground water basin (Figure 6). In view of the above, care should be taken by the proponent to ensure that, potential surface water pollution contributing factors such oil spill and other waste are managed on site properly as the EMP.

6. Geology

6.2. Regional Geology

About 18 km north of Karibib where the road to Omaruru crosses the Khan River on Etiro 50, a circular stock of coarse-grained Salem granite has intruded limestone and dolomite of the Damara System along the axis of an east-west trending anticline. The emplacement of this granite was followed by the intrusion of dykes of mediun-grained granite and pegmatite. The pegmatite dykes show many signs of earlier prospecting activities but the Etiro pegmatite appear to have been the only worthwhile proposition.

The dolomite and limestone are topographically the most prominent rook types in the area and enclose the Salem granite in a circle of low-lying hills. Within the granite itself the medium-grained granite forms a conspicuous ridge while many of the pegmatites stand out like uneven broken wall between one and two meters high.

The dolomite and limestone representing the Hakos Series of the Damara System and the overlying mica schist of the Khomas Series are the oldest rocks in the area (Promurze, Gevers and Rossouw, 1942, p. 19-20; Smith, 1965, p. 21-36). The intrusion of the granite has produced a remarkable swelling in the strike of these rocks and they dip at angles ranging between 47° and 64° to the north and south away from it.

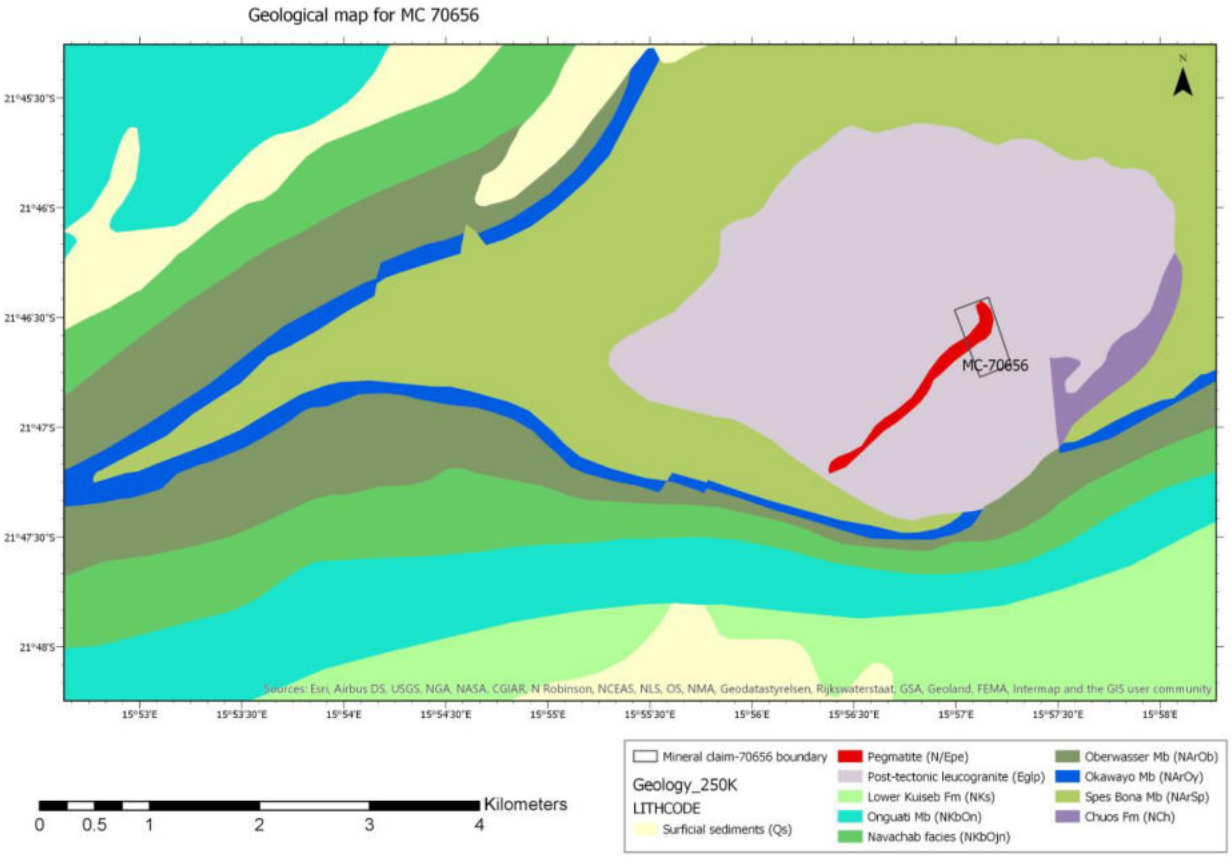

Figure 5: Geological map near Mining claim 70656

The Salem granite 10 non-porphyritic, coarse-grained, and is essentially composed of quartz, potassium-feldspar (largely non-perthitic microcline), plagioclase and biotite with a small amount of accessories (Smith, 1965, D.49).

The medium-grained granite is in the form of a northeast - southwest striking dyke, 1.8 km long and between 20 and 42 meters wide. It has a grey colour and le composed of quartz, microcline and plagioclase with accessory amounts of biotite and 10 probably very similar to the intrusive granite of Smith (1965, p.54-60).

The pegmatites are the youngest rocks in the area and occur as sub-parallel dykes striking more or less north-south. They range in width from a few centimeters to a maximum of 28 meters and most of them are longer than 800 meters. Many divide into two or more branches, which may either become progressively thinner

or end very abruptly. Although surface weathering makes recognition and delineation of zones rather difficult, most of the pegmatites can be considered as being inhomogeneous and appear to be distinctly zoned.

6.2. Local Geology

The Etiro Pegmatite is one of the largest of the pegmatite and due to the exploitation of the minerals in it, is also the best exposed. It is 850 meters long and between 4 and 28 meters wide. Near the southern limit it joins up with a neighboring pegmatite for a distance of 70 meters, to form a single dyke, but this divides into two again further on.

The granite-pegmatite contact is very sharp and dips between 80° and 86° west. There is no alteration zone within the granite and the only contact reaction in evidence is the concentration of fine-grained muscovite book (1 cm. in diameter) on the contact itself.

A large excavation (100 meters long and up to 30 meters wide) made along strike in the central portion of the body, and three other prospecting pits, show that the pegmatite consists of four distinct units, namely: wall zone (which includes a thin border zone), intermediate zone, core zone and replacement bodies.

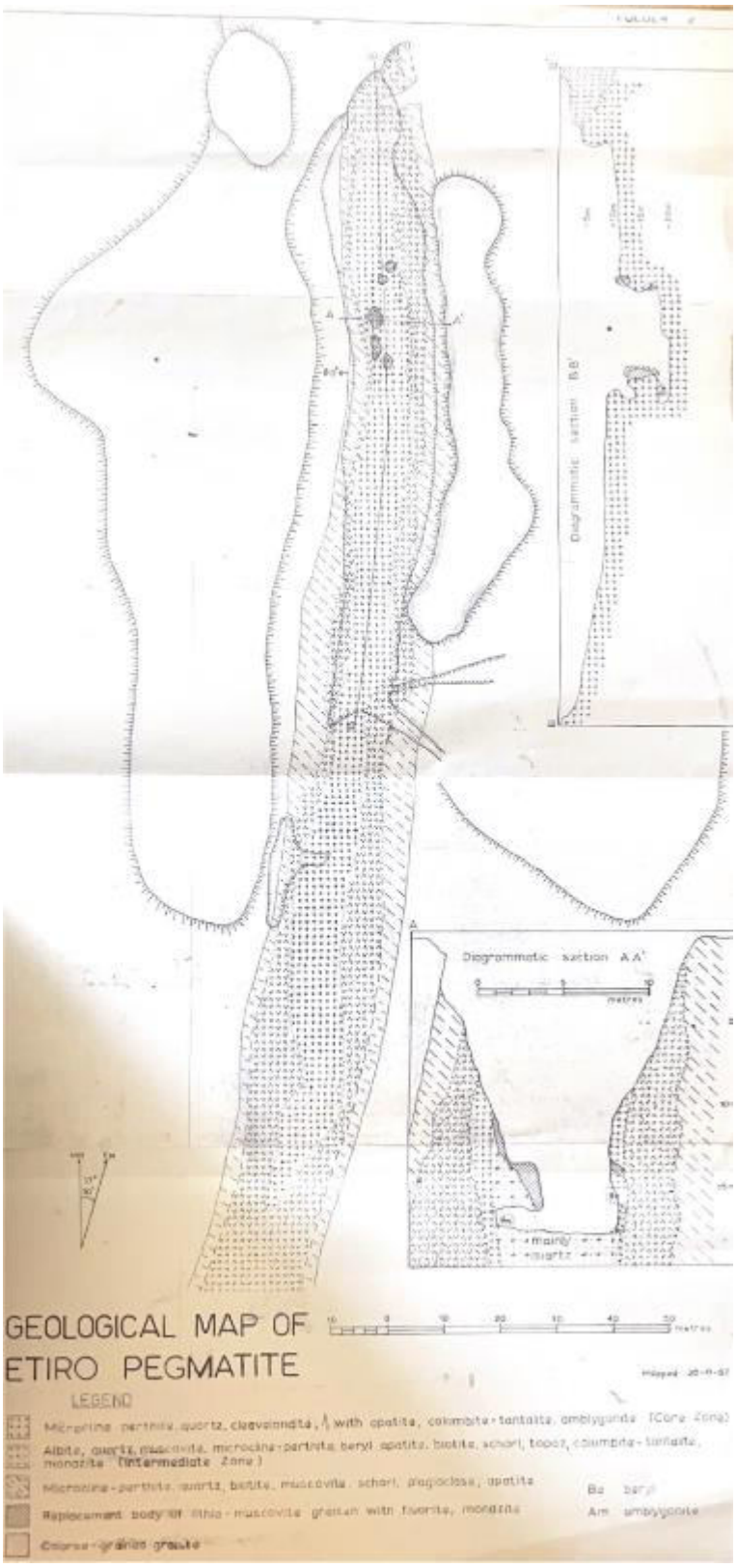

Figure 6: Geology of the Etiro Pegmatite

Wall Zone: Between the wall zone and the granite an inconsistent border zone 1s developed which ranges in thickness from 5 to 15 cm. and has essentially the same composition so the wall zone. The wall zone itself is fine to medium-grained and is between 0.7 and 5 meters thick. It consists of the following minerals in order of abundance: Microcline-perthite, quartz, biotite, muscovite, schorl, plagioclase and apatite. The microcline-perthite is usually pink in color and is largely in the form of randomly orientated anhedral to subhedral crystals from 3 to 10 cm. long. Graphic intergrowth with quartz are found locally. Muscovite occurs as individual books as well as fine-grained intergrowth with quartz. Biotite also occurs as small individual books but it is more often in the form of long, thin blades from 0.5 to 2.5 cm, wide and from 10 cm, to 1 meter long. These blades are orientated more or less perpendicular to the granite-pegmatite contact. The concentration of schorl varies, but it occurs throughout the zone and is found either as individual crystals (with diameters up to 1.5 cm.) or as intergrowths with quartz. Albitic plagioclase is present in only subordinate amounts. It generally occurs as graphic intergrowths with quartz but also as white subhedral inclusions in microcline-perthite. Dark green apatite crystals generally less than 0.5 cm. in diameter are found scattered through the zone.

Intermediate Zone: - The thickness of this zone ranges from 0.3 to 5 meters in the main excavation while the grain size of the constituent minerals changes from medium-grained at the outer edge to coarse-grained near the contact with the core. The following minerals occur. in order of abundance: albite, quarter biotite, muscovite. Microcline-perthite, beryl, apatite, schorl, tantalite and monazite. The plagioclase is either in the form of cleavelandite or saccharoidal albite. Typically scattered through the latter are minute crystals of schorl. Near the southern end of the main opencast, coarse-grained graphic intergrowth of plagioclase and quartz are numerous.

Microcline-perthite is in the form of large isolated crystals up to 30 cm. in length. All show signs of corrosion on their edges, which would seem to indicate incipient assimilation of the perthite by the surrounding material. These corrosion rims often contain abundant fine-grained green apatite. Muscovite occurs mainly in pockets and veins, which are mostly found in the inner portions of the zone near the contact with the core. The size of the books becomes conspicuously larger in the proximity of the core. However, isolated books of muscovite up to 5 cm. also occur and fairly often intimate medium-grained intergrowths of quartz and muscovite are found.

The muscovite of the pocket and vein occurrences is usually randomly orientated and in the form of flat or wedge shaped sheets, which often exhibit 'A' type structure. Herring-bone structure also occasionally occur. All normal sheets are ruled and generally showing iron staining. Most of the muscovite is colorless or light brown but in the deeper parts of the pegmatite it ss all rose-colored. In two exposures, horizontal veins show a rose-colored lower half and a colorless upper half indicating that the color change is not influenced by crystal boundaries. Initially the rose color of certain occurrences of muscovite was attributed to the presence of lithium but work that is more recent suggests that it may be due to a predominance of manganese 3+ ions over iron 3+ ions and an absence of iron 2+ ions. This rose coloration may therefore represent a post-crystallization manganese 3+ ion enrichment.

The occurrences of beryl that have been exposed to date are in the deeper part of the pegmatite within or very close to a portion of the core composed almost entirely of quartz. The beryl occurs near the contact of the intermediate zone with the core as large subhedral to enhedral crystal between 20 and 60 cmm in diameter. Some huge subhedral crystals have been exposed just within the core - the two largest of which had a longth of 2.6 metres and a width of 1.7 meters. Most of the large beryl crystals are surrounded by smaller ones that decreases in

size as the distance between them and the central crystal increases. Although a few white crystals are encountered, the majority have a striking pink colour.

The apatite occur mainly as small dark green crystals which are more or less disseminated throughout the zone. The crystal diameters increase from less than 0.5 cm. near the outer edge to as much as 3 cm. near the core. However, much larger crystals of dark green and light brown apatite are found associated with the pockets of muscovite either between, or as inclusions in individual books.

Schorl is largely confined to the outer portion of the zone. Individual crystals with diameters up to 2 cm. as well as fine-grained quartz-schorl intergrowths occur. Topaz, which varies in colour from light blue to light yellowish-green, is only found associated with the pocket and vein muscovite where it occurs as large crystals between the books. Columbite-tantalite is only locally present in the form of thin blades between sheets of muscovite. Very small anounts of monazite are found in patches in the muscovite pockets.

Figure 7: Lilac lithian mica with quartz and feldspar observed on site.

Core Zone: The core zone has a width that ranges from five to nine meters and a discernable length of 195 metres. Microcline-perthite and quartz are the main constituents with either one or the other predominating in different portions. Small amounts of cleavelandite occur in places and other rare minerals found in the core are apatite, columbite-tantalite, amblygonite, triplite, bismuth ore and tourmaline. The microcline-perthite has a white to very light cream colour. Most crystals are subhedral and show no preferred orientation. Several are as much as 6 metres long. large dark green apatite crystals up to 30 cm in diameter occur in the perthitic portions of the core either as individual crystals or as inclusions in perthite. The occurrence of columbite-tantalite in the core is confined to occasional small inclusions of mineral in crystals of dark green apatite.

Only very small amounts of amblygonite and bismuth ore have been exposed. These minerals invariably occur very close to the contact between the quartz core and intermediate zone. The respective diameters of two subhedral amblygonite crystals observed were 18 cm. and 0.7 meters. Bismuth ore usually occurs in tiny pockets but in places staining by bismuth minerals produces light yellowish green patches. A few small shattered light green tourmaline crystals have been exposed in the quartz.

Replacement Bodies: Five large and several smaller replacement bodies of lithia-muscovite greisen have thus far been exposed within and adjacent to the core zone. Most are near the quarts-rich portion. Within the bodies themselves there are no large unaltered inclusions and no one mineral type seems to have hindered the advance of the replacement process. The edges of the bodies are very uneven and all surrounding minerals show numerous small centres of incipient alteration to lithia-muscovite. Cleavelandite, perthite, quartz and beryl have all been affected. Throughout the replacement bodies small patches (less than 5 mm.) of unaltered material: (cleavelandite, perthite, quartz) remain

between the small (less than 2 cm.), flat, irregularly-orientated books of lithia-muscovite.

The bulk of the lithia-muscovite of the replacement bodies has a beautiful rose colour (but the cores of the larger occurrences are made up of mics with a delicate pearly white colour (optically negative, 2v = 32°, p ~ j= 1.563). The texture is the same as that of the pink mica and both pink and white varieties impart an intense crimson colour to the Bunsen burner flame.

Small crystals of purple fluorite are sparsely disseminated throughout the bodies. Occasionally small patches or even only stains of a brown, highly radioactive mineral occur. This has been identified as monasite.

Figure 8: Old tailings on site showing rock fragments of beryl, quarts, feldspar and lepidolite.

Figure 9: stockpile of k-feldspar on site

Incipient replacement of large perthite crystal. of the core by rose-colored Lithia-muscovite is evident in places. This has occurred along cleavage planes and crystal edges so that the resulting Lithia-muscovite veins are straight and between 6 and 20 cm. wide. All the mica sheets are wedge shaped and have 'A' structures

and the axes of the 'A's are always more or less at right angles to the replacement surface.

6.3. Exploitation

The Etiro Pegmatite has been worked by open-cast method in four places altogether The southernmost excavation is shallow and was probably only opened up during prospecting operations. Only a few small white and green beryl crystals (less than 3 cm.in diameter) appear to have been exposed. Mining operations did take place in the two northernmost oper-caste but these are almost completely filled up with rock waste at present. Extracted minerals that are still in evidence in the area are potassium feldspar, 'A' structural muscovite, light green muscovite greisen, a few pieces on very clear silica rock crystal and a little triplite.

The first minerals to be mined in the main open- cast were microcline-perthite, muscovite and beryl. During the course of these activities the uppermost replacement bodies of lithia-muscovite were exposed. Recently deeper excavation has revealed more of these bodies as well as large quantities of pink beryl. Several subhedral crystals weighing as much as six tons have been removed and one huge crystal exceeded 15 tone in weight. By the end of 1967 the depth of excavation was 19.5 metres below surface. Production figures up to that date were: 9,500 tone feldspar (of which 1,500 tons still have to be sold), 450-tone beryl, 250 tons silica, 1,000 lba. columbit tantalite and 400 lbs. bismuth ore.

Figure 10: View of the historical tailings of the Etiro pegmatite

Figure 11: View of the historical pit on the Etiro Pegmatite

7. Public consultation process

7.1. Legal and policy requirement

7.1.1. Environmental management act (2007) and it EIA regulations (2012)

Public consultation is a crucial part of the EIA process. This provides an opportunity to stakeholders or interested member of the public to find out more about what is being proposed, and to raise any issues or concerns. The Environmental Management Act 2007 and its EIA regulations of 2012 are the key documents governing environmental impact assessment in Namibia. One of the key objectives of the Act is to prevent and mitigate the significant effects of activities on the environment by ensuring that there are opportunities for timeous participation of interested and affected parties throughout the assessment process; and ensuring that the findings of an assessment are taken into account before any decision is made in respect of activities.

The key principle of the Environmental Management Act 2007 advocates for public participation. The principles states that "the participation of all interested and affected parties must be promoted and decisions must take into account, the interest, needs and values of interested and affected parties".

Section 21 of the EIA Regulations outlines procedure on public participation process as follows:

"(2). The person conducting a public consultation process must give notice to all potential interested and affected parties of the application which is subjected to public consultation by:

A. Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is or is to be undertaken;
B. Giving written notice to:

i. The owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site;
ii. The local authority council, regional council and traditional authority, as the case may be, in which the site or alternative site is situated;
iii. Any other organ of state having jurisdiction in respect of any aspect of the activity; and

C. Advertising the application once a week for two consecutive weeks in at least two newspapers circulated widely in Namibia.

(3) A notice, notice board or advertisement referred to in sub regulation (2) must:

A. Give details of the application which is subjected to public consultation; and
B. State:

i. That the application is to be submitted to the Environmental Commissioner in terms of these regulations;
ii. The nature and location of the activity to which the application relates;
iii. Where further information on the application or activity can he obtained: and

C. The manner in which and the person to whom representations in respect of the application may be made.

(6) When complying with this regulation, the person conducting the public consultation process must ensure that a) information containing all relevant facts in respect of the application is made available to potential interested and affected parties; and b) consultation by potential interested and affected parties is facilitated in such a manner that all potential interested and affected parties are provided with a reasonable opportunity to comment on the application.

For the purpose of the Act and these regulations a notice is given to a person or a person is informed of a decision, if a document to that effect is:

A. Delivered personally to that person;
B. Sent by registered post to the persons last known address;
C. Left with an adult individual apparently residing at or occupying or employed at the person's last known address; or
D. In the case of a business-

i. Delivered to the public officer of the business;
ii. Left with an adult individual apparently residing at or occupying or employed at its registered address;
iii. Sent by registered post addressed to the business or its public officer at their last known addresses; or
iv. Transmitted by means of a facsimile transmission to the person concerned at the registered office of the business."

7.2. Consultation process followed during the EIA process

Communication with stakeholders about the proposed small-scale surface exploration project was facilitated through the following ways:

- Identification of stakeholders
- Newspaper adverts
- Written notices
- Information documents
- Stakeholder meetings
- Reasonable opportunity for the public to register and comment on the project

Table 5: below explains how the communication process was facilitate using the above-mentioned ways.

Steps	Description of the process	Time allowed
Identification of stakeholders	Keys stakeholders were identified and included in the register. Contact details for I&APs were obtained from their offices.	The registration process was maintained throughout the EIA process

Newspapers adverts	Notices were placed in the press, briefly explaining the development and its locality, inviting the public to register as stakeholders and informing them of the time and venue of the public meeting (Appendix C).	On the 18th, 22th , 25th and 29th of November 2022 in The New Era and Namibian sun Newspaper
Written Notices	Written notices were provided to relevant the immediate affected farmers Appendix D	The emails where sent via the office of the PROPONENT.
Notice boards:	On various notice boards in Karibib	
Background Information Documents	A Background Information Document (BID) was compiled The BID contained the information of the project (Appendix F) The BID was forwarded to all authorities and registered stakeholders.	Continued throughout the process every time someone registered.
Meetings	4 December 2022, Karibib	

7.3. Limitation of the public consultation process

The following factors limited the public participation process:

- Delivery of letters, Notice Board Posters and BID by hand is timing consuming.
- Some stakeholders do not have access to email.

7.4. The interested and affected parties (I & AP's)

There I&APs for this project were identified using information from our existing stakeholder database. Notices were placed in various newspapers inviting the public to register as interested and affected parties. Organizations were also selected whom the consultant considered to be interested in or affected by this particular project_ An I&APS can be defined **as '(a)** any person, group of persons

or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity.

7.5. Outcome of the public engagement

The main issue that is drawn from the public participation is that the public were interested in the project regardless of its magnitude, duration and the number of people to be employed.

7.6. Key issues identified during the public engagement process

During the public participation process the following keys issues were identified:

- Rehabilitation of the site after exploration trenching
- Number of people to be employed in the project
- The duration of the EIA process
- The start of the exploration stage
- Management of waste both solid and liquid waste
- Safety measures in place for employees

The identified keys issues during the public participation process together with the issues identified before in this report were assessed for potential impacts in section 8 below.

8. Impact assessment

8.1. Identification of key issues

Potentially significant impact identified from the baseline conditions, legal requirement, and public participation process were screened to obtain issues that require further investigation or assessment and those that doesn't required further investigation. The process shown in the flow chart below was used for the screening of potential issues. Table 6 below, shows the screening of the identified impact using the flow chart.

Table 6: Process of determining the key impacts resulting from certain aspects of the proposed small-scale exploration and mining for industrial minerals

Environmental feature	Potential impacts of project feature	Key impact	Degree of sensitivity	Issue addressed in
Surface water and ground water	Contaminants of construction process (e.g. oil spills etc) Affluent discharge from mobile toilet. Contaminants resulting from the presence of construction workers	Deterioration of groundwater quality	Medium sensitivity	Addressed in subsection: 8.3.1. and EMP
Fauna	Destruction of flora (vegetation) could result in the loss of faunal biodiversity	Loss of faunal biodiversity	Medium to Low sensitivity	Addressed in subsection: 8.3.1 And EMP
Flora	Removal or damage to vegetation could result in loss of biodiversity and habitat destruction	Loss of biodiversity Habitat destruction	Medium to Low sensitivity	Addressed in subsection: 8.3.2. And EMP

Social Economic Environment	Employment or job creation Support to local retailers shops and Export taxes and VAT payment	Permanent job creation for local people Contribute to the Karibib Town economic growth and the nation at large	Low sensitivity	Addressed in sub-section:8.4.1 And EMP.
Archaeology	Disturbance or destruction of archaeological sites as a result of earthmoving operations (construction) and accelerated soil erosion (operation).	Damage to existing or undiscovered archaeological sites in the area	High sensitivity	Addressed in subsection:8.4.1 and EMP.
Solid waste	Exploration solid waste such as drill bites, plastic, and wire will be generated on site	Damage to the surrounding environment	Medium sensitivity	Addressed in subsection:8.4.1 and EMP.
Dust on site and gravel road	Exploration or working of tailings, dust will be generated	Effect the employees and wellbeing	Medium sensitivity	Addressed in sub- section.8 3.3 and EMP
Disturbance on soil or land	During Exploration top soil will be removed to access the rich layers	Losses of top soil that support vegetation growth	High sensitivity	Addressed in sub- section.8 3.3 and EMP

8.2. Methodology used or adopted for the impact assessment

The assessment process that was developed by Burgundy Trading cc was formulated based on the collection and interpretation of the available literature pertaining to the pegmatite mineral development. The process included the

review of previous EIA',s and EMP',s done in the surrounding areas and those about mining claims. Other relevant documents were identified and collected including:

- Environmental regulations covering environment, water energy health and safety as well as all the related policies and guidelines;
- Mining regulations and all the related introductory information obtained from the office of the Mining Commissioner in the Ministry of Mines and Energy,
- Topographic maps, information and data sets about the location and characteristics of mining claim 70656.
- Information and data sets about the environmental regulation, biodiversity, social economic and natural environment around the mining claim 70656 obtained from the Directorate of Environnrental Affairs in the Ministry of Environment and Tourism, Namibia Statistics Agency.
- Information and data sets about the regional and local geology, geological maps and all there related data sets, published materials and open file documents have all been located in the Directorate of the Geological Survey in the Ministry of Mines and Energy;

The following methods were used by all specialists to determine the significance rating of impacts identified:

8.2.1. Description of Impact

The specialists identified potential impacts of the proposed project on the receiving environment. They were tasked to consider the following:

- The type of effect that the proposed activity will have on the environment;
- What will be affected; and
- How will it be affected?

The sources of risk are, where possible, based on accepted scientific techniques. Failing this, the specialists made a professional judgment based on expertise and experience. All potential impacts that result from the proposed project have been evaluated for the full life-cycle of the project, namely, construction, operations, and decommissioning phases. The impact assessment methodology is contained in table 7 below:

Table 7: Definition of criteria for assessing significant impact

Criteria	Description
Nature	Reviews the type of effect that the proposed activity willhave on the relevant component of the environment and includes "what will be affected and how?"
Extent	Indicates whether the impact will be site specific; local (limited to within 15 Km of the area); regional (limited to -100 Km of the area); national (limited to the coastline of Namibia); or international (extending beyond Namibia's borders).
Duration	Reviews the lifetime of the impact, as being short (days, <1 month), medium (months, <1 year), long (years, <10 years), or permanent (generations, or >10 years).
Intensity	Establishes whether the magnitude of the impact is destructive or innocuous and whether or not it exceeds set standards, and is described as none (no impact); low (where natural/ social environmental functions and processes are negligibly affected); medium (where the environment continues to function but in a noticeably modified manner); or high (where environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).
Probability	Considers the likelihood of the impact occurring and is described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of prevention measures).
Degree of Confidence in Predictions	Is based on the availability of specialist knowledge and other information.

The application of the above criteria (Table 7) to determine the significance of potential impacts uses a balanced combination of nature, extent, duration, and intensity/magnitude, modified by probability, cumulative effects, and confidence.

8.2.2. Sensitivity of the Affected Environment

In the description of the affected environment, specialists provided an indication of the sensitivity of the affected environment. Sensitivity, in this instance, refers to the `ability' of an affected environment to tolerate disturbance (given existing cumulative impacts). For example, if very little disturbance results in the permanent loss of the biodiversity of a habitat, the affected environment could be categorized as having a low tolerance to disturbance and can consequently be described as being a 'high sensitivity' habitat. If, on the other hand, a habitat is able to withstand significant disturbance without a marked impact on its biodiversity the affected environment could be categorized as having a high tolerance to disturbance (i.e., `low sensitivity' habitat).

Based on the above considerations, the specialists provided an overall evaluation of the significance of the potential impact, which is described as follows

Table 8: Definitions of various significant rating or sensitivity

Low	Where the impact will have a negligible influence on the environment and no modifications or mitigations are necessary for the given development description. This would be allocated to impacts of any severity/ magnitude, if at a local scale/ extent and of temporary duration/time.
Medium	Where the impact could have an influence on the environment, which will require modification of the development design and/or alternative mitigation. This would be allocated to impacts of moderate severity/magnitude, locally to regionally, and in the short term.
High	Where the impact could have a significant influence on the environment and, in the event of a negative impact the activity(i.e.) causing it, should not be permitted (i.e., there could be a 'no-go' implication for the development, regardless of any possible mitigation). This would be allocated to impacts of high magnitude, locally for longer than a month, and/or of high magnitude regionally and beyond.

8.2.3. Mitigation and Enhancement Measures

Where negative impacts are identified, mitigation objectives have been set, and practical, attainable mitigation measures must be recommended that will minimize or eliminate the impacts. Where mitigation is not feasible, this has been

stated and reasons given. In the case of positive impacts, enhancement measures are recommended for optimizing the benefit to be derived.

8.2.4. Monitoring

Monitoring requirements with quantifiable standards to assess the effectiveness of mitigation actions have been recommended where appropriate. These must indicate what actions are required, by whom, and the timing and frequency thereof. If further investigations must be undertaken and monitoring programmes implemented before, during and after operations, these have been recommended.

8.3. Biophysical Environment

8.3.1. Impact of oil spills on groundwater aquifer and surface water streams

8.3.1.1. Description

Mining of pegmatite minerals is a clean industry from a pollution point of view especially from the existing tailings on site. Various environmental impact assessments conducted identified petrochemical pollution and dust emanating from these activities as the most serious threat in this regard, and in order to maintain the record as a clean industry, this threat is taken very seriously.

Management of used oil at a large scale is reported to be a challenge as more significant maintenance is required to minimize the losses of the oil into the environment (Richards, 2009). Used oil once it spill, it causes detrimental effect to both living and none living things and more especially to groundwater, because its chemical constituents are poisonous. The oil coats and clings to every rock and grain of sand. Sometimes if the oil washes into coastal marshes, mangrove forests or other wetlands, fibrous plants and grasses absorb the oil, which can damage the plants and make the whole area unsuitable as wildlife habitat.

8.3.1.2. Sensitivity of the affected environment

Table 9: Expected significance of the project on liquid waste

Criteria	Impact of oil spills on groundwater aquifer and surface water streams
Extent	Local
Duration	Permanent
Intensity	High
Probability	Definite
Significance before mitigation	High
Significance after mitigation	Medium
Degree of confidence in predictions	High

8.3.1.3. Mitigation and enhancement measures

- Train and supervise staff to ensure minimal spillage of oil.
- Routine inspections before the start of every work schedule involving potential spillage.
- Old oil is collected and stored, and is sold to recycling companies.
- Equip the prospecting and mining site with emergency petrochemical spillage kits, which are, used in such events as hydraulic pipes bursting in service and spilling oil.
- Bio-remediate contaminated soil using proprietary products kept on sites for the purpose. The process of bio-remediation involves loosening the contaminated soil to allow for oxygen penetration. Transported contaminated soil to a specific impervious site for treatment to avoid compaction during the process, and adding agricultural fertilizer and the proprietary products containing appropriate microbes to break down the hydrocarbons.

8.3.1.4. Monitoring

- Daily visual monitoring by site manager.
- Weekly spot checks by environmental manager

8.3.2. Loss of Fauna and Flora diversity

8.3.2.1. Description

Biodiversity (i.e., fauna and flora) is likely to be affected by the project during the exploration and mining process. However, due to the size and duration of the project, the impact is manageable.

The types of vegetation found in this area are classified in medium value category. In addition to vegetation various invertebrates also host the area. Regardless of the low value of the existing vegetation on site and along the road, activities that will be undertaken during the exploration process is likely to have an effect on the vegetation and the invertebrates thereof. Therefore, management measures will be considered to minimize the above impacts.

8.3.2.2. Sensitivity of the affected environment

Table 10: Expected significance of the project on Biodiversity: fauna and flora

Criteria	Biodiversity: fauna and flora
Extent	Local
Duration	Long
Intensity	Medium
Probability	Definite
Significance before mitigation	High
Significance after mitigation	Medium
Degree of confidence in predictions	High

8.3.2.3. Mitigation and enhancement measures

- Avoid damage to protected or high use value trees exploration and usage of heavy machines.
- Disturbance of marginal vegetation at the mountains should be limited.
- Avoid disturbance on invertebrate on site and along the gravel road stretch.
- During operation avoid the creation of multiples roads strips, which could result in the disturbance of breading sites for various mammals.

8.3.2.4. Monitoring

The environmental coordinator for Chrono Industrial Projects Pty Ltd should accompany drivers or heavy machine operator so that the avoidance of trees and vegetation can be optimized. Other rules in the EMP to avoid vegetation destruction should be monitored monthly.

8.3.3. Dust generation on site

8.3.3.1. Description

During the prospecting and small-scale mining process, dust will be generated onsite by earth moving equipment and also, on the gravel road by trucks and vehicles. On site, old mine tailing workings could be remined for lithian mica silica. Pegmatites are a big source of silica, and the silica dust is known to cause silicosis. Silicosis is **a long-term lung disease caused by inhaling large amounts of crystalline silica dust**

Silicosis is a form of occupational lung disease caused by inhalation of crystalline silica dust. It is marked by inflammation and scarring in the form of nodular lesions in the upper lobes of the lungs. It is a type of pneumoconiosis.[4] Silicosis (particularly the acute form) is characterized by shortness of breath, cough, fever, and cyanosis (bluish skin). It may often be misdiagnosed as pulmonary edema (fluid in the lungs), pneumonia, or tuberculosis. Using workplace controls, silicosis is almost always a preventable disease.[5]

Using the Hierarchy of Controls, there are various methods to preventing exposure to respirable crystalline silica. The best way to prevent silicosis is to avoid worker exposure to dust containing respirable crystalline silica.[21] The next best preventive measure is to control the dust. Water-integrated tools are often used where dust is created during certain tasks. To avoid dust accumulating on clothing and skin, wear a disposable protective suit or place clothes in a seal-able bag and, if possible, shower once returning home. When dust starts accumulating around a workplace, and the use of water-integrated tools is not feasible, an

industrial vacuum should be used to contain and transport dust to a safe location for disposal.[22] Dust can also be controlled through personal dry air filtering.[23] The use of personal protective equipment (PPE) is a measure of last resort when attempting to control exposure to respirable crystalline silica.

Preventing silicosis may require specific measures. One example is during underground mining operations where purpose-designed cabins are used in addition to air scrubbers to filter the air during construction. Items to be considered when selecting respiratory protection include whether it provides the correct level of protection, if facial fit testing has been provided, if the wearer is absent of facial hair, and how filters will be replaced.

8.3.3.2 of the affected environment

Table 11: Expected significance of the project on dust generated on site

Criteria	**Soil or land disturbance**
Extent	Local
Duration	Long to permanent
Intensity	Medium
Probability	Definite
Significance before mitigation	High
Significance after mitigation	Medium
Degree of confidence in predictions	High

8.3.3.3. Mitigations and enhancement measures

- Measures such as the use of wet processes enclosure of dust-producing processes under negative air pressure (slight vacuum compared to the air pressure outside the enclosure),
- Exhausting air containing dust through a collection system before emission to the atmosphere, and exhaust ventilation should be used in the workplace.
- Use of personal protective equipment for proper dust control for respiratory protection and should be used only where dust control methods are not yet effective or are inadequate.

- Direct skin contact should be prevented by gloves, wearing respiratory protection during cleanup,
- Educational awareness programs for workers should be instituted about hazard of exposure to silica dust and on the use and maintenance of exhaust ventilation systems, and the use and maintenance of personal protective equipment to avoid risk of dust and noise.
- All gravel roads in quarry areas should have a speed limit of 60km/h for light vehicles and 30km/h for heavy vehicles in order to minimize the amount of dust generated by vehicles.
- In addition, where available water allows, roads should be sprayed with water on a regular basis in order to prevent dust creation.

8.3.3.4. Monitoring

- Daily inspection by the environmental coordinator (ENC) of the gravel roads and quarry site on possible dust creation that requires attention.
- Daily inspection on site by the ENC to ensure that all workers are wearing their protective clothes at all time during the exploration process and the dry skin contact with gloves is prevented.

8.4. Social Economic Environment

8.4.1. Job creation

8.4.1.1. Description

According to the Social Impact Assessment study by Anna, (2014), the employment rate in Karibib has reduced from 71% in 2001 to 59% in 2011 while the unemployment increased from 29% in 2001 to 41% in 2011. Comparing to the Erongo region at large, the Karibib residence has the second highest unemployment rate in the region after the Daures constituency with an unemployment rate of 44%. Karibib district is also one of the constituencies with a high rate of no proper sanitation, ranking in second after the Daures constituency.

It is clear that unemployment is big challenge in the Town of Karibib; hence the necessity of this project which will employ about 12 to 15 people during the exploration phase. The employment will be conducted in the company's offices which will be opened in the Town of Karibib exploration has begun, the local authority will be contacted if assistance is needed during the employment process in order to ensure that the local inhabitants can get the full benefit.

It should be noted that the use of manual labour instead of mechanized construction methods, does pose some advantages and disadvantages:

Advantages:

- If locals are used, housing will be available nearby,
- Contribution to local economy — reducing unemployment,
- Development of local skills,
- Smaller ecological footprint.

Disadvantages:

- It might increase the costs of the project impacting on the affordability of water;
- It will take longer to complete than if the processed in mechanized;

- ❖ The safety risk resulting from open trenches will become bigger;
- ❖ It will require a greater management of workforce, quality of work.

8.4.1.2. Sensitivity of the affected Environment

By implementing exploration and small scale mining on mining claim 70656, the socioeconomic significance of Chrono Industrial Projects Pty Ltd can be summarized as follows:

Table 12: Expected significance of the project on social economics implications

Criteria	Social economics implications
Extent	Local
Duration	Long to permanent
Intensity	Medium
Probability	Definite
Significance before mitigation	High
Significance after mitigation	Low
Degree of confidence in predictions	High

8.4.1.3. Mitigation and enhancement measures

- ❖ Where unskilled labour can be used, a 'locals first' policy should be considered.
- ❖ It is proposed that local people, meaning the community members from Karibib Town, should be employed as far as possible, especially where no specific skills are required.
- ❖ The Karibib Town Councilor could be requested to assist with the recruitment of construction workers.
- ❖ Both men and women should be granted the opportunity to be employed by this project.

8.4.1.4. Monitoring

It is recommended that Chrono Industrial Projects Pty Ltd Exploration Manager should source employees or workers from the potentially affected communities in particular Karibib Town. Chrono Industrial Projects Pty Ltd in consultation with the

Karibib Town Council will then be responsible to supervise the employment process when implementing this 'local's first' recommendation.

8.4.2. Potential spread of HIV/AIDS & COVID -19

8.4.2.1. Description

In the proposed project area, it is estimated that one out of every four people are HIV positive. (Anna, 2014) Previous experience has shown that workers residing in a construction camp may engage in risky sexual behavior with members of the community. This can contribute to the spread of HIV & COVID-19 both in the project area and beyond to another region.

8.4.2.2. Sensitivity of the affected Environment

Table 13: Expected significance of the project on the spread of HIV/AIDS

Criteria	Contribution to the spread of HIV/AIDS
Extent	National
Duration	Permanent
Intensity	Serious effect
Probability	Definite
Significance before mitigation	High
Significance after mitigation	Medium
Degree of confidence in predictions	High

8.4.2.3. Mitigation and enhancement measures

Chrono Industrial Projects Pty Ltd environmental coordinator should sensitize the risks of sexual behaviour, and the effects of HIV/AIDS to its employees. Workers should be prohibited to engage in such activities with especially minors. Practicing safe sec should be highly encouraged. Mitigation measures as outlined in the EMP should be adhered to.

8.4.2.4. Monitoring

The ENC should report back to Chrono Industrial Projects Pty Ltd as to when and how the workers received HIV training. In addition, how workers were informed about the mitigation measures of the EMP.

8.4.3. Disturbance or destruction of archaeological sites

8.4.3.1. Descriptions

There is no prints of archaeological activities within the polygon of mining claim 70656.

8.4.3.2. Sensitivity of the affected environment

Table 14: Expected significance of the project on archaeological sites

Criteria	Archaeological sites
Extent	Local
Duration	Permanent
Intensity	Serious effect
Probability	Definite
Significance before mitigation	Medium
Significance after mitigation	Low
Degree of confidence in predictions	High

8.4.3.3. Mitigation and enhancement measures

• The records obtained during this fieldwork are considered adequate and no further work is needed.

8.5. Solid waste: wires, drill bits, and human waste

8.5.1. Descriptions

Solid waste management is a problem in the exploration and mining industry or quarrying industry, and sometimes this problems extent beyond the mining industry. In the mining industry, different types of solid waste are generated and some of these wastes contain toxic substance that can affect living and non-living things. Therefore, proper handling and management of these wastes is critical for the protection of the environment.

Solid waste that will be generated from this project if not managed will have an effect on the environment. The effect will mainly be at the project site. Human waste that will be generated during the exploration process, if not managed will have an effect on the environment although at a small scale.

8.5.2. Sensitivity of the affected environment

The significance of the identified problem to the study can summaries as follows:

Table 15: Expected significance of the project on solid waste

Criteria	Solid waste
Extent	Local
Duration	Short
Intensity	Low
Probability	Definite
Significance before mitigation	Medium
Significance after mitigation	Low
Degree of confidence in predictions	High

8.5.3. Mitigation and enhancement measures

Waste disposal sites should established on site were paper, plastic and wire should be kept. The collected solid waste should be disposed at the Town of Karibib soil waste disposal site. For human waste, mobile toilet should be made available on site for workers and once these facilities are full, the collected human waste should be disposed at the Karibib Town human waste disposal site. Prior to the

disposal of the above-mentioned wastes Chrono Industrial Projects Pty Ltd must entered into agreement with the Karibib Town for permission to use their facility.

8.5.4. Monitoring

- Weekly inspection by the ENC, to collect and empty the plastic bag that are full and the mobile toilet.

8.6. Land or soil disturbance: on site.

8.6.1. Descriptions

During the exploration process, land or soil will be disturb both on site and and widening the farm tracks which connects the site to the C33 road. Top soil will be removed on the surface rocks during the drilling to recover the slabs needed for testing. The removed top soil during drilling if not properly management will affect the growth of vegetation and the development biodiversity hiding or resting spots.

8.6.2. Sensitivity of the affected environment

The significance of the identified problem to the study can summarize as follows:

Table 16: Expected significance of the project on soil or land disturbance

Criteria	Soil or land disturbance
Extent	Local
Duration	Permanent
Intensity	Serious effect
Probability	Definite
Significance before mitigation	High
Significance after mitigation	Medium
Degree of confidence in predictions	High

8.6.3. Mitigation and enhancement measures

The top soil from 0 to 30cm to removed and stockpile and to be used during the rehabilitation process. The stockpile will be rehabilitated with seeds of grasses and shrubs to keep organic activity alive, as well as ensure a fertile seed bank in the topsoil when it is finally used. It is recommended that top soil to be removed down to the subsoil, where it is significantly thicker than 0.5m, as topsoil is always a

scarce resource, and even if this lower material does not contain seed and is poorer in soil organisms, it has been found to be useful in reclamation. Where top soil is less than 150mm thick the unconsolidated material beneath should also be removed and treated as topsoil.

8.6.4. Monitoring

- Daily inspection by ENC to ensure that top soil is removed and stock pile on site.

9. Conclusion and recommendations

9.1. Conclusion

The mining claim 70656 is in the Karibib District in Erongo Region. The mining claim lies outside designated national parks. The implementation of the proposed small-scale surface exploration and mining project by Chrono Industrial Projects Pty Ltd will be undertaken with provisions of the EIA regulation of 2012. Based on the assessment of both negative and positive impacts undertaken for the proposed small-scale surface exploration and mining project, a number of high positive and negative impacts have been identified. Overall, positive impacts of the proposed small-scale surface exploration and mining project activities outweigh the negative ones at local, regional, nation and global levels.

It is therefore concluded that all significant impacts identified during this Environmental Impact Assessment can be mitigated through management actions implemented during construction and operation. It is important that the Environmental Management Plan developed for the project be implemented during construction and operation otherwise the impacts identified will remain unacceptable.

9.2. Recommendations

Based on the findings of this Environmental Assessment Study, it is recommended that the proposed small-scale surface exploration project receive an Environmental Clearance if an Environmental Plan was implemented.

10. References

1. Barnard, P. (1998). Under protected habitats. In: Barnard, P. (ed.). Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.
2. Bester, B. (1996). Bush encroachment – A thorny problem. Namibia Environment 1: 175-177.
3. Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.
4. Branch, B. (1998). Field guide to snakes and other reptiles of southern Africa. Struik Publishers, Cape Town, RSA.
5. Channing, A. (2001). Amphibians of Central and Southern Africa. Protea Bookhouse, Pretoria, RSA.
6. Department of Water Affairs (DWA). (2002). The hydrogeological map of Namibia
7. IUCN, (1996). IUCN red list of threatened animals, IUCN, Gland, Switserland.
8. IUCN. (2004). IUCN, Gland, Switserland. In: Griffin, M. 2005. Annotated checklist and provisional national conservation status of Namibian mammals. Ministry of Environment, Forestry and Tourism, Windhoek.
9. Mendelson, J., Jarvis, A., Roberts, C., and Robertson, T. (2002). Atlas of Namibia: A portrait of the land and its people. Windhoek, Namibia: Ministry of Environment, Forestry and Tourism.
10. Miller ,R. (2008).The geology of Namibia, neoproterozoic to lower palaeozoic
11. Miller, R. McG. (1983a). The Pan – African Damara Orogen od S.W.A. / Namibia, Special Publication of the Geological Society of South Africa, 11, 431 - 515.
12. Miller, R. McG. (1983b). Economic implications of plate tectonic models of the Damara Orogen, Special Publication of the Geological Society of South Africa, 11, 115 -138.
13. Miller, R. McG. (1992). Stratigraphy. The mineral resource of Namibia, Geological Survey of Namibia, Ministry of Mines and Energy, Windhoek, 1.2 .1 - 1.2.13.
14. Ministry of Environment, Forestry and Tourism. Republic of Namibia. (2008). Guide to the Environmental Management Act No. 7 of 2007. 56 pp

15. Ministry of Environment, Forestry and Tourism. Republic of Namibia. (2012). Environmental Impact Assessment Regulation: Enviromnental Management Act, 2007. Government Gazette No.4878.
16. Republic of Namibia. (2005). Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation.
17. Republic of Namibia. (2007). Environmental Management Act No. 7 of 2007. Government Gazette No. 3966.
18. Republic of Namibia. (2007). Minerals (Prospecting and Mining) Act 33 of 1992. Government Gazette No. 564.