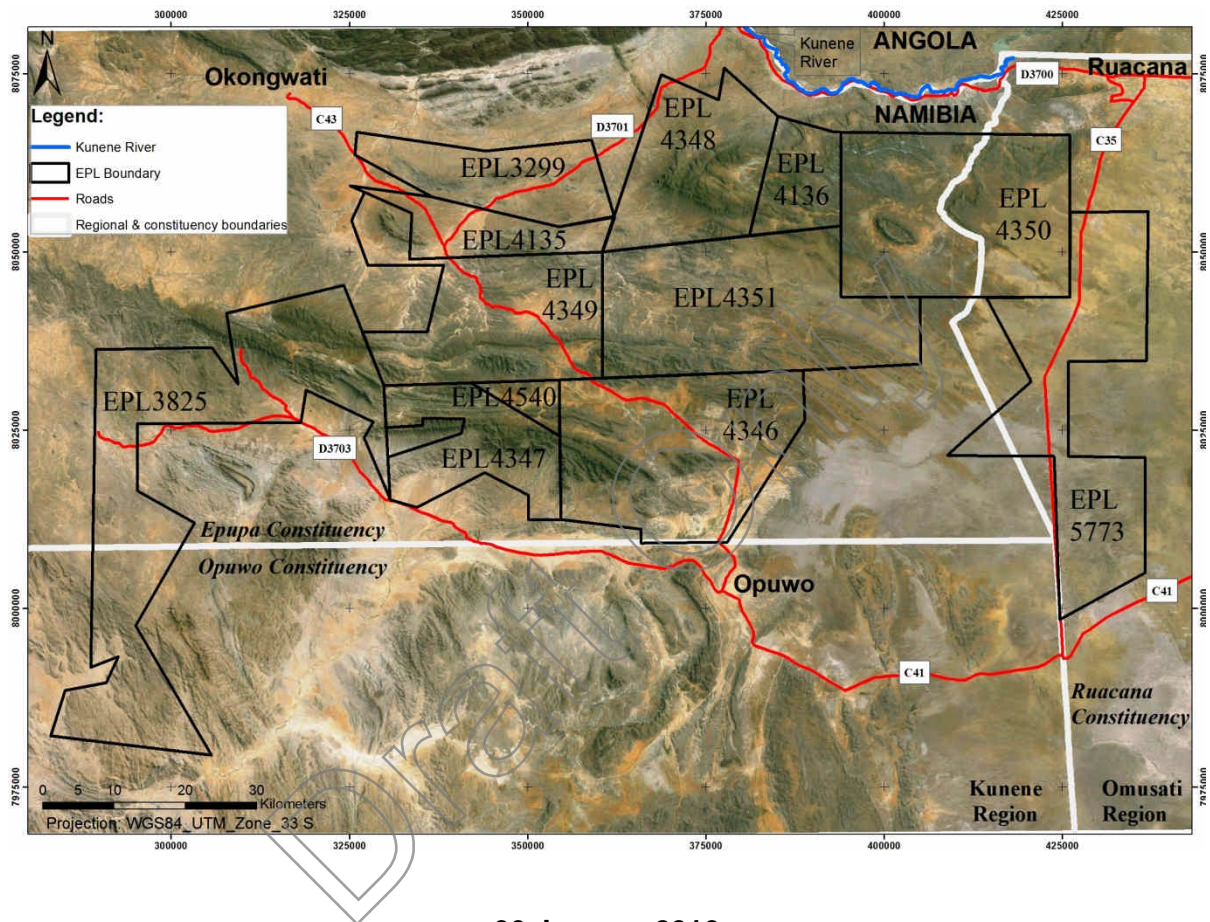


# ENVIRONMENTAL SCOPING AND MANAGEMENT PLAN FOR THE *KAOKO PROJECT*, KUNENE AND OMUSATI REGIONS, NAMIBIA



06 January 2016

Prepared by:



Prepared for:



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## ACRONYMS AND GLOSSARY

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The following is a list of the abbreviations, acronyms, technical terms, and definitions used in this Report:

AIDS	Acquired Immunodeficiency Syndrome
ART	Anti-retroviral Therapy
AU	African Union
CBD	Convention on Biological Diversity
CEO	Chief Executive Officer
CoM	Chamber of Mines of Namibia
DEA	Directorate of Environmental Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EAPAN	Environmental Assessment Professionals of Namibia
ECC	Environmental Clearance Certificate
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPL	Exclusive Prospecting License
GIIP	Good International Industry Practice
GN	Government Notice
GRN	Government of the Republic of Namibia
HIV	Human Immunodeficiency Virus
I&APs	Interested and Affected Parties
IEMA	Institute of Environmental Management and Assessment
IFC	International Finance Corporation
ISO	International Organization for Standardization
IWM	Integrated Waste Management
KRN	Kunene Resources Namibia (Pty) Ltd
LAC	Legal Assistance Centre
LFPR	Labour Force Participation Rate
MAWF	Ministry of Agriculture, Water and Forestry
MDRL	Mineral Deposit Retention Licence
MET	Ministry of Environment and Tourism
ML	Mining License
MME	Ministry of Mines and Energy
MOHSS	Ministry of Health and Social Services
MSDS	Material Safety Data Sheet
N/A	Not Applicable
NamWater	Namibian Water Corporation
NBC	National Broadcasting Corporation
NDP	National Development Plan
NHIES	Namibia Household Income and Expenditure Survey
NHSS	National HIV Sentinel Survey
NLFS	Namibia Labour Force Survey
NPC	National Planning Commission
NSA	Namibia Statistics Agency
NSF	National Strategic Framework
PAYE	Pay As Your Earn
PDAC	Prospectors and Developers Association of Canada
PEA	Potentially Economically Active

PM	Particulate Matter
PMTCT	Prevention from Mother to Child Transmission
PPE	Personal Protective Equipment
PPP	Public Participation Process
PS	Permanent Secretary
RAB	Rotary Air Blast
RC	Reverse Circulation
RIAM	Rapid Impact Assessment Matrix
SA	South Africa
SADC	Southern African Development Community
SAIE-ES	Southern African Institute of Ecologists and Environmental Scientists
STIs	Sexually Transmitted Infections
UK	United Kingdom
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
US	United States
VAT	Value Added Tax
VOC	Volatile Organic Compound(s)

cm	centimetre
°C	degrees centigrade
km	kilometre
km <sup>2</sup>	square kilometre
km/h	kilometre per hour
l	litre
m	metre
mm	millimetre
m <sup>3</sup> /h	cubic metres per hour
%	percent

Aspect	Element of an organization's activities or products or services that can interact with the environment (International Organization for Standardization (ISO), 2004).
Backfill	Waste material used to fill the void created by mining an ore-body (The Northern Miner, 2007).
Base Metal	Any non-precious metal (e.g. copper, lead, zinc, nickel, etc.) (The Northern Miner, 2007).
Biodiversity	Defined in the Convention on Biological Diversity (CBD) as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."
Bulk Sample	A large sample of mineralized rock, frequently hundreds of tonnes, selected in such a manner as to be representative of the potential orebody being sampled. Used to determine metallurgical characteristics (The Northern Miner, 2007).
Deposit	A body of rock containing valuable minerals; usage generally restricted to zones of mineralization whose size has been wholly or partially determined through sampling (The Northern Miner, 2007).
Diamond Drilling	A rotary type of rock drill that cuts a core of rock that is recovered in long cylindrical sections, two centimetres (cm) or more in diameter (The Northern Miner, 2007).
Disposal	The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid or hazardous waste on or in the land or water (United States (US), Environmental Protection Agency (EPA)).
EM Survey	A geophysical survey method which measures the electromagnetic properties of rock (The Northern Miner, 2007).
Environment	Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation (ISO, 2004).
Environmental Assessment (EA)	The process of identifying, predicting and evaluating the effects of proposed activities on the environment. It should include information about the risks and consequences of activities, possible alternatives, and steps which can be taken to mitigate (minimize or

	off-set) any negative impacts. It should also discuss steps to increase positive impacts and to promote compliance with the principles of environmental management. Both Government bodies and private persons or groups (such as private companies) can be required to carry out environmental assessments (Ministry of Environment and Tourism (MET), 2008).
Environmental Clearance Certificate (ECC)	A certificate which allows a listed activity to go ahead. The certificate means that the Ministry of Environment and Tourism is satisfied that the activity in question will not have an unduly negative impact on the environment. It may set conditions for the activity to prevent or to minimize harmful impacts on the environment (MET, 2008).
Environmental Management Plan (EMP)	A key document that should consist of the set of measures to be taken during implementation and operation to eliminate, offset, or reduce adverse environmental impacts to acceptable levels. Also included in the plan are the actions needed to implement them (Directorate of Environmental Affairs (DEA), 2008).
Erosion	The breaking down and subsequent removal of either rock or surface material by wind, rain, wave action, freezing and thawing and other processes (The Northern Miner, 2007).
Exploration	Prospecting, sampling, mapping, diamond drilling and other work involved in searching for ore (The Northern Miner, 2007).
Geochemistry	The study of the chemical properties of rocks (The Northern Miner, 2007).
Geophysics	The study of the physical properties of rocks (The Northern Miner, 2007).
Geophysical Survey	A scientific method of prospecting that measures the physical properties of rock formations. Common properties investigated include magnetism, specific gravity, electrical conductivity and radioactivity (The Northern Miner, 2007).
Good International Industry Practice (GIIP)	The exercise of professional skill, diligence, prudence, and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally. The outcome of such an exercise should be that the project employs the most appropriate technologies in the project-specific circumstances (International Finance Corporation (IFC), 2007a).
Grab Sample	A sample from a rock outcrop that is assayed to determine if valuable elements are contained in the rock. A grab sample is not intended to be representative of the deposit, and usually the best-looking material is selected (The Northern Miner, 2007).
(Grouped) Hazardous Substance	Any substance, mixture of substances, product or material declared in terms of section 3 (1) to be a hazardous substance of any kind (Hazardous Substances Ordinance No. 14 of 1974).
Hazardous Waste	Waste that poses substantial or potential threats to public health or the environment. There are four factors that determine whether or not a substance is hazardous: i) ignitability (i.e. flammable); ii) reactivity; iii) corrosivity; and iv) toxicity (Wikipedia).
Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO, 2004).
Industrial Minerals	Non-metallic, non-fuel minerals used in the chemical and manufacturing industries. Examples are asbestos, gypsum, salt, graphite, mica, gravel, building stone and talc (The Northern Miner, 2007).
Integrated Waste Management (IWM)	Concept of employing several waste control and disposal methods such as source reduction, recycling, reuse, incineration, and land filling, to minimize the environmental impact of commercial and industrial waste streams (Business Dictionary).
Invasive Alien Species	The intentional or accidental introduction of alien, or non-native, species of flora and fauna into areas where they are not normally found can be a significant threat to biodiversity, since some alien species can become invasive, spreading rapidly and out-competing native species (IFC, 2012).
Magnetic Survey	A geophysical survey that measures the intensity of the Earth's magnetic field (The Northern Miner, 2007).
Mitigation	Any action intended to either reduce or avert exposure or the likelihood of exposure to sources that are not part of a controlled practice, or which are out of control as a consequence of an accident (DEA, 2008).
Mitigation Hierarchy	Adoption of a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, or compensate/offset for risks and impacts to workers, Affected Communities, and the environment is widely regarded as a Good International Industry Practice (GIIP) approach to managing environmental and social risks and impacts: <u>Avoidance</u> requires the client to identify and, where available and technically and financially feasible, make changes to the project's design (or potential location) to avoid

	<p>adverse risks and impacts on social and/or environmental features. Avoidance is considered to be the most acceptable form of mitigation.</p> <p><u>Minimization</u>: where avoidance is not possible, adverse impacts and risks can be minimized through environmental and social measures/treatments/design. Acceptable options to minimize will vary and include: abate, rectify, repair, and/or restore impacts, as appropriate.</p> <p><u>Compensation/Offset</u>: where avoidance or minimization measures are not available, it may be appropriate to design and implement measures that compensate/offset for residual risks and impacts. It should be noted that these measures do not eliminate the identified adverse risks and impacts, but they seek to offset it with an (at least) comparable positive one (IFC, 2012).</p>
Monitoring	The repetitive and continued observation, measurement and evaluation of environmental data to follow changes over a period of time to assess the efficiency of control measures (DEA, 2008).
Pollution	The direct or indirect introduction of something which is harmful to people, property, or the environment into the air, land, or water. Pollution can be caused by substances, vibrations, heat, radiation or noise. One of the key ideas behind the law is that the polluter must pay the costs of pollution (MET, 2008).
Polluter Pays Principle	Principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment (DEA, 2008).
Rare Earth Elements	Thirty elements composed of the lanthanide and actinide series (The Northern Miner, 2007).
Rotary Air Blast (RAB) Drilling	A rotary drilling method that uses compressed air to move drill cuttings up to the drill collar (The Northern Miner, 2007).
Rehabilitation	It refers to the physical aspects of earth moving, regrading and revegetation. <u>Decommissioning</u> is the transitional period between the cessation of operations and the final closure of that operation, <u>closure</u> is a term reserved for the point in time when revegetation has been completed, waste materials have been removed to the extent practical, a final surface and ground water monitoring program has been initiated, and the maximum degree of passive management has been implemented (Prospectors and Developers Association of Canada (PDAC), 2009).
Renewable energy	Energy that comes from natural resources, such as sunlight or wind, and that are renewable (Wikipedia).
Resource	The calculated amount of material in a mineral deposit, classified as measured, indicated, or inferred, based on the density of drill hole information used (The Northern Miner, 2007).
Reverse Circulation (RC)	A drilling method in which a rotating bit cuts rock or compacted earth into fragments, which are flushed upward to the drill collar by water or fluid mixtures for sampling. Unlike diamond drilling, it does not provide an intact core for examination or sampling (The Northern Miner, 2007).
Sewage	The subset of wastewater that is contaminated with faeces and/or urine; it includes domestic, municipal, or industrial liquid waste products disposed of, usually via a pipe or sewer or similar structure (Wikipedia).
Significant Effect	Having, or likely to have, a consequential qualitative or quantitative impact on the environment, including changes in ecological, aesthetic, cultural, historic, economic and social factors, whether directly or indirectly, individually or collectively (Environmental Management Act (EMA) 7 of 2007).
Stormwater	Water that originates during precipitation (rainfall) events. Stormwater that does not soak into the ground becomes surface runoff. Stormwater is of concern for the following two reasons: one is related to the volume and timing of runoff water (for flood control and the supply of water) and the other is related to the potential contaminants that the water may be carrying and subsequent water pollution (Wikipedia).
Sustainable Use	Using natural resources in a way and at a rate that does not lead to a long-term decline, so that the environment will be able to meet the needs of future generations, i.e. the natural resources of the earth must be shared fairly between present and future generations (MET, 2008).
Trench	A long, narrow excavation dug through overburden, or blasted out of rock, to expose a vein or ore structure (The Northern Miner, 2007).
Vein	A fissure, fault or crack in a rock filled by minerals that have travelled upwards from some deep source (The Northern Miner, 2007).



Waste	An unwanted or undesired material or substance. It is also referred to as rubbish, trash, refuse, garbage, or junk, depending on the type of material. Litter is waste that has been carelessly disposed of in plain sight. Waste is “dumped” in order to avoid paying waste disposal fees (Wikipedia).
Waste Management	The collection, transport, processing, recycling or disposal, and monitoring of waste materials (Wikipedia).
Wastewater	Any water that has been adversely affected in quality by anthropogenic (human) influences, i.e. liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture and can encompass a wide range of potential contaminants and concentrations (Wikipedia).

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# 1 Introduction

## 1.1 Background

Kunene Resources Namibia (Pty) Ltd (KRN), a wholly-owned Namibian Company, is undertaking exploration activities for mainly Base and Rare Metals, and Industrial Minerals at 11 Exclusive Prospecting Licenses (EPLs) located in the Kunene and Omusati Regions, Namibia (see Figure 1).

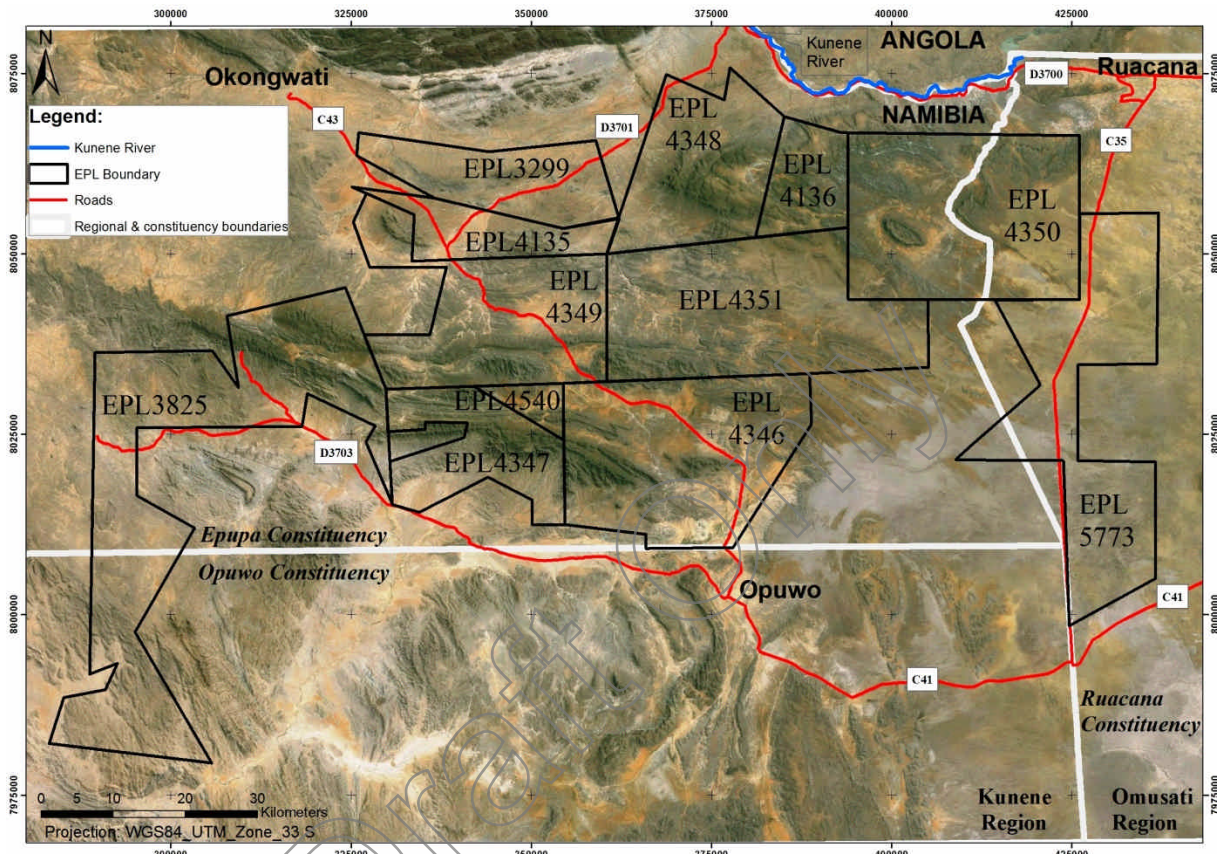


Figure 1: Map showing the locating of Exclusive Prospecting Licenses (EPLs) 3299, 3825, 4135, 4136, 4346-4351, 4540 and 5773, Kunene and Omusati Regions, Namibia (Source: Kaarina Ndalulilwa, Kunene Resources Namibia (Pty) Ltd).

EPL 3299 was issued to Epembe Minerals, EPLs 3825, 4135, 4136 to Solarwind (Pty) Ltd, and EPLs 4346-4351 and 4540 to Kunene Resources Namibia (Pty) Ltd (KRN) (see Table 1). On 23<sup>rd</sup> of September 2014, KRN applied to the Ministry of Mines and Energy (MME) for the issuing of a 12<sup>th</sup> EPL (EPL 5773); this license has not been granted by the MME.

Overall, the project is referred to as the *Kaoko Project* and the project is managed by Kunene Resources Namibia (Pty) Ltd.

KRN wishes to continue with their exploration activities for mainly Base and Rare Metals, and Industrial Minerals, that is: geological mapping, rock grab and systematic trench sampling, road construction (blasting may be required in very rugged terrain), drilling (Rotary Air Blast (RAB), Reverse Circulation (RC) and Diamond), trench and bulk sampling, and remote infrastructure development.

Application was thus made by KRN to the Environmental Commissioner, Ministry of Environment and Tourism (MET) for the renewal of the existing (11) Environmental Clearance Certificates (ECCs) and for issuing an ECC for exploration activities at EPL 5773 (20 November 2015) (see Annexure A).

Table 1: A summary of the relevant information related to the Exclusive Prospecting Licenses managed by Kunene Resources Namibia (Pty) Ltd as part of the *Kaoko Project*, Kunene and Omusati Regions, Namibia.

Company	Exclusive Prospecting License (EPL)	Size (Hectares)	Date Granted	Expiry Date	*Commodities	Environmental Clearance Certificate (ECC)
Epembe Minerals (Gazania 25)	3299	29050	16/08/2005	15/08/2016	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (Gazania Investments Twenty Five (Pty) Ltd)
Solarwind (Pty) Ltd	3825	74123	10/10/2007	09/10/2016	BRM, IM, PM, NNF, PS	14/02/2013 – 13/02/2016 (Solarwind Investments (Namibia) (Pty) Ltd)
Solarwind (Pty) Ltd	4135	17754	27/05/2010	08/04/2015	BRM, NNF, PM	14/02/2013 – 13/02/2016 (Solarwind Investments (Namibia) (Pty) Ltd)
Solarwind (Pty) Ltd	4136	16099	17/12/2008	16/12/2015	BRM, PM	14/02/2013 – 13/02/2016 (Solarwind Investments (Namibia) (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4346	68286	16/06/2010	15/06/2015	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (**Gazania Investments One Hundred and Ninety-Five (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4347	30258	16/06/2010	15/06/2015	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (Gazania Investments One Hundred and Ninety-Five (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4348	40907	16/06/2010	15/06/2015	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (Gazania Investments One Hundred and Ninety-Five (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4349	54608	16/06/2010	15/06/2015	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (Gazania Investments One Hundred and Ninety-Five (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4350	74610	16/06/2010	15/06/2015	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (Gazania Investments One Hundred and Ninety-Five (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4351	74310	16/06/2010	15/06/2015	BRM, IM, PM, PS	11/02/2013 – 10/02/2016 (Gazania Investments One Hundred and Ninety-Five (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	4540	4874	19/01/2011	18/01/2016	MRM, PM	11/02/2013 – 10/02/2016 (INV Exploration (Pty) Ltd)
Kunene Resources Namibia (Pty) Ltd	5773	68875	***N/A	N/A	BRM, IM, PM, PS, SPS	N/A

\*BRM – Base and Rare Metals; IM – Industrial Minerals; PM – Precious Metals; PS – Precious Stones; NNF – Non-Nuclear Fuel; and SPS – Semi-Precious Stones

\*\* Gazania Investments One Hundred and Ninety-Five (Pty) Ltd's name was changed to Kunene Resources Namibia (Pty) Ltd on 19 August 2013.

\*\*\* N/A – Not Applicable

## 1.2 Terms of Reference

LM Environmental Consulting was appointed by Kunene Resources Namibia (Pty) Ltd on 09 November 2015 to conduct a desktop Environmental Scoping and prepare an Environmental Management Plan (EMP) for the exploration for mainly Base and Rare Metals, and Industrial Minerals at EPLs 3299, 3825, 4135, 4136, 4346-4351, 4540 and 5773 (the *Kaoko Project*), Kunene and Omusati Regions, Namibia.

## 1.3 Environmental Assessment Practitioner

The Author of this Environmental Scoping and Management Plan Report is Dr Lima Maartens who has 23 years' experience in natural resource management (she gained her doctorate in Fisheries Science from Rhodes University, South Africa (SA) in 2000 while working for the Namibian Ministry of Fisheries and Marine Resources), lecturing (University of Namibia), environmental science and management (De Beers Marine Namibia and the Canadian Forsys Metals Corp), and consulting. Dr Maartens is registered as a lead practitioner with the Environmental Assessment Professionals of Namibia (EAPAN) (she also serves on the Executive Committee), an associate member of the Namibian Chamber of Mines (CoM), a member of the Southern African Institute of Ecologists and Environmental Scientists (SAIE-ES), and a registered associate environmental auditor with the Institute of Environmental Management and Assessment (IEMA) in the United Kingdom (UK). LM Environmental Consulting was established by Dr Maartens in October 2009 (see Annexure A for a Curriculum Vita).

## 1.4 Purpose of this Scoping Study

The Scoping Process determines the extent of and approach to the detailed (environmental) assessment; Scoping Report is defined (Government of the Republic of Namibia (GRN) (Government Notice (GN) No. 30), 2012) as "a document prepared by the proponent to present the case for the assessment of an activity as part of the initial assessment process" (see Figure 2).

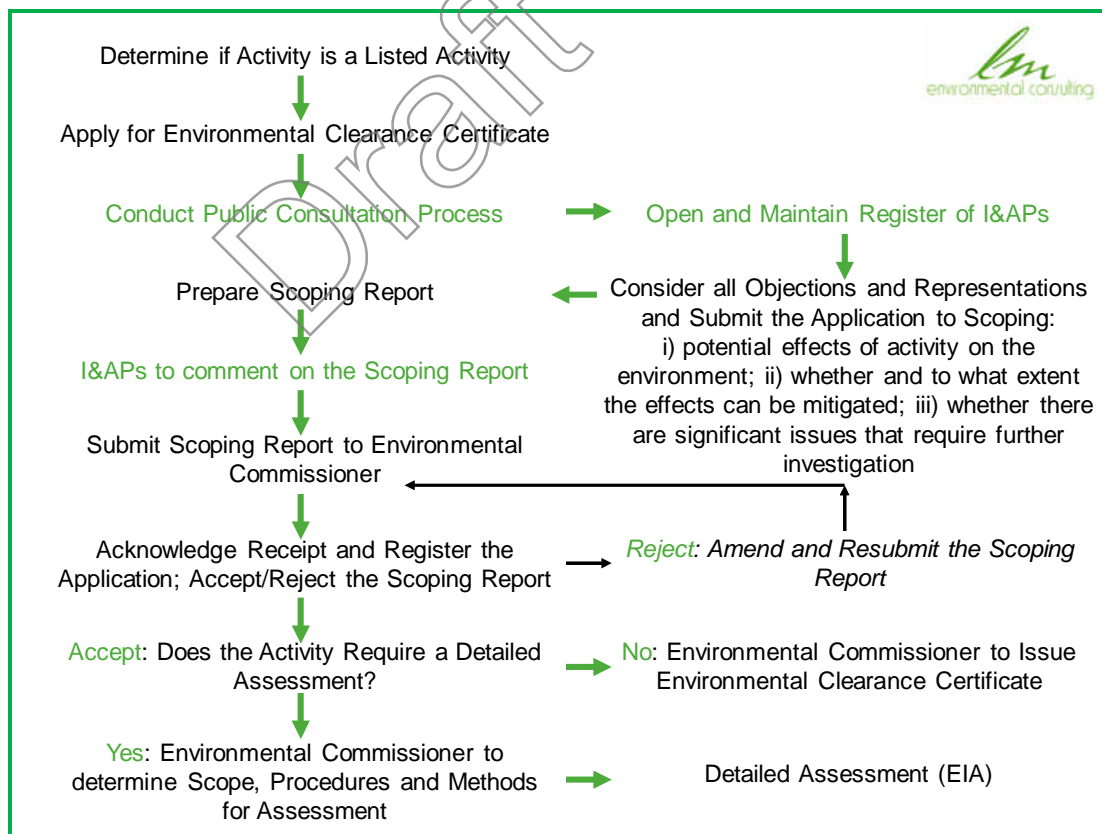


Figure 2: Schematic presentation of Namibia's Environmental Scoping Procedure.

This Scoping Report and Management Plan (“a plan that describes how activities that may have significant environmental effects on the environment are to be mitigated, controlled and monitored”) (GRN (GN No. 30), 2012) set out to provide information on: i) KRN’s current and proposed exploration activities (the *Kaoko Project*); ii) the natural environment, including the physical, bio-physical and socio-economic environments; iii) the regulatory framework; iv) the Public Participation Process (PPP); v) an assessment of the potential impacts that certain aspects of KRN’s current and proposed exploration activities (the *Kaoko Project*) may have on the environment; and vi) the mitigation measures for the negative impacts of KRN’s current and proposed exploration activities (the *Kaoko Project*) in the form of an EMP for the exploration and rehabilitation phases.

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## 2 Description of the Project

### 2.1 Location and Land Use

Exclusive Prospecting Licenses (EPLs) 3299, 3825, 4135, 4136, 4346-4351, 4540 and 5773 are located in the Kunene and Omusati Regions, Namibia (see Figure 1).

The majority of the EPLs are located in the Epupa constituency of the Kunene Region. There is, however, some overlap with the Opuwo constituency, Kunene Region (EPL 3825) and the Ruacana constituency, Omusati Region (EPLs 4350 and 5773), as well as several registered communal conservancies (see Table 2 and Figure 3).

Approximately 30 communities in the Kunene Region have or are in the process of registering their land as conservancies. Previously, many of these areas were “hotbeds of poaching”, but wildlife is now welcomed and protected and wildlife numbers are increasing annually. More than 20 communities whose wildlife was poached out in the 1970s and early-1980s have asked the Namibian Government to assist them to restock their lands with game. This strategy is ongoing (see <http://www.irdnc.org.na/areas.htm>).

Table 2: Location of the *Kaoko Project* Exclusive Prospecting Licenses in terms of Namibia’s administrative regions, political constituencies, and registered communal conservancies.

Exclusive Prospecting License (EPL)	Administrative Region	Constituency	Registered Communal Conservancy
3299	Kunene	Epupa	Kunene River and Okanguati
3825	Kunene	Epupa and Opuwo	Ombazu, Etanga, and Okonjombo
4135	Kunene	Epupa	Kunene River and Okanguati
4136	Kunene	Epupa	Kunene River
4346	Kunene	Epupa	Ombazu
4347	Kunene	Epupa	Ombazu
4348	Kunene	Epupa	Kunene River
4349	Kunene	Epupa	Kunene River and Ombazu
4350	Kunene and Omusati	Epupa and Ruacana	Kunene River and Uukolonkadhi-Ruacana
4351	Kunene	Epupa	Kunene River and Ombazu
4540	Kunene	Epupa	Ombazu
5773	Kunene and Omusati	Epupa and Ruacana	Uukwaluudhi

Land use in the Kunene and Omusati Regions consists of: State-protected areas (that is the Skeleton Coast National Park and the Etosha Restricted Area and Park); small- and large-scale agriculture on communal land; resettlement; and urban. In the Kunene and Omusati Regions, 150 and 5,630 square kilometres (km<sup>2</sup>), respectively have been cleared for crops (Mendelsohn *et al.*, 2009). The Kunene Region is not suitable for intensive farming and people’s livelihoods are based on semi-nomadic and settled livestock farming (goats, cattle, and sheep), and some small-scale crop farming.

The estimated numbers of livestock per region (2000) is indicated below (Mendelsohn *et al.*, 2009):

Estimated numbers of livestock in 2000	Kunene Region	Omusati region
Goats	547,400	269,100
Donkeys	11,800	66,100
Cattle	255,200	180,500
Karakul Sheep	17,900	0
Dorper Sheep	116,000	10,000

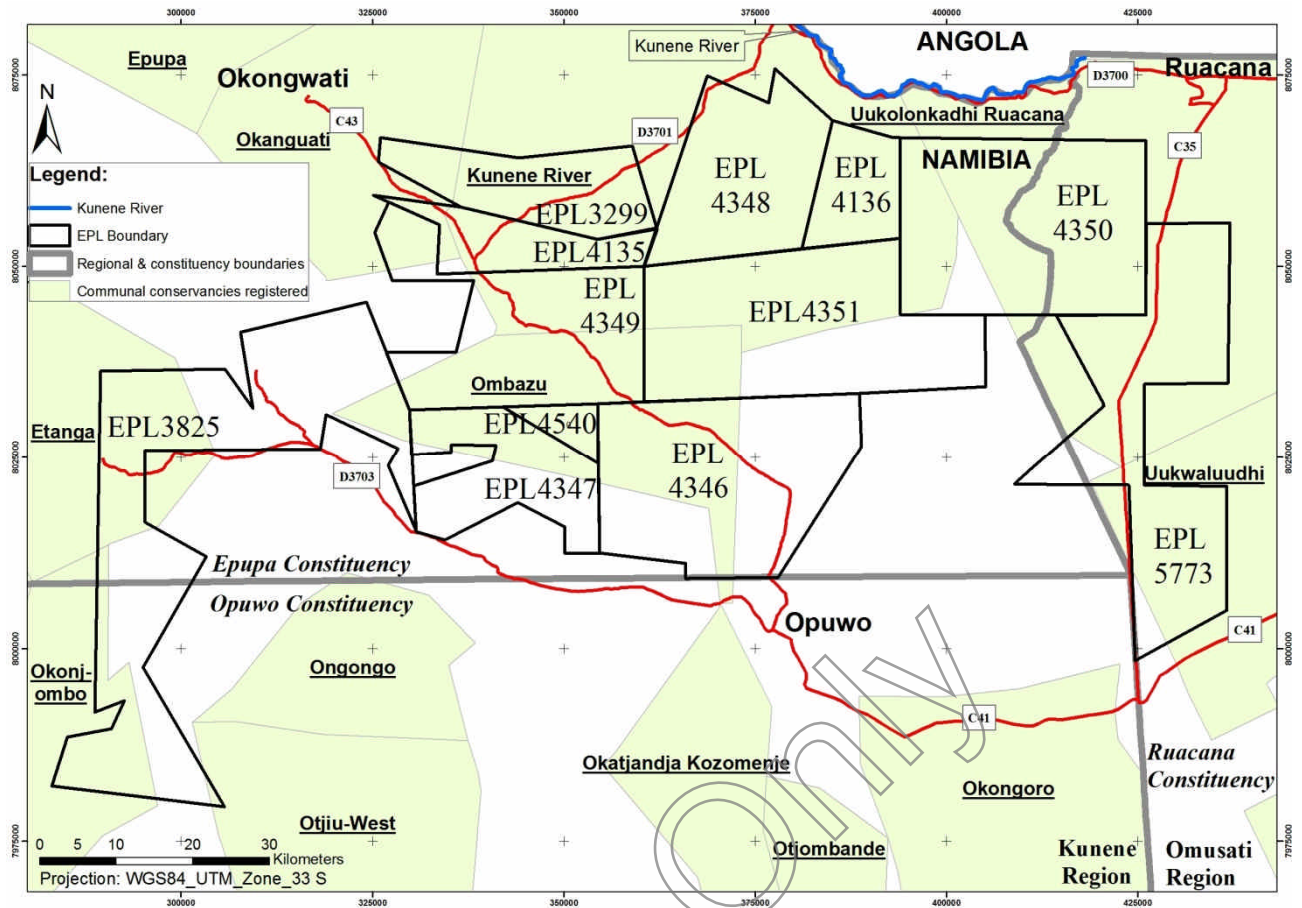


Figure 3: Map showing the registered communal conservancies overlapping with the *Kaoko Project* Exclusive Prospecting Licenses, Kunene and Omusati Regions, Namibia (Source: *Karina Ndalulilwa, Kunene Resources Namibia (Pty) Ltd.*)

## 2.2 Existing and Planned Activities

The following exploration activities have been carried out by KRN at the *Kaoko Project* EPLs, and/or are envisaged:

- **Geological mapping:** geological maps of the area are reviewed, ground traverses and observations are made, and the maps are updated.
- **Ground geophysics:** sensors (radar, magnetic and electromagnetic) are used (carried by staff or mounted on vehicles) to detect mineralization in a specific area.
- **Airborne geophysics:** sensors are mounted on an aircraft and lines are flown.
- **Soil sampling:** orientation (low impact) soil sampling (along a few selected lines), followed by a full soil sampling survey (along many lines covering target areas).
- **Rock grab sampling:** samples are collected and sent for geochemical trace element analysis at an analytical chemical laboratory in order to determine if sufficient quantities of e.g. Base and Rare Metals, and Industrial Minerals are present; a grab sample is not intended to be representative of the deposit, and usually the best-looking material is selected.
- **Systematic trench sampling:** a long, narrow excavation dug through overburden, or blasted out of rock, to expose a vein or ore structure.
- **Bulk sampling (including blasting):** a large sample of mineralized rock is taken; the sample is selected in such a manner as to be representative of the potential orebody being sampled.
- **Water sampling** (boreholes and springs).
- **Drilling** of geophysical and geochemical targets (based on the results of the soil sampling program and geophysical survey):
  - **RAB Drilling:** A rotary drilling method that uses compressed air to move drill cuttings up to the drill collar.

- Reverse Circulation Drilling: a rotating bit cuts rock or compacted earth into fragments, which are flushed upward to the drill collar by water or fluid mixtures for sampling.
- Diamond Drilling: a rotary type of rock drill cuts a core of rock that is recovered in long cylindrical sections, two cm or more in diameter (The Northern Miner, 2007; Carter, 2015).

The construction of roads (blasting may be required in very rugged terrain) and the development of remote infrastructure are also planned. No information re the before-mentioned activities, however, was available at the time of compiling this Scoping and EMP Report.

### 2.2.1 Access

Access to the *Kaoko Project* can be attained via the town of Opuwo, situated ~720 km north-northwest of Windhoek. From Opuwo, access to the north-west and north-east can be attained via the C43 and C35, respectively. Well-maintained gravel roads (D3703, D 3701 and D3700) lead north-west, north, and north-east into the project area (see Figure 4). The individual EPLs can be accessed via a network of 4x4 tracks and trails that branch off from the main gravel roads.

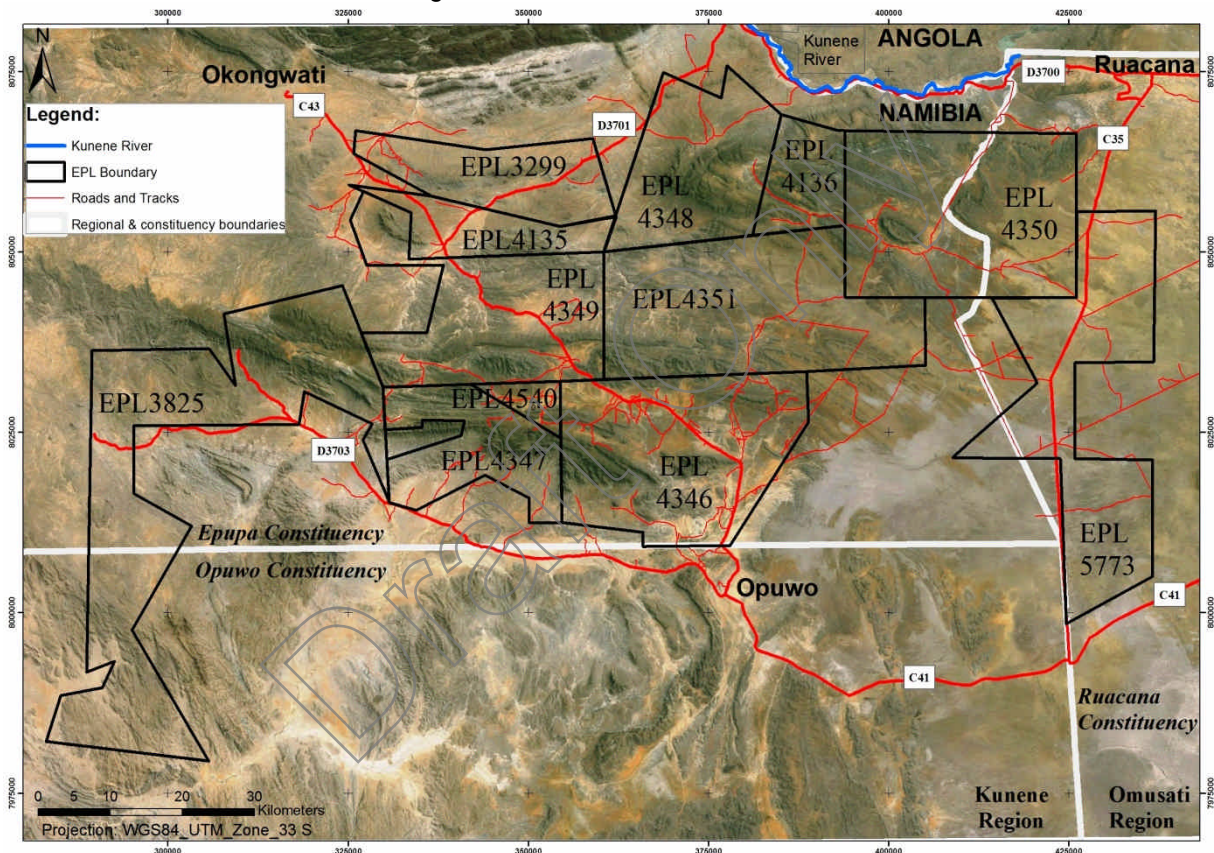


Figure 4: Map showing the various access routes to the *Kaoko Project* Exclusive Prospecting License-areas, Kunene and Omusati Regions, Namibia (Source: Kaarina Ndalulilwa, *Kunene Resources Namibia (Pty) Ltd*).

### 2.2.2 Exploration Camp

The exploration and drill teams (no more than 30 people at any time for all the EPLs) are and will be, where possible, housed in tents in Opuwo (Opuwo Country Lodge Campsite) and Okanihova (cattle post).

When exploration is carried out in the more remote areas, tented fly-camps are put up, with prior permission from the Traditional Authorities, close to the drill sites to house the geological (i.e. KRN) and drilling contractor teams (Carter, 2015; Tobias Mwangi, Ex-Logistics/Camp Manager, *Kunene Resources Namibia (Pty) Ltd*, pers. comm.).



### 2.2.3 Water Supply

Water for domestic consumption and drilling is abstracted from existing boreholes on the EPLs, with prior permission from the Traditional Authorities. In the past, potable water from the Namibian Water Corporation's (NamWater) supply in Opuwo has also been transported in 25 litre (l) containers to the EPLs (for domestic consumption and drilling).

Additional or new boreholes may be drilled on an *ad hoc* basis, with prior permission from the Traditional Authorities, and the Ministry of Agriculture, Water and Forestry (MAWF).

In future, water may be piped from the Kunene River to the northern EPLs (Dr. Rainer Ellmies, Kunene Resources Namibia (Pty) Ltd, pers. comm.). As "any water abstraction from a river that forms an international boundary" is a listed activity, an ECC would need to be obtained from the Office of the Environmental Commissioner and subsequently a Permit issued (by the MAWF) in terms of Section 7 (aA) of the Water Act, 1956 (Act 4 of 1956), as amended and as applicable on a Public Stream.

### 2.2.4 Power Supply

Power supply to the Exploration Camp(s) and the related infrastructure consist of a diesel powered generator(s); the drill rigs usually have their own power supplies and/or generators attached.

### 2.2.5 Sewage Disposal

At Okanihova (cattle post), a flush toilet (French drain) was made available for use by staff (Tobias Mwandangi, Ex-Logistics/Camp Manager, Kunene Resources Namibia (Pty) Ltd, pers. comm.). Additional toilet facilities (i.e. a pit latrine) should be made available for use by the staff and contractors on the remainder of the EPLs (note that in remote locations, the supply, use, and removal of the contents of portable chemical toilets are not feasible).

### 2.2.6 Solid Waste Management

An Integrated Waste Management (IWM) approach, are and will be followed, i.e. employing several waste control and disposal methods such as source reduction (e.g. buying in bulk quantities), recycling, reuse, incineration (in a rubbish pit), and land filling (with prior permission from the Opuwo Town Council), in order to minimize the environmental impact of the commercial and industrial waste streams.

Non-hazardous and hazardous waste will be collected and stored separately. Hazardous waste, e.g. petroleum (fuels and lubricants) waste products will be recycled; batteries and print cartridges will also be collected and recycled. The remainder of the (hazardous) waste will be transported to a recognized hazardous waste disposal site (e.g. Kupferberg in Windhoek).

## 2.3 Project Rationale

The Namibian Directorate of Mines, Ministry of Mines and Energy (MME) "endeavours to promote the optimal exploitation of Namibia's mineral resources and integrate the mining industry with other sectors of the economy for the socio-economic development of the country" (see <http://www.mme.gov.na/directorates/mine/>).

"Mineral Licenses" are issued by the MME and include: Reconnaissance Licenses (valid for a period of six months); Mineral Deposit Retention Licences (MDRLs) (valid for a period not exceeding five years after which the MDRL can be renewed for further periods, but not exceeding two years at a time); Exclusive Prospecting Licenses (EPLs) (valid for a period of three years, after which the EPL can be renewed for further periods, but not exceeding two years at a time); and Mining Licenses (MLs) (valid for a period of 25 years, or shorter depending on the estimated life of mine; the ML may be renewed for further periods not exceeding 15 years at a time) (see Minerals (Prospecting and Mining) Act 33 of 1992).

Kunene Resources Namibia (Pty) Ltd (KRN) wishes to continue with their exploration activities in search of ore bodies for a variety of commodities on the existing 11 EPLs and to commence with exploration on EPL 5773 (see Table 1). Once a feasible ore body/resource is located, a full Environmental Impact Assessment (EIA) would need to be carried out, and an ECC issued by the Environmental Commissioner, MET before the MME would consider the issuing of a ML (and a mine can thus be opened and become operational).

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### 3 Natural Environment

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#### 3.1 Physical Environment

##### 3.1.1 Regional Setting

The Kunene Region (also called Kaokoland) can be found in the north-western corner of Namibia. It covers an area of 115,293 km<sup>2</sup>, or 13.9% of the total surface area of the Country. The Region is bordered by the Kunene River and Angola (north), the Skeleton Coast Park and Atlantic Ocean (west), the Erongo and Otjozondjupa Regions (south), and the Omusati Region and western boundary of the Etosha National Park (north-east).

A veterinary cordon fence divides the Kunene Region into northern and southern Kunene. The north and west of the Region are populated by Ovahimba, Damara and OtjiHerero speaking people. The south east of the Region is largely populated by white commercial farmers.

Kunene is subdivided into seven political constituencies: Epupa, Kamanjab, Khorixas, Opuwo Rural, Opuwo Urban, Outjo, and Sesfontein. Opuwo is the capital of the Region.

The Omusati Region is situated in the north-central part of Namibia and covers an area of 26,537 km<sup>2</sup>, or 3.22% of the total surface area of Namibia. The Region is bordered by the Kunene River and Angola (north), the Kunene Region (west and south), and the Oshana and Ohangwena Regions to the east and north-east, respectively.

Characteristic of the Region is the Oshanas, which funnel towards the Etosha Pan. Omusati is predominantly an agricultural region in which mahango is cultivated.

Omusati is subdivided into 12 political constituencies: Anamulenge, Elim, Etayi, Ogongo, Okaho, Okalongo, Onesi, Oshikuku, Otamanzi, Outapi, Ruacana, and Tsandi. Outapi is the only urban centre in the Region (Ministry of Regional and Local Government, Housing and Rural Development, 2010a, b; Namibia Statistics Agency (NSA), 2014b; d).

##### 3.1.2 Climate

The climate of the Kunene Region is classified as semi-arid (tropical steppe) to very arid (desert). Precipitation increases from the west to the east of the Region and ranges between less than 50 millimetres (mm) (at the coast), 300 to 350 mm (at Opuwo), and 350 to 400 mm (at Ruacana, Omusati Region) per annum. Average annual temperatures range between 18 to 20 degrees centigrade (°C) (at the coast), 20 to 22 °C (at Opuwo) and more than 22 °C (at Ruacana, Omusati Region). Maximum and minimum temperatures at Opuwo during the hottest and coldest months range between 34 to 36 °C and 6 to 8 °C, respectively. Relative humidity in the Opuwo area ranges between 80 to 90% during the most humid months and between 10 and 20% during the least humid months. The average annual rates of evaporation in the Opuwo area range between 1,960 and 2,100 mm (Environmental Resources Management (ERM), 2009; Mendelsohn *et al.*, 2009).

##### 3.1.3 Archaeology

Apart from the Ongulumbashe Memorial (that commemorates the start of the "Bush War" in 1966) there are no known heritage sites and/or sites of archaeological importance in the Omusati Region (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy; and Mr Erastus Immanuel, Uukolonkadhi-Ruacana Conservancy, pers. comm.).

Apart from marked (and possibly unmarked graves), there are no known sites of archaeological importance within the Kunene Region EPLs (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy; Mr Ignatius Koruhama, Spokesperson Okonjombe Conservancy; Foreman Tjihenu Tjiposa, Omuangete; Foreman K. Ruither, Oruhona; Mr M. Tjiposa, Okanguati Conservancy; and Foreman K. Maundu, Maundu Traditional Authority, pers. comm.).

It is advised that Mr Ignatius Koruhama (Okonjombe Conservancy) and Mr M. Tjiposa (Okanguati Conservancy) be consulted re the location of the grave(s) in EPL 3825 and the Okanguati Conservancy. The Traditional Authorities should be consulted re the possibility and location of (additional) graves in the remainder of the *Kaoko Project* EPLs. It is also advised that a Chance Finds Procedure (see Annexure B) be implemented and that an archaeological reconnaissance be carried out should a feasible ore body/resource be located.

#### 3.1.4 Landscape and Elevation

Three landscapes can be found in the area where the *Kaoko Project* is located: the Kunene Hills, the Karstveld, and the Escarpment.

The Kunene Hills consist of rugged and heavily dissected terrain, especially inland. Altitudes range between 1,000 and 1,900 metres (m) above sea level. Most of the landscape consists of metamorphic and folded rocks that were formed between 1,800 and 2,600 million years ago. Several river valleys cut through the landscape; the river valleys of the Hoarisib (to the south of EPL 3825) and Kunene Rivers (to the north of the *Kaoko Project*) were originally gouged out by glaciers some 300-280 million years ago. The Baynes and Zebra Mountains, as well as the Marienfluss Valley can be found in the Kunene Hills landscape (Mendelsohn *et al.*, 2009); the two mountain ranges and the Marienfluss Valley fall outside the area of the *Kaoko Project* EPL-areas.

Most of the Karstveld landscape extends as a narrow, raised margin that encircles the lower-lying Owambo-basin in central northern Namibia. Rocks in the landscape are dominated by limestone that easily dissolves in water, forming large underground caverns, lakes and aquifers of underground water. No major rivers drain the Karstveld and there is little surface water runoff from the landscape.

The Escarpment divides most of Namibia into two general landscapes; the low-lying coastal plains (west); and the higher, inland plateau (east). The division is especially pronounced in central and southern Namibia where altitudes can rise several hundred metres over short distances and in many areas. In north-western Namibia, the escarpment is broader and less obvious and it has been cut back and obliterated in the Central-western Plains (Mendelsohn *et al.*, 2009).

The following mountain ranges can be found within the *Kaoko Project* EPL-areas: Tonnesberge (1,762 m); Steilrandberg (1,837 m); and Ehombaberge (1,852 m).

#### 3.1.5 Soils

Due to the extremely low rainfall in the Kunene Region, soils are relatively undeveloped. The pH-values of the soils are mainly in the alkaline range due to the strong calcareous influences. The soils have a low organic content, and together with the low rainfall, soils are of little value to rain-fed crop agriculture.

The following soils are found in the Omusati Region: sodic sands (Cuvelai area); sands and loams (Mopane Shrubland); deep Kalahari Sands (Kalahari Woodlands); and loams (extreme southern parts with Mopane Shrubland and Karstveld landscapes). Dolomite sands are found in the Karstveld landscape (National Planning Commission (NPC), 2007a; b).

According to Mendelsohn *et al.* (2009), the following dominant soils may be found in the *Kaoko Project* EPL-areas: Chromic Cambisols, Petric Calcisols, Rock Outcrops (Kunene Region), and Ferralic Arenosols (Omusati Region).

#### 3.1.6 Hydrology, Geology, and Hydrogeology

The Northern Namib and Kaokoveld groundwater region is located in north-western Namibia and coincide more or less with the boundaries of the Kunene Region. The north-eastern dolomitic mountain ridges represent the eastern rim of the Cuvelai Basin and in the south it is bordered by the Ugab River and the Brandberg (Christelis and Struckmeier (Eds), 2011).

The perennial Kunene River flows north from Angola to Namibia at the juncture of the Omusati and Kunene Regions and the border with Angola. Tributaries of the Kunene flowing north include e.g. Otjinjange, Omuhongo and Ondoto; westwardflowing ephemeral rivers (from north to south) include the Nadas, Sechomib, Khumib, Hoarisib, Hoanib, Uniab, Koigab, Huab and Ugab Rivers (NPC, 2007a; Christelis and Struckmeier (Eds), 2011). No permanent surface bodies can be found in any of the *Kaoko Project* EPL-areas; the Hoarisib River is located just the south of EPL 3825.

Christelis and Struckmeier (Eds) (2011) describe the geology of the Northern Namib and Kaokoveld groundwater region as follows: "Granitic and gneissic rock types cover vast areas in the Kaokoveld. Granites, gneiss and old volcanic rocks are roughly located in a triangle between Marienfluss, Swartbooisdrif and Sesfontein. Metamorphic rocks including marble and quartzitic bands occur in the western part of the Kaokoveld. They form a strip between the Hartmann's Mountains and the coast that goes all the way down to the Uniab River. Mountain ranges of carbonate rock types (dolomites and limestones of the Otavi Group) that can be related to the Otavi Mountain Land, form the eastern edge of the area, grading towards the north into outcrops of quartzitic sandstone representing the Nosib Group. The Baynes Mountains in the far north are also dolomitic and quartzitic rocks of the Otavi and Nosib groups. Volcanic rocks of the Etendeka Formation crop out between Sesfontein and the Huab River. Some smaller units are present in the area south of Orupembe. These volcanic rocks build the typical table mountain landscape of Damara land. Underlying shale and mudstone of the Dwyka Formation are present in the area west and east of Orupembe, in the Opuwo area, west of Sesfontein and at Ruacana. The most recent rocks are calcretes (in the area of Khorixas, Fransfontein and Sesfontein) as well as alluvial deposits occurring locally in the ephemeral river beds. As far as tectonic structures are concerned, the most well known ones are the Sesfontein Thrust and the Purros Lineament. The Sesfontein Thrust represents the contact between the Otavi Dolomites and metamorphosed rocks, represented by phyllites of the Mulden Group. This contact zone gave rise to the springs found at Sesfontein. The topo- graphical location of the contact, on top of a hill, makes it impossible to intersect by boreholes. The Purros Lineament has been investigated hydrogeologically but is not productive, despite some good yielding boreholes drilled on the lineament."

The Northern Namib and Kaokoveld groundwater region generally has a low groundwater potential and due to the low number of boreholes and few government investigations on groundwater, knowledge of aquifers in the area is sparse. The area is, however, well-known for its numerous springs that provide water to the villages and wildlife. Alluvial groundwater is obtained from boreholes and hand-dug wells in the ephemeral rivers, especially in the western half of the area.

Opuwo obtains its water from a Dwyka shale aquifer, known as the north-western wellfield (yields exceed 15 cubic metres per hour ( $m^3/h$ ); Group C and D water quality), as well as from a sandstone and shale aquifer (low yield) of the south-eastern wellfield.

Water supply schemes operated by NamWater provide groundwater to the urban centres of Khorixas, Opuwo, and Kamanjab, as well as to some of the smaller villages i.e. Anker, Bergsig, Erwee and Fransfontein (Christelis and Struckmeier (Eds), 2011).

The Cuvelai-Etoshia groundwater Basin is the Namibian part of the Cuvelai River catchment. Perennial tributaries can only be found in Angola; in the Namibian part of the basin, the oshanas flow only during the rainy season. Water from the Calueque Dam, just north of the Angolan border, is supplied to Namibian villages and towns in the Cuvelai Basin via an extensive system of canals and pipelines. The Cuvelai Basin is bordered in the south and west by the surface water divide running from Otavi to Outjo, Kamanjab, Otjovasandu, Otjondeka, Opuwo and Ruacana. The eastern boundary is formed by a faint ground water divide running north from Tsintsabis; the border between Namibia and Angola forms the northern boundary. The hydrogeological Cuvelai Basin thus comprises the Omusati, Oshana, Ohangwena, Oshikoto Regions and parts of Kunene Region (Christelis and Struckmeier (Eds), 2011).

Christelis and Struckmeier (Eds) (2011) describe the geology of the area as follows: "the Cuvelai Basin, including Etosha Pan, is part of the much larger Kalahari Basin covering parts of Angola, Namibia, Zambia, Botswana and South Africa. It contains a very thick series of rocks of various ages. The basin floor consists of gneissic and granitic basement. Outcrops of this occur in the Kamanjab Inlier along the south-western rim of the basin (Fransfontein Granitic Suite and Khoabendus Group, 2 700 to 1700 Ma). Up to 8 000 m of sedimentary rocks of the Nosib, Otavi and Mulden groups of the late-Proterozoic Damara Sequence overlie this. Carbonatic rocks of the Otavi Group are found on the surface in the mountain ridges south and west of the basin. The Damara Sequence is followed by 360 m of Karoo Sequence rocks ranging from Lower

Permian to Jurassic (300 -130 Ma) and up to 600 m of semi- to unconsolidated sediments of the Cretaceous to Recent (< 70 Ma) Kalahari Sequence. This is shown in the table on “Aquifers and aquitards of the basin.”

The groundwater quality over much of the Cuvelai-Etoshia groundwater Basin is extremely poor. The quality of water is especially poor in the central areas extending south from the Namibia-Angola border between Oshikango and Ruacana in a south-easterly direction towards Etosha and Oshivelo. The best quality ground water is available along the basin rim in much of the Tsumeb area, in the entire north-eastern area of Ohangwena and Oshikoto, in south-western Omusati and Etosha, and in the Uukwaluudhi area north towards Ruacana (Christelis and Struckmeier (Eds), 2011).

## 3.2 Biophysical Environment

### 3.2.1 Fauna and Flora

The general area is commonly referred to as the Mopane Savanna (Giess, 1971). According to Mendelsohn *et al.* (2009) the *Kaoko Project* EPLs overlap with the Western Highlands (central and eastern Kunene Region), and the Western Kalahari (far eastern part of the Kunene and western part of the Omusati Region). The dominant vegetation structure is classified as sparse shrubland and woodland. The average plant production in the *Kaoko Project* EPL-areas ranges from “low” to “medium”, and from “high” to “very high”; variation in green vegetation biomass ranges from “low” (5-10%) to “medium” (10-15%) (for example, plant growth can be abundant in one season and largely absent in another) (Mendelsohn *et al.*, 2009).

An important plant species in the *Kaoko Project* EPL-areas is the Mopane tree (*Colophospermum mopane*) (protected under the (Namibian) Forest Regulations 2015: Forest Act 12 of 2001) (see Figures 5 and 6). Mendelsohn *et al.* (2009) note that “Mopane is the most used, versatile and possibly over-utilised woody resource in the country. Tens of thousands of households in rural central-northern and north-west Namibia as well as in eastern Caprivi make great use of the tree for firewood, fencing and building material, and sometimes for implements. In the past, its roots were exported to decorate aquariums. Mopane prefers clayey soils and is sensitive to frost.”



Figure 5: Roadside vegetation (mainly Mopane trees), C43 road between Opuwo and Epembe, Kunene Region, Namibia (Source: L. Maartens, 07 December 2015).



Figure 6: Roadside vegetation (mainly Mopane trees), D3703 road between Opuwo and Etanga, Kunene Region, Namibia (Source: L. Maartens, 08 December 2015).

The overall plant diversity (i.e. higher plants) in the *Kaoko Project* EPL-areas is “low to average” and estimated at between 100 and 499 species (Mendelsohn *et al.*, 2009). Maggs *et al.* (1994; 1998) indicate that high (27.7%) floristic individuality occur in the Kaokoveld region. The area is also one of high plant endemism (23 taxa) (the Brandberg in the southernmost extension of the Kaokoveld is especially rich in endemics). Flora in the Kaokoveld is relatively undercollected (as the area is highly inaccessible) and the flora of especially the high mountain ranges is largely unknown.

Carter (2015) (see Environmental Information System (EIS) Namibia, 2002) listed the following protected tree species that are known to occur in the general area: Camel-thorn (*Acacia erioloba*); Bird-plum (*Berchemia discolor*); Shepherd’s tree (*Boscia albitrunca*); Mopane (*Colophospermum mopane*); Leadwood (*Combretum imberbe*); *Elaeodendron transvaalensis* (= *Cassine transvaalensis*); Wild ebony (*Euclea pseudebebus*); Namaqua rock-fig (*Ficus cordata*); Sycamore fig (*Ficus sycomorus*); *Kirkia acuminata*; Ringwood tree (*Maerua schinzii*); Weeping wattle (*Peltophorum africanum*); Tamboti (*Spirostachys Africana*); and African star-chestnut (*Sterculia africana*). Note that *Elaeodendron transvaalensis* (= *Cassine transvaalensis*), *Kirkia acuminata*, and *Peltophorum africanum* are not protected under the (Namibian) Forest Regulations 2015: Forest Act 12 of 2001.

The following tree species are protected under the (Namibian) Forest Regulations 2015 and may occur in the *Kaoko Project* EPL-areas: Bushman poison (*Adenium boehmianum*); Worm-cure Albizia (*Albizia anthelmintica*); various *Commiphora* species; Kobas (*Cyphostemma currorii*); Blue Kobas (*Cyphostemma juttae*); Kaoko Kobas (*Cyphostemma uter*); Owambo Wooden-banana (*Entandrophragma spicatum*); Namib Coral-tree (*Erythrina decora*); Anaboom (*Faidherbia albida*); Kaoko kirkia (*Kirkia dewinteri*); Bottle Tree (*Pachypodium lealii*); Marula (*Sclerocarya birrea*); Kaoko Sesame-bush (*Sesamothamnus benguellensis*); Large-leaved Sterculia (*Sterculia quinqueloba*); Wild Tamarisk (*Tamarix usneoides*); and Buffalo-thorn (*Ziziphus mucronata*) (see <http://treeatlas.biodiversity.org.na/>).

During a visit to the area (7-8 December 2015), very little grass cover was observed; the latter is due to the drought, as well as severe overgrazing. Apart from Mopane trees, *Acacia* species, and Shepherd’s trees, *Aloe* species (protected under the Nature Conservation Ordinance 4 of 1975) and Herero Sesame-bush/Ongumbati (*Sesamothamnus guerichii*) (protected under the (Namibian) Forest Regulations 2015) were observed; the latter two flora species occurred outside the EPL-boundaries of the *Kaoko Project*.

An estimated 51-80 species of reptile (17-24 endemic species), 4-15 species of amphibian (frogs), 46-75 species of mammal (7-8 endemic species), and 51-110 species of avifauna (birds) (4-10 endemic species) may occur in the *Kaoko Project* EPL-areas (Mendelsohn *et al.*, 2009).

The *Kaoko Project* EPL-areas overlap with seven communal conservancies (see Tables 2 and 3). Major wildlife resources (excluding those associated with the Kunene River and predators) include: black-faced impala, kudu, black-backed jackal, Damara dik dik, mountain zebra, springbok, ostrich, duiker, elephant, steenbok, oryx, giraffe, rooibok, klipspringer, baboon, eland (occasionally), and hartebeest. Predators include: leopard, cheetah, and spotted hyena (see <http://www.nacso.org.na/>).

Table 3: Information related to the registered communal conservancies within the *Kaoko Project* Exclusive Prospecting License-areas (after <http://www.nacso.org.na/>).

Communal Conservancy	Area (km <sup>2</sup> )	Geographical features	Average annual rainfall (mm)	Unusual or important features	Major wildlife resources
Kunene River	2,764	Mountainous with river boundary	300-400	Kunene River (northern boundary)	Black-faced impala, kudu, black-backed jackal, Damara dik dik, leopard, hippo, mountain zebra, springbok, ostrich, duiker, elephant, crocodile, steenbok, spotted hyena, black-backed jackal, oryx, giraffe
Okanguati	1,159	-	-	-	Kudu, oryx, Damara dik dik, springbok, and rooibok (Mr M. Tjiposa, Okanguati Conservancy, pers. comm.)
Ombazu	871	-	-	-	Elephant, oryx, giraffe, jackal, klipspringer, kudu, mountain zebra, ostrich, springbok, steenbok, black-faced impala
Etanga	908	-	-	-	Elephant, oryx, giraffe, jackal, klipspringer, kudu, mountain zebra, ostrich, springbok, steenbok, Damara dik dik
Okonjombo	1,645	Arid area with hills, plains and wooded river valleys making up the landscape	<100	Ovahimba culture Otjize ochre mine	Elephant, giraffe, kudu, springbok, oryx, mountain zebra, klipspringer, steenbok, ostrich, cheetah, leopard, black-backed jackal, baboon
Uukolonkadhi-Ruacana	2,993	Flat to mountainous area with grass- and woodlands	300-400	Ruacana Falls on the Kunene River Olushandja Dam	Elephant, springbok, mountain zebra, ostrich, black-faced impala, hippo, crocodile  Kudu, oryx, Damara dik dik, and eland are also found in the area (Mr Erastus Immanuel, Uukolonkadhi-Ruacana Conservancy, pers. comm.)
Uukwaluudhi	1,437	Savannah woodland with small hills	350-400	Core wildlife area with re-introduced high-value species Multiple cultures (Wambo, Herero, Himba, Dhemba and San)	Black rhino, black-faced impala, kudu, duiker, hartebeest, eland, plains zebra, giraffe, springbok, elephant, eland  Oryx, hyena, cheetah and leopard are also found in the area. Black rhino was removed from the area early-2014 and the conservancy now wishes to bring in other high-value species like (privately-owned) white rhino and non-productive lion (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy, pers. comm.)



### 3.2.2 Key Habitats

Cunningham (2009) views the following areas as sensitive habitats generally associated with unique species: i) mountains; ii) hills and ridges; iii) drainage lines (i.e. ephemeral drainage lines); iv) open spaces; and v) the urban periphery (these areas are in direct contact with the surrounding natural habitat).

Africon Environment & Sustainability Consulting in association with DRFN, EnviroNomics Environmental Consultants and Metro GIS (2004; see Cunningham, 2009) have identified the following habitats as the most sensitive: i) high mountains; and ii) riverine thickets.

The following mountain ranges can be found within the *Kaoko Project* EPL-areas: Tonnesberge (1,762 m); Steilrandberg (1,837 m); and Ehombaberge (1,852 m).

It is advised that a baseline ecological survey (of the vertebrate fauna and flora) be carried out prior to any trench sampling (and especially blasting), bulk sampling (and especially blasting), or drilling, being carried out in the sensitive mountain habitats.

### 3.3 Socio-Economic Environment

A baseline socio-economic study was compiled using data from the following Government documents: the Namibia Household Income & Expenditure Survey (NHIES) 2009/2010 (NSA, 2012); the Namibia 2011 Population & Housing Census Main Report (NSA, 2013); the Kunene 2011 Census Regional Profile (NSA, 2014a); the 2011 Population and Housing Census Kunene Regional Based on 4<sup>th</sup> Delimitation (NSA, 2014b); the Omusati 2011 Census Regional Profile (NSA, 2014c); the 2011 Population and Housing Census Omusati Regional Based on 4<sup>th</sup> Delimitation (NSA, 2014d); and the Namibia Labour Force Survey (NLFS) 2014 Report (NSA, 2015).

#### 3.3.1 Population Characteristics

During the 2011 Population and Housing Census, the population of the Kunene Region was estimated at 86,856 persons (4.1% of the national population); the population of the Omusati Region was estimated at 243,166 persons (11.5% of the national population). Omusati is the fourth most densely populated region (9.2 persons per km<sup>2</sup>) in Namibia. In 2011, the population density in the Kunene and Omaheke Regions was estimated at 0.8 persons per km<sup>2</sup> (vs the national average of 2.6 persons per km<sup>2</sup>).

The level of urbanisation in Kunene has remained more or less constant (25% in 2001 vs 26.4% in 2011). In Outapi (Omusati Region), the population more than doubled between 2001 and 2011. Nationally, the total urban population increased by almost 50% between 2001 and 2011. There are 18,495 households (12,489 households in 2001) (5.3 vs 4.6 persons per household in 2001 and 2011, respectively) in the Kunene Region. In the Omusati Region, there are 46,698 households (38,202 households in 2001) (5.9 vs 5.2 persons per household in 2001 and 2011, respectively).

Two main languages are spoken in the Kunene Region and these are: OtjiHerero (47%), and Nama/Damara (32%). In the Omusati Region, mainly Oshiwambo (96%) is spoken (NSA, 2013).

The Kunene Region is subdivided into seven political constituencies: Epupa (population: 17,696), Kamanjab (population: 8,441), Khorixas (population: 12,566), Opuwo Rural and Urban, (population: 27,272), Outjo (population: 12,447), and Sesfontein (population: 8,434) (NSA, 2014a). Omusati is subdivided into 12 political constituencies: Anamulenge (population: 13,410), Elim (population: 11,406), Etayi (population: 35,101), Ogongo (population: 19,546), Okahao (population: 17,548), Okalongo (population: 30,609), Onesi (population: 13,149), Oshikuku (population: 9,093), Otamanzi (population: 36,934), Outapi (population: 14,587), Ruacana (population: 28,018), and Tsandi (population: 13,495) (NSA, 2014c).

The *Kaoko Project* spans over three constituencies in the two Regions. These are: Epupa and Opuwo constituencies (Kunene Region); and the Ruacana constituency (Omusati Region). Census selected indicators for the three constituencies are provided below (NSA, 2014a; b; c; and d):

Region Census Indicator / Constituency	Kunene Region		Omusati Region
	Epupa Constituency	Opuwo Constituency	Ruacana Constituency
Population size	17,696	27,272	14,857
Males	8,378	13,376	7,530
Females	9,318	13,896	7,327
Sex Ratio: males per 100 females	90	96	103
Number of private households	2,781	5,178	3,520
Average size of private households	6.3	5.2	4.1
Age composition (%):			
Junior population (< 15 years)	53	44	40
Potentially Economically Active (PEA) persons (15 to 59 years of age)	40	50	53
Senior population (> 60 years of age)	7	7	6
Literacy rate (15+ years) (%)	29	62	78
Education (15+ years) (%):			
Never attended school	70	43	23
Currently at school	6	11	15
Left school	15	42	56

### 3.3.2 Economic Profile

The economic context of the Epupa and Opuwo (Kunene Region) and Ruacana (Omusati Region) constituencies (or Kunene and Omusati Regions where figures are not available for the constituency) is illustrated by means of economic indicators such as employment, source of income, and main working activities (NSA, 2014a; b; c; d; 2015):

Region Census Indicator / Constituency	Kunene Region		Omusati Region
	Epupa Constituency	Opuwo Constituency	Ruacana Constituency
Labour force (15+ years) (%):	60	63	61
Employed	81	59	65
Unemployed	19	41	35
*Labour Force Participation Rate (LFPR) (Region)		74.1	64.8
**Broad unemployment rate (Region)		32.6	22.9
Key industry:			
Agriculture Forestry and Fishing	89.3	19.7 (U); 86.9 (R)	42.6
Administrative and Support Service Activities		13.9 (U)	
Wholesale and Retail trade; Repair of motor vehicles and motorcycles		12.3 (U)	
Occupation profile (%):			
Armed force	0.2	1.0 (U); 0.3 (R)	4.5
Legislators senior officials and Managers	0.6	4.7 (U); 0.3 (R)	0.6
Professionals	1.0	13.1 (U); 1.4 (R)	7.1
Technician and associate professionals	0.4	5.5 (U); 0.6 (R)	4.2
Clerk	0.3	7.1 (U); 0.3 (R)	1.1
Service workers	4.4	23.9 (U); 4.8 (R)	16.5
Skilled Agricultural and Fishery workers	88.3	17.2 (U); 85.2 (R)	37.2
Craft and Related trades workers	1.2	7.8 (U); 2.7 (R)	8.6
Plant and Machine operators and assemblers	0.2	2.2 (U); 0.2 (R)	2.8
Elementary occupations	3.3	17.0 (U); 4.1 (R)	17.2
Don't know	0.1	0.4 (U); 0.1 (R)	0.0
Main source of income (%):			
Farming	77	47	35
Wages & Salaries	6	27	32
Cash remittance	1	3	5
Business, non-farming	5	12	9
Pension	8	10	12

\*LFPR: the number of persons in the labour force given as a percentage of the working age population in that population group. \*\* Broad unemployment rate: people being without work, or who are available for work, irrespective of whether they are actively seeking work. U: Urban and R: Rural

### 3.3.3 Poverty Levels

According to the 2009/10 NHIES, the Kunene and Omusati Regions have an average household income of N\$47,772 and N\$49,076, respectively. The income per capita is N\$10,944 (Kunene Region) and N\$9,414 (Omusati Region) (vs the Kavango Region with the lowest (N\$5,682) income per capita).

Households in the Kunene Region spend most of their money on food/beverages (35.5%), housing (21.8%), and transport/communication (15.1%). Similarly in the Omusati Region, most of the household money is spent on food/beverages (40.6%), housing (18.2%), and transport/communication (16.7%).

Four percent (4.4%) of households in the Kunene Region were rated as poor and 4.8% as severely poor. In the Omusati Region, 5.1% each of households were rated as poor and severely poor. The highest incidence of poverty is found in the Kavango where 43% and 24% of households are rated as poor and severely poor, respectively. Poverty incidence is lowest in the Erongo Region; 5% of households are poor and 2% are severely poor (NSA, 2012).

### 3.3.4 Housing

The percent of the population in the Epupa, Opuwo Urban and Rural (Kunene Region), and Ruacana constituencies (Omusati Region) by type of housing unit is indicated below (NSA, 2014b; d):

Percent of the Population by Type of Housing Unit	Kunene Region			Omusati Region
	Epupa Constituency	Opuwo Urban Constituency	Opuwo Rural Constituency	Ruacana Constituency
Detached House	13.7	41.5	6.5	14.3
Semi-detached House	0.5	8.7	0.2	2.3
Apartment/Flat	0.4	4.5	0.1	0.6
Guest Flat	0.2	0.7	0.0	0.1
Part Commercial/Industrial	0.1	0.2	0.0	0.3
Mobile Home	0.6	1.3	3.1	1.1
Single Quarters	0.7	0.5	0.3	0.3
Traditional Dwelling	81.7	40.3	88.8	78.4
Improvised Housing Unit (Shack)	1.4	1.6	0.7	2.2
Other	0.7	0.8	0.3	0.4

### 3.3.5 Access to Services

#### Water

During 2011, 67% and 52% of households in the Kunene and Omusati Regions, respectively had access to safe drinking water (NSA, 2013).

The majority of the population in the Epupa (49.2%) and Opuwo Rural (31.5%) constituencies obtained their water for cooking and drinking from *River/Dam/Stream*. In the Opuwo Urban and Ruacana constituencies, 28.6% and 25.9% of the population obtained their water for cooking and drinking from *Public Pipe* (NSA, 2014b; d).

#### Energy

In 2011, the majority of the population in the Epupa (95.0%), Opuwo Urban (70.0%) and Rural (97.7%) (Kunene Region), and Ruacana (89.7%) constituencies (Omusati Region) prepared their food using *Wood/Charcoal from Wood*.

Energy for lighting was mainly obtained through using *Wood/Charcoal from Wood* (79.9% of the population in the Epupa constituency) and *Candles* (39.0% of the population in the Opuwo Rural constituency; 41.0% of the population in the Opuwo Urban constituency; and 48.1% of the population in the Ruacana constituency) (NSA, 2014b; d).

#### Sanitation

In 2011, 94.3% of the population in the Epupa constituency had no toilet facility; in the Opuwo Rural and Urban constituencies, 95.9% and 63.3% of the population had no toilet facility. Almost 83% of the population in the Ruacana constituency had no toilet facility in 2011 (NSA, 2014b; d).

### Health Care

In the Kunene Region, there are three referral district hospitals, and 20 clinics and three health centres that serve the rural community. Private health care providers include two Doctor's consulting rooms, one physiotherapy practice, one pharmacy, two laboratory services, and one psychotherapeutic centre.

Health and social welfare facilities in the Omusati Region include: four district hospitals (in Okahao, Oshikuku, Outapi and Tsandi), six health centres, and 40 clinics and 124 outreach points (see <http://www.mhss.gov.na/>).

### Education

There are 64 schools, three circuits, 16 clusters, 24,140 learners, six literacy districts and 4 community libraries in the Kunene Region (see <http://www.moe.gov.na/>). In 2013, Omusati had 274 schools with a total of 86,365 pupils.

#### 3.3.6 *Human Immunodeficiency Virus*

The 2014 National HIV Sentinel Survey (NHSS) revealed the following: i) sites with the highest HIV prevalence among pregnant women were Engela (22.8%), Rundu (24.1%), and Katima Mulilo (36.0%); sites with the lowest HIV prevalence among pregnant women were Opuwo (3.9%), Windhoek Central (4.1%) and Okakarara (9.0%); ii) the percent HIV prevalence among females between 15 and 24 years in age in Opuwo declined from 8.8 (2012) to 0.0 (2014); iii) in the age group 25 to 49, the percent HIV prevalence also declined from 10.7% (2012) to 7.0% (2014); iv) Namibia's HIV/AIDS epidemic remains in a period of stabilization with slow yet sustained decreases in HIV prevalence among pregnant women since 2004; v) the highest age-specific prevalence in Namibia was observed among women age 40-44 years (30.6%) and women age 35-39 years (30.3%) (the continuing shift in peak HIV prevalence from younger to older age groups can be expected in a mature and stabilized generalized HIV epidemic); vi) the overall HIV prevalence among women age 15-24 years was 8.3% and it may be possible for Namibia to achieve the NSF (National Strategic Framework) target of 5% prevalence among pregnant women age 15-24 years by 2015/16; the prevalence among women age 15-19 has nearly levelled at 5.8% and additional work is needed to prevent HIV infections in this highly vulnerable young population; there is a continued decrease in prevalence among women age 20-24 from 10.9% in 2012 to 9.8% in 2014; and vii) 49.1% of all women who tested HIV positive during the 2014 NHSS were already on ART (Anti-retroviral Therapy) before the survey (vs 41.4% in 2012); this indicates a notable success of the ART and PMTCT (Prevention of Mother to Child Transmission) programs (MOHSS, 2014).

#### 3.3.7 *Gender*

Legislation that promotes equal gender participation in all aspects of Namibian society includes: i) Articles 10 and 23(3) of the Constitution of the Republic of Namibia 1990; ii) Affirmative Action (Employment) Act 29 of 1998; and iii) National Gender Policy (2010 – 2020).

## 4 Regulatory Framework

The most pertinent legislation (Legal Assistance Centre (LAC), 2010; Ruppel, 2013), with the aim of informing KRN of the legal requirements pertaining to the *Kaoko Project* during the exploration and rehabilitation phases is listed in Table 4.

Table 4: Regulatory framework for Kunene Resources Namibia (Pty) Ltd's existing and proposed exploration activities, *Kaoko Project*, Kunene and Omusati Regions, Namibia.

<b>National Law</b>
<b>Acts of Parliament, Regulations, Ordinances, Proclamations</b>
The Constitution of the Republic of Namibia 1990
Employees' Compensation Act 30 of 1941; Amendment Act 5 of 1995, that came into force on 1 March 1995, amends the Act substantially and changes its name from the Workmen's Compensation Act to the Employees' Compensation Act
Artesian Water Control Ordinance 35 of 1955
Explosives Act 26 of 1956 (as amended in South Africa to April 1978; and related Regulations)
Water Act 54 of 1956 (as amended)
Burial Place Ordinance 27 of 1966
Soil Conservation Act 76 of 1969 (as amended in South Africa to March 1978; section 13 is amended by the Forest Act 12 of 2001)
Mountain Catchment Areas Act 63 of 1970
Hazardous Substance Ordinance 14 of 1974
Nature Conservation Ordinance 4 of 1975 (and the associated Regulations Government Notice (GN) 240/1976)
Atmospheric Pollution Prevention Ordinance 11 of 1976
Petroleum Products and Energy Act 13 of 1990 (as amended by the Petroleum Products and Energy Amendment Act 29 of 2004, Act 3 of 2000 and Act 16 of 2003; Petroleum Act Regulations were made in 1991 and 2000 under the Petroleum Products and Energy Act 13 of 1990 ("Petroleum Act Regulations"), to provide for the application of environmental standards and the avoidance of environmental harm caused by the keeping, handling, conveying, using and disposing of petroleum products)
Foreign Investment Act 27 of 1990
Regional Councils Act 22 of 1992 (and Amendment Acts 17 of 1997, 30 of 2000, 12 of 2002, and 12 of 2010)
Minerals (Prospecting and Mining) Act 33 of 1992 (and Minerals (Prospecting and Mining) Amendment Act 8 of 2008)
Social Security Act 34 of 1994 (and the Regulations)
Nature Conservation Amendment Act 5 of 1996
Namibia Water Corporation Act 12 of 1997 (and Namibia Water Corporation Amendment Act 17 of 2001)
Affirmative Action (Employment) Act 29 of 1998 (as amended by Act 6 of 2007 and the Labour Act 11 of 2007) (and the Regulations)
Road Traffic and Transport Act 22 of 1999 (as amended by the Road Traffic and Transport Amendment Act 6 of 2008)
Traditional Authorities Act 25 of 2000 (and the Regulations)
Forest Act 12 of 2001 (and the Forest Regulations 2015)
Water Resources Management Act 24 of 2004 (promulgated, but not yet implemented)
National Heritage Act 27 of 2004 (and the Regulations/Appointments/Declarations made under the National Monuments Act 28 of 1969 and the Regulations 2005)
Environmental Management Act 7 of 2007 (and the Environmental Impact Assessment Regulations 2012)
Labour Act 11 of 2007 (and the Labour Amendment Act 2 of 2012)
Tobacco Products Control Act 1 of 2010 (and the Regulations)
Disaster Risk Management Act 10 of 2012
Water Resources Management Act 11 of 2013 (promulgated, but not yet implemented)
Public and Environmental Health Act 1 of 2015
<b>Policies, Guidelines, National Strategies &amp; Action Plans</b>
<b>Policies</b>
Conservation of Biotic Diversity and Habitat Protection 1994
Environmental Assessment Policy for Sustainable Development and Environmental Conservation 1995
Minerals Policy of Namibia 2002
National Policy on Human-Wildlife Conflict Management 2009
National Gender Policy 2010 - 2020
National Health Policy Framework 2010-2020 - "towards quality health and social welfare services"
<b>Guidelines</b>
The Water Act (Act 54 of 1956) and its requirements in terms of water supplies for drinking water and for waste water treatment and discharge 1998
<b>National Strategies &amp; Action Plans</b>

Namibia's Green Plan 1992
Namibia's Fourth National Development Plan (NDP4) (2012/13 to 2016/17) – <i>Changing gear towards achieving Vision 2013</i>
<b>Good Industry Practice</b>
Minimum Standards Rehabilitation of Exploration Sites 2012
<b>International Law</b>
<b>African Union (AU)</b>
African Charter on Human and Peoples' Rights 1981
Constitutive Act of the African Union 2000
African Convention on the Conservation of Nature 2003
<b>Southern African Development Community (SADC)</b>
Protocol on Mining 1997
<b>United Nations (UN) / International Conventions</b>
Declaration of the United Nations Conference on the Human Environment 1972
Vienna Convention for the Protection of the Ozone Layer 1985 and Montreal Protocol on Substances that Deplete the Ozone Layer 1987; Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Adopted at the Fourth Meeting of the Parties at Copenhagen on 25 November 1992; Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Adopted by the Ninth Meeting of the Parties at Montreal on 17 September 1997; and Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Beijing, 3 December 1999
Convention on Biological Diversity (CBD) 1992
United Nation Convention to Combat Desertification (UNCCD) 1994
United Nations (UN) Framework Convention on Climate Change 1992 and Kyoto Protocol to the UN Framework Convention on Climate Change 1997
Convention for the Safeguarding of the Intangible Cultural Heritage 2003
Convention on the Protection and Promotion of the Diversity of Cultural Expressions 2005
<b>International Best Practice</b>
The Vermillion Accord on Human Remains 1989
International Finance Corporation (IFC) Environmental Health and Safety (EHS) Guidelines 2007 and EHS Guidelines for Mining 2007
Prospectors and Developers Association of Canada (PDAC) Excellence in Environmental Stewardship e-toolkit (EES) 2009
Equator Principles 2013

Draft Only

## 5 Stakeholder and Public Consultation

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### 5.1 Objectives

The purpose of Public Participation is to provide stakeholders, including the public, an opportunity to participate in the Environmental Assessment Process, in order to ensure that the intended development initiatives consider broad-based concerns. It further improves governance in that the intended development must consider a wide range of issues, e.g. the need to conserve the natural environment and the need to maintain a functioning ecology.

### 5.2 Consultation Process

Communication with stakeholders about the *Kaoko Project* was facilitated through the following methods:

- Key stakeholders were identified from contacts of the Project Team (see Annexure C: List of Interested and Affected Parties (I&APs) Consulted);
- Advertisements (Notice of an Environmental Assessment Process) were placed in two National newspapers, *Republikein* and *The Namibian*, on 23 and 30 November 2015 (see Annexure C: Advertisements);
- Laminated notices (with the Notice of an Environmental Assessment Process) were put up by Kaarina Ndalulilwa, Kunene Resources Namibia (Pty) Ltd, at the:
  - Omunghete School (EPL 3299, Kunene Region, Epupa constituency);
  - Opuwo Constituency Office, Opuwo (Kunene Region, Opuwo constituency); and
  - Omusati Regional Council, Oshifo (Omusati Region, Ruacana constituency) (see Annexure C: Notices Displayed);
- Written notices re the *Kaoko Project* were given to Kaarina Ndalulilwa, Kunene Resources Namibia (Pty) Ltd, for distribution to the following people:
  - Hon. Petrus Muharukua, Councillor - Epupa Constituency;
  - Hon. Kazeongere Tjeundo, Councillor - Opuwo Constituency;
  - Hon. Abast lipinge, Councillor - Ruacana Constituency;
  - Alfons Tjitombo, the Chief Executive Officer (CEO), Opuwo Town Council;
  - Mr Sam Petrus, Acting Regional Head, MAWF, Directorate of Rural Water Supply;
  - Chief Tjimbaure Thom, Vita Royal House, Opuwo;
  - Chief Paulus Tjavara, Otjikaoko Royal House, Opuwo;
  - Chief Vemuui Tjambiru, Kakurukouje Royal House, Etanga;
  - Relevant Foremen (10 letters);
  - Relevant Chairpersons, communal conservancies (the letters were delivered on 25 November 2015);
- Written notice re the *Kaoko Project* was also sent/given to:
  - Mr Abraham Nehemia, Acting Permanent Secretary (PS), MAWF by e-mail (23 November 2015) (see Annexure C: Sample Letter);
  - Mr Veibyahiwa Rutjido, Kunene River Conservancy by e-mail via the Owners of the Kunene River Lodge (03 December 2015) (see Annexure C: Correspondence with I&APs);
  - Mr Ignatius Koruhama, Spokesperson Okonjombe Conservancy (07 December 2015);
  - Mr Sinai Ruhozu (son to Foreman Ruhozu), Oukongo (07 December 2015);
  - Mr Paul Tuukonjere, Control Officer, Constituency Office of Ruacana (08 December 2015);
  - Mr Erastus Immanuel, Uukolonkadhi-Ruacana Conservancy (08 December 2015);
  - Chief Daniel Shooya (via Mr Erastus Immanuel), Uukolonkadhi Traditional Authority (08 December 2015);
  - Mr M. Tjiposa, Okanguati Conservancy (08 December 2015);
  - Foreman K. Maundu, Maundu Traditional Authority (08 December 2015) (see Annexure C: List of Interested and Affected Parties (I&APs) Consulted);
- In addition, the Notice of Environmental Assessment was translated into OtjiHerero (the main language spoken in the Kunene Region) and Oshiwambo (the main language spoken in the Omusati Region) and the *live reads* were broadcasted on NBC (National Broadcasting Corporation) Radio at 08h00 on Wednesdays the 25<sup>th</sup> of November 2015 and 2<sup>nd</sup> of December 2015 (see Annexure C for the translated *live reads*);
- The advertisements, notices/posters, written notices, and *live reads* provided details re the application; stated also was that the application was submitted to the Environmental Commissioner

- in terms of the EIA Regulations: EMA 7 of 2007, the nature and location of the proposed Project/Activity, and where, how and from whom additional information on the application/activity can be obtained;
- Focus Group Meetings took place with the following persons on the 1<sup>st</sup> (in Windhoek), and 7<sup>th</sup> and 8<sup>th</sup> (in the Kunene and Omusati Regions) of December 2015 (see Annexure C: Meeting Attendance Register);
    - Mr Paavo Amunyela, Uukwaluudhi Conservancy;
    - Mr Ignatius Koruhama, Spokesperson Okonjombe Conservancy;
    - A meeting was organised in advance with Chiefs Tjavara, Tjambiru, and Thom:
      - Chief Tjavara had to go to Outjo Hospital and Mrs Karijarua Tjondu, Otjikaoko Traditional Authority, attended the meeting;
      - Chief Tjambiri was in a car accident, but was going to send a representative; the representative did not show up for the meeting;
      - Chief Thom went to the hospital for treatment, but was represented by Mr Ben Kapi from the Vita Royal House;
    - Foreman Tjihenu Tjiposa, Omuangete;
    - Foreman K. Ruither, Oruhona (see Figure 7a);
    - Mr Paul Tuukonjere, Control Officer, Constituency Office of Ruacana;
    - Mr Erastus Immanuel, Uukolonkadhi-Ruacana Conservancy;
    - Mr M. Tjiposa, Okanguati Conservancy;
    - Foreman K. Maundu, Maundu Traditional Authority (see Figure 7b);
    - Foremen Tjindunda and Kovita could not be reached and Mr Muhenje (son to Foreman Muhenje was out of town); contact details for the Ombazu and Etanga Conservancies could not be obtained (see Annexure C: Correspondence with I&APs);
    - All persons with whom meetings were held, were given a map of the area (see Figure 3) and the Environmental Scoping Process was explained; it was noted that LM Environmental Consulting, conducting the Environmental Assessment, is independent from Kunene Resources Namibia (Pty) Ltd; as all communication at the meetings had to be translated, no minutes (of the meetings) could be taken; however, people were asked to raise issues and/or concerns and these were recorded (see Table 5);
  - A register of I&APs was opened (see Annexure C: Register of I&APs; also see Annexure C: Correspondence with I&APs); only one person registered as an I&AP;
  - A hard copy of the *Draft* Environmental Scoping and Management Plan Report was made available at the Public Library in Opuwo (07 January 2016); persons with whom meetings were held, and without e-mail addresses, were informed via sms of the availability of the Report for comment; an electronic copy of the Report was sent to the one registered I&AP, as well as the persons with whom meetings were held and who are in possession of e-mail addresses (06 January 2016);
  - The seven-day comment period commenced on 08 January 2016 and ended on 18 January 2016.



Figure 7: Pictures of: a) Tobias Mwandingi and Foreman K. Ruither, Oruhona (07 December 2015); and b) the meeting with Foreman K. Maundu, Maundu Traditional Authority (08 December 2015) (Source: L. Maartens).

### 5.3 Summary of Issues and/or Concerns

A summary of the issues/concerns raised during the Public Consultation Process and the measures taken to address these issues, is provided in Table 5.



Table 5: A summary of the issues/concerns (including positive feedback) and measures taken to address these issues during the Environmental Assessment Process.

Issue/Concern	Response
<b>Land Use</b>	
As it is a Conservancy, there are special areas for visitors, locals and passers-by. No hunting/poaching is allowed. No exploration can be conducted in any of the "tourist attraction areas" (Mr Ignatius Koruhama, Okonjombe Conservancy).	Kunene Resources Namibia (Pty) Ltd (KRN) will arrange for a meeting with Mr Koruhama before activities in Okonjombe Conservancy will start to understand the location and nature of the "tourist attraction areas" (Dr Rainer Ellmies, Kunene Resources Namibia (Pty) Ltd, pers. comm.).
Kunene Resources Namibia (Pty) Ltd (KRN) cannot cordon off areas (for exploration); livestock should be allowed access to grazing areas and water points at all times (Mrs Karijarua Tjondu, Otjikaoko Traditional Authority).	See Section 7.4: Environmental Management Plan (EMP)
<b>Archaeological Sites</b>	
The Headmen and Councillors look after the social welfare of the people and livestock; the Conservancy Agencies look after the wildlife and tourism in the areas. The people in the villages should point out where the sites of archaeological importance are (Mr Ben Kapi, Vita Royal House).	See Sections 3.1.3 and 7.4: EMP
<b>Socio-Economic</b>	
Crime (poaching, theft and damage to property) due to contractors coming into the area (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy).	See Section 7.4: EMP
Human-wildlife conflict should be avoided (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy).	See Section 7.4: EMP
HIV/AIDS: the spreading of HIV by contractors coming into the area (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy).	See Section 7.4: EMP
Poverty: children are conceived by contractors coming into the area and are then left unsupported (when the contractors leave) (Mr Paavo Amunyela, Chairman Uukwaluudhi Conservancy).	See Section 7.4: EMP
Workers should be recruited from the specific (Traditional Authority) areas/Conservancies (Mr Ignatius Koruhama, Okonjombe Conservancy).  Where possible, people from the community should be employed by KRN (vs bringing in their own people) Mr M. Tjiposa, Okanguati Conservancy).  Take workers from the community (Foreman K. Maundu, Maundu Traditional Authority).	See Section 7.4: EMP
Should KRN find something, there is no guarantee that the community will benefit (Mr Ben Kapi, Vita Royal House).	KRN is currently doing exploration. Should KRN find something (a feasible resource), they will employ people from the community (Mr Hikuru Tjazapi, Herero Translator and Ex-Trainee Geologist, Kunene Resources Namibia (Pty) Ltd).  Should KRN find a feasible resource, a full Environmental Impact Assessment (EIA), including a socio-economic specialist study, would have to be conducted/carried out (and an Environmental Clearance Certificate (ECC) issued by the Ministry of Environment and Tourism (MET)). Only then will the Ministry of Mines and Energy issue a Mining License (ML).
KRN should give two or three of the Exclusive Prospecting Licenses (EPLs) to the Royal Houses.	The Ministry of Mines and Energy issues/grants EPLs.
MME awards so many EPLs to one company, while the community is there. The community should get EPLs and then find investors.	The community should claim their EPLs (from MME) (Mr Hikuru Tjazapi, Herero Translator and Ex-Trainee Geologist, Kunene Resources Namibia (Pty) Ltd).

Issue/Concern	Response
We call for decentralization of MME; there is no MME Office in Opuwo ((Mr Ben Kapi, Vita Royal House).	The issue to be taken up with the Governor of the Kunene Region.
We are not in favour of verbal agreements; all agreements should be on paper and signed / there should be a contract (Mr Ben Kapi, Vita Royal House).	The comment is noted.
<p>We have had a drought for the past four years; if a mine opens and KRN takes out minerals, KRN should give back to the community. There are granite and copper sulphate companies (that operate) in the area and they don't give back. KRN should help with socio-economic upliftment (of the communities) (Mr Ben Kapi, Vita Royal House).</p> <p>If KRN mines, they must uplift the community (Foreman Tjihenu Tjiposa, Omuangete).</p> <p>Should KRN find something, they should recognize the community (Foreman K. Maundu, Maundu Traditional Authority).</p>	Should KRN find a feasible resource, a full EIA, including a socio-economic specialist study and public consultation, would have to be conducted/carried out (and an ECC issued by the MET). Only then will the MME issue a ML.
When KRN drills (Reverse Circulation and Diamond), they must also drill water boreholes for the community and livestock (Foreman Tjihenu Tjiposa, Omuangete).	As demonstrated in the past, KRN will make available suitable exploration boreholes for rural water supply (Dr Rainer Ellmies, Kunene Resources Namibia (Pty) Ltd, pers. comm.).
There was a verbal agreement between Foreman Tjiposa and Mr Brandon Munro re the improvement of infrastructure at the school. Even though KRN donated a tent, Mr Brandon Munro never got back to him re the improvements at the school. Will brick rooms/classes be built for the children in future (Foreman Tjihenu Tjiposa, Omuangete)?	All support of the Omuangete school was obtained from third parties, e.g. fishing companies. KRN will continue to facilitate this kind of support (Dr Rainer Ellmies, Kunene Resources Namibia (Pty) Ltd, pers. comm.).
<b>Public Consultation</b>	
A public meeting with the communities should be organised. Should KRN find something and there are power-/water lines in the area, or people living there, people need to be informed that they will be relocated (Mr Paul Tuukonjere, Control Officer, Constituency Office of Ruacana).	<p>See Section 5.2.</p> <p>Should KRN find a feasible resource, a full EIA, including a public meeting(s), would have to be conducted (and an ECC issued by MET). Only then will the MME issue a ML. To have a public meeting at this stage, and tell people that they may be relocated, will only cause fear (and KRN may not find a feasible resource).</p>
No feedback has been given to the community re what KRN found (Foreman K. Maundu, Maundu Traditional Authority)?	The comment is noted; it was explained to the community that the EPL-areas are large, and that the analysis of e.g. soil and drill samples take time (i.e. people do not go into the field and immediately know whether there is an ore body/resource).
<b>Positive Feedback</b>	
<p>To date, exploration (soil sampling) by KRN has not impacted on the environment. No drilling has been done.</p> <p>The tracks made by KRN have not impacted anyone. KRN drilled a (water) borehole and this is a benefit to the community (Foreman Tjihenu Tjiposa, Omuangete).</p>	The comments are noted.
There has been no problems with KRN; they did not cause any damage to the environment; KRN did what they were authorised to do in the area; should they/KRN find copper, it will also benefit the community (Foreman K. Ruither, Oruhona).	The comments are noted.
<p>I have never heard of KRN and thus have no previous concerns.</p> <p>Should a mine open, then the community at large would benefit.</p> <p>Most animals/game in the EPL-areas would be relocated to an area that is fenced off (i.e. between Kaokoland and Uukwaluudhi) (Mr Erastus Immanuel, Uukolonkadhi-Ruacana Conservancy).</p>	The comments are noted.

Draft Only

## 6 Environmental Impact Assessment

### 6.1 Introduction

Certain aspects related to KRN's current and proposed exploration activities (the *Kaoko Project*) may cause potential impacts to the environment. These impacts can occur under normal conditions, but also under abnormal and potential emergency conditions (e.g. fire (causing uncontrolled atmospheric emissions), flood and accidental physical damage (causing uncontrolled releases to air, water and land)). The impacts that are envisaged as a result of the current and proposed exploration activities were identified from the desktop studies, as well as during consultation with various stakeholders.

*Aspect* is defined by the International Organization for Standardization ISO 14001:2004 as an “*element of an organization's activities or products or services that can interact with the environment*”; *environment* is defined as “*surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation*” and *impact* is defined as “*any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.*”

Management actions (i.e. the adoption of the “mitigation hierarchy”, and including monitoring), with the aim of avoiding, minimizing, or compensating/offset the potential negative impacts (and maximizing the potential positive impacts), are provided in the Environmental Management Plan (EMP) (see Section 7).

### 6.2 Methodology

The Rapid Impact Assessment Matrix (RIAM) Software Package (Pastakia, 1998) was used for the assessment of the potential impacts. Scoring takes place within a matrix, the latter that was designed to allow subjective judgements to be quantitatively recorded. The system thus provides an impact evaluation, as well as a record that can be re-assessed in the future (e.g. should more information become available).

First, through the process of scoping, specific assessment/environmental components, falling into four categories, needs to be defined:

Physical/Chemical (PC)	<i>“all physical and chemical aspects of the environment, including finite (non-biological) natural resources, and degradation of the physical environment by pollution”</i>
Biological/Ecological (BE)	<i>“all biological aspects of the environment, including renewable natural resources, conservation of biodiversity, species interactions, and pollution of the biosphere”</i>
Sociological/Cultural (SC)	<i>“all human aspects of the environment, including social issues affecting individuals and communities; together with cultural aspects, including conservation of heritage, and human development”</i>
Economic/Operational (EO)	<i>“the economic consequences of environmental change, both temporary and permanent, as well as the complexities of project management within the context of the project activities”</i>

Second, the impacts are scored using certain assessment criteria and scales.

The assessment criteria fall into two groups:	
A	These criteria are of importance to the condition
B	These criteria are of value to the situation
The assessment scales are as follows:	
Group A – Importance of condition (A1)	
4	Important to national/international interests
3	Important to regional/national interests
2	Important to areas immediately outside the local condition
1	Important only to the local condition

0	No importance
Group A - Magnitude of change/effect (A2)	
+3	Major positive benefit
+2	Significant improvement in status quo
+1	Improvement in status quo
0	No change/status quo
-1	Negative change to status quo
-2	Significant negative dis-benefit or change
-3	Major dis-benefit or change
Group B - Permanence (B1)	
1	No change/not applicable
2	Temporary
3	Permanent
Group B - Reversibility (B2)	
1	No change/not applicable
2	Reversible
3	Irreversible
Group C - Cumulative (B3)	
1	No change/not applicable
2	Non-cumulative/single
3	Cumulative/synergistic

Third, by means of a series of formulae, a value is ascribed to each of the groups of criteria. The use of a multiplier for Group A is important for it ensures that the weight of each score is expressed. Scores for Group B are added together, ensuring that the individual value scores cannot influence the overall score, but that the collective importance of all values in Group B is fully taken into account. The sum of the Group B scores is then multiplied by the result of the Group A scores and a final environmental (assessment) score (ES) for the condition is obtained:

$$(a1) \times (a2) = aT$$

$$(b1) + (b2) + (b3) = bT$$

$$(aT) \times (bT) = ES$$

where

(a1) and (a2) are the individual criteria scores for Group A  
(b1) to (b3) are the individual criteria scores for Group B  
aT is the result of multiplication of all Group A scores  
bT is the result of summation of all Group B scores  
ES is the environmental score for the condition

Finally, a matrix is produced for each project option and individual ES scores calculated and recorded. These individual ES scores are then banded together into ranges (Range Values (RV)) (see Table 6). For ease of interpretation, significant and major positive impacts are indicated in green and significant and major negative impacts in red.

Table 6: The range bands used for the Rapid Impact Assessment Matrix (Source: Pastakia, 1998).

Environmental Score (ES)	Range Value (RV) (Alphabetic)	Range Value (RV) (Numeric)	Description of Range Band
72 - 108	E	5	Major positive change/impact
36 - 71	D	4	Significant positive change/impact
19 - 35	C	3	Moderate positive change/impact
10 - 18	B	2	Positive change/impact
1 - 9	A	1	Slight positive change/impact
0	N	0	No change/status quo/not applicable
-1 - -9	-A	-1	Slight negative change/impact
-10 - -18	-B	-2	Negative change/impact
-19 - -35	-C	-3	Moderate negative change/impact
-36 - -71	-D	-4	Significant negative change/impact
-72 - -108	-E	-5	Major negative change/impact

The lower limits of 'significant change', for example, can be taken as the point when a condition is outside local boundaries (A1 = 2), but is of major importance (A2 = 3), yet is temporary (B1 = 2) and reversible (B2 = 2), and non-cumulative (B3 = 2). A 'major change' can be taken as the point when the condition extends to a regional/national boundary (A1 = 3), is of major importance (A2 = 3), is permanent (B1 = 3) and irreversible (B2 = 3), and non-cumulative (B3 = 2) (Pastakia, 1998).

### 6.3 Kaoko Project: Current and Proposed Exploration Activities

The various aspects and the potential related impacts per environmental component (PC, BE, SC and EO) for KRN's current and proposed exploration activities (the *Kaoko Project*) are summarised in Table 7.

Note that the RIAM does not include an assessment scale for Probability of Occurrence; the following scale was used to rate (the probability of occurrence of) the various impacts and the results are included in Table 7.

	Probability of Occurrence
Definite	Impact will occur
Highly probable	Impact is most likely to occur
Probable	Distinct possibility that the impact will occur
Low	Possibility of impact occurring is low

Table 7: The potential impacts, and probability of occurrence, that certain aspects related to Kunene Resources Namibia (Pty) Ltd's current and proposed exploration activities may have on the environment (PC = Physical/chemical; BE = Biological/ecological; SC = Sociological/cultural; and EO = Economic/operational).

Impact Code	Pontential Impact	Aspect	Probability of Occurrence
PC 1	Contamination of soil/groundwater (spills of hazardous materials)	Hazardous materials management (spills of oil/grease/chemicals)	Highly Probable
PC 2	Contamination of soil/groundwater (liquid and solid waste disposal)	Waste management (liquid and solid waste disposal)	Probable
PC 3	Decreasing groundwater levels (abstraction)	Groundwater abstraction	Highly Probable
PC 4	Contamination surface water (runoff)	Runoff during precipitation events	Low
PC 5	Air Quality (dust or Particulate Matter (PM) pollution & gaseous emissions)	Exploration activities (clearing of land, exposed surfaces and windblown dust, presence of vehicles / equipment)	Definite
PC 6	Air Quality (dust or Particulate Matter (PM) pollution)	Exploration activities (vehicle entrained dust from gravel roads)	Definite
PC 7	Air Quality (gaseous emissions)	Exploration activities (presence of vehicles on roads)	Definite
BE 1	Loss of fauna (exploration activities)	Exploration activities (soil sampling,	Definite

Impact Code	Pontential Impact	Aspect	Probability of Occurrence
		rock grab sampling, trench and bulk sampling, drilling, blasting)	
BE 2	Loss of fauna (livestock theft and poaching)	Unsupervised exploration team and livestock theft and poaching	Probable
BE 3	Disturbance of fauna (airborne geophysics)	Exploration activities (e.g. airborne geophysical survey)	Definite
BE 4	Loss of habitat for fauna (exploration activities)	Exploration activities (soil sampling, rock grab sampling, trench and bulk sampling, drilling, blasting)	Definite
BE 5	Injured fauna (exploration activities)	Exploration activities (fauna falling into open pits and trenches)	Probable
BE 6	Displacement of fauna (livestock)	Exploration activities (cordoning off of drill sites, pits and trenches)	Probable
BE 7	Loss of flora (exploration activities)	Exploration activities (soil sampling, rock grab sampling, trench and bulk sampling, drilling, blasting)	Definite
BE 8	Soil erosion and/or compaction (exploration activities)	Exploration activities (clearing of land)	Highly Probable
SC 1	Loss/damage to archaeological material/sites	Exploration activities	Probable
SC 2	Visual impacts (presence of people/equipment/dust)	Exploration activities (presence of people/equipment/dust)	Definite
SC 3	Visual impacts (trench and bulk sampling, drilling, blasting)	Exploration activities (trench and bulk sampling, drilling, blasting)	Definite
SC 4	Visual impacts (blasting)	Exploration activities (blasting)	Definite
SC 5	Noise Pollution (e.g. drilling)	Exploration activities (e.g. drilling)	Definite
SC 6	Noise Pollution (airborne geophysics)	Exploration activities (e.g. airborne geophysical survey)	Definite
SC 7	Noise Pollution (e.g. drilling)	Exploration activities (blasting)	Definite
SC 8	Safety and security of staff and communities (job seekers)	Exploration phase (job seekers)	Probable
SC 9	Safety of staff and communities (uncontrolled blasting)	Exploration phase (uncontrolled blasting)	Low
SC 10	Occupational/Public safety (transport of staff)	Transport of staff during the exploration phase	Probable
SC 11	Increased incidence of social ills (e.g. alcoholism, prostitution, criminality)	Exploration phase	Highly Probable
SC 12	Increased HIV infections (and other diseases)	Exploration phase	Highly Probable
SC 13	Influx of people into the EPL-areas (water boreholes)	Conversion of exploration drill holes into water boreholes	Highly Probable
EO 1	Financial losses (to the community)	Unsupervised exploration team and livestock theft and poaching	Probable
EO 2	Temporary job creation	Exploration phase	Definite
EO 3	Temporary economic benefits	Exploration phase	Definite

The Rapid Impact Assessment Matrix is summarised in Table 8.

Three slight negative (PC 1, 2 and 5), three negative (PC 4, 6 and 7), and one moderate negative (PC 3) impacts were identified under the physical/chemical component (see Table 8).

In order to recharge groundwater resources, the infiltration of as much uncontaminated precipitated water as possible is needed. The contamination of soil and groundwater should thus be avoided in order to prevent the spreading of contaminated groundwater to neighbouring receptors. Groundwater contamination can occur via infiltration through the sediments or through the infiltration through fractures, joints and faults that are present in the subsurface. The contamination of soil (and the groundwater during infiltration of precipitation and runoff water (see PC 4)) can occur from the transport of fuel, chemical and fuel storage tanks (including dispensing points and the associated reticulation pipelines), during maintenance of equipment and machinery, hydraulic oil leaks and pipe bursts (drill rigs), by chemicals used during the exploration phase (see PC 1), and by leaching pollutants from (liquid and solid) surface waste (see PC 2) (Mr Pierre Botha, Geo Pollution Technologies, pers. comm.).

Air quality (dust pollution and gaseous emissions) will be impacted as a result of the exploration activities, i.e. the clearing of land, exposed surfaces and windblown dust, RAB and RC drilling, the presence of vehicles and equipment at the explorations sites, and vehicles travelling on the gravel roads (see PC 5, 6, and 7).

The slight negative and negative impacts can be relatively easily mitigated through the implementation of certain management measures (see Section 7.4: EMP).

The abstraction of groundwater (for human and/or animal use) must be done in such a way so that other groundwater users (that depend on the groundwater; and including ecosystems) are not impacted negatively (Mr Pierre Botha, Geo Pollution Technologies, pers. comm.) (see PC 3: moderate negative impact).

Table 8: Rapid Impact Assessment Matrix for Kunene Resources Namibia (Pty) Ltd's current and proposed exploration activities.

Impact Code	Potential Impact	ES	RV	A1	A2	B1	B2	B3
PC 1	Contamination of soil/groundwater (spills of hazardous materials)	-6	-A	1	-1	2	2	2
PC 2	Contamination of soil/groundwater (liquid and solid waste disposal)	-6	-A	1	-1	2	2	2
PC 3	Decreasing groundwater levels (abstraction)	-24	-C	2	-2	2	2	2
PC 4	Contamination surface water (runoff)	-12	-B	2	-1	2	2	2
PC 5	Air Quality (dust or Particulate Matter (PM) pollution & gaseous emissions)	-6	-A	1	-1	2	2	2
PC 6	Air Quality (dust or Particulate Matter (PM) pollution)	-12	-B	2	-1	2	2	2
PC 7	Air Quality (gaseous emissions)	-12	-B	2	-1	2	2	2
BE 1	Loss of fauna (exploration activities)	-16	-B	1	-2	3	3	2
BE 2	Loss of fauna (livestock theft and poaching)	-16	-B	1	-2	3	3	2
BE 3	Disturbance of fauna (airborne geophysics)	-12	-B	2	-1	2	2	2
BE 4	Loss of habitat for fauna (exploration activities)	-12	-B	1	-2	2	2	2
BE 5	Injured fauna (exploration activities)	-12	-B	1	-2	2	2	2
BE 6	Displacement of fauna (livestock)	-6	-A	1	-1	2	2	2
BE 7	Loss of flora (exploration activities)	-16	-B	1	-2	3	3	2
BE 8	Soil erosion and/or compaction (exploration activities)	-6	-A	1	-1	2	2	2
SC 1	Loss/damage to archaeological material/sites	-8	-A	1	-1	3	3	2
SC 2	Visual impacts (presence of people/equipment/dust)	-12	-B	2	-1	2	2	2
SC 3	Visual impacts (trench and bulk sampling, drilling, blasting)	-12	-B	2	-1	2	2	2
SC 4	Visual impacts (blasting)	-12	-B	2	-1	2	2	2
SC 5	Noise Pollution (e.g. drilling)	-12	-B	2	-1	2	2	2
SC 6	Noise Pollution (airborne geophysics)	-12	-B	2	-1	2	2	2
SC 7	Noise Pollution (e.g. drilling)	-12	-B	2	-1	2	2	2
SC 8	Safety and security of staff and communities (job seekers)	-12	-B	2	-1	2	2	2
SC 9	Safety of staff and communities (uncontrolled blasting)	-6	-A	1	-1	2	2	2
SC 10	Occupational/Public safety (transport of staff)	-24	-C	2	-2	2	2	2
SC 11	Increased incidence of social ills (e.g. alcoholism, prostitution, criminality)	-32	-C	2	-2	3	3	2
SC 12	Increased HIV infections (and other diseases)	-81	-E	3	-3	3	3	3
SC 13	Influx of people into the EPL-areas (water boreholes)	-16	-B	2	-1	3	2	3
EO 1	Financial losses (to the community)	-16	-B	1	-2	3	3	2
EO 2	Temporary job creation	18	B	3	1	2	2	2
EO 3	Temporary economic benefits	18	B	3	1	2	2	2

Two slight negative (BE 6 and 8) and six negative (BE 1 to 5, and 7) impacts were identified under the biological/ecological component (see Table 8).

Should areas have to be cordoned off (e.g. pits, trenches and drill sites), alternative arrangements should be made to ensure that livestock can have access to grazing areas and water points at all times (BE 6). Soil erosion and/or compaction (BE 8) may occur and the proposed mitigation measures (see Section 7.4: EMP) should be implemented.



Fauna may be impacted as a result of the exploration activities (BE 1, 4 and 5), potential livestock theft and poaching (BE 2), and airborne geophysical surveys (BE 3). The flora in the area will definitely be impacted as a result of the exploration activities (soil sampling, rock grab sampling, trench and bulk sampling, drilling, blasting) (BE 7). The negative impacts can be relatively easily mitigated through the implementation of certain management measures (see Section 7.4: EMP).

As far as the sociological/cultural components are concerned, two slight negative (SC 1 and 9), eight negative (SC 2 to 7 (visual impacts and noise pollution), SC 8, and SC 13), two moderate negative (SC 10: occupational and public safety of staff travelling on the gravel roads, and SC 11: increase incidence of social ills due to people entering the area(s)), and one major negative (SC 12) impacts were identified (see Table 8).

Apart from marked (and possibly unmarked graves), and as far as could be ascertained, there are no known sites of archaeological importance (SC 1) within the Kunene Region EPL-areas. However, the Traditional Authorities should be consulted re the possibility and location of (additional) graves (and any other sites of archaeological importance) in the remainder of the *Kaoko Project* EPL-areas. It should be noted that archaeological sites are protected under the provisions of the National Heritage Act 27 of 2004. Also, the Act is not solely focussed on the sites, but also extends protection to their landscape setting.

Job seekers coming into the *Kaoko Project* EPL-areas may threaten the safety and security of KRN's staff and the communities in the area (SC 8). New water supply points (through the conversion of exploration boreholes to water supply boreholes; see SC 13) could cause an influx of people into the area(s) and/or the development of new settlements.

The mixing of exploration staff and/or drilling contractors with the local communities may result in the transmission of communicable diseases (e.g. HIV) (SC 12: major negative impact). There may also be other potential negative impacts (the use of drugs and alcohol, Sexually Transmitted Infections (STIs), and gender violence and thus the health of the local communities) as a result of exploration staff and/or drilling contractors moving into the area (and mixing with the local community(ies)). The hallmark of the situation is the "Four M's", i.e. Men (*labour influx*), Money (*surge in disposable cash*), Movement (*development of new transport routes facilitating access to rural communities*), and Mixing (*interface of high prevalence rate groups with low prevalence rate men and women*) (IFC, 2007b).

Two positive (EO 2: temporary job creation and EO 3: temporary economic benefits), and one negative impacts were identified under the economical/operational component (see Table 8).

In addition to other direct, indirect and induced economic impacts, Government revenue will also be generated through a range of taxes (i.e. VAT (Value Added Tax) on goods and services, VAT derived from personal spending by employees and contractors, PAYE (Pay As Your Earn), as well as employment insurance contributions to the Social Security Commission and Workmen's Compensation Fund).

Should unsupervised exploration team members be guilty of livestock theft and/or poaching, this will result in financial losses to the communities (as well as the communal conservancies) (EO 1).

A summary of the scores is provided in Table 9. It is evident that one major negative, three moderate negative, 18 negative, seven slight negative, and two positive impacts were identified.

Table 9: Summary of scores for Kunene Resources Namibia (Pty) Ltd's current and proposed exploration activities (PC = Physical/chemical; BE = Biological/ecological; SC = Sociological/cultural; and EO = Economic/operational).

Range	-108	-71	-35	-18	-9	0	1	10	19	36	72
	-72	-36	-19	-10	-1	0	9	18	35	71	108
Class	-E	-D	-C	-B	-A	N	A	B	C	D	E
PC	0	0	1	3	3	0	0	0	0	0	0
BE	0	0	0	6	2	0	0	0	0	0	0
SC	1	0	2	8	2	0	0	0	0	0	0
EO	0	0	0	1	0	0	0	2	0	0	0
<b>Total</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>18</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

The impact assessment histogram for KRN's current and proposed exploration activities is shown in Figure 8.

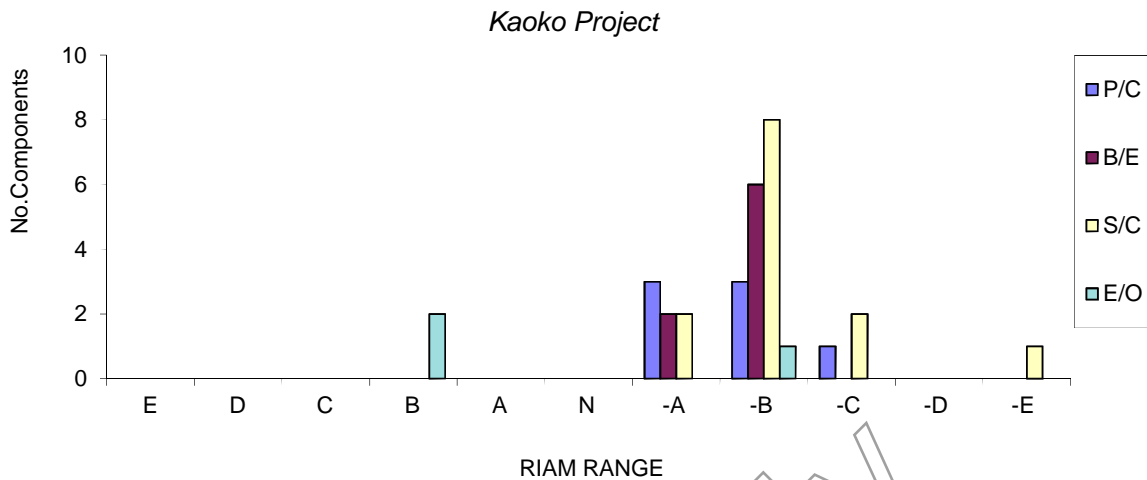


Figure 8: Impact assessment histogram for Kunene Resources Namibia (Pty) Ltd's current and proposed exploration activities (PC = Physical/chemical; BE = Biological/ecological; SC = Sociological/cultural; and EO = Economic/operational).

#### 6.4 Conclusion

Kunene Resources Namibia (Pty) Ltd's current and proposed exploration activities will have potential impacts on the environment and these will be of a positive, as well as a negative nature: one major negative, three moderate negative, 18 negative, seven slight negative, and two positive impacts were identified (see Table 9 and Figure 8).

The majority of the potential major, moderate, negative, and slight negative impacts can be relatively easily and effectively mitigated through the implementation of certain mitigation measures contained in the Environmental Management Plan (EMP) for the exploration and rehabilitation phases of KRN's *Kaoko Project* (see Section 7.4).

## 7 Environmental Management Plan

### 7.1 Goal, Aim and Structure of the Environmental Management Plan

The ultimate goal of an Environmental Management Plan (EMP) is to ensure that the physical, biophysical and socio-economic objectives are met to such an extent that the overall product of the activity will not result in a net negative impact.

The aim of the EMP is to assist KRN and their Contractor(s) to ensure that the day-to-day operations are carried out in an environmentally responsible manner, thereby preventing or minimizing the negative effects and maximizing the positive effects of KRN's current and proposed exploration activities (the *Kaoko Project*).

Once approved by the Directorate of Environmental Affairs (DEA), Ministry of Environment and Tourism (MET), in the form of an Environmental Clearance Certificate (ECC), the EMP will become a legally binding document and KRN, its Contractor(s), and their Sub-Contractor(s) are required to abide to the conditions stipulated in the EMP.

The EMP is presented as a comprehensive matrix: for each Activity/Process and related Aspects and Impacts, Management Actions required to address the impacts arising directly and indirectly from the various aspects of KRN's current and proposed exploration activities are listed.

Copies of the EMP should be made available at the Office of KRN during the exploration and rehabilitation phases of the *Kaoko Project*.

External auditing (and monitoring) should be carried out to ensure compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that needs to be undertaken.

Note that the EMP is not a static document and that the document should be updated as the Project progresses/more information re the proposed activities becomes available.

### 7.2 Permits and Approvals

The most pertinent legislation, with the aim of informing KRN of the legal requirements pertaining to the Project during the exploration and rehabilitation phases of the *Kaoko Project*, is listed under Section 4 of this Report.

A summary of the relevant legislation and regulatory authorities (including contact details) as far as permits and/or approvals are concerned, is provided:

Legislation	Regulatory Authority	Permit/Approval	Contact Details
Nature Conservation Ordinance No. 4 of 1975	Ministry of Environment and Tourism (MET)	A permit is required prior to the picking, cutting/chopping/picking off, taking, gathering, uprooting, damaging or destroying, or transporting any protected plant.	Mr Toivo Uahengo Directorate Scientific Services Tel. 061-2842506 tuahengo@met.na
Forest Act 12 of 2001 (as amended by the Forest Amendment Act 13 of 2005)	Ministry of Agriculture Water and Forestry, Directorate of Forestry	A permit is required prior to the removal of any protected tree species.	Mr Vincent G. Louw Deputy Director: Forest and Botanical Research Tel. 061-208 7327 LouwV@mawf.gov.na
National Heritage Act 27 of 2004	Ministry of Sport, Youth and National Service, Directorate National Heritage and Culture	Inform the National Heritage Council of Namibia should any archaeological material be found during the exploration phase	Rev Salomon April Director, National Heritage Council of Namibia Tel. 061-244375 salomon@nhc-nam.org

Legislation	Regulatory Authority	Permit/Approval	Contact Details
Environmental Management Act 7 of 2007	Ministry of Environment and Tourism (MET), Directorate of Environmental Affairs	Environmental Clearance Certificate.	Mr Teofilus Nghitila Environmental Commissioner Tel. 061-2842751 nghitila@met.na or tnghitila@yahoo.com
Labour Act 11 of 2007	Ministry of Labour, Industrial Relations and Employment Creation	Permission is needed to run 12-hour shifts (should it be required).	Mr Henri Kassen Labour Commissioner Tel. 061-379100 hkassen@mol.gov.na

### 7.3 Roles and Responsibilities

KRN is responsible for fulfilling the requirements in the EMP for the *Kaoko Project*.

In addition to the before-mentioned, the following actions are proposed:

1. The provision by KRN of, on an on-going basis, sufficient management sponsorship and human and financial resources for the implementation of the EMP;
2. The development of a monitoring programme(s) (as needed) (see Section 7.5); and
3. External auditing (by an independent, external auditor) of the management actions as contained in the EMP for the exploration and rehabilitation phases of KRN current and proposed exploration activities (the *Kaoko Project*).

### 7.4 Environmental Management Plan

This Section contains the Environmental Management Plan (EMP) for the exploration and rehabilitation phases (Table 10) of KRN's *Kaoko Project* (also see IFC, 2007a, b; Prospectors and Developers Association of Canada (PDAC), 2009).

Table 10: Environmental Management Plan for the exploration and rehabilitation phases of Kunene Resources Namibia (Pty) Ltd's current and proposed exploration activities, *Kaoko Project*, Kunene and Omusati Regions, Namibia.

ASPECT	IMPACT	MITIGATION/COMPENSATION
<b><i>Kaoko Project</i> Exploration and Rehabilitation: Social and Environmental Performance</b>		
Management and Monitoring	Social and Environmental Performance	<p>Adhere to all Namibian Legislation, including Best Practice Guidelines.</p> <p>Ensure that all aspects related to the Environmental Management Plan (EMP) are implemented during the exploration (and rehabilitation) phases.</p>
Consultation and Disclosure	Social and Environmental Performance	<p>Maintain open and direct lines of communication with the Authorities and Interested and Affected Parties (I&amp;APs) (e.g. the Ministry of Environment and Tourism (MET), the Ministry of Mines and Energy (MME), the Traditional Authorities, and the Chairpersons/Managers of the Conservancies) with regards to environmental matters.</p> <p>Consult with I&amp;APs throughout the project process and adequately incorporate I&amp;APs' concerns.</p>
Grievance Mechanism	Social and Environmental Performance	<p>Implement a grievance mechanism for receiving and resolving any concerns and grievances related to the project's social and environmental performance throughout the project life cycle.</p> <p>Inform all I&amp;APs about the mechanism.</p> <p>Address concerns promptly and transparently and in a culturally appropriate manner.</p> <p>Keep a register of all concerns/issues received from I&amp;APs, as well as the measures taken to address these.</p>
Training, including awareness and inductions	Social and Environmental Performance	<p>Train employees and contractors in matters related to the project's social and environmental performance and Namibia's regulatory requirements.</p> <p>Ensure adequate environmental awareness training for all senior site personnel.</p> <p>Give environmental induction presentations to all site personnel prior to work commencement (note that rehabilitation issues need to be addressed, i.e. the need to avoid damage as far as possible and from the start).</p>
Employment and procurement opportunities	Social and Environmental Performance	<p>Include the EMP in the contract(s) with the contractors (e.g. drilling contractors)/service providers so that the latter can make provision for the implementation of the EMP.</p> <p>Penalties for non-compliance with the stipulations of the EMP should be agreed upon (and can be included in the contract documents).</p> <p>Source contracting companies/service</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>providers/ experts/workers based on merit and expertise giving preference to local contractors/service providers/experts/workers on condition that the local contractors/service providers/experts/workers have the required experience and expertise.</p> <p>Consider utilising local labour for unskilled work and to then provide training to workers in order to perform semi-skilled work; this should be done under the supervision of managers/specialists to ensure maximum local beneficiation.</p> <p>Ensure that contractors/service providers/experts adhere to the Namibian Labour, Social Security, Health and Safety, and Affirmative Action laws.</p> <p>Tender documents/contracts to stipulate that all contractors/service providers have an <b>HIV/AIDS Policy and Programme</b> in place.</p> <p>Source maximally from local resources to ensure maximum economic beneficiation of local businesses in terms of new business sales.</p>
Labour and Working Conditions	Social and Environmental Performance	<p>Establish, maintain and improve the worker-management relationship. Base the employment relationship on equal opportunity and fair treatment and no discrimination to be allowed.</p> <p>Comply with Namibia's labour and employment laws.</p> <p>Promote safe and healthy working conditions and the protection and promotion of worker health.</p> <p>Document and communicate the Working Conditions and Terms of Employment.</p> <p>Respect Collective Agreements and the right of workers to organize and bargain collectively.</p> <p>Implement a Grievance Mechanism.</p>
Occupational Health and Safety and Security	Social and Environmental Performance	<p>Adhere to all Namibia's Health and Safety Regulations (Labour Act, 1992: Regulations Relating to the Health and Safety of Employees at Work).</p> <p>Prepare and submit a <b>Health and Safety Plan</b>.</p> <p>A SHE (Safety, Health, Environment) Representative to be appointment once the staff complement reaches 20.</p> <p>Occupational Health and Safety Training to be provided to all employees.</p> <p>Ensure that qualified first aid can be</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>provided at all times.</p> <p>Comply with all safety regulations re. electricity supply.</p> <p>Ensure that employees are trained in the use of appropriate fire fighting equipment and ensure that such equipment is on hand at all times.</p> <p>Provide and ensure the active use of Personal Protective Equipment (PPE) (e.g. protective glasses and dust masks in dusty working conditions, overalls, gloves, safety shoes and hard hats).</p> <p>Make suitable arrangements, as far as practicable, for the maintenance of health, the prevention and overcoming of outbreaks of disease and of adequate first aid services.</p> <p>Supply potable water for human consumption and other domestic uses; conduct chemical testing of water samples on a monthly basis (if applicable). A water supply borehole should not be within 30 m of a French drain, not within 30 m of fuel or waste oil storage areas, not within 100 m of a waste dumpsite and not within an active drilling area; conduct groundwater test pumping to ensure a perennial supply; water storage tanks/reservoirs to be insect and animal-proof and to be covered to reduce evaporation; ensure that pipelines laid from the borehole to the camp- and/or drill sites do not unduly disturb vegetation and/or soil; drinking-water quality to be in accordance with the Ministry of Agriculture, Water and Rural Development's <i>Guidelines for the evaluation of drinking-water quality for human consumption with regard to chemical, physical and bacteriological quality</i>.</p> <p>Prevent communicable disease (e.g. Sexually Transmitted Infections (STIs) such as HIV transmission): provide surveillance and active screening and treatment of employees; prevent illness among employees (through health awareness and education initiatives); ensure ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers; and promote immunization.</p> <p>Ensure that security arrangements are in place.</p>
Community Health and Safety	Social and Environmental Performance	<p>Notice or information boards relating public health and safety hazards and emergency contact details should be put up at the entrances to the Exclusive Prospecting License (EPL)-areas/pits and trenches/drill site(s)/blasting sites.</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>Transport safety: all vehicles/trucks moving on the roads should not exceed 60 kilometres per hour (km/h).</p> <p>Enforce a strict ban on the recruitment of workers at the entrances to the EPL-areas and on visitors gaining entry to the workers on site.</p> <p>Restrict construction activities to demarcated areas; all other areas will be regarded as "no go" zones in order to minimize the impact on the surrounding land/properties.</p>
<b>Kaoko Project Exploration: General</b>		
Exploration Activities	Disturbance of fauna and flora and habitat alteration	<p>Carry out a baseline ecological survey (of the vertebrate fauna and flora) prior to any trench sampling (and especially blasting), bulk sampling (and especially blasting), or drilling, being carried out in sensitive mountain habitats.</p> <p>Avoid important habitats (e.g. ephemeral rivers, rocky outcrop and mountainous areas, and clumps of protected tree species) in the selection of camp and other temporary lay over sites.</p> <p>Avoid the removal of any protected flora species as far as feasible. A permit is required prior to the picking, cutting/chopping/picking off, taking, gathering, uprooting, damaging or destroying, or transporting any protected tree and/or plant.</p> <p>No trees or natural vegetation may be removed for the making of fires.</p> <p>No fires will be allowed, unless a specific area has been set aside for the cooking of food.</p> <p>Ensure that the kitchen areas/areas where fires will be made are cleared of grass (to prevent accidental fires which could cause wildlife and domestic stock mortalities).</p> <p>Ensure the availability of firefighting equipment (e.g. fire beaters, spades, extinguishers, etc.) at the exploration/camp sites.</p> <p>Avoid introducing dogs and cats as pets to the camp sites (these can cause significant mortalities to local fauna (by cats) and even stock losses (by dogs)).</p> <p>Do not introduce non-indigenous/invasive alien plant species.</p> <p>Implement a policy of "no kill" with regards</p>



ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>to fauna (e.g. poaching for meat (snares); the collection of veld foods (e.g. tortoises); the capture/killing of birds; the killing of snakes, etc.).</p> <p>No wild animal may be injured, fed, trapped, hunted or harmed in any way.</p> <p>Should areas have to be cordoned off (e.g. pits, trenches and drill sites), alternative arrangements should be made to ensure that livestock can have access to grazing areas and water points at all times.</p> <p>Implement a suitable and appropriate refuse removal policy (littering could result in certain animals becoming accustomed to humans and the associated activity and result in typical problem animal scenarios).</p> <p>Avoid off-road and unnecessary nocturnal driving in the area (as it could result in the destruction of slow moving fauna, i.e. various reptiles and other nocturnal species).</p> <p>Implement and maintain (internal) track discipline with maximum speed limits (e.g. 30 km/h; in the villages and around animals, a speed limit of 20 km/h to be enforced) (this would result in fewer faunal road mortalities and associated dust pollution problems).</p> <p>Teach drivers to use three point turns (vs full circle turns), or restrict turning to designated areas.</p> <p>Make use of existing tracks/roads as much as possible; where tracks have to be made, the routes should be selected so as to cause minimal damage to the environment (e.g. cross drainage lines at the right angles, and avoid placing tracks within drainage lines).</p> <p>Restrict all activities to previously demarcated areas; all other areas will be regarded as "no go" zones in order to minimize the impact on the surrounding land.</p> <p>No trespassing on adjoining properties is allowed and no game/vegetation is to be interfered with.</p>
Exploration Activities	Loss of or damage to archaeological material	All staff (i.e. personnel, contractors, subcontractors, etc.) to be made aware of the provisions of the National Heritage Act 27 of 2004 with regard to the protection of all archaeological sites and the need to report any new finds.

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>Consult with the Traditional Authorities and the Chairpersons of the communal conservancies re the location of e.g. grave(s) in the various EPL-areas.</p> <p>Carefully examine the area before any site preparation/excavation is undertaken.</p> <p>Implement the Chance Finds Procedure (see Annexure B): should a possible or suspected site be discovered (e.g. a grave), immediately stop work, cordon the area off and photograph the area/site; immediately inform the project manager/supervisor, and contact Dr Kinahan, the National Heritage Council of Namibia, and the Police in Opuwo.</p> <p>Under no circumstances are archaeological and/or cultural heritage sites to be disturbed or any relics to be removed from such a site.</p>
Exploration Activities	Pollution of biophysical environment (air, soil and water)	<p>No fires will be allowed, unless specific areas have been identified and set aside for the cooking of food. Cooking appliances are to be properly maintained and ventilated.</p> <p>Pit latrines to be provided and used at the exploration and camp sites(s).</p> <p>Sanitary wastewater to be released into a French drain system.</p> <p>Use bio-degradable detergents on site.</p> <p>Vehicle maintenance/servicing/washing not to be allowed anywhere on site.</p> <p>Fuel tanks (portable), gas cylinders and chemicals (if relevant) are to be properly stored and transported.</p> <p>All diesel generators on site to be placed on concrete slabs/a tarpaulin sail.</p> <p>Oil and grease traps or sumps to be installed and maintained.</p> <p>Immediately report and clean up any accidental hydrocarbon spill: Sunisorb, Drizit, Peatsorb can be used to clean up small spills; in case of larger spills, the spill together with the polluted soil should be removed and disposed of at e.g. a biological remediation site; ensure the availability of absorbent pads and/or spill kits and ensure that personnel are trained in their use.</p> <p>Enforce proper waste (hazardous and non-hazardous) management practices (as per <b>Waste Management Plan</b>) – waste and litter to be disposed of in scavenger and weatherproof bins and the refuse to be collected and disposed of at least once a</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
<p>Exploration Activities (Soil Sampling, Pits and Trenches, and Drilling)</p>	<p>Clearing of vegetation for exploration activities / negative impact on floral species</p>	<p>week.</p> <p>Carry out a baseline ecological survey (of the vertebrate fauna and flora) prior to any trench sampling (and especially blasting), bulk sampling (and especially blasting), or drilling, being carried out in sensitive mountain habitats.</p> <p>Avoid the removal of and/or damage to any protected flora species as far as feasible. A permit is required prior to the picking, cutting/chopping/picking off, taking, gathering, uprooting, damaging or destroying, or transporting any protected tree and/or plant.</p> <p>Do not clear any vegetation more than six months in advance of when it is required.</p> <p>Bulldozer blading and clear cutting to be avoided (if possible) (excavators and backhoes do a neater job), also clearing with heavy machinery.</p> <p>Where possible, preserve the organic mat, i.e. drive over flattened vegetation (for rootstock preservation and the prevention of soil erosion). Leave large trees standing where possible.</p> <p>Reduce the visual impact of vegetation clearance as far as possible. E.g. weave roads around trees or relocate facilities to help reduce the visual impact of vegetation clearance.</p> <p>Avoid removing vegetation adjacent to rivers and streams. Leave a buffer zone of undisturbed vegetation at least 10 m wide on either side of the stream or waterway.</p> <p>Cutting vegetation: cut vegetation close to ground level; buck cut trees; trim overhanging vegetation; do not fell live saplings of any species over 150 mm in diameter unless absolutely necessary.</p> <p>Line Cutting and Surveys: use hand tools to cut lines; survey lines or walking tracks to not exceed 1 m in width; only use biodegradable and then also only small lengths of tape.</p>
<p>Exploration Activities (Pits and Trenches)</p>	<p>Land disturbance / negative impact on floral species</p>	<p>Locate trenches and pits to avoid large trees (&gt;150 mm in diameter) (where feasible), or pre-cut trees and move them to one side for salvage.</p> <p>For large trenches that will be left open for weeks or months, strip the topsoil and move it to one side of the trench into long, narrow piles, no more than 1-2 m in height; ensure proper drainage through the topsoil piles. Place the subsoil plus any excavated rock in separate piles (i.e. not on top of the topsoil).</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>Use excavators and backhoes to dig trenches (vs bulldozers).</p> <p>When refilling the trench, replace the rock and subsoil first, and then the topsoil/vegetation layers. If topsoil is stored for more than three months, fertilizing may be needed and if it is stored for more than six months, seeding may be beneficial.</p>
Exploration Activities (Drilling, including rigs, vehicles, generators)	Pollution of biophysical environment (soil and groundwater)	<p>Use biodegradable and non-toxic drill fluids/additives.</p> <p>All diesel generators on site to be placed on a tarpaulin sail.</p> <p>Oil traps to be installed in appropriate places to collect potential toxic materials.</p> <p>Immediately report and clean up any accidental hydrocarbon spill: SunSorb, Drizit, Peatsorb can be used to clean up small spills; in case of larger spills, the spill together with the polluted soil should be removed and disposed of at e.g. a biological remediation site.</p> <p>Ensure the availability of absorbent pads and/or spill kits and ensure that personnel are trained in their use.</p> <p>(Backfill or) seal all drill holes with a steel or uPVC casing equipped with a secure cap (to prevent groundwater contamination from taking place through the drill holes).</p> <p>Drill cuttings not to be used for backfilling; use clean sand or clay where possible.</p> <p>Drill holes not to be used as pit latrines and/or for the disposal of waste.</p>
Exploration Activities	Possible loss of the seed bank in the topsoil	<p>Any decaying vegetation, overlying the soil layer, should be removed first and stockpiled.</p> <p>The upper layer of soil (10 - 20 cm), where alluvial, to be stripped and stockpiled separately (1 – 2 m high piles to allow for proper aeration). Install drainage to protect the topsoil pile from (water) erosion and cover it to protect it from (wind) erosion.</p> <p>Any excavated subsoil and rock also to be stockpiled for backfilling.</p>
Exploration Activities (airborne geophysical survey)	Noise pollution (disturbance of fauna, landowners and residents)	<p>Inform and discuss flight plans with the Traditional Authorities.</p> <p>Avoid flying over residences and game/livestock enclosures (if feasible).</p> <p>No wildlife to be chased, diverted, followed, or otherwise harassed by aircraft.</p>
Exploration Activities	Soil erosion	<p><b>Sediment mobilization and transport:</b> reduce or prevent soil erosion (schedule activities to avoid heavy rainfall periods;</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>contour and minimize length and steepness of slopes; mulching to stabilize exposed areas; re-vegetate areas promptly (if feasible); and design channels and ditches for post-construction flow). Note that the area(s) towards and adjacent to the drainage line(s) are easily eroded and further development may exacerbate this problem.</p> <p><u>Road design</u>: limit access road gradients to reduce run-off induced erosion; provide adequate road drainage based on road width, surface material, compaction and maintenance.</p> <p><u>Structural (slope) stability</u>: provide effective short-term measures for slope stabilization, sediment and subsidence control until long-term measures (during operations) can be implemented; provide adequate drainage systems to minimize and control infiltration.</p>
Increased traffic, presence and movement of machinery	Air quality (dust or Particulate Matter (PM) pollution)	<p>Minimize dust generation from vehicles on the roads; all vehicles, trucks moving in the area should not exceed 30 km/h; in the villages and around animals, a speed limit of 20 km/h to be enforced.</p> <p>Minimize the area in which the movement of vehicles will take place to reduce the effects of dust pollution.</p> <p>Avoid the excavation, handling and transport of erodible materials under high wind conditions or when a visible dust plume is present.</p> <p>Maintain the road surface to preserve surface characteristics (e.g. texture and roughness).</p> <p>Use dust control/suppression methods (if needed), such as applying water or non-toxic chemicals to minimize dust (oil and oil by-products is not a recommended measure to control road dust).</p>
Increased traffic, presence and movement of machinery (exhaust from diesel engines)	Air quality & Occupational and Community Health and Safety	Implement manufacturer recommended engine maintenance programmes (to control vehicle emissions: Carbon Monoxide (CO), Nitrogen Oxide (NO <sub>x</sub> ), Sulphur Dioxide (SO <sub>2</sub> ), Particulate Matter (PM) and Volatile Organic Compounds (VOCs)).
Increased traffic, movement of machinery	Occupational and Community Safety	<p>Adopt best transport safety practices by implementing the following measures: emphasize safety aspects among drivers; improve driving skills and require licensing of drivers; adopt limits for trip duration; avoid dangerous routes and times of day; and use speed control devices.</p> <p>Regularly maintain vehicles and use manufacturer approved parts.</p> <p>Use locally sourced materials (where possible) to minimize transport distances.</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		Employ safe traffic control measures, including the use of traffic and safety warning signs and flag persons to warn of dangerous conditions.
Use of Explosives for Blasting	Occupational Health and Safety	Ensure that the use, handling, and transporting of explosives is in accordance with the Regulations of the Explosives Act 26 of 1956.
<b>Kaoko Project Exploration: Change in Land Use</b>		
Exploration Activities	Change in land use	<p>Restrict all exploration and related activities to demarcated areas; all other areas will be regarded as "no go" zones in order to minimize the impact on the surrounding land.</p> <p>Should areas have to be cordoned off (e.g. pits, trenches and drill sites), alternative arrangements should be made to ensure that livestock can have access to grazing areas and water points at all times.</p>
<b>Kaoko Project Exploration: Resource Use</b>		
Energy Management	Resource use (e.g. coal) / depletion of natural resources	<p>Promote the sustainable use of energy (that will result in the reduction of use and cost reductions) (e.g. energy efficient light sources).</p> <p>Raise awareness amongst the staff and contractors/service providers (to save energy).</p>
Water Management	Resource use / depletion of natural resources	<p>Ensure prudent use of water in all activities.</p> <p>Implement a water conservation program, promoting the continuous reduction in water consumption; treatment and disposal costs commensurate with the magnitude and cost of water use.</p> <p>Water storage tanks to be insect and animal-proof and to be covered to reduce evaporation.</p>
<b>Kaoko Project Exploration: Hazardous Materials Management</b>		
Hazardous materials management	Social and Environmental Performance	<p>Establish hazardous materials management priorities (based on hazard analysis of risky operations).</p> <p>Avoid, or minimize the use of hazardous materials.</p> <p>Prevent uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that may result in fire or explosion.</p>
Hazardous materials management	Pollution of biophysical environment (soil and water)	<p>Implement prevention and control measures for the use, handling and storage of hazardous materials:</p> <p><b>Materials transfer:</b> regularly inspect, maintain and repair fittings/pipes/hoses; make use of drip trays/other drip containment measures at connection/possible overflow points;</p> <p><b>Overfill protection:</b> use trained filling operators; install gauges on tanks to measure the volume inside; make use of dripless hose connections (vehicle tanks)</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>and fixed connections (storage tanks); use a catch basin/drip tray around the fill pipe to collect spills;</p> <p><u>Reaction, fire, and explosion prevention:</u> hazardous materials to be stored in marked containers and separate (from non-hazardous materials); incompatible hazardous materials (acids, bases, flammables, oxidizers, reactive chemicals) to be stored in separate areas and with containment facilities separating material storage; smoking or working with open flames not to be permitted in the presence of these substances; limit access to hazardous waste storage areas and clearly label and demarcate the area; conduct regular inspections of the areas and document the findings; prepare and implement spill response and emergency plans; train employees in the use of appropriate fire fighting equipment and ensure that such equipment is on hand at all times.</p> <p><u>Secondary containment:</u> use bunding (made of impervious, chemically resistant material) that can contain the larger of 110% of the largest tank or 25% of the combined tank volumes for above-ground tanks with a total storage volume equal or greater than 1,000 litres.</p> <p>Train workers on the correct transfer and handling of fuels and chemicals and the response to spills.</p> <p>Immediately report and clean up any accidental hydrocarbon spill: Sunisorb, Drizit, Peatsorb can be used to clean up small spills; in case of larger spills, the spill together with the polluted soil should be removed and disposed of at e.g. a biological remediation site.</p>
Hazardous materials management	Occupational Health and Safety	<p>Implement hazard communication and training programmes (including information on Material Safety Data Sheets (MSDS)) to make employees aware of workplace chemical hazards and how to respond to these.</p> <p>Provide and ensure the active use of PPE.</p>
<b>Kaoko Project Exploration: Waste Management</b>		
Waste management: non-hazardous and hazardous	Pollution of biophysical environment	<p>Prepare and submit a <b>Waste Management Plan</b> before the activities commence. The generation of waste should be avoided or minimized as far as practicable; where it cannot be avoided, but has been minimized, waste should be recovered and reused; where waste cannot be recovered/reused, it should be treated, destroyed and disposed of in an environmentally sound manner.</p> <p>Institute and maintain good housekeeping and operating practices; littering is not allowed.</p> <p>Runoff from areas where surface water</p>

ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>might have become contaminated should be captured and treated to sewage effluent standards; uncontaminated runoff should be diverted around areas where such water might become contaminated.</p> <p>Non-hazardous and hazardous waste to be collected and stored separately.</p> <p>Non-hazardous waste: refuse (that will not be recycled) to be stored in covered refuse bins, collected on a regular basis and disposed of at a waste disposal facility (e.g. Opuwo).</p> <p>Non-hazardous, recyclable waste: refuse to be stored in covered bins/bags, collected on a regular basis and disposed of at the waste disposal facility in Windhoek.</p> <p>Hazardous waste: recycle petroleum (fuels and lubricants) waste products and collect and recycle batteries and print cartridges (if relevant). The remainder to be transported to a recognized hazardous waste disposal site (e.g. Windhoek).</p>
Waste management: sanitary	Pollution of biophysical environment	<p>Pit latrines to be provided and used at the exploration and camp sites(s).</p> <p>Sanitary wastewater to be released into a French drain system.</p> <p>Ensure that the discharge of sanitary wastewater to land conform to the regulatory requirements.</p>
Wastewater management - wastewater treatment	Pollution of biophysical environment	<p>Ensure that the discharge of process wastewater and/or sanitary wastewater and/or wastewater from utility operations and/or stormwater to land conform to the regulatory requirements (if relevant).</p> <p>Runoff from areas where surface water might have become contaminated should be captured and treated to sewage effluent standards; uncontaminated runoff should be diverted around areas where such water might become contaminated.</p>
Wastewater management - stormwater management	Soil erosion	Regular inspection and maintenance of permanent erosion and runoff control features.
<b>Kaoko Project: Rehabilitation &amp; Decommissioning</b>		
Rehabilitation	Social and Environmental Performance	<p>Rehabilitation to take place on a continuous basis.</p> <p>Drill dust to be raked into already disturbed areas (e.g. tracks), or the dust to be removed to a dump site.</p> <p>If water is struck while drilling, a sump must be built to capture the mud; the water must be left to evaporate; salt crusts must then be covered with gravel and topsoil / removed.</p> <p>Disturbed areas to be backfilled with rocks and subsoil, and then the topsoil/vegetation</p>



ASPECT	IMPACT	MITIGATION/COMPENSATION
		<p>layers. If topsoil is stored for more than three months, fertilizing may be needed and if it is stored for more than six months, seeding may be beneficial.</p> <p>Manually rip (using picks or rakes) disturbed areas where compaction has taken place; avoid creating parallel furrows (this will promote erosion).</p> <p>Reshape all disturbed areas to their original contours / manually rip disturbed areas, where compaction has taken place.</p> <p>Manually remove all weedy / invasive alien species that are present at the site.</p> <p>Adequately drain pipelines and tanks prior to decommissioning (to avoid pollution of the biophysical environment (soil and groundwater)).</p>
Decommissioning	Social and Environmental Performance	<p>Clean out the oil traps, seal all petrol, diesel, oil and grease containers and remove these from the site(s) to a recognized hazardous waste facility (in Windhoek).</p> <p>Remove all equipment, waste, temporary structures, etc. from the site(s).</p> <p>Pending the approval by the relevant people, the Company may donate infrastructure, etc. to the Community or Organizations aimed at uplifting the standards of the local Communities.</p> <p>Inform the Ministry of Environment and Tourism to assess the rehabilitation effort for approval and signoff.</p>

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## 7.5 Monitoring and Reporting

The following monitoring and reporting, at least but not limited to, need to be carried out during the exploration and rehabilitation phases:

Type	Parameter	Frequency	Responsible Person
Exploration drill holes	Rest water level	Once off	Designated Person(s)
	(Identify) clay layers	<i>Ad hoc</i>	
	Water strike depths	<i>Ad hoc</i>	
Abstraction boreholes	Volumes of groundwater abstracted	Weekly	Designated Person(s)
	Pump water levels	Weekly	
Hazardous materials management	Hydrocarbon spills of more than 200 litres	<i>Ad hoc</i> ; inform the Minister, Ministry of Mines and Energy, by completing form PP/11 (Petroleum Products Regulations 2000)	Designated Person(s)
Stormwater and soil erosion	Soil erosion rates	<i>Ad hoc</i> (rainy season)	Designated Person(s)
Environmental Management Plan	Environmental performance / corrective measures to be taken as or when required	Internal audits (monthly) External audits (bi-annual)	Designated Person(s)

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## 8 Conclusions and Recommendations

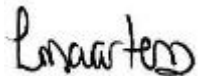
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The existing and proposed exploration for mainly Base and Rare Metals, and Industrial Minerals at EPLs 3299, 3825, 4135, 4136, 4346-4351, 4540 and 5773 (the *Kaoko Project*), Kunene and Omusati Regions, Namibia, will have potential impacts on the environment and these will be of a positive, as well as a negative nature: one major negative, three moderate negative, 18 negative, seven slight negative, and two positive impacts were identified.

The major, moderate, negative, and slight negative impacts could be relatively easily and effectively mitigated through the implementation of certain management measures contained in the Environmental Management Plan for the exploration and rehabilitation phases.

It is advised that: Kunene Resources Namibia (Pty) Ltd, its consultants, contractors and employees should implement and observe the Environmental Management Plan from the beginning of exploration and on an ongoing basis; that environmental performance is regularly monitored (so that the lessons learnt during the exploration phase can be incorporated into the improvement of the Environmental Management Plan over time); and that corrective measures are taken as or when required.

The Minerals (Prospecting and Mining) Act 33 of 1992 requires (Section 54(2)(b)) that should a prospecting area be abandoned (as provided in subsection (1)), the holder of the mineral license *take all such steps as may be necessary to remedy to the reasonable satisfaction of the Minister any damage caused by any prospecting operations and mining operations carried on by such holder to the surface of, and the environment on, the land in the area in question*. It is recommended that, where feasible, rehabilitation off all exploration sites be carried out as the exploration programme progresses.



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