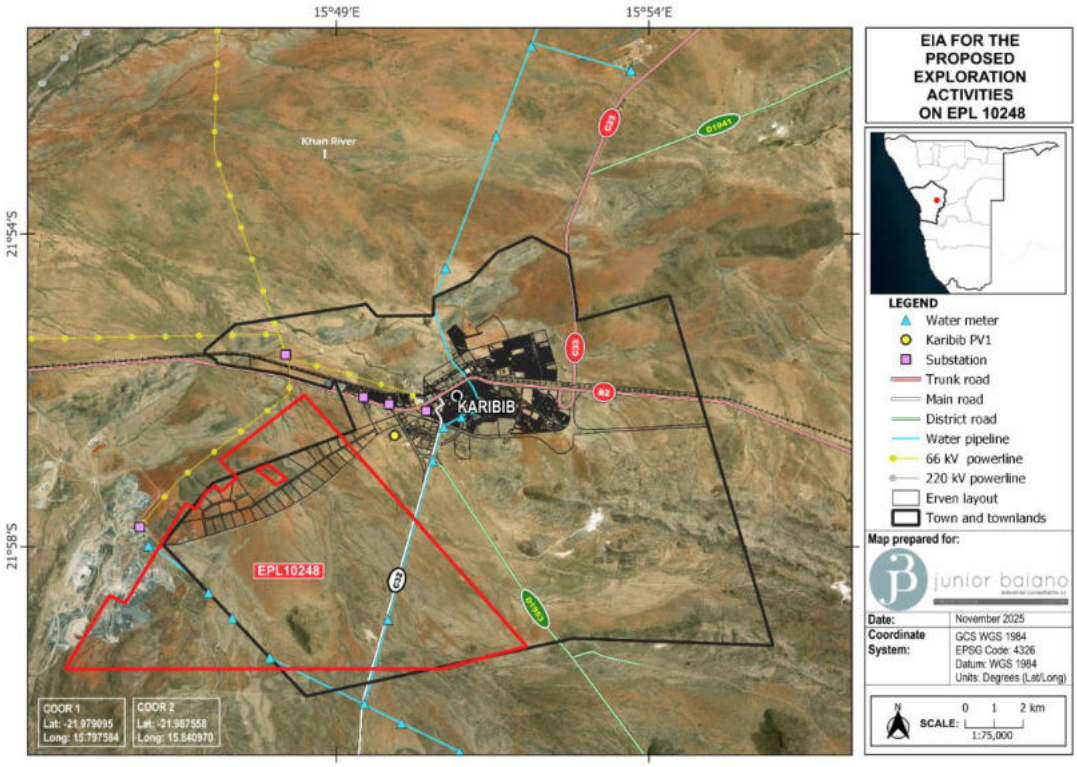
ENVIRONMENTAL IMPACT ASSESSMENT

FOR THE PROPOSED PROSPECTING AND EXPLORATION ACTIVITIES ON EPL 10248 IN KARIBIB DISTRICT, ERONGO REGION, NAMIBIA



ENVIRONMENTAL SCOPING REPORT
FINAL VERSION
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EXECUTIVE SUMMARY

Junior Baiano Industrial Consultants (JBIC) cc has been appointed by Elina Ndaendelao Naukili to undertake an Environmental Impact Assessment (EIA), prepare an Environmental Management Plan (EMP), and apply for an Environmental Clearance Certificate (ECC) for the proposed prospecting and exploration activities within Exclusive Prospecting Licence (EPL) 10248, located in the Karibib District of the Erongo Region, Namibia.

Prospecting and exploration activities are listed activities under Namibia's Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations, 2012, and may not be undertaken without an approved Environmental Clearance Certificate. To ensure compliance with national environmental legislation and regulatory requirements, the Proponent appointed JBIC cc as an independent Environmental Assessment Practitioner (EAP) to conduct the required Environmental Assessment process and submit the ECC application on their behalf.

The proposed exploration programme includes desktop geological studies, reconnaissance surveys, geological mapping, geochemical and geophysical surveys, limited establishment of temporary access routes, and exploratory drilling where justified. These activities are temporary, localised, and reversible in nature, and do not involve mining, mineral processing, or the development of permanent infrastructure.

In terms of the EIA Regulations (2012), the proposed project triggers the requirement for an Environmental Clearance Certificate due to the potential for the following impacts:

- Physical land and soil disturbance associated with access routes, drill pads, and sampling;
- Disturbance to fauna and flora through limited habitat disruption and increased human activity;
- Minor noise and vibration impacts from vehicles, drilling equipment, and generators;
- Minor air quality impacts through dust generation;

- Occupational health and safety risks to workers and potential community safety concerns;
- Generation of minor quantities of domestic and operational waste;
- Possible impacts on archaeological or cultural heritage resources if encountered;
- Potential social nuisance, land-use interactions, and access-related conflicts; and
- Temporary impacts on grazing land and farm infrastructure.

Public Participation Process

A Public Participation Process (PPP) was undertaken in accordance with the EIA Regulations. Interested and Affected Parties (I&APs) were informed of the proposed project through newspaper advertisements, site notices, and stakeholder notifications. All consultation activities, issues raised, and responses are documented in Chapter 4 of this report, with supporting evidence included in the Appendices. The consultation process ensured transparency and provided stakeholders with an opportunity to raise concerns and contribute to the assessment process.

Recommendation

Based on the findings of the Environmental Assessment, it is concluded that the majority of identified environmental and socio-economic impacts associated with the proposed exploration activities are low to moderate in significance and can be effectively mitigated through the implementation of the recommended management and mitigation measures outlined in this report and the accompanying Environmental Management Plan (EMP).

Provided that the mitigation measures and monitoring requirements described in the EMP are implemented in full, the residual impacts are expected to remain within acceptable limits for the duration of the project. The proposed exploration activities are therefore considered environmentally acceptable and compliant with applicable legislation.

Accordingly, it is recommended that the proposed prospecting and exploration activities on EPL 10248 be authorised through the issuance of an Environmental Clearance Certificate, subject to adherence to the conditions and commitments contained in this report and the approved EMP.

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Acronyms

TERMS	DEFINITION
BID	Background Information Document
CA	Competent Authorities
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gasses
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
JBIC	Junior Baiano Industrial Consultants
MEFT: DEA	Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs
PPE	Personal Protective Equipment

1 CHAPTER ONE: BACKGROUND

1.1 INTRODUCTION

Elina Ndaendelao Naukili proposes to undertake exploration activities for Dimension Stone, Base and Rare Metals, Industrial Minerals, and Precious Metals within Exclusive Prospecting Licence (EPL) 10248, situated in the Karibib District of the Erongo Region. The licence area measures approximately 3 937.9211 hectares and extends across several privately owned farms, namely Karibib No. 54, Navachab No. 58, Habis No. 71, and Okongava-Ost No. 72. EPL 10248 is located to the south-west of Karibib town, and the spatial extent of the licence is illustrated in the locality map included in this report.

The planned exploration programme consists of a range of early-stage investigations, including desktop assessments, geological field mapping, geochemical sampling, non-intrusive geophysical surveys, and limited drilling where necessary to verify subsurface mineralisation. These activities are intended to determine whether the licence area holds sufficient mineral potential to justify further investment and possible future resource development.

Under the provisions of the Environmental Management Act, 2007 (Act No. 7 of 2007) and the Environmental Impact Assessment Regulations of 2012, exploration activities fall within the category of listed activities that cannot proceed without first undergoing an Environmental Impact Assessment (EIA) and obtaining an Environmental Clearance Certificate (ECC). Specifically, the project triggers the following listed activities related to mining and natural resource extraction:

- Activities requiring a licence, right, or authorisation under the Minerals (Prospecting and Mining) Act, 1992.
- Mining or extraction of natural resources, irrespective of regulatory status.
- Resource extraction, manipulation, conservation, and associated operations.

The purpose of the EIA is to assess the potential environmental and socio-economic implications of the proposed exploration work, identify risks and opportunities, and outline appropriate mitigation and management measures. Conducting the EIA ensures compliance with Namibia’s environmental legislation, promotes responsible land-use planning, and supports national objectives for sustainable mineral resource development.

To meet these requirements, the Proponent has appointed Junior Baiano Industrial Consultants (JBIC) as the independent Environmental Assessment Practitioner (EAP) to oversee the assessment process and prepare the accompanying Environmental Management Plan (EMP). This Scoping Report therefore forms part of the submission to the Ministry of Environment, Forestry and Tourism (MEFT): Department of Environmental Affairs and Forestry (DEAF) for consideration and issuance of the Environmental Clearance Certificate for EPL 10248.

1.2 PROJECT LOCATION

The proposed exploration activities will be undertaken within Exclusive Prospecting Licence (EPL) 10248, situated to the south-west of Karibib in the Karibib District of the Erongo Region, central-western Namibia. The licence area is positioned within a predominantly arid environment, characterised by rocky terrain, scattered shrub–savanna vegetation, and seasonal drainage features associated with the broader Khan River system.
EPL 10248 covers a total surface area of approximately 3 937.9211 hectares and overlaps several registered farms, namely Farm Karibib No. 54, Farm Navachab No. 58, Farm Habis No. 71, and Farm Okongava-Ost No. 72.

The spatial configuration of the EPL boundary is presented in the official locality map, which also illustrates key infrastructure such as the B2 trunk road, district roads, electrical transmission lines, water pipelines, and the townlands of Karibib.

The EPL coordinates are referenced using the WGS 84 (EPSG:4326) geographic coordinate system. Two of the main reference points extracted from the locality map include:

- **Coordinate 1:**
  - Latitude: **-21.979095°**
  - Longitude: **15.797584°**
- **Coordinate 2:**
  - Latitude: **-21.987558°**
  - Longitude: **15.840970°**

These coordinates define part of the EPL footprint and are used for regulatory submissions, mapping, and the verification of licence boundaries.

Access to the area is primarily achieved through the national B2 highway, which connects Karibib to neighbouring towns. Internal farm roads and existing gravel tracks provide further access to the licence area for reconnaissance, sampling, and other exploration-related activities. Karibib town serves as the nearest service centre, providing accommodation, fuel, communications, and logistical support for exploration personnel.

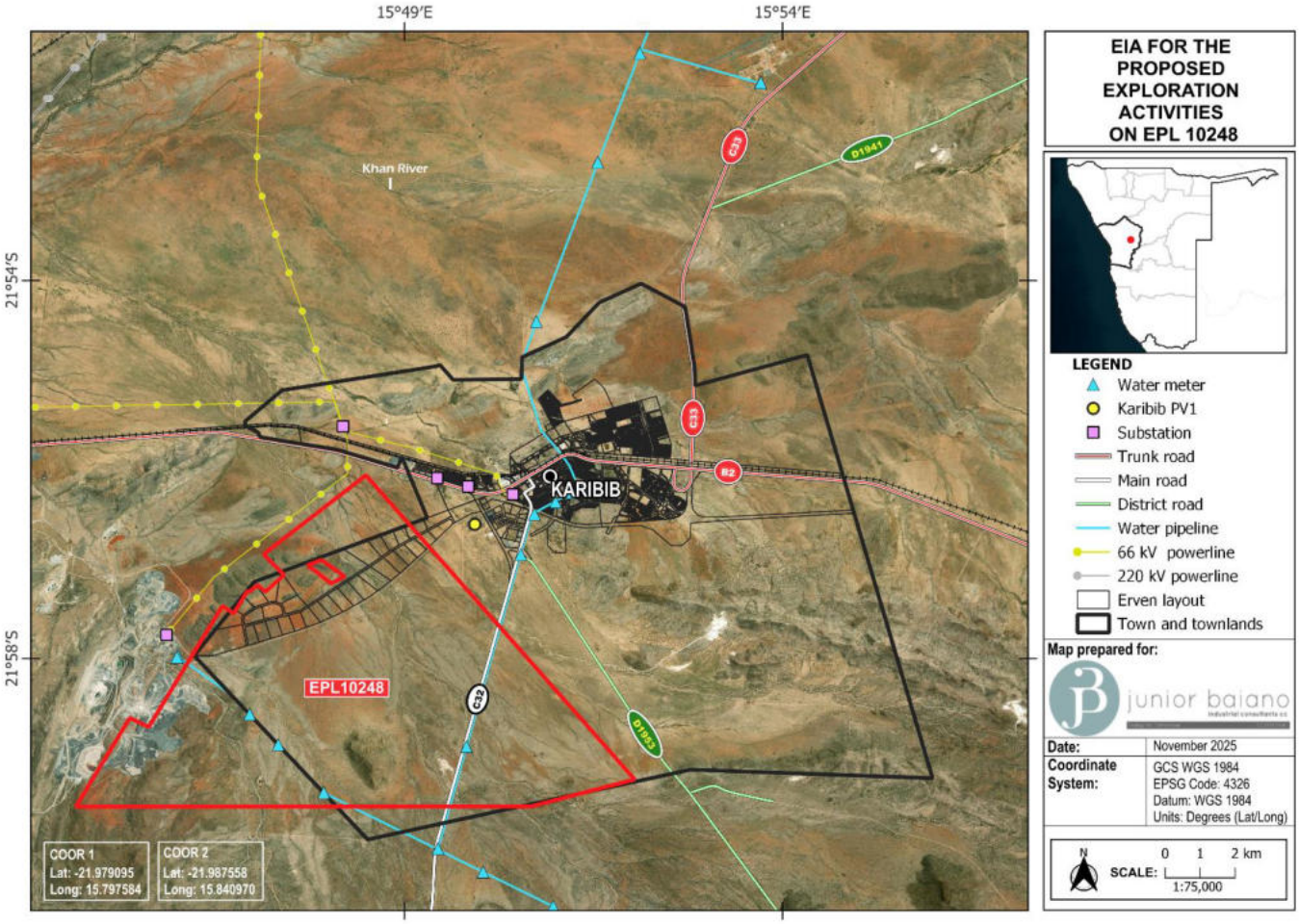

Figure 1-1: Locality Map

1.3 PROJECT OVERVIEW

The exploration programme proposed for EPL 10248 will be implemented in a phased approach, progressing from low-impact prospecting methods to more targeted field-based investigations. This structured progression ensures that the Proponent can evaluate mineral potential systematically while minimizing environmental disturbance during the early stages of the project.

1.3.1 Pre-Development Phase (Prospecting)

The pre-development phase focuses on collecting preliminary geological information to determine whether EPL 10248 holds favourable conditions for Dimension Stone, Base and Rare Metals, Industrial Minerals, and Precious Metals. This phase involves desktop analysis, initial ground reconnaissance, and target identification, most of which are non-invasive.

1.3.1.1 Desktop Studies (Initial Geological Assessment)

The exploration programme begins with a comprehensive desktop review to understand the geological characteristics of the Karibib region. Key tasks include:

- Reviewing regional and local geological survey reports published by the Geological Survey of Namibia;
- Analysing stratigraphic, lithological, and structural maps of the Damara Belt around the Karibib–Nauchas corridor;
- Compiling historical exploration data, if available, from past prospecting within nearby mineral licences;
- Interpreting regional geophysical and geochemical datasets, including airborne radiometrics, magnetics, and gravity surveys;
- Identifying lithostratigraphic units associated with known mineralisation, such as marble, pegmatite-hosted rare metals, or structurally controlled quartz veins.

This phase provides the basis for identifying prospective geological targets before fieldwork commences.

1.3.1.2 Field Verification Work (Reconnaissance Exploration)

Following the desktop review, reconnaissance site visits are conducted to verify geological features and identify potential exploration targets. Activities include:

- Mapping lithological exposures and structural features across accessible portions of the EPL;
- Collecting preliminary soil, rock chip, and float samples for qualitative geochemical screening;

- Checking for surface mineral indicators such as quartz veining, alteration zones, pegmatite bodies, or mineralised outcrops;
- Assessing terrain conditions to plan safe access routes and determine optimal sampling transects.

Where no existing farm tracks are available, short temporary access paths may be created in accordance with the Environmental Management Plan (EMP), ensuring minimal disturbance and avoiding sensitive areas such as drainage lines.

1.3.1.3 Advanced Prospecting Activities (Target Confirmation)

If reconnaissance results indicate promising mineralisation, further investigation will be undertaken. Advanced prospecting may include:

- High-resolution geological mapping of identified targets;
- Localised geochemical grid sampling to delineate geochemical anomalies;
- Ground-based geophysical surveys such as:
    - Radiometric surveys (for rare metals or alteration detection),
    - Magnetic surveys (for structural and lithological interpretation),
    - Electromagnetic/TEM profiling (depending on the deposit model);
- Identifying and prioritising drill or trench targets based on integrated datasets.

Exploration will proceed to the next phase only after obtaining the Environmental Clearance Certificate (ECC) as required under the Environmental Management Act (No. 7 of 2007).

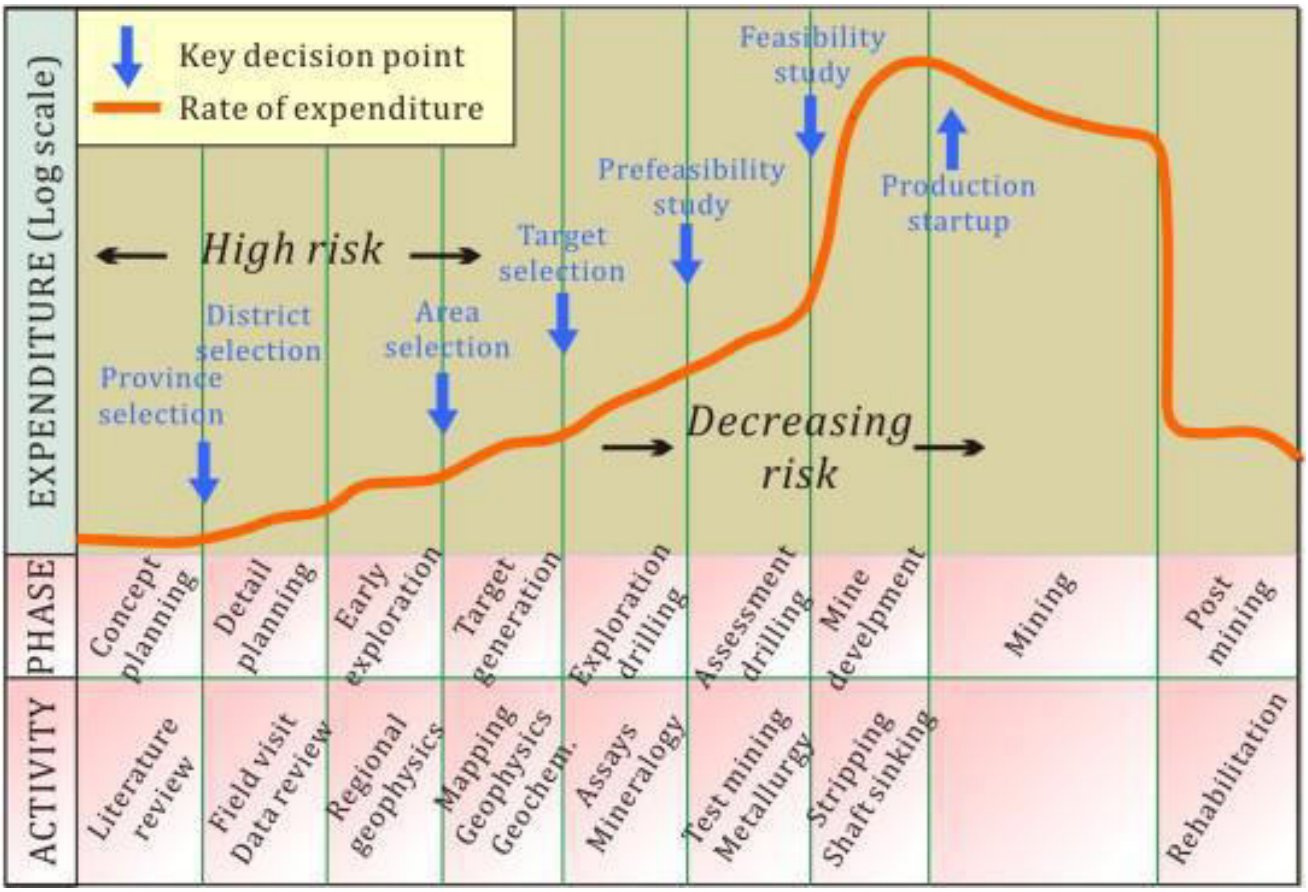

Figure 1-2: Exploration Project Phases (Contextual Interpretation)

This figure illustrates the typical progression of mineral exploration activities, showing that risk and cost are high during the early conceptual and target-generation stages. As exploration advances toward drilling and feasibility-level evaluations, uncertainty decreases but expenditure increases. The figure emphasises that intrusive activities such as drilling occur only after early-stage data supports their justification.

1.3.2 Exploration Phase (Drilling, Sampling, and Analysis)

Once targets have been confirmed through advanced prospecting, the project progresses to physical subsurface investigation. This stage is more invasive and therefore requires stricter environmental controls.

1.3.2.1 Drilling and Sampling Operations

Drilling may be undertaken using Reverse Circulation (RC) or Diamond Core (DC) methods, depending on the target depth, lithology, and geological objectives. Activities include:

- Establishing small, temporary drill pads;

- Conducting drilling under strict safety and environmental procedures;
- Logging of recovered samples for lithology, mineralisation, structure, and alteration;
- Submitting samples to accredited laboratories for geochemical and mineralogical analysis;
- Generating subsurface geological models based on drilling data.

No blasting or explosive use is anticipated during the exploration programme.

1.3.2.2 Specialist Contractor Support

The drilling and sampling programme will be implemented by certified specialist contractors with experience in Namibian exploration projects. Contractors will comply with:

- The Minerals (Prospecting and Mining) Act, 1992;
- Occupational Health and Safety Regulations;
- The EMP and site-specific environmental requirements;
- Best practices of the Southern African Institute of Mining and Metallurgy (SAIMM) and the Australian JORC Code for sampling quality assurance.

1.3.2.3 Purpose of the Exploration Programme

This phase aims to:

- Confirm the presence and continuity of mineralisation;
- Evaluate the grade, style, and geometry of mineralised zones;
- Provide sufficient information to model the mineral system;
- Determine whether follow-up work such as a prefeasibility study may be warranted.

1.3.3 Summary of Exploration Techniques Applicable to EPL 10248

1.3.3.1 Desktop & Remote Sensing Techniques

- Satellite imagery interpretation (ASTER, Landsat, Sentinel-2);
- Remote sensing of lithological and alteration anomalies;
- GIS-based spatial modelling of structural and lithological trends.

1.3.3.2 Regional & Local Field Techniques

- Soil and calcrete geochemical sampling;
- Rock chip and trench sampling;
- Ground-based radiometric and magnetic surveys;
- Structural mapping;
- Geobotanical and geomorphological observation.

1.3.3.3 Detailed Site-Specific Techniques

- Targeted test pitting where justified;
- Stratigraphic or structural drilling;
- Petrographic and geochemical laboratory analysis.

1.3.3.4 Operational Support Requirements

Exploration may require the following temporary infrastructure:

- Use of existing farm roads;
- Construction of short-term access tracks;
- Temporary field camps or mobile units;
- Mobile sanitation and waste management facilities;
- Sample storage areas and secure material laydown zones.

All support facilities will be managed in accordance with EMC guidelines and the project EMP.

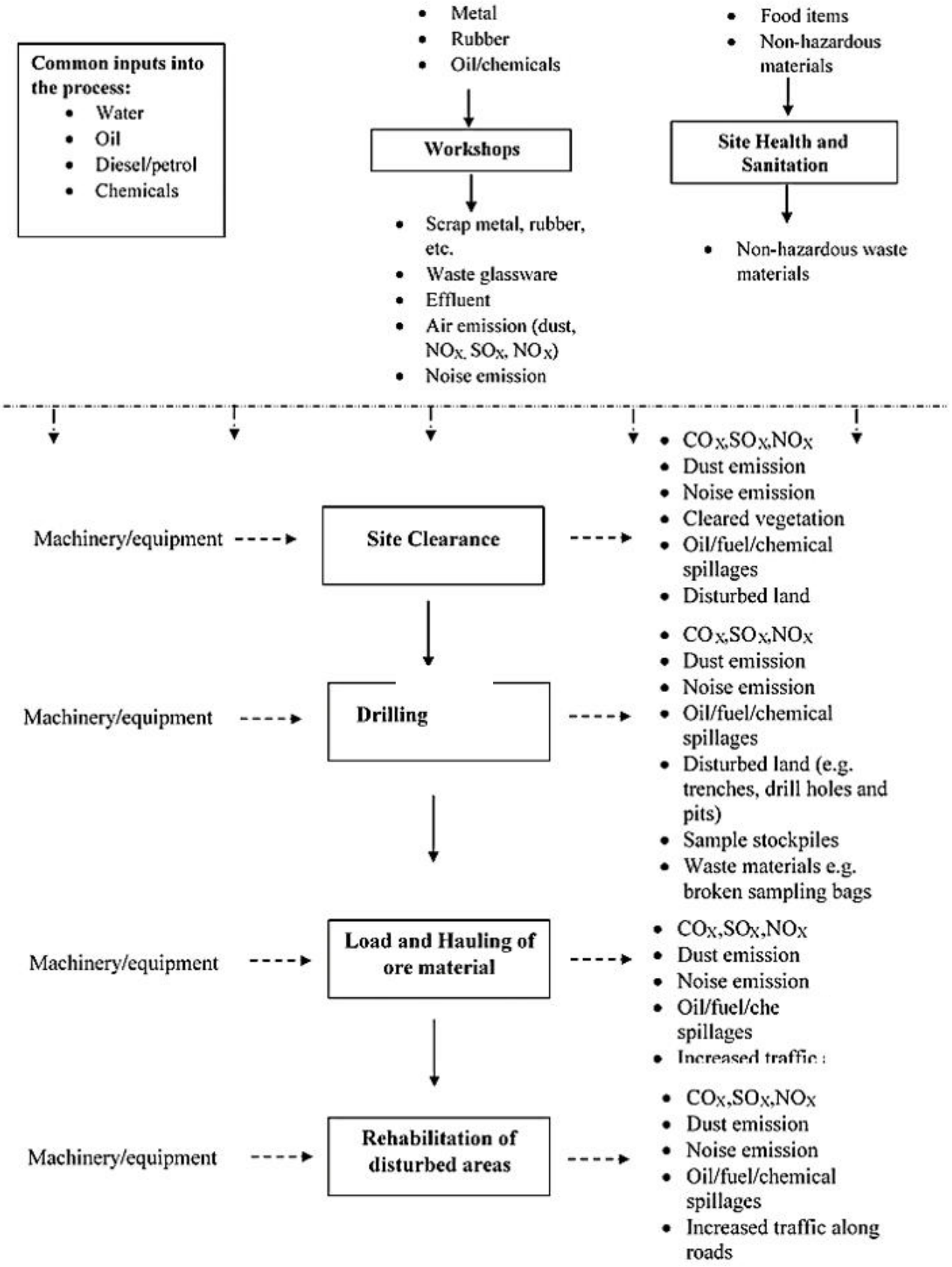

Figure 1-3: Environmental Management Flow Chart for Exploration Activities

Figure 1-3 presents a step-by-step flow of operational activities associated with mineral exploration and the corresponding environmental aspects that must be managed throughout the project lifecycle. The diagram begins with the common inputs required for exploration, water, oil, diesel/petrol and chemicals, which are used across workshops, field operations, and site activities. These inputs generate various outputs such as scrap metal, rubber, glass waste, effluent, air emissions (dust, NOx, SOx), and noise, all of which must be managed responsibly.

The right-hand pathway of the diagram shows site health and sanitation inputs, including food supplies and other non-hazardous materials, which produce domestic waste requiring correct handling and disposal.

The core operational sequence consists of four key activity phases, each linked to specific machinery/equipment and associated environmental impacts:

a. Site Clearance

Machinery and equipment are used to clear vegetation and prepare small-scale access points or drill pads. This activity generates:

- COx, SOx, NOx emissions from machinery
- Dust generation
- Noise emissions
- Removal of vegetation and surface cover
- Potential oil, fuel, and chemical spillages
- General soil disturbance

This phase represents the first point at which ground disturbance occurs.

b. Drilling

Once clearance is completed, drilling is undertaken at selected target sites. Impacts typical of this stage include:

- COx, SOx, NOx emissions

- Dust and noise emissions from drilling rigs
- Increased risk of hydrocarbon spillages
- Creation of disturbed ground surfaces (trenches, drill holes, pits)
- Generation of sample stockpiles
- Waste from sampling materials, such as broken sample bags
- Localised alteration of micro-topography

This phase marks the highest potential for localised disturbance and requires strict adherence to spill prevention and waste-control procedures.

c. Load and Hauling of Ore / Material

If material needs to be transported, hauling trucks or utility vehicles are used. This activity produces:

- COx, SOx, NOx emissions from haulage vehicles
- Dust emissions along gravel access tracks
- Noise pollution
- Increased traffic, with associated safety risks
- Possible hydrocarbon spills from mobile equipment

Although hauling during early exploration is limited, its impacts must still be managed.

d. Rehabilitation of Disturbed Areas

Once exploration at a particular site is completed, the Proponent rehabilitates all disturbed areas. During rehabilitation, machinery may still emit:

- COx, SOx, NOx emissions
- Dust
- Noise

- Hydrocarbon spill risks

Rehabilitation includes backfilling trenches, closing drill holes, reshaping disturbed ground, and encouraging natural vegetation recovery.

Figure 1-3 demonstrates that:

- Exploration activities follow a clear, linear operational process.
- Each activity has predictable environmental risks, which can be mitigated through proper planning and implementation.
- Environmental management is continuous, starting from inputs (materials, fuel, chemicals) and extending through operations to final rehabilitation.
- Responsibility for monitoring and mitigation is shared between the Proponent, JBIC Environmental Consultants, the appointed Environmental Control Officer (ECO), and the Ministry of Environment, Forestry and Tourism (MEFT).

This figure reinforces that environmental considerations must be integrated into every stage of exploration rather than treated as stand-alone tasks.

1.3.4 Summary of Activity Impacts

Table 1-1 below provides a summary of the anticipated disturbance levels associated with each key exploration activity planned for EPL 10248. Most early-stage prospecting methods are non-invasive, with measurable disturbance arising only during drilling, and temporary camp establishment.

Table 1-1: Summary of Activity Impacts

Activity	Purpose	Disturbance Level
Desktop Studies	Identify target zones and anomalies	None
Satellite Imagery	Remote detection of geological features	None

Activity	Purpose	Disturbance Level
Geochemical Surveys	Collect surface soils, rock chips, calcrete samples	Low impact, limited to walk-over sampling
Geophysical Surveys	Map subsurface structures and anomalies	Low, restricted to movement along existing tracks
Test Pits / Trenches	Examine near-surface geology	Localised and temporary
RC / Diamond Drilling	Obtain subsurface geological samples	Localised disturbance; drill pads rehabilitated post-use
Temporary Camps	Short-term accommodation and support	Low, fully reversible
Rehabilitation	Restore disturbed areas	Positive environmental outcome

1.4 ACCESSIBILITY

EPL 10248 is situated within an area that already benefits from an established network of public roads, farm tracks and service routes associated with Karibib's agricultural and mining activities. As a result, the licence area is easily reachable without the need for new permanent roads or major ground disturbance.

Primary access to the EPL is obtained through the B2 National Road, which links Karibib with Arandis and Usakos. From the B2, several existing farm access roads extend southwards and provide direct entry into the licence area. These internal tracks are routinely used by landowners for livestock management, property maintenance, and access to existing water points, making them suitable for most prospecting vehicles.

Within the EPL itself, the exploration team will rely on a combination of:

- established farm roads and previously disturbed routes,
- short internal tracks leading to old quarries, livestock posts, or water infrastructure, and

- jeep tracks used for historical mineral exploration in the wider Karibib–Nauchas region.

No new permanent roads are anticipated for the project. Where access to a specific sampling site or drill collar cannot be achieved using existing routes, the Proponent may create short, temporary access paths. These will:

- follow natural clearings or previously disturbed surfaces wherever feasible;
- avoid ecologically sensitive areas such as drainage lines, steep slopes, or protected vegetation;
- be constructed at the minimum width necessary for a single vehicle to pass safely; and
- be rehabilitated immediately once no longer required, in accordance with the Environmental Management Plan (EMP) and landowner expectations.

Given the compact size of EPL 10248 and the availability of existing access infrastructure, the overall disturbance associated with vehicle movement is expected to remain low and fully reversible.

1.5 INFRASTRUCTURE AND SERVICES

Although EPL 10248 is located in a rural portion of the Karibib District, the area is supported by well-established infrastructure associated with farming activities, quarrying operations, nearby mining developments, and the strategic B2 transport corridor. The available infrastructure is adequate to support low-impact mineral exploration without requiring new permanent installations.

1.5.1 Road Network

- The EPL is easily accessed from the B2 National Road, which links Karibib with Usakos and Arandis and serves as a major transport artery for regional mining and logistic activities.
- A network of farm access roads, service tracks, and jeep routes branching off the B2 provides internal access across the licence area.

- These routes are regularly used by farmers, contractors, and land management personnel and are therefore suitable for most exploration vehicles.
- No new permanent roads are anticipated. Only short temporary tracks may be created for reaching drilling sites that do not have existing access, and these will be rehabilitated after use.

1.5.2 Water Supply

- The Karibib area relies predominantly on groundwater abstraction from farm boreholes, which is typical of rural Erongo Region.
- Exploration activities require modest quantities of water, primarily for drilling operations, dust control, and domestic camp use.
- Water will be sourced from:
    - Existing landowner boreholes, subject to consent and verification of sustainable abstraction rates; or
    - Water delivery from Karibib using commercial water suppliers or tanker services if borehole use is not feasible or if local water availability is limited.
- No permanent water infrastructure will be installed as part of exploration activities.

1.5.3 Power Supply

- EPL 10248 itself is not connected to the national electricity grid, though 66 kV and 220 kV powerlines occur in the broader Karibib landscape (as shown in project locality maps).
- Exploration activities will operate using portable diesel generators, solar hybrid systems, and rechargeable battery-powered equipment.
- All fuel storage and handling will comply with the EMP, including bunding requirements and spill-prevention measures.

1.5.4 Sanitation and Waste Management

- Portable chemical toilets will be provided at temporary camps and drill sites and serviced by a registered waste contractor when required.

- Domestic waste will be:
    - collected daily at field camps or work areas,
    - stored in secure and animal-proof containers, and
    - transported for disposal at the Karibib municipal landfill or another approved facility.
- No waste will be buried, burned, or disposed of on farmland.
- Hydrocarbon or hazardous waste (e.g., oily rags, used filters) will be stored separately and removed for disposal at a licensed hazardous waste facility.

1.5.5 Communication Networks

- Mobile network coverage in the Karibib area is generally moderate to strong along the B2 corridor but becomes weaker in low-lying or remote sections of the farms.
- The exploration team will use a combination of:
    - mobile phones where coverage is available,
    - satellite communication devices or radio systems in poor-signal zones, and
    - GPS and digital mapping tools for field navigation.
- Emergency communication procedures will form part of the project's Safety Plan.

1.5.6 Accommodation

Field personnel will be accommodated using one of the following options depending on the duration and intensity of exploration activities:

- Farmstead accommodation, subject to arrangements with landowners;
- Lodges, guest farms, and guesthouses located in and around Karibib;
- A small temporary exploration camp set up at an agreed location within the EPL. Any camp will include water storage, ablution facilities, a waste management system, and renewable energy options, and will be fully dismantled and rehabilitated after use.

1.6 NEED AND DESIRABILITY

The proposed exploration activities on EPL 10248 support Namibia's national development goals by contributing to the sustainable expansion of the minerals sector—one of the country's most important economic anchors. Mining and exploration collectively contribute significantly to national GDP, foreign direct investment, export earnings, and rural employment. As global markets continue to demand secure, ethically sourced industrial minerals, base metals, and dimension stone products, Namibia remains competitively positioned due to its favourable geology, political stability, and regulatory certainty.

Exploration is a critical first step in defining the country's future mineral-resource base. National policy frameworks—including Vision 2030, National Development Plans (NDP5 and NDP6), the Harambee Prosperity Plan II, and the National Minerals Policy of 2003—all identify mineral exploration as essential for economic diversification, industrialisation, and attracting responsible investment. By generating new geological knowledge, exploration reduces uncertainty, guides land-use planning, and strengthens Namibia's ability to compete regionally in mining-related value chains.

EPL 10248 is situated within the geologically prospective Damara Belt, a region well known for its mineral diversity, including dimension stone bodies, pegmatite-hosted rare metals, and structurally controlled precious-metal systems. The licence area is accessible via the B2 National Road and local farm tracks, allowing exploration to proceed with low logistical requirements and minimal environmental disruption. The underlying land uses—commercial livestock farming and low-impact rural activities—are compatible with controlled, small-scale exploration when managed under the Environmental Management Plan (EMP).

From a socio-economic perspective, exploration activities will create direct and indirect benefits for the Karibib community and surrounding farms, including short-term employment, local procurement, and increased demand for services such as accommodation, fuel, transport, and catering. These benefits contribute positively to rural economic resilience, consistent with national economic-recovery and industrial-growth strategies.

The desirability of the project is further supported by Namibia's commitment to responsible natural resource development, as emphasised in the country's sustainable development policies and environmental legislation. By following the EMA (2007) framework, the project

ensures that environmental risks remain low and manageable, while socio-economic opportunities are maximised.

A summary of the project's overall justification is presented in Table 1-1 as the Need vs Desirability Matrix.

Table 1-2: Need vs Desirability Matrix

Criterion	Need	Desirability
National Economic Priorities	Supports GDP growth, exports, and employment by strengthening the upstream exploration pipeline necessary for future mining development.	EPL is located in a geologically favourable area that can contribute to national economic diversification and mineral-resource security.
Demand for Base & Industrial Minerals	Growing regional and international demand for construction materials, rare metals, and industrial minerals essential for infrastructure and technology.	EPL 10248 lies within the mineral-prospective Damara Belt, increasing the likelihood of viable discoveries.
Economic Recovery & Green Growth	Exploration attracts investment and stimulates rural economies, aligning with national post-pandemic economic recovery strategies.	Activities utilise existing infrastructure and promote low-impact, responsible resource evaluation consistent with sustainability objectives.
Regional Socio-Economic Needs	Need for rural employment, local procurement, and enhanced economic participation in Karibib and surrounding farming communities.	Exploration creates work opportunities, supports local businesses, and injects spending into the regional economy.
Scientific & Geological Knowledge	Namibia requires updated geological data to refine its national mineral inventory and support long-term planning.	EPL 10248 represents an underexplored area with potential to improve scientific

Criterion	Need	Desirability
		understanding of Damara Belt mineralisation.
Environmental Suitability	Exploration must be undertaken responsibly to avoid unnecessary impacts on farming areas and natural ecosystems.	The licence area's existing disturbance footprint and moderate environmental sensitivity make it suitable for controlled, EMP-guided exploration.
Infrastructure Availability	Access to roads, water sources, and services is required for cost-effective exploration.	EPL is readily accessible via the B2 road and existing farm tracks, reducing the need for new infrastructure.
Policy Alignment	Directly supports Vision 2030, NDP5/6, HPP II, the National Minerals Policy, and Namibia's investment-promotion objectives.	Timing aligns with national strategies to boost exploration, attract investors, and strengthen Namibia's presence in mineral supply chains.

1.7 PROJECT ALTERNATIVES

The consideration of alternatives is a statutory requirement under Regulation 8 of the Environmental Impact Assessment Regulations (GN 30 of 2012). Although alternatives for exploration projects are limited—because the EPL boundary is fixed by the mineral right issued under the Minerals (Prospecting and Mining) Act—reasonable operational options must still be assessed to ensure that exploration is undertaken in the most environmentally responsible manner.

The alternatives evaluated for EPL 10248 include the No-Go option, the Project (Go) option, and a suite of operational alternatives relating to access, water use, sanitation, energy sources, and waste management.

1.7.1 No-Go Alternative

Under the No-Go alternative, exploration would not proceed.

1.7.1.1 Environmental Implications

- No vegetation clearing, soil disturbance, drilling, or track creation would occur.
- Existing land uses (commercial livestock farming and low-intensity rural activities) would continue unchanged.
- No additional pressure would be placed on groundwater, biodiversity, or surface features.

1.7.1.2 Socio-Economic Implications

- No job creation or procurement opportunities for Karibib and surrounding communities.
- No expenditure on accommodation, fuel, transport, or local services.
- National geological knowledge would not be enhanced, limiting Namibia's ability to plan future mineral-resource development.

1.7.1.3 Policy Alignment

The No-Go option is **not aligned** with Namibia's national strategic objectives—which emphasise exploration-led economic diversification—but remains the baseline against which the proposed project is assessed.

1.7.2 Project (Go) Alternative

The Go option involves implementing the exploration programme using the phased, low-impact activities described in Section 1.3.

1.7.2.1 Economic and Strategic Advantages

- Supports Namibia's long-term mineral-resource development objectives.
- Stimulates local procurement (fuel, transport, accommodation, technical services).
- Enables geological mapping and data generation for an underexplored area of the Damara Belt.
- Creates short-term employment opportunities.

1.7.2.2 Environmental Justification

- Exploration is temporary, small in scale, and highly reversible.
- No explosives are used.
- All drill pads and temporary tracks will be rehabilitated according to the EMP.

- Environmental risks are considered low and manageable with standard mitigation measures.

Given the socio-economic benefits and the relatively low environmental footprint, the Go Alternative is preferred—subject to compliance with the EMP.

1.7.3 Siting and Micro-Siting Considerations

Although the EPL footprint cannot change, internal "micro-siting" is possible. The placement of drill sites, camp areas, and sample transects will avoid sensitive features identified during reconnaissance, including:

- boreholes and waterpoints
- homesteads and farm infrastructure
- riparian zones and drainage lines
- heritage or archaeological features (if encountered)
- steep or erosion-prone slopes

This internal optimisation ensures responsible spatial planning within the legally fixed EPL boundary.

1.7.4 Operational Alternatives

Table 1-3: Summary of Operational Alternatives Considered

Aspect	Alternatives Considered	Preferred Option & Justification
Access & Transport	Road, rail, maritime	Road transport using B2 + farm tracks; rail/maritime not feasible.
Water Supply	Borehole abstraction; water carting	Early-phase preference for water carting; protects groundwater resources.
Sanitation	Mobile toilets; septic systems	Mobile chemical toilets—lowest impact and fully reversible.
Energy	Solar; diesel; grid	Solar as primary source; diesel used only for drilling. Grid not available.
Waste Management	On-site storage; off-site disposal; 3Rs	Off-site disposal at approved facilities; apply 3Rs hierarchy.

Aspect	Alternatives Considered	Preferred Option & Justification
Camp Setup	Farmstead accommodation; mobile camp	Mobile camp (with consent) or farmstead accommodation—low-impact and demountable.

1.7.5 Conclusion on Alternatives

The assessment demonstrates that:

- the No-Go alternative preserves the status quo but fails to support Namibia's mineral-development strategy,
- the Go alternative provides clear socio-economic benefits with low and manageable environmental risks, and
- operational alternatives have been optimised to ensure minimal disturbance, efficient resource use, and strict compliance with the EMP.

Therefore, the Implementation (Go) Alternative is recommended as the most viable and sustainable option for EPL 10248

2 CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 INTRODUCTION

This Environmental Impact Assessment (EIA) Report for the proposed exploration activities on EPL 10248, located in the Karibib District of the Erongo Region, has been prepared in accordance with Namibia's environmental and natural resource management legislation. The legal framework governing exploration activities establishes clear requirements for environmental protection, land-use regulation, pollution control, biodiversity conservation, occupational health and safety, and responsible utilisation of natural resources.

Namibia's environmental legislation ensures that exploration projects:

- prevent pollution and manage waste responsibly, including hydrocarbons, drilling residues, dust and noise;
- protect soil, vegetation, wildlife and water resources from unnecessary disturbance;
- promote sustainable land-use planning, particularly within agricultural and semi-arid rangeland environments;
- safeguard the occupational health and safety of exploration teams and nearby communities; and
- clarify the obligations of the Proponent, competent authorities and other stakeholders regarding compliance and environmental stewardship.

This chapter provides a consolidated overview of the national laws, regulations, policies and international commitments applicable to the proposed exploration programme. The legal instruments summarised here guide the EIA process, shape the mitigation measures described in the Environmental Management Plan (EMP), and define the compliance responsibilities of the Proponent throughout the lifecycle of exploration on EPL 10248.

2.2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The pursuit of sustainability is guided by a sound legislative framework. In this section, relevant legal instruments as well as their relevant provisions have been surveyed. An explanation is provided regarding how these provisions apply to this project.

Table 2-1 - Legal Compliance

Aspect	Legislation / Policy	Relevant Provisions	Relevance to EPL 10248 Exploration Project
Constitutional Obligations	Namibian Constitution (1990)	• Article 95(l): State must safeguard ecosystems and biodiversity. • Article 16: Protects lawful property and economic activity.	• Exploration must prevent undue environmental harm. • Activities constitute lawful economic use subject to EMP and ECC controls.
National Development Planning	Vision 2030; NDP5/NDP6; Harambee Prosperity Plan II	• Prioritizes economic growth, mineral development, rural employment, sustainability.	• Exploration supports economic diversification, job creation and growth in the minerals sector.
Archaeology & Heritage Protection	National Heritage Act 27 of 2004	• Prohibits disturbance of heritage resources without approval. • Requires chance-find procedures.	• EPL not known to contain registered heritage sites, but chance finds (graves, artefacts, stone features) may occur during access creation or drilling.

Aspect	Legislation / Policy	Relevant Provisions	Relevance to EPL 10248 Exploration Project
	National Monuments Act 28 of 1969	• Protects archaeological objects, fossils and historic features.	• Any discoveries require work stoppage and notification to NHC.
Environmental Management	Environmental Management Act (EMA) 7 of 2007	• Listed activities require EIA and ECC. • Promotes pollution prevention, waste management and stakeholder engagement.	• Forms legal basis for this EIA/EMP. • Proponent must comply with all ECC conditions and reporting requirements.
	EIA Regulations (GN 30 of 2012)	• Prescribes EIA process, consultation, report structure and decision-making.	• Guides public notices, consultation meetings, BID distribution, stakeholder registry, and report format.
Pollution & Waste Management	Draft Pollution and Waste Management Bill	• Sets standards for waste handling, pollution control and hazardous waste.	• Domestic waste, hydrocarbons and drill-related waste must follow best-practice management and legal disposal pathways.
Soil Conservation	Soil Conservation Act 76 of 1969	• Prevents soil erosion and degradation.	• Track alignment, drill pads and camps must minimise soil disturbance; rehabilitation required post-use.

Aspect	Legislation / Policy	Relevant Provisions	Relevance to EPL 10248 Exploration Project
Biodiversity & Ecosystems	National Biodiversity Strategy & Action Plan (NBSAP2)	• Promotes biodiversity conservation and sustainable use.	• EPL area consists of semi-arid savanna requiring careful avoidance of sensitive flora/fauna; no unnecessary clearing.
Hazardous Substances	Hazardous Substances Ordinance 14 of 1974	• Controls storage, handling and disposal of hazardous materials.	• Diesel, oils, drilling lubricants must be stored in bunded containers with spill kits on-site.
Air Quality	Atmospheric Pollution Prevention Ordinance 11 of 1976	• Controls emissions, dust and air pollutants.	• Dust suppression required; vehicles and generators must be maintained to minimize emissions.
Forestry & Vegetation	Forest Act 12 of 2001	• Permit required removing protected trees or vegetation within 100 m of watercourses.	• Several protected species may occur—removal only if unavoidable and authorized by MAWLR Forestry Directorate.
Water Resources	Water Act 54 of 1956 (currently applicable)	• Prohibits pollution of surface/groundwater.	• Sanitation waste from mobile toilets must be handled by licensed providers; no discharge to environment.

Aspect	Legislation / Policy	Relevant Provisions	Relevance to EPL 10248 Exploration Project
	Water Resources Management Act 11 of 2013	• Requires permits for abstraction and drilling of water boreholes.	• Exploration water will be sourced sustainably; any dedicated water boreholes require permits.
Health & Safety	Labour Act 11 of 2007	• • Ensures workplace safety, PPE use, emergency preparedness.	• All contractors must comply with OHS standards, training and incident reporting.
Public Health	Public Health & Environmental Act 1 of 2015	• Prohibits creation of nuisances; regulates sanitation, waste and dust.	• Exploration must prevent dust, noise, waste or sanitation impacts affecting nearby land users or workers.
Mining Legislation	Minerals (Prospecting and Mining) Act 33 of 1992	• Governs EPL conditions, work programs, reporting, and environmental duties.	• Exploration must comply with EPL 10248 license conditions and annual reporting to MME.
Land Use Planning	Township and Regional Planning Act 5 of 1996	• Ensures land-use compatibility.	• Exploration on farmland requires access permissions and must avoid conflict with ongoing farming operations.

Aspect	Legislation / Policy	Relevant Provisions	Relevance to EPL 10248 Exploration Project
Fuel Storage	Petroleum Products & Energy Act 1990	• Requires licensing for applicable fuel storage and safety compliance.	• Any on-site fuel storage for drilling rigs must meet bunding, safety, and permitting requirements.
Climate Policy	National Climate Change Policy (2011)	• Encourages reduced emissions and climate-resilient development.	• Solar systems preferred for camps; reduced generator use minimizes emissions.

All legislation identified in Sections 2.1 and 2.2 is legally binding on the Proponent and must be complied with throughout the duration of exploration on EPL 10248. Compliance will be achieved through the implementation of the Environmental Management Plan (EMP), adherence to licence conditions issued by the Ministry of Mines and Energy (MME), and alignment with all applicable sectoral regulatory requirements.

Where specialist compliance is required—such as for heritage protection, water abstraction, vegetation clearance, hazardous-material handling, or fuel storage—the Proponent will engage qualified and registered professionals or licensed service providers to facilitate regulatory adherence. Environmental compliance auditing shall form part of the regular bi-annual environmental monitoring and reporting process conducted by the appointed Environmental Assessment Practitioner (EAP) or Environmental Control Officer (ECO), with findings submitted to the competent authorities as required.

All relevant permits and authorisations must be obtained before any site-based exploration activities commence. These include, but are not necessarily limited to, the following:

- *Environmental Clearance Certificate (ECC)*

  Issued under the Environmental Management Act (7 of 2007) by the Ministry of Environment, Forestry and Tourism (MEFT). This is the primary authorisation required before exploration may commence.

- *Permit for the Removal of Protected Tree Species*

  Required under the Forest Act (12 of 2001) if the removal of any protected tree species (e.g., *Acacia erioloba*, *Boscia albitrunca*) becomes unavoidable during access creation or drilling.

- *Water Abstraction and Borehole Registration Permits*

  Required under the Water Resources Management Act (11 of 2013) if groundwater is abstracted or if a dedicated water-supply borehole is drilled for exploration purposes.

- *Fuel Storage Permit (if applicable)*

  Required under the Petroleum Products & Energy Act (1990) if on-site fuel storage exceeds 200 litres. All fuel must be stored in bunded containers with spill-prevention systems.

- *Hazardous Waste Handling and Disposal Permit*

  Required where hazardous waste (e.g., waste oils, contaminated absorbents, chemical residues) is generated and transported off-site to licensed disposal facilities.

- *Land Access and Surface Use Agreements*

  Written consent must be obtained from all affected landowners prior to accessing farm properties for exploration activities.

Note: A *Mineral Prospecting Licence* is not required, as the Proponent already holds a valid Exclusive Prospecting Licence (EPL 10248) issued under the Minerals (Prospecting and Mining) Act (33 of 1992).

3 CHAPTER THREE: RECEIVING ENVIRONMENT

3.1 SOCIO-ECONOMIC ENVIRONMENT

EPL 10248 is located within the Karibib District of the Erongo Region, central-western Namibia. The project area falls within a predominantly rural and peri-urban landscape characterised by commercial livestock farming, quarrying and mining-related land uses, transport infrastructure, and scattered settlements associated with the Karibib–Usakos–Arandis corridor.

For broader national context, Figure 3-1 presents a regional map of Namibia indicating the location of the Erongo Region and the approximate position of Karibib within the central-western part of the country. This regional perspective provides spatial context in relation to major economic hubs, transport routes, and surrounding administrative regions.

Figure 3-1: Regional Map of Namibia

The socio-economic context of the receiving environment is important for understanding how exploration-related access, employment opportunities, land use interactions, and potential disturbances may influence local communities, farming operations, and service centres.

3.1.1 Regional Context

The Erongo Region is one of Namibia's most economically active regions, with an estimated population of approximately 210,000–230,000 people (NSA, 2023). The region plays a critical role in the national economy through mining, logistics, manufacturing, fisheries, tourism, and commercial agriculture. Karibib, Usakos, Arandis, Swakopmund and Walvis Bay form an integrated economic corridor supported by major road, rail and port infrastructure.

Key regional socio-economic features relevant to the project include:

- *Livelihoods and income* - Household income in the Erongo Region is primarily derived from formal employment, small business activities, mining, transport, retail services, and commercial farming. The large mining and logistics sector increases demand for fuel, accommodation, catering, mechanical services, and general supplies—sectors that exploration activities typically support.
- *Demographic profile* - The region has a relatively young and economically active population, with strong labour mobility between towns and rural farm areas. This creates opportunities for short-term and contract-based employment associated with exploration.
- *Services and infrastructure* - Erongo has some of the best-developed infrastructure in Namibia outside Windhoek, including:
    - paved national roads (B2, B1 connectors),
    - rail links between Walvis Bay and central Namibia,
    - electricity grid coverage along main corridors,
    - regional hospitals and clinics,
    - schools, vocational centres and retail services.

    However, rural farm areas remain dependent on boreholes, gravel access roads, and stand-alone power systems, making careful planning of water use and access routing essential.

Given this context, exploration activities within EPL 10248 must be implemented in a manner that avoids disruption to farming operations, water infrastructure, road access, and existing economic activities.

3.1.2 Local Context – Karibib District and Surrounding Farms

At the local scale, the EPL 10248 area is situated within a landscape dominated by commercial livestock farming, quarrying and dimension-stone activities, small-scale mining, and transport-linked enterprises associated with the Karibib area. Karibib town serves as the primary local service centre and provides:

- public services (schools, clinic, municipal offices),
- retail outlets, fuel stations and workshops,
- accommodation facilities, guesthouses and lodges,
- a local labour pool for skilled, semi-skilled and general workers.

The immediate project environment can be characterised as follows:

- *Settlement pattern* - Farmsteads are widely spaced, with low residential density. Most farm workers reside on-site, while others commute from Karibib.
- *Land use* - Predominantly cattle and small-stock farming, with pockets of stone quarrying, mining infrastructure, and transport-related activities. Tourism occurs at a smaller scale compared to the coastal part of Erongo.
- *Water supply* - Almost entirely borehole-dependent, with farm-made reservoirs, tanks and earth dams used for livestock watering. This makes groundwater protection a key socio-economic and environmental sensitivity.
- *Access* - Provided through existing farm tracks and secondary gravel roads linked to the B2 national road and district routes.

From a socio-economic perspective, the key sensitivities for exploration include:

- grazing land used for livestock production,
- farm infrastructure such as fences, gates, boreholes, pipelines and reservoirs,
- traffic, noise and visual disturbance affecting farm owners, workers and visitors, and
- potential short-term pressure on local accommodation and services during peak exploration periods.

3.1.3 Key Socio-economic Indicators – Erongo Region

Table 3-1 provides a regional-level snapshot of selected demographic and socio-economic conditions in the Erongo Region, compared with the national profile, based on data from the 2023 Namibia Population and Housing Census. These indicators provide important context

for understanding the receiving socio-economic environment within which the proposed exploration activities on EPL 10248 in the Karibib District will take place.

Table 3-1: Key Socio-Economic Indicators for Erongo

Indicator	**Namibia (2023)***	**Erongo Region (2023)***
Population size	~3.02 million	~214,000
– Males	–	~109,000
– Females	–	~105,000
Sex ratio (males per 100 females)	~96	~104
Age composition (% of population)		
– Under 5 years	~13%	~11%
– 5–14 years	~23%	~19%
– 15–59 years	~57%	~62%
– 60+ years	~7%	~8%
Literacy rate (15+ years)	~91%	~94%
Economic activity (15+ years)		
– In labour force	~58%	~67%
– Employed (of labour force)	~78%	~84%
– Unemployed (of labour force)	~22%	~16%
Main source of household income		
– Wages & salaries	~57%	~63%
– Farming	~14%	~9%
– Business (non-farming)	~8%	~11%
– Old-age pension	~12%	~8%
Housing & services		
– Households with safe water access	~87%	~92%
– Households with no toilet facility	~36%	~18%
– Households using wood/charcoal for cooking	~46%	~21%

*National and regional values based on NSA 2023 Population and Housing Census.

These indicators show that, relative to the national profile, Erongo Region is one of the more economically active and urbanised regions in Namibia, with:

- Higher literacy levels, reflecting stronger access to education;
- Higher participation in the labour force, driven by mining, logistics, manufacturing, and port-related industries;
- Lower dependence on subsistence farming compared to northern communal regions;
- Better access to water, sanitation, and modern energy; and
- A dominant working-age population, which is particularly relevant for employment generation.

However, within Karibib District and its surrounding farm areas, pockets of vulnerability still exist, especially among:

- Farm workers,
- Informal settlements,
- Seasonal labourers, and
- Small-scale livestock farmers.

These groups remain sensitive to:

- Water availability and borehole protection,
- Grazing land access,
- Dust, noise, and traffic disturbances,
- Employment stability.

3.1.3.1 Implications for Exploration Activities on EPL 10248

In designing and implementing the proposed exploration programme on EPL 10248, the following socio-economic priorities should be embedded into project planning and the Environmental Management Plan (EMP):

- Local employment and skills development, particularly for unskilled and semi-skilled labour from Karibib and surrounding farm areas;
- Local procurement, where feasible, to enhance indirect economic benefits;
- Protection of farm infrastructure, including boreholes, access roads, fences, and grazing areas;
- Strict dust, noise, and traffic management, especially along access routes near settlements and farming operations; and

- Clear, continuous communication with landowners, the Karibib Municipality, and affected farmers regarding activity schedules, access control, and safety risks.

3.1.4 Land Use and Livelihoods Across the EPL 10248 Area

Land use within and surrounding EPL 10248 in the Karibib District, Erongo Region, is shaped by a combination of commercial livestock farming, mining-related activities, and peri-urban land uses associated with the town of Karibib. The affected farms, including Farm Karibib No. 54, Farm Navachab No. 58, Farm Habis No. 71, and Farm Okongava-Ost No. 72, are predominantly utilised for cattle and small-stock grazing across extensive semi-arid rangelands, supported by borehole-based water supply systems.

In addition to livestock production, the broader Karibib area supports:

- Active and historical mining operations (notably uranium, gold, marble, and dimension stone);
- Mining-related service industries and transport infrastructure;
- Peri-urban settlement expansion linked to Karibib town; and
- Limited but growing nature-based tourism and recreational activities along regional access routes.

Charcoal production may occur on some properties as part of bush-thickening control and rangeland management, although this is not the dominant land use. Together, these activities create a local economy that remains strongly dependent on natural resources and functional farm and access infrastructure, particularly:

- Availability and protection of grazing land;
- Reliable borehole water supply for livestock and domestic use;
- Functioning farm infrastructure, including fences, troughs, gates, access tracks, and internal roads; and
- Safe movement along shared access routes used by farm workers, livestock, mining vehicles, and regional traffic.

Because livelihoods in the EPL 10248 area are directly linked to land, water, and rangeland productivity, exploration activities must be carefully coordinated with landowners and lawful occupiers to prevent disruption to:

- Water points and boreholes,
- Grazing camps and rotational grazing systems,

- Farm access routes and internal road networks, and
- Farm safety and security arrangements.

Although permanent rural settlement density within the EPL boundary is low, the area remains socio-economically sensitive due to:

- The direct dependence of livelihoods on natural resources,
- The shared use of land and infrastructure between farming, mining, and transport,
- The economic vulnerability of farm workers, and
- The strategic role of Karibib as a regional mining and transport node.

Accordingly, land use interactions represent a key consideration for impact management during the exploration phase, particularly in relation to dust, noise, traffic, fencing integrity, and disturbance to livestock and grazing patterns.

3.1.5 Access to Services

The EPL 10248 area is located within the Karibib District of the Erongo Region, which is a well-established mining, transport, and service corridor. Unlike more remote exploration areas in Namibia, the project site benefits from good access to essential services due to its proximity to Karibib town, as well as the regional centres of Okahandja, Usakos, and Swakopmund.

The primary service and supply centre for the project is Karibib Town, which provides ready access to:

- Health services, including a clinic and referral linkage to district and regional hospitals;
- Fuel stations supplying diesel and petrol;
- Vehicle repair, welding, and light engineering services;
- Retail shops, hardware stores, and informal markets;
- Police services and local government administration; and
- Telecommunications, with generally good mobile network coverage (MTC and other providers), though intermittent signal loss may occur in low-lying terrain and rugged topographic sections.

These services are considered adequate to support exploration-phase logistics and emergency response requirements.

3.1.5.1 Transport and Access

Road and transport access to the EPL 10248 area is well developed, consisting mainly of:

- The B2 National Road, which passes directly through Karibib and links the area to Windhoek and the Port of Walvis Bay;
- District and access roads branching from the B2 toward the affected farms;
- Farm access tracks and internal roads controlled by landowners; and
- A major railway line traversing Karibib, which supports bulk mineral transport in the wider region.

Movement within the EPL area will rely largely on farm roads and internal access tracks, and access must be:

- Formally negotiated with each landowner,
- Coordinated around gates, livestock crossings, and farm operations, and
- Managed to minimise dust generation, stock disturbance, and road damage.

Although access is generally good, exploration vehicle traffic will require careful scheduling and speed control, especially where access routes are shared with livestock and farm workers.

3.1.5.2 Water and Energy

Water supply within the EPL 10248 area is predominantly borehole-based, abstracted using solar-powered pumps and diesel-driven systems for livestock and limited domestic use.

- Any water required for exploration activities must:
    - Comply with the Water Resources Management Act (2013),
    - Be subject to formal agreements with landowners, and
    - Avoid compromising existing livestock and household water supply.
- Electrical power in the surrounding farms is mainly supplied through:
    - Off-grid solar systems, and
    - Backup diesel generators during periods of high demand.
- Sanitation for exploration crews and temporary camps will be provided through:
    - Mobile chemical toilets, serviced by approved waste management contractors in line with public health requirements.

3.1.5.3 Overall Service Adequacy for Exploration

Overall, access to services within and around EPL 10248 is considered good for exploration-phase activities, particularly due to:

- The project’s proximity to Karibib town,

- Direct connection to a national transport corridor, and
- Availability of fuel, healthcare, engineering support, and communications.

However, careful logistical planning remains essential with respect to:

- Water abstraction and transport,
- Fuel storage and handling,
- Waste and sanitation management, and
- Safe navigation of farm access roads shared with farming operations.

3.1.6 Socio-Economic Relevance to the Project (EPL 10248)

The proposed exploration activities on EPL 10248 are expected to generate a range of localised socio-economic effects for the surrounding farming community and the wider Karibib District. These effects are largely characteristic of early-phase exploration projects, which are limited in spatial footprint, short to medium term in duration, and reversible in nature.

3.1.6.1 Potential Positive Contributions

The main anticipated positive socio-economic contributions of the exploration programme include:

- Short-term direct employment opportunities, particularly for:
    - General labourers,
    - Drivers and machine operators,
    - Security personnel,
    - Camp support staff (e.g. cooks, cleaners).
- Procurement of goods and services from Karibib, including:
    - Fuel and lubricants,
    - Accommodation and catering,
    - Vehicle repairs and mechanical services,
    - Hardware and general supplies.
- Diversification of income streams for affected farms, especially where:
    - Temporary access routes traverse private land,
    - Short-term exploration camps or equipment laydown areas are hosted, and
    - Land-use compensation agreements are negotiated between the proponent and landowners.

These contributions, while modest in scale, are locally significant, particularly in a farming-based economy where income sources are often vulnerable to drought and commodity price fluctuations.

3.1.6.2 Key Socio-Economic Sensitivities

Because EPL 10248 is situated entirely on commercial farming units, the most important socio-economic sensitivities are directly linked to land, water, and farm infrastructure, namely:

- Protection of boreholes and groundwater infrastructure, which are essential for:
  - Livestock production,
  - Domestic use by farm households and workers.
- Minimising disturbance to grazing camps and rotational grazing systems, which are central to rangeland sustainability.
- Ensuring the integrity of farm infrastructure, particularly:
  - Fences,
  - Gates,
  - Water pipelines,
  - Troughs and reservoirs,
  - Internal access roads.
- Avoiding unnecessary disturbance to farm security arrangements, including controlled access points and movement restrictions.
- Preventing dust, noise, and traffic-related impacts, which may affect:
  - Livestock behaviour and health,
  - Farm worker living conditions,
  - Adjacent peri-urban areas closer to Karibib.

Although nature-based tourism is not a dominant land use in the immediate EPL area, any recreational or visitor-related activities on nearby farms may also be sensitive to dust, noise, and altered access routes.

3.1.6.3 Overall Socio-Economic Sensitivity Rating

The overall socio-economic sensitivity of the EPL 10248 area is assessed as low to moderate, primarily because:

- Settlement density is low within the rural farm landscape,
- Exploration activities are temporary, localised, and reversible, and
- Most potential impacts can be effectively mitigated through:
  - Access agreements with landowners,
  - Clear communication and grievance mechanisms,
  - Compliance with the Environmental Management Plan (EMP),
  - Strict adherence to traffic, dust, and noise management measures.

When properly managed, the proposed exploration programme is therefore expected to pose manageable socio-economic risks, while offering localised short-term economic benefits, without resulting in:

- Long-term displacement of existing land uses, or
- Permanent disruption to farming livelihoods.

3.2 Climate

3.2.1 Overview of Climatic Setting

The project area within EPL 10248 falls in Namibia's central-western semi-arid climatic zone, characterised by:

- Low and highly variable rainfall,
- High summer temperatures,
- Cool to cold winter nights,
- Very high evaporation rates, and
- Low relative humidity throughout most of the year.

This climate is typical of the transition zone between the Khomas Hochland and the Namib Escarpment, where water scarcity, strong seasonality, and high temperature variability significantly affect field logistics, drilling schedules, water sourcing and dust management.

Climatic conditions are therefore a critical factor in planning exploration activities on EPL 10248, particularly for:

- Water supply and storage,
- Worker heat exposure and safety,
- Dust suppression and road access,
- Fire risk management, and
- Seasonal access in ephemeral drainage areas.

3.2.2 Rainfall Patterns

Rainfall in the Karibib area is low, erratic, and concentrated in the summer months (December–March). Based on national climate atlases, the EPL 10248 area receives approximately 150–250 mm of rainfall per year (Figure 3.2).

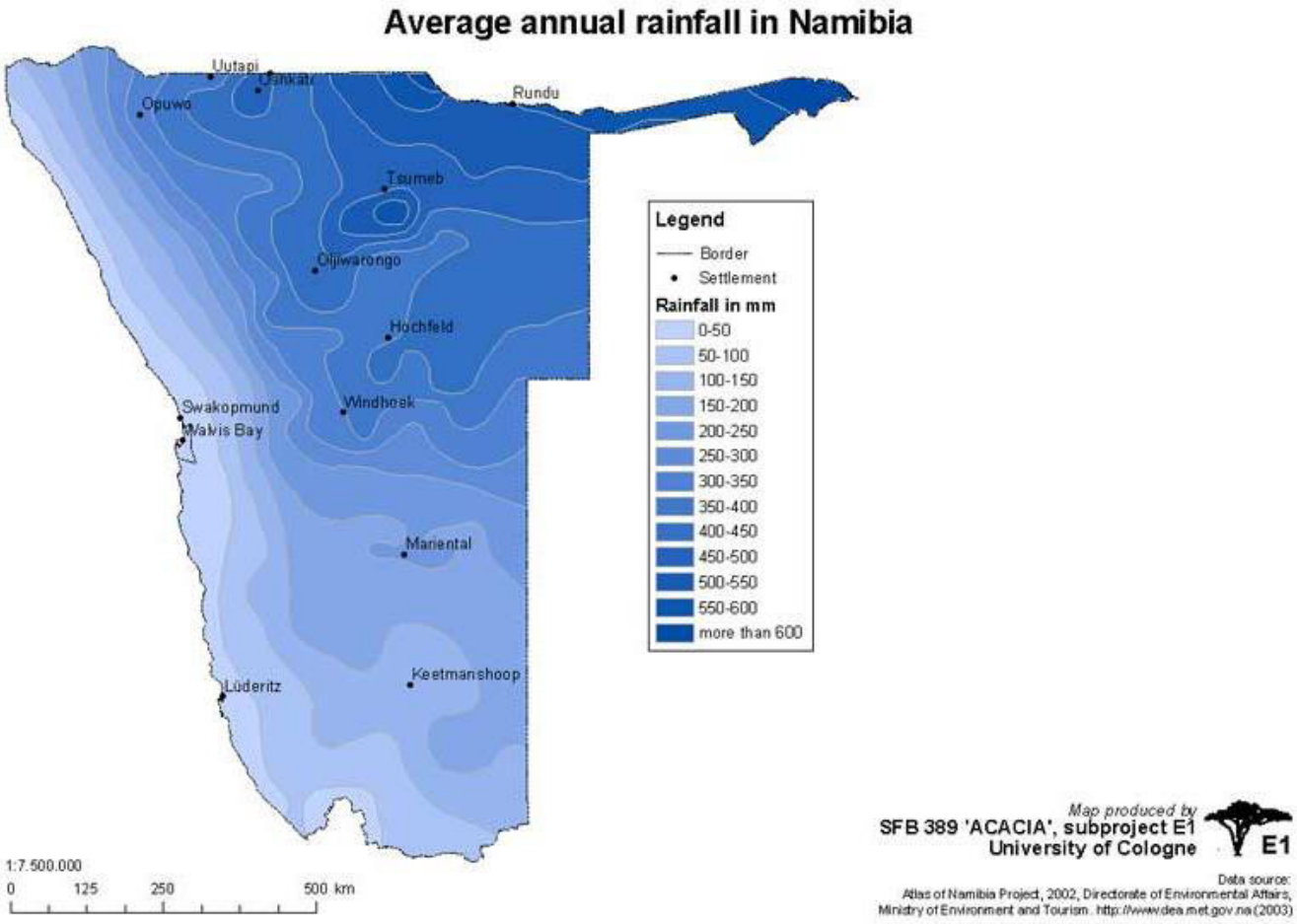

Figure 3-2: Average Annual Rainfall in Namibia

Rainfall is typically delivered through short-lived convective thunderstorms, often intense but highly localised, followed by extended dry spells. The rainfall gradient across Erongo decreases from east to west, with the Karibib area lying within a mid-range transitional rainfall band between the wetter central plateau and the extremely dry Namib fringe.

The high spatial and temporal variability of rainfall is illustrated in Figure 3.3, showing year-to-year fluctuations exceeding 40–60% in some central areas.

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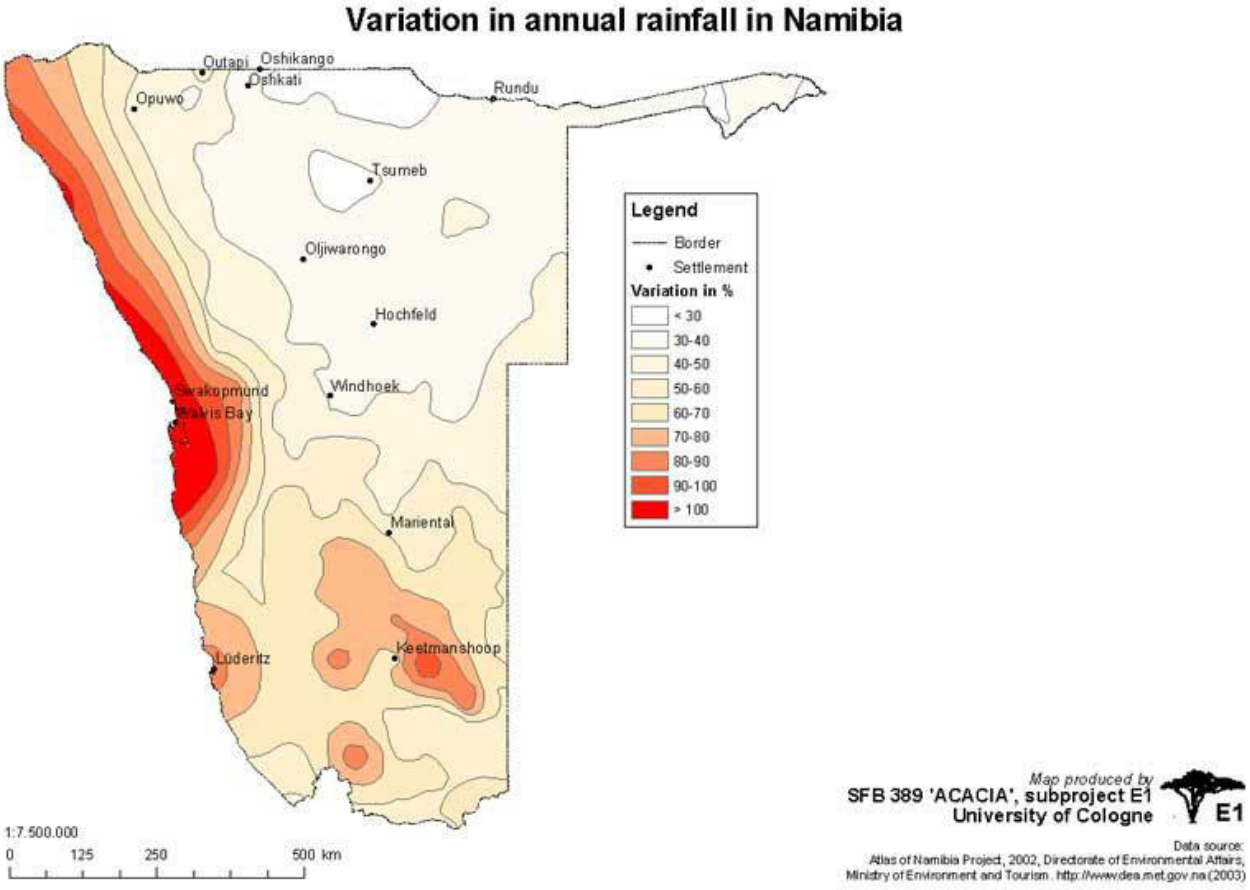

Figure 3-3: Variation in Annual Rainfall in Namibia

This unpredictability directly influences:

- Water availability for drilling,
- The need for strict water budgeting,
- Seasonal access to remote farm tracks, and
- Localised flash-flooding in ephemeral drainage lines.

Although the Swakop River system lies south of the licence area, small tributaries and pans within EPL 10248 may temporarily carry runoff following heavy storms.

3.2.3 Climate Variability and Extremes

Namibia is among the most climatically variable countries in sub-Saharan Africa. Central-western Namibia—including Karibib—experiences:

- Frequent drought cycles every 3–5 years,
- Occasional extreme rainfall events leading to sudden flooding,
- Multi-year dry periods,
- Pronounced inter-annual variability in vegetation cover and soil moisture.

These extremes affect operational planning by requiring:

- Flexible drilling schedules,
- Fuel and water storage contingencies,
- Seasonal timing of heavy vehicle movements, and
- Adaptive safety measures for storms and lightning.

3.2.4 Temperature Regimes

The EPL 10248 area experiences warm to hot temperatures with annual mean values ranging between 20–22°C (Figure 3.4).

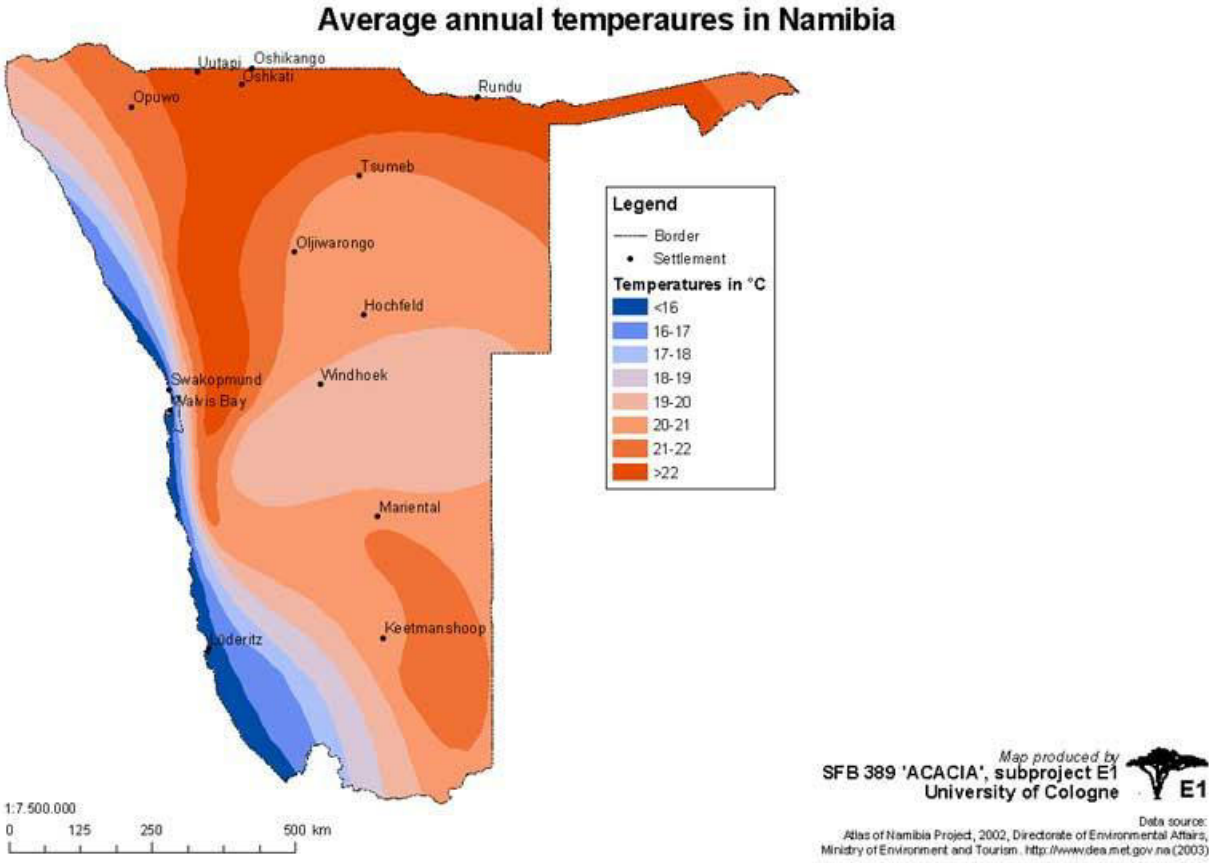

Figure 3-4: Average Annual Temperatures in Namibia

Seasonal patterns are typical of semi-arid Namibia:

a. Summer (October–March)

- Daytime highs: **32–36°C**, occasionally above 38°C
- Heat stress risk is high
- Fuel storage and equipment cooling need careful management

b. Winter (June–August)

- Daytime temperatures: **18–25°C**
- Night-time lows: **2–6°C**, occasionally near freezing
- Cold dry nights increase worker fatigue and require appropriate PPE

Temperature conditions affect several operational aspects of exploration work. High daytime heat can harden soils, reducing drilling penetration efficiency, while also increasing the amount of water needed for dust suppression. Hot, dry conditions elevate the risk of dehydration among workers, requiring strict hydration and rest protocols. In addition, elevated temperatures influence the safe storage of fuel and chemicals, as heat can increase volatility and the risk of spills or ignition if materials are not properly managed.

3.2.5 Evaporation and Water Balance

Evaporation rates in the Karibib–Erongo zone are among the highest in Namibia, averaging 3,000–3,400 mm per year (Figure 3.5)

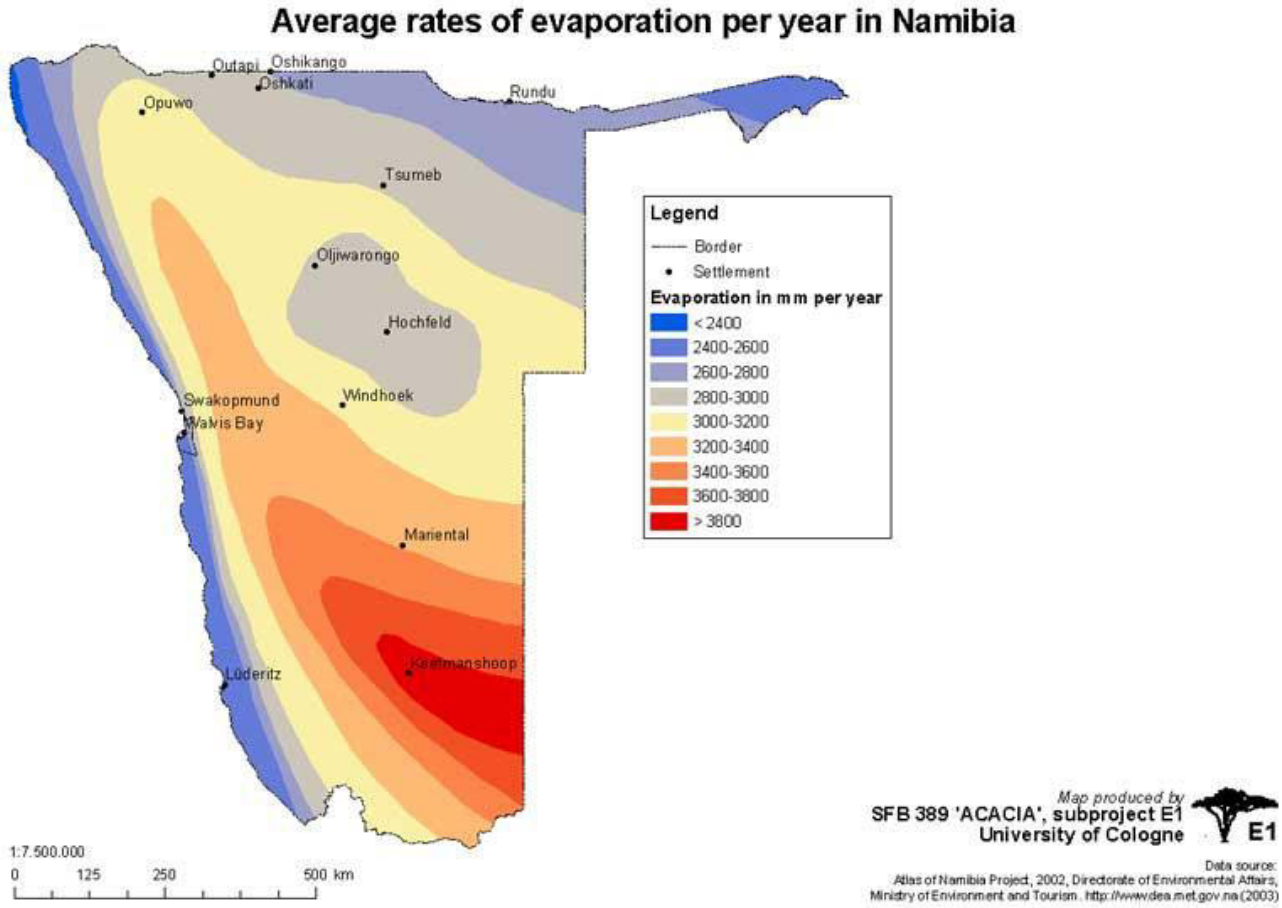

Figure 3-5: Average Evaporation Rates in Namibia

Because evaporation far exceeds rainfall, the water balance is strongly negative, contributing to:

- Rapid drying of soils,
- High dust potential,
- The need for efficient water storage,
- Evaporation losses from water tanks and drill sumps.

The water deficit map (Figure 3.6) confirms that the EPL 10248 area falls within a 2,000–2,500 mm annual deficit zone, reinforcing the need for:

- Careful water permitting under the Water Resources Management Act (WRMA, 2013),
- Minimising water losses,
- Securing storage in lined tanks or portable bowser units.

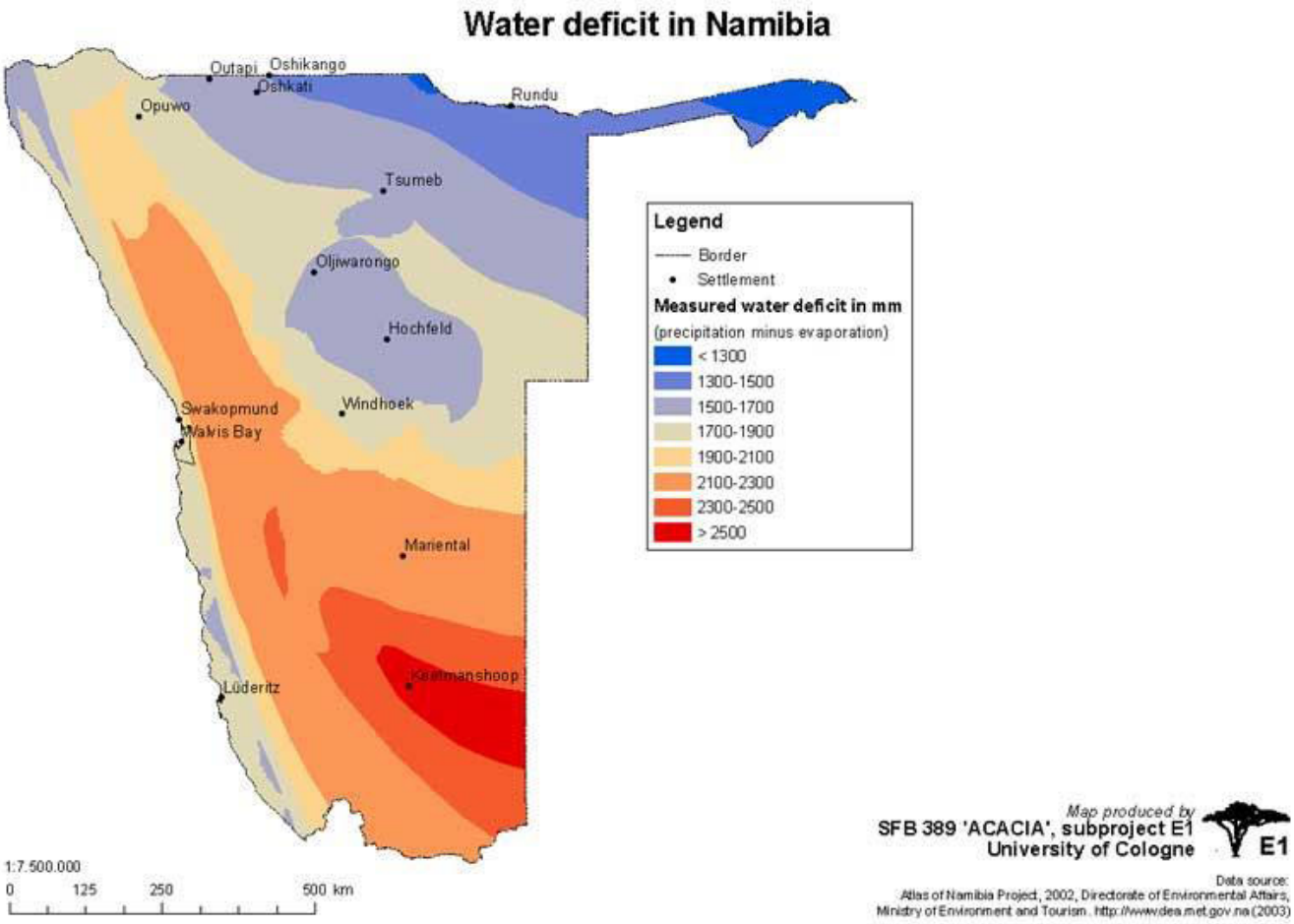

Figure 3-6: Water Deficit Map for Namibia

3.2.6 Humidity and Atmospheric Moisture

Relative humidity in the Karibib area is very low, typically 10–20% during the driest months i.e. between July and September (Figure 3.7)

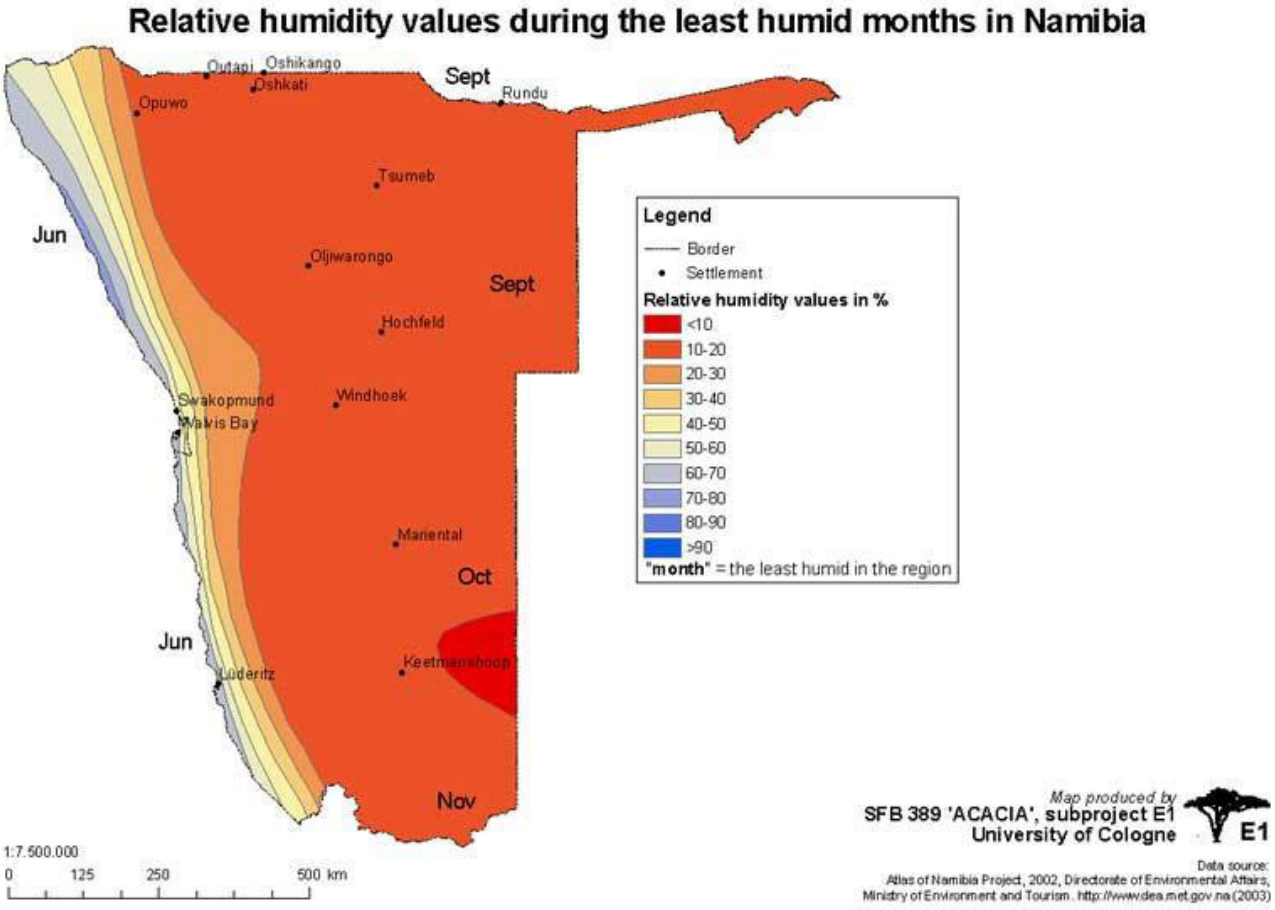

Figure 3-7: Relative Humidity Map for Namibia

Low humidity contributes to:

- Increased dust generation during vehicle movement, drilling, and sampling,
- Dehydration risks for field staff,
- Elevated fire danger when combined with high winds and dry vegetation,
- Faster drying of soils and drilled spoils.

These factors require robust dust management protocols and worker hydration plans.

3.2.7 Wind Patterns

Prevailing winds in the Karibib District typically originate from the east to southeast, particularly during the winter and spring months. Seasonal patterns include strong late-winter and early-spring gusts (August–October), occasional berg winds that bring hot, dry conditions and elevate fire risks, and increased dust entrainment during high-wind periods.

These winds can significantly influence the dispersion of dust from vehicle movement and fine drill cuttings. As a result, wind direction is an important consideration for the safe and efficient placement of drilling rigs, the layout of fuel storage areas, the siting of temporary camps and sanitation facilities, and the design of directional dust-mitigation measures.

3.2.8 Solar Radiation

The Karibib–Erongo area receives very high solar radiation, averaging 5.8–6.2 kWh/m²/day.

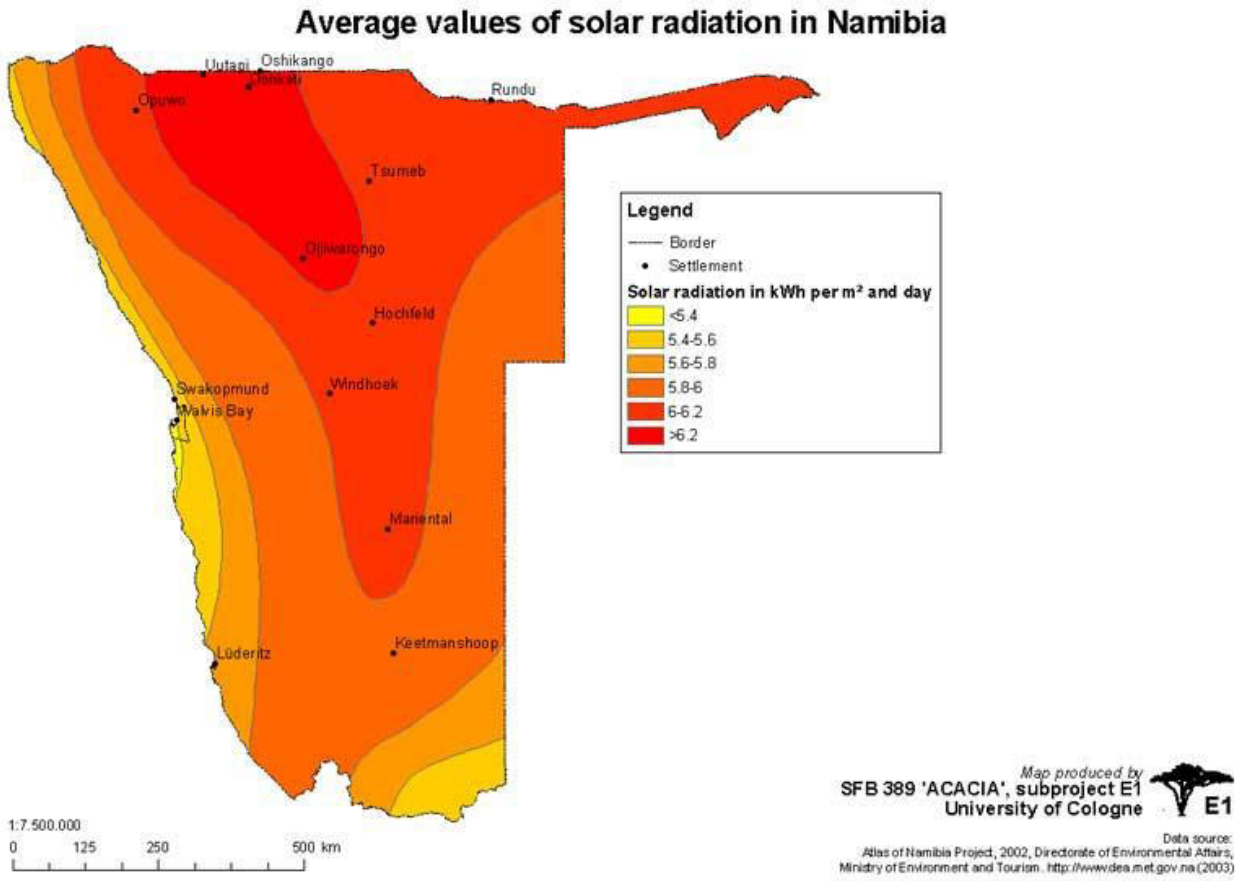

Figure 3-8: Solar Radiation Map

This has operational implications:

- Favourable conditions for solar-powered field equipment,
- Reduced dependency on diesel generators,
- Improved alignment with the National Climate Change Policy (2011) and best practice for reducing carbon footprint.

High solar exposure also increases heat-load risks for field workers and equipment during summer campaigns.

3.2.9 Implications of Climate for Exploration Activities

The climatic characteristics of EPL 10248 directly influence the timing and planning of exploration activities. The most suitable period for fieldwork is between May and September, when temperatures are cooler, rainfall is minimal, and the risk of storms is significantly lower. Conducting exploration during this window improves worker safety, reduces weather-related disruptions, and ensures better access to farm roads and drilling sites.

3.2.9.1 Operational Considerations

The following include operational considerations to take into account:

- Water scarcity demands strict water-use planning and WRMA-compliant abstraction.
- High evaporation requires efficient water storage and dust suppression measures.
- Low humidity and wind increase dust risk, requiring:
  - PPE,
  - Vehicle speed limits,
  - Strategic site layout.
- Summer heat necessitates enhanced worker heat-stress protocols.
- Occasional heavy storms may cause flash flooding in drainage lines, affecting access routes.
- High winds require secure anchoring of structures and careful placement of field camps.

3.2.9.2 Overall Assessment

With appropriate planning, the climate of the EPL 10248 area presents manageable environmental risks during exploration. Seasonal timing, water management, dust control, and adherence to the EMP will ensure safe and environmentally compliant operations.

3.3 Topography, Relief and Landscapes

The EPL 10248 area is located within Namibia's central-western interior, characterized by the transition from the low-lying coastal plains to the elevated interior plateau. The topography of the Karibib District ranges from approximately 1,200 m to over 1,600 m above sea level, consisting of gently undulating plains, isolated hills, shallow valleys, and scattered rocky outcrops typical of the Damara Orogen geological belt. These landforms influence drainage patterns, erosion potential, vegetation structure, and the level of physical access for exploration activities.

The Elevations and Relief Map (Figure 3-9) shows that EPL 10248 lies within a moderate-elevation belt between 1,100–1,600 m, forming part of the interior plateau. The escarpment zone to the west contributes to varied relief around Karibib, with broken terrain and ephemeral drainage systems such as small tributaries feeding into the Swakop River. These geomorphological features result in shallow, stony soils and intermittent slope changes that may affect vehicle movement, drill-site positioning, and erosion sensitivity during disturbance.

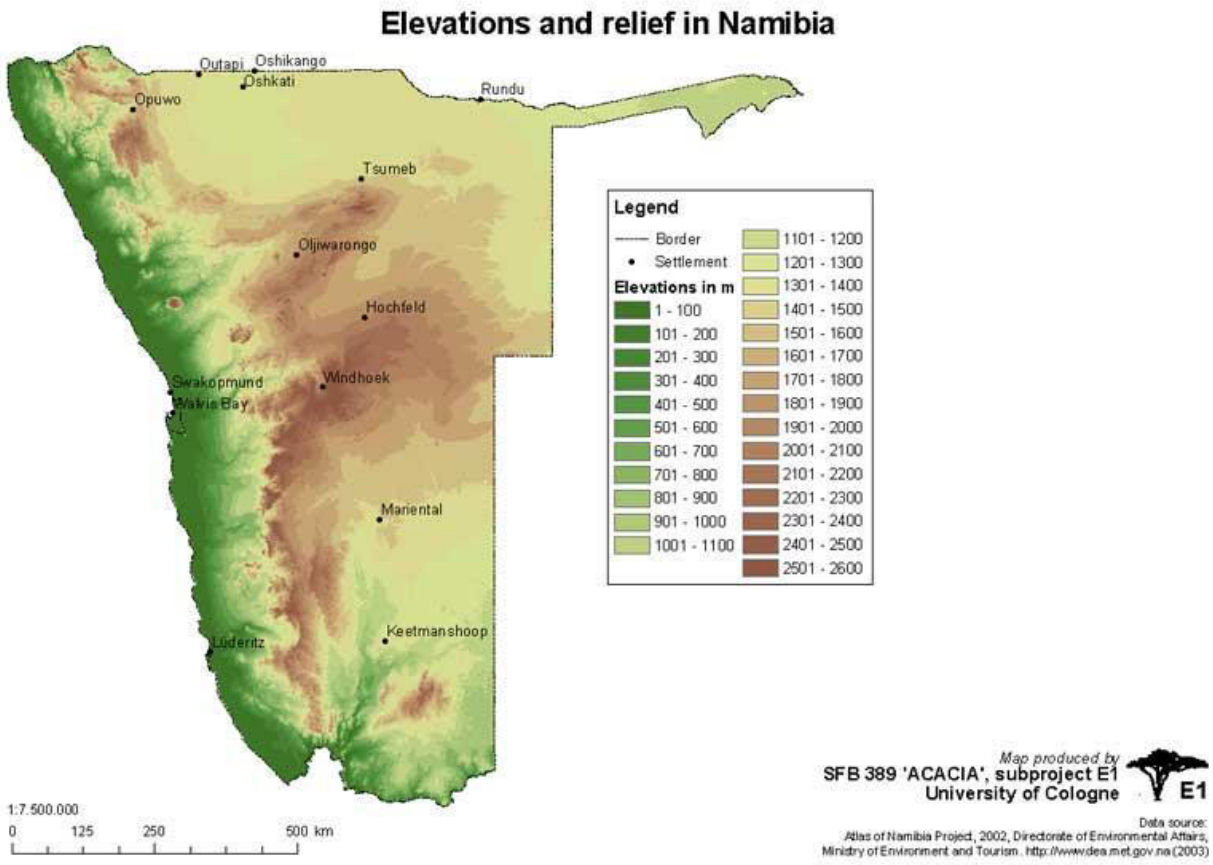

Figure 3-9: Elevations and Relief in Namibia

The Altitudinal Profiles Map (Figure 3-10) illustrates the east–west rise in terrain from the coastal lowlands near Walvis Bay and Swakopmund toward the higher interior around Karibib and Otjiwarongo. This gradient highlights areas where steeper slopes or elevated rocky terrain may require careful route planning for exploration access. The profiles also emphasise the prevalence of shallow soils and rugged outcrops within the EPL area, which will influence drill rig placement, stormwater management and potential sediment runoff during intrusive exploration.

Overall, the topography of EPL 10248 presents manageable but important operational considerations, especially regarding erosion control, safe access, and the selection of suitable locations for drill pads and temporary field infrastructure.

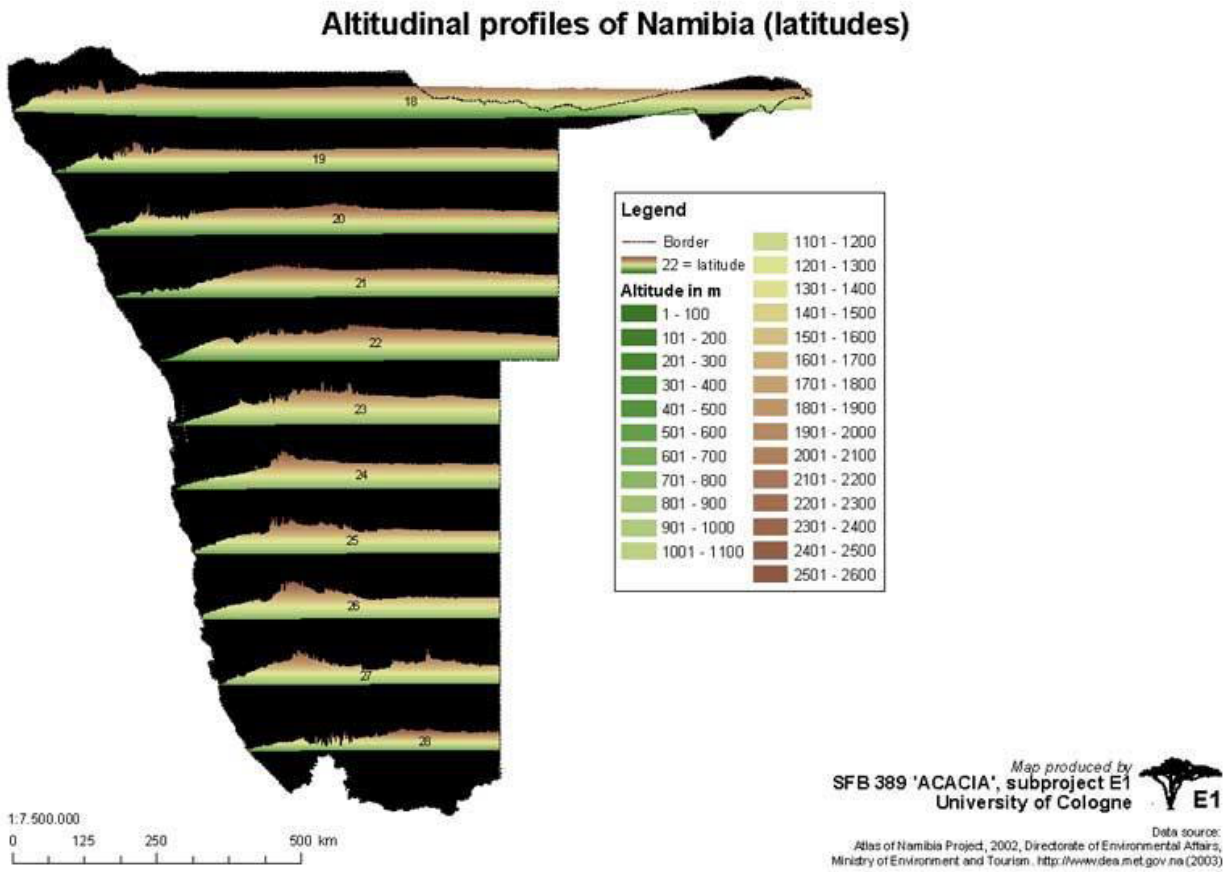

Figure 3-10: Altitudinal Profiles of Namibia

3.4 Soils

Soils across EPL 10248 in the Karibib District are typical of the central-western Namibian highlands, consisting predominantly of Regosols, Arenosols, shallow Calcisols and extensive rock outcrops. These soils are generally shallow (often <50 cm), sandy to sandy-loam in texture, and commonly underlain by schist, quartzite or granitic bedrock associated with the Damara Belt. As shown on the Dominant Soils Map of Namibia (Figure 3.11), the project area is characterised by a mosaic of:

- Rock outcrops, especially on higher ridges and rugged terrain around the Erongo–Karibib corridor
- Eutric Regosols, typical of eroding and weakly developed soils
- Haplic Calcisols, common in semi-arid rangelands with calcrete lenses
- Chromic and Cambic Arenosols, occurring in deeper sandy patches and interdune-like plains

These soil types have low agricultural potential, high infiltration rates, and are susceptible to compaction and erosion around drill pads, access tracks and turning areas. Their characteristics directly inform exploration planning, especially regarding:

- Limits on ground disturbance
- Sediment control and erosion management
- Rehabilitation measures following drilling
- The siting and width of temporary access tracks

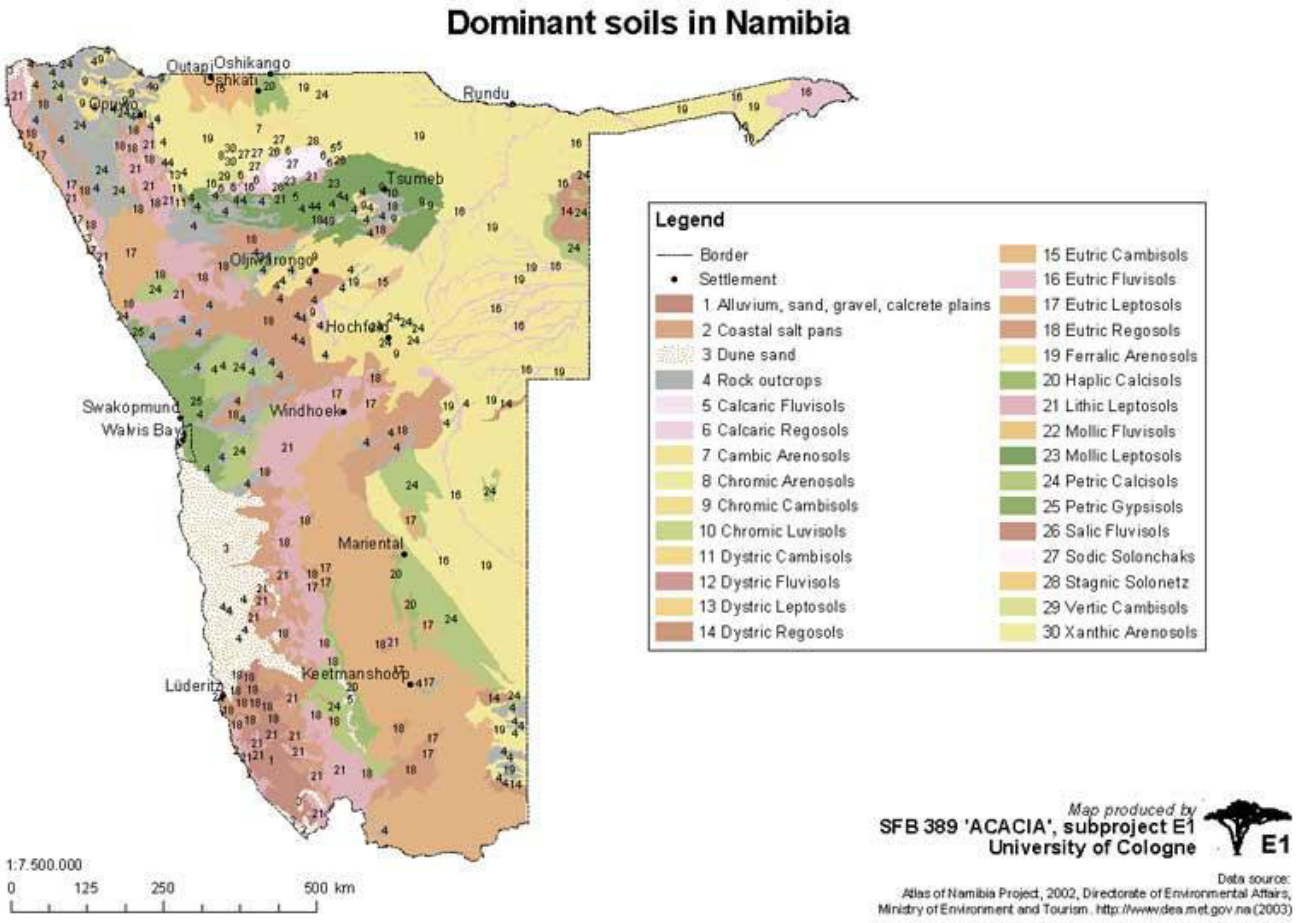

Figure 3-11: Dominant Soils in Namibia

Where deeper sandy and calcareous substrates are present, erosion potential increases significantly once vegetation is disturbed, requiring strict adherence to the EMP's soil conservation and rehabilitation requirements.

3.5 Geology

The geology underlying EPL 10248 forms part of the Southern Central Zone of the Damara Orogenic Belt, a region well known for structurally controlled mineralisation and diverse lithological assemblies. The area is dominated by:

- Mica schists and quartzites, forming much of the bedrock across the licence
- Granitic intrusions, associated with regional deformation and heat flow
- Calcrete deposits, particularly in valley bottoms and drainage lines

- Fractured-rock aquifers, which influence groundwater flow and drilling-water availability

The Groundwater Basins and Rock Types Map (Figure 3.12) illustrates that the EPL lies within a geologically complex terrain with schistose and granitic formations typical of the Karibib–Usakos–Omaruru structural corridor. These rocks present favourable conditions for mineral exploration due to their tectonic history and potential to host:

- structural traps and shear zones,
- contact-metamorphic mineralisation, and
- calcrete-hosted secondary uranium or base-metal anomalies.

The interplay between these lithologies has direct implications for exploration planning, including:

- Borehole siting based on fracture distribution
- Design and interpretation of geophysical surveys
- Geochemical sampling strategies
- Understanding structural controls on mineralisation

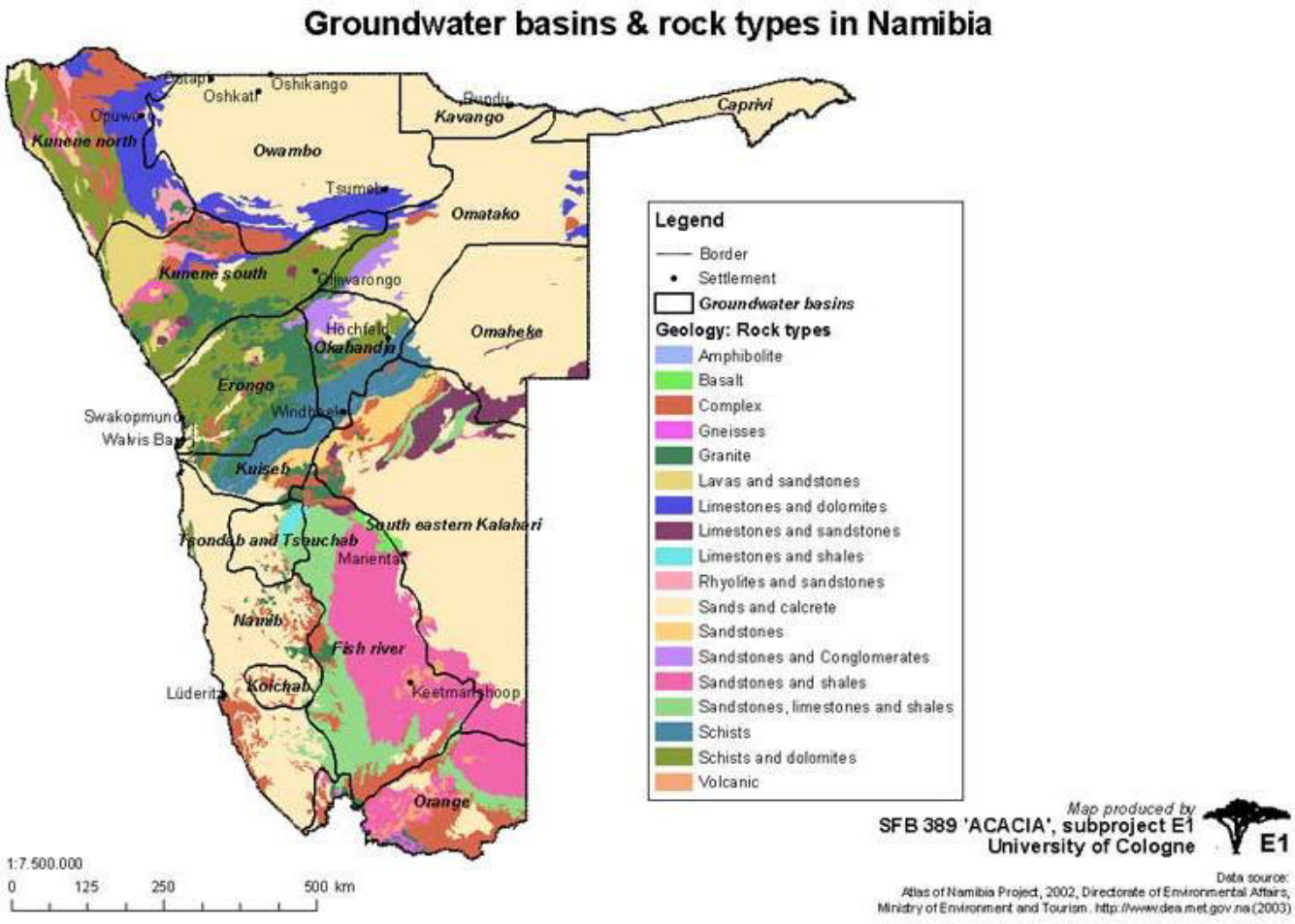

Figure 3-12: Groundwater Basins and Rock Types in Namibia

3.6 Hydrology

EPL 10248 is located within a semi-arid hydrological zone dominated by ephemeral river systems, notably parts of the Swakop and Kuiseb catchments, with minor tributaries draining westwards toward the coastal basin. These rivers flow only during episodic high-intensity rainfall events, yet they play a significant role in sediment transport, groundwater recharge and shaping local ecological systems.

The Hydrography Map of Namibia (Figure 3.13) confirms that:

- No perennial rivers occur within or near EPL 10248
- The area contains numerous ephemeral drainage lines, which may experience sudden flash floods
- Drainage density is moderate, reflecting rugged topography and shallow soils

Surface-water availability is extremely limited; therefore, all exploration water requirements must rely on existing boreholes, licensed abstraction points, and low-impact water-use methods. This aligns with the Water Resources Management Act (2013) and the EMP.

Hydrology also links closely to groundwater protection. Given that the area is underlain by fractured-rock aquifers, contamination risks are heightened if:

- drilling fluids are poorly managed,
- fuel is stored or handled improperly, or
- waste disposal is not strictly controlled.

For this reason, the EMP requires stringent implementation of spill-prevention measures, routine inspection of drilling sites, and hydrogeologically informed siting of new exploration boreholes.

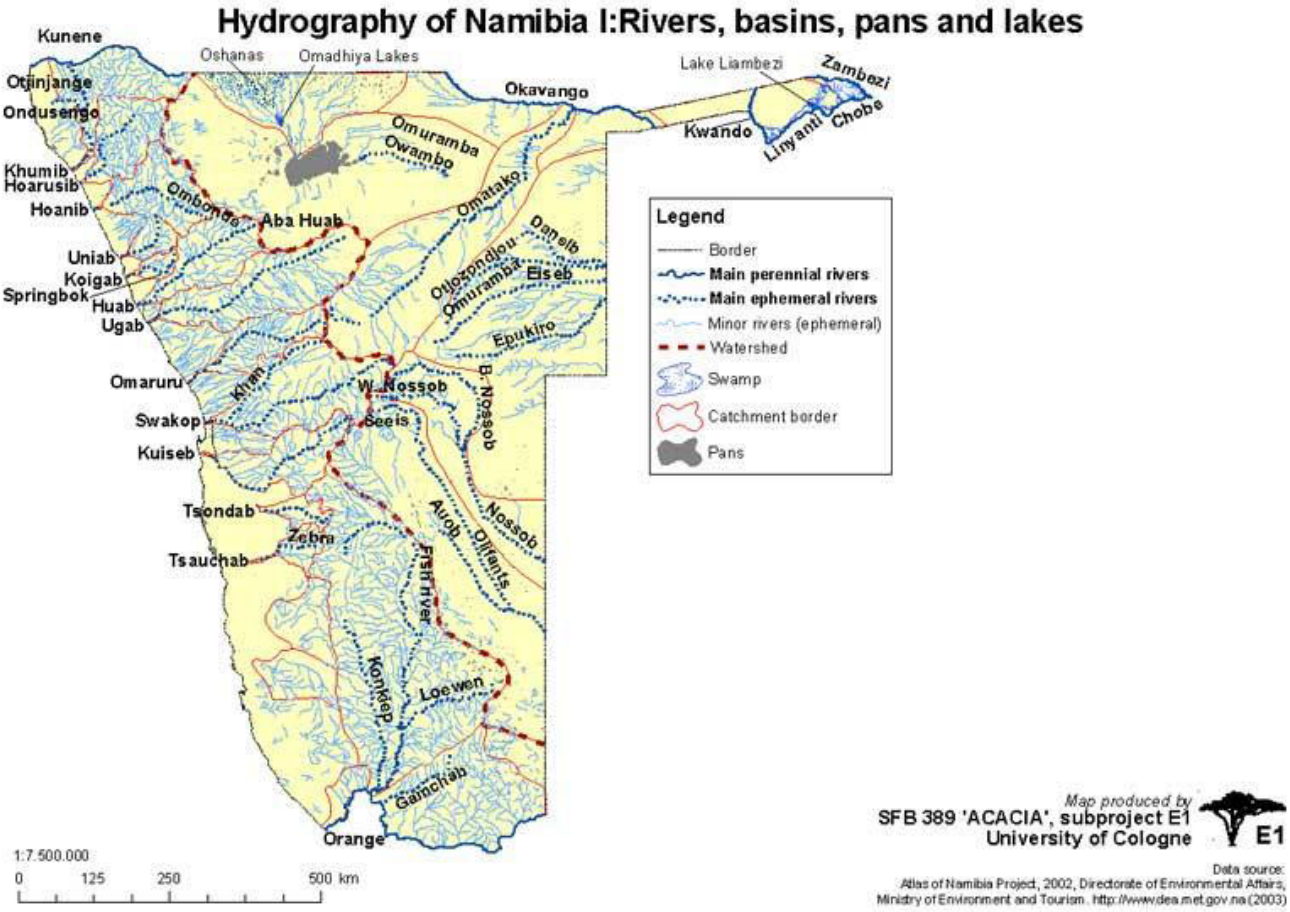

Figure 3-13: Hydrography of Namibia – Rivers, Basins, Pans and Lakes

3.7 Flora, Vegetation Structure and Biodiversity

The EPL 10248 license area, located south of Karibib within the Erongo Region, forms part of Namibia's central Tree-and-Shrub Savanna—one of the country's most extensive and ecologically productive biomes. Vegetation patterns in this area are shaped by semi-arid climate, variable rainfall, shallow soils, and underlying Damara geology, resulting in a mosaic of shrubland, scattered woodland patches, and grass–shrub communities (Atlas of Namibia Project, 2002; Mendelsohn et al., 2003). These ecosystems support a moderate-to-high diversity of plant species and provide essential grazing resources for commercial livestock farming, which dominates land use across the EPL.

3.7.1 Vegetation Structure

Vegetation in and around EPL 10248 is primarily classified as Sparse Shrubland and Grass–Shrub Mosaic, transitioning into patches of Dense Shrubland and Shrubland–Woodland Mosaic toward slightly higher elevations on adjoining farms. Dominant structural elements include Vachellia and Senegalia shrub species, interspersed with hardy savanna grasses adapted to low rainfall and high evaporation. This distribution is illustrated in Figure 3.14,

which shows that the Karibib district lies within the central savanna band characterised by shrub-dominated landscapes.

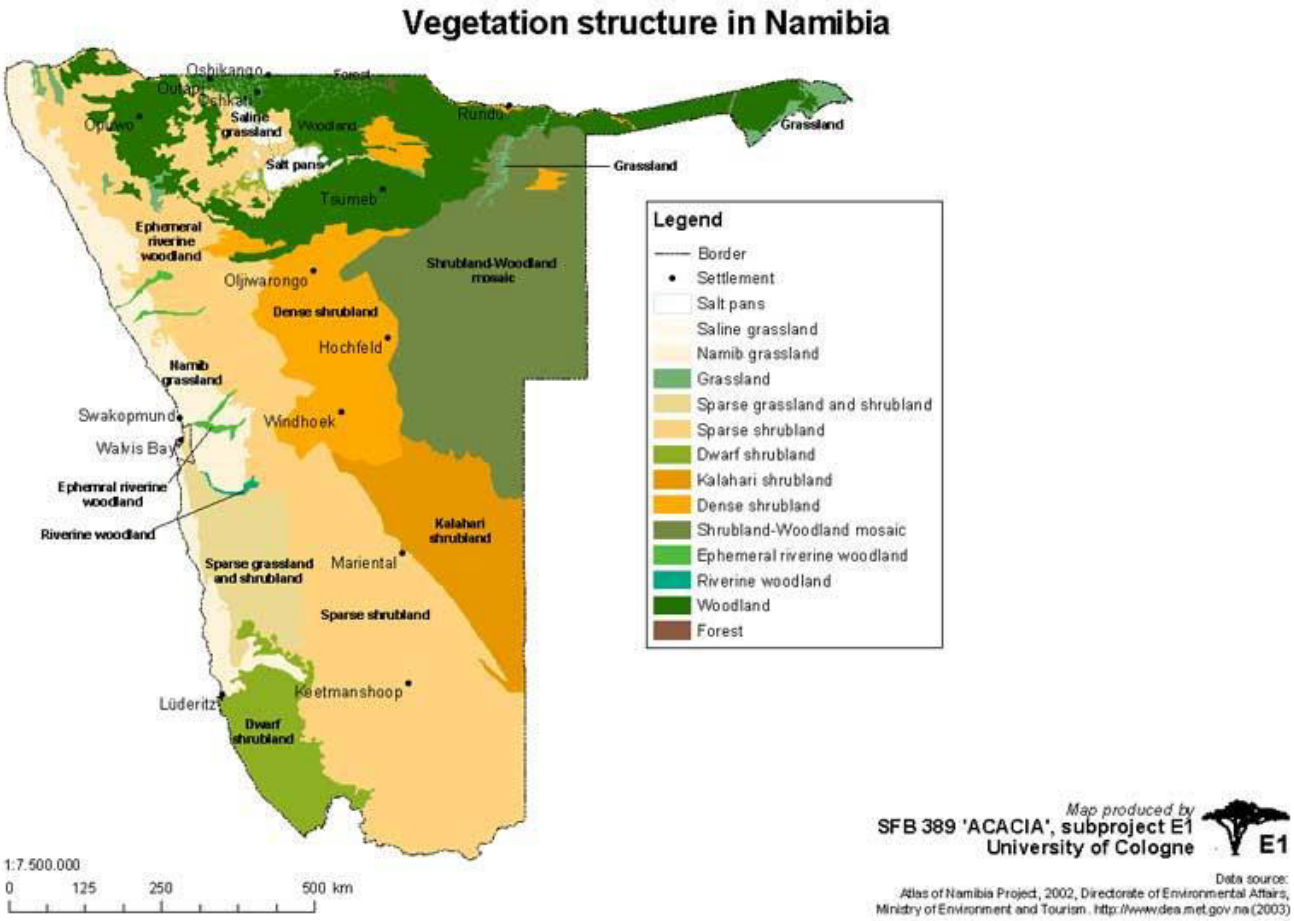

Figure 3-14: Vegetation Structure in Namibia

3.7.2 Floral Diversity

The Erongo–Otjozondjupa transition zone, within which EPL 10248 falls, supports approximately 150–300 plant species per grid unit, reflecting moderate biodiversity typical of semi-arid savannas. Species richness increases northwards and eastwards with higher rainfall but declines toward the drier escarpment-linked plains southwest of Karibib. Figure 3.15 confirms that the wider Karibib area falls into a medium-diversity band, consistent with savanna vegetation growing on shallow, nutrient-moderate soils..

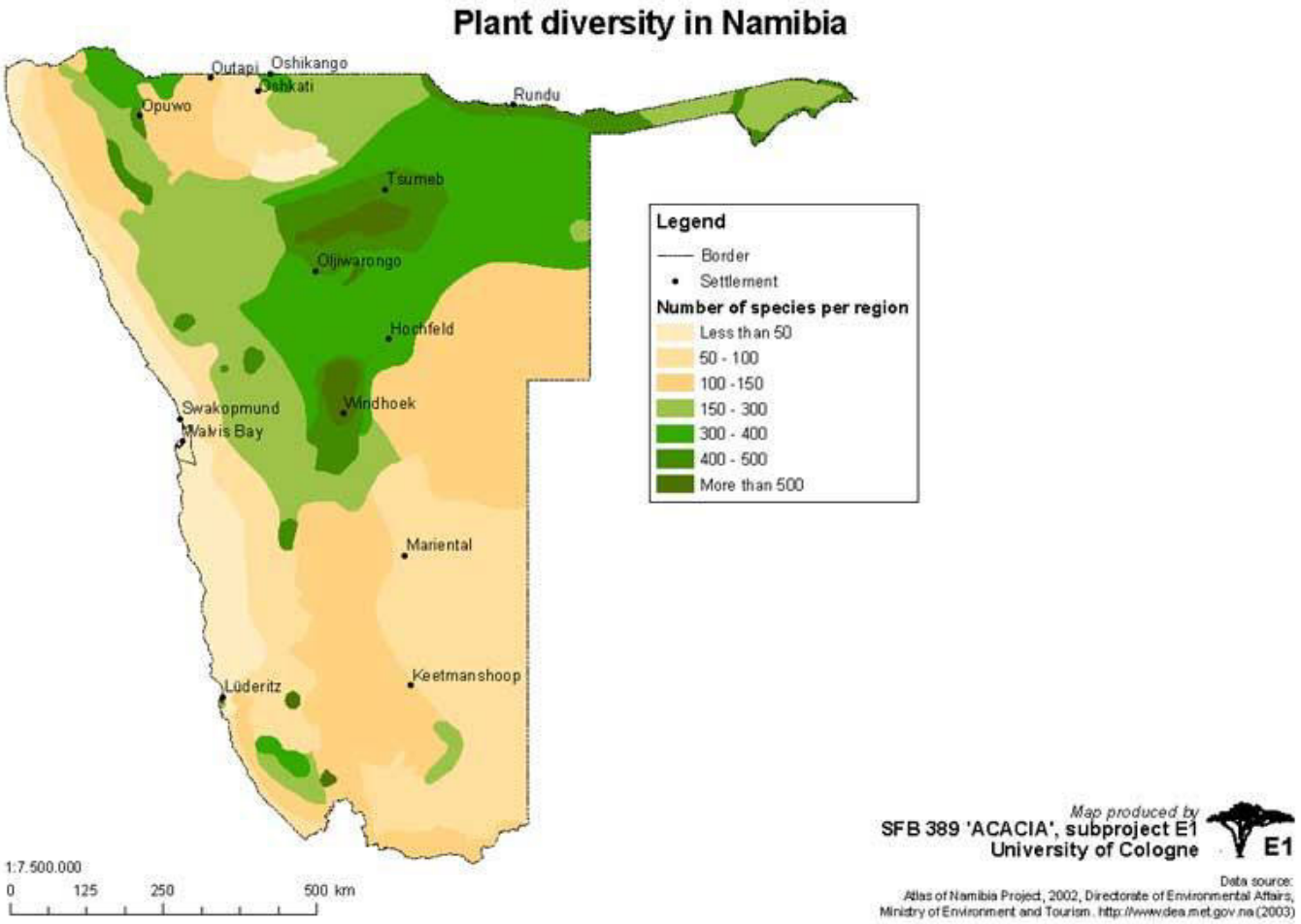

Figure 3-15: Plant Diversity in Namibia

3.7.3 Important Plant Species

Several plant species of ecological, cultural, grazing and economic importance occur, or are likely to occur, within and around EPL 10248. The licence area falls within the central savanna zone of the Karibib district, where woody shrubs, drought-tolerant trees and hardy perennial grasses dominate. The combined influence of rainfall patterns, soils, and the underlying Damara geology creates a characteristic savanna flora with both common and high-value species. Their broader national distribution patterns are presented in Figure 3.16.

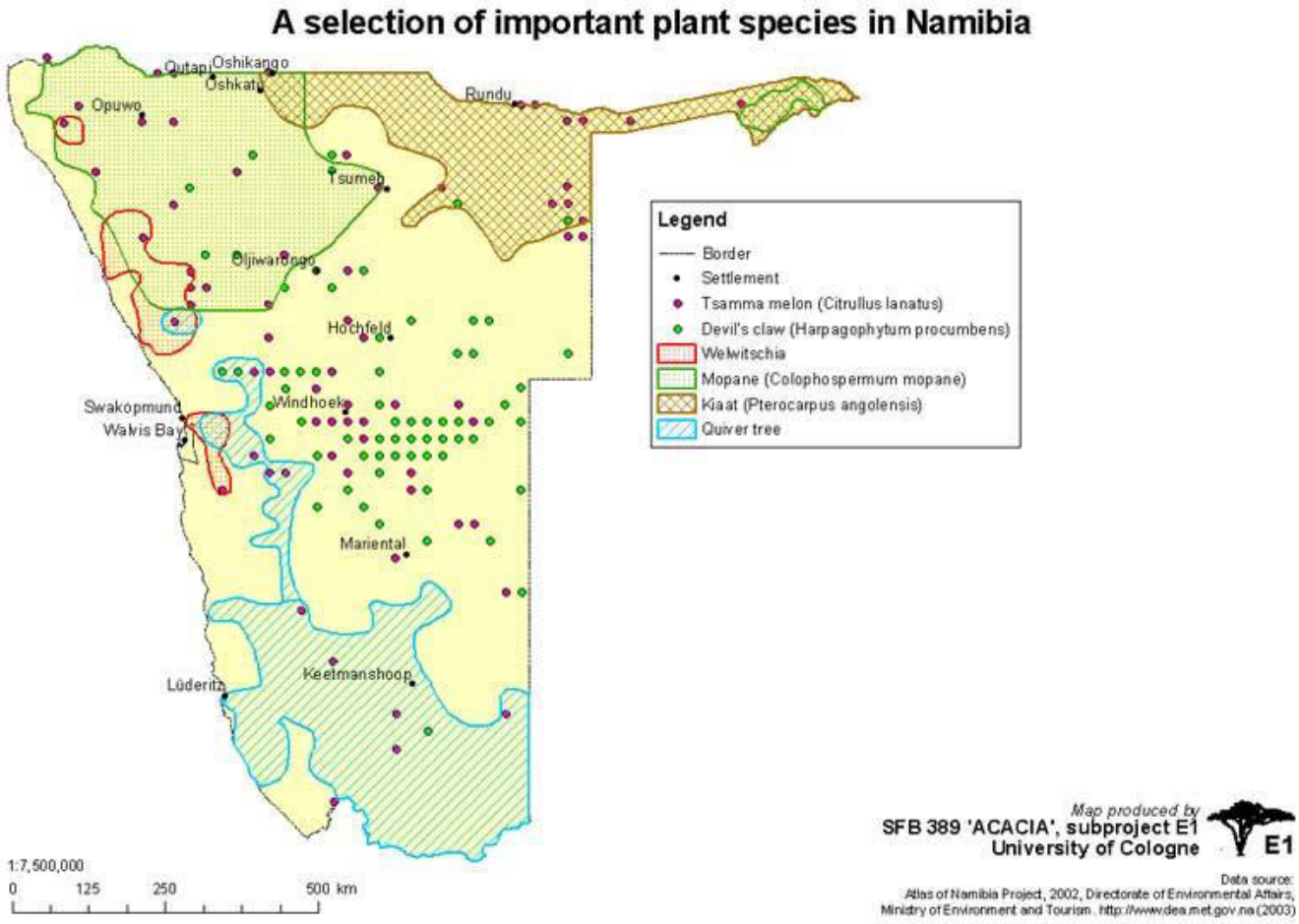

Figure 3-16: Important Plant Species in Namibia

3.7.3.1 Dominant and Co-Dominant Woody Species

These species define the structural character of the vegetation and are widely distributed across farms in the EPL landscape. They shape habitat quality, bush density, and ecological sensitivity.

- *Vachellia mellifera* (Black Thorn) – the most dominant species; a major driver of bush encroachment.
- *Senegalia erubescens* (Blue Thorn) – common on shallow, rocky soils.
- *Vachellia reficiens* (Red Thorn) – widespread in disturbed or overgrazed rangelands.
- *Terminalia prunioides* (Purple-pod Terminalia) – locally abundant across central Namibia.
- *Combretum apiculatum* (Red Bushwillow) – favours drainage lines and deeper sandy pockets.
- *Boscia albitrunca* (Shepherd's Tree) – a key drought-resistant species providing shade and browse.
- *Grewia flava / G. flavescens* (Raisin Bushes) – common browse shrubs supporting wildlife and livestock.

These dominant species form the background structure against which micro-siting, drill access, and vegetation disturbance must be planned.

3.7.3.2 Less Dominant but Ecologically Significant Species

These species occur at lower densities but hold notable ecological, cultural or economic value:

- Devil's Claw (*Harpagophytum procumbens* and *H. zeyheri*) – a globally traded medicinal plant; protected and regulated.
- Commiphora species (e.g., *C. glaucescens*, *C. africana*, *C. kraeusslinii*) – common in Damara terrain; important for browse and habitat structure.
- *Sterculia africana* (African Star-chestnut) – typically found near rocky hills and inselbergs.
- *Aloe hereroensis* (Herero Aloe) – drought-adapted succulent of rocky slopes.

These species contribute significantly to ecosystem function, forage availability and microhabitat diversity.

3.7.3.3 High-Value and Protected Species (Patchy / Low Density)

Although not abundant in this specific part of Erongo, the following remain relevant for permitting and ecological safeguarding:

- Kiaat (*Pterocarpus angolensis*) – a protected hardwood requiring Forestry Act clearance.
- Quiver Tree (*Aloe dichotoma*) – more common westwards; isolated individuals may still occur.
- Mopane (*Colophospermum mopane*) – dominant further north but can occur in scattered stands.
- Welwitschia mirabilis – unlikely within EPL 10248, but regional presence warrants screening during traverses.

3.7.3.4 Interpretation for EPL 10248

Based on local conditions and vegetation structure:

- Dominant vegetation will consist of *Vachellia*, *Senegalia*, *Boscia*, *Terminalia*, *Grewia*, and mixed savanna grasses.
- Less dominant but locally important species include *Commiphora* spp., *Sterculia africana*, and aloes.
- Species of conservation concern, particularly Devil's Claw and Kiaat, require:
    - pre-clearing botanical surveys,
    - micro-siting of drill pads and access routes,
    - avoidance buffers,
    - and compliance with the Forestry Act (2001) and ABS Regulations.

3.7.3.5 Ecological Planning Implications

The presence of diverse savanna flora and protected species necessitates a cautious and environmentally responsible exploration approach. Key ecological-planning considerations include:

- Micro-siting of drilling pads to avoid protected or slow-growing species.
- Avoidance of drainage-line woodland, which supports higher species diversity and is more sensitive to disturbance.
- Minimal clearing of vegetation, especially in dense thornbush or rocky woodland transitions.
- Rehabilitation of disturbed areas using brush-pack and soil replacement techniques.
- Monitoring for Devil's Claw harvesting zones, with zero disturbance allowed.
- Baseline flora mapping prior to any intrusive activity.

3.7.3.6 Overall Conclusion

The plant community within EPL 10248 reflects a typical central Namibian semi-arid savanna with dominant thornbush species, scattered woodland trees, protected hardwoods and valuable medicinal plants. This composition underscores the need for site-sensitive planning, responsible vegetation management and strict adherence to ecological mitigation measures to ensure that exploration impacts remain localised, low-intensity and fully reversible.

3.7.4 Grass Cover and Ground Layer

Grass cover across EPL 10248 is variable but generally low to moderate (11–25%), typical of central-western semi-arid rangelands. Grass abundance is strongly seasonal and influenced by annual rainfall variability. Species commonly found include *Stipagrostis uniplumis, Anthephora pubescens* and *Eragrostis spp*.

As shown in Figure 3.17, grass biomass decreases toward the west and southwest of the EPL, reflecting the sharp decline in rainfall and increasing aridity toward the Namib fringe. These patterns strongly influence land-use suitability and ecological functioning. Grass dynamics are important for maintaining grazing potential, supporting both wildlife and livestock; enhancing soil stabilisation by protecting against wind and water erosion; and shaping fire behaviour, particularly in dry years when reduced ground cover can either suppress natural fire regimes or, conversely, create highly combustible fine fuels after episodic rainfall.

To help maintain these ecological functions, the project must minimise unnecessary vegetation clearing, avoid disturbing key grass-rich patches, and ensure that vehicle movement is restricted to existing tracks, thereby reducing soil compaction and protecting grass regrowth across the EPL.

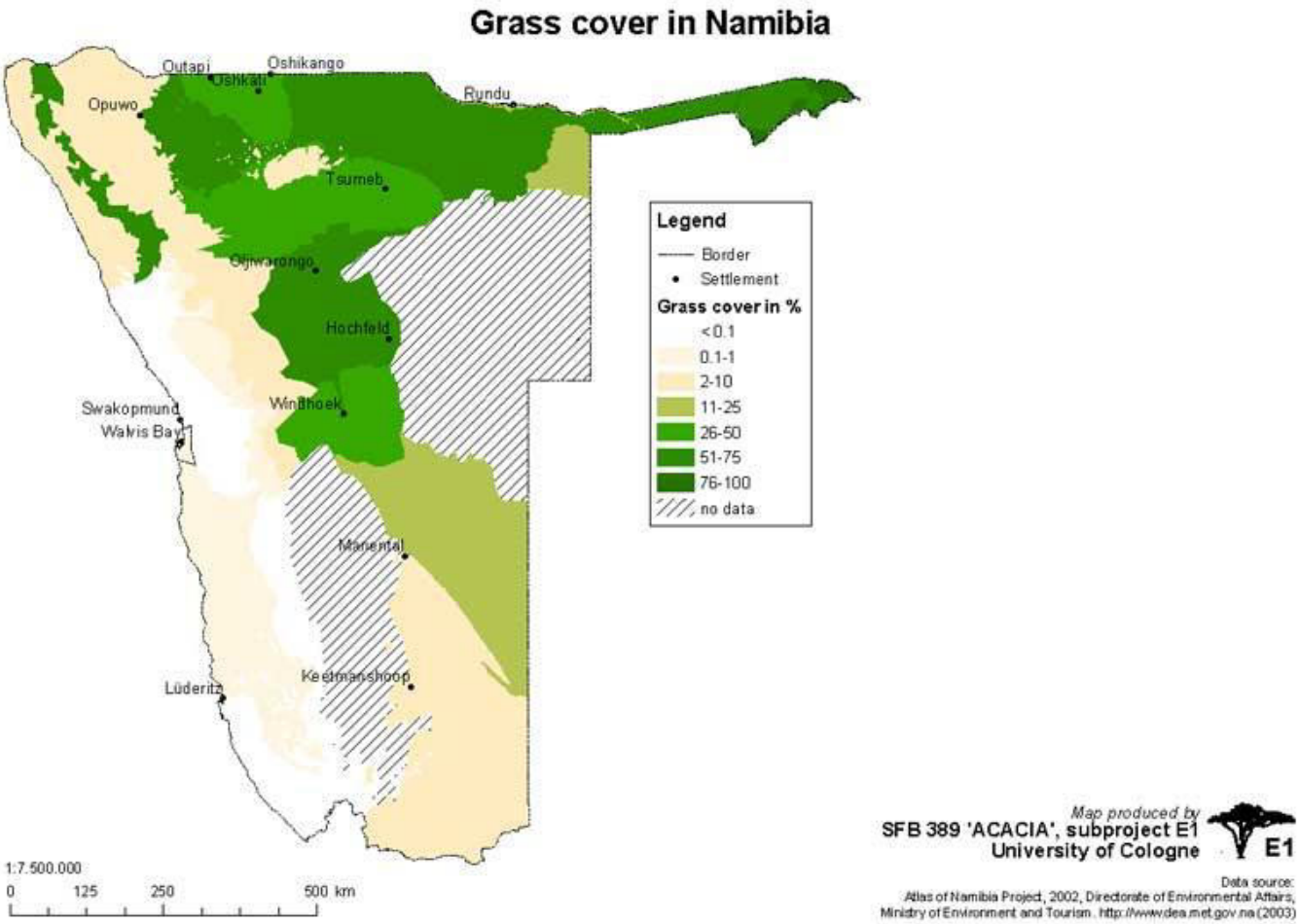

Figure 3-17: Grass Cover in Namibia

3.7.5 Biome Context and Conservation Importance

EPL 10248 is entirely within the Tree-and-Shrub Savanna Biome—the largest biome in Namibia and an important national conservation unit. This biome:

- contains several near-endemic and drought-adapted species;
- supports wildlife movement corridors between the Erongo, Karibib and Omaruru landscapes; and
- is increasingly affected by bush encroachment, primarily by Vachellia mellifera, Vachellia reficiens and Senegalia erubescens.

Bush encroachment is a major ecological issue in both the Erongo and adjacent Otjozondjupa regions (de Klerk, 2004), reducing grazing capacity—a critical concern for the commercial livestock production that dominates land use across EPL 10248. As shown in Figure 3-18 (Biomes of Namibia), the EPL sits firmly within this ecologically significant savanna system.

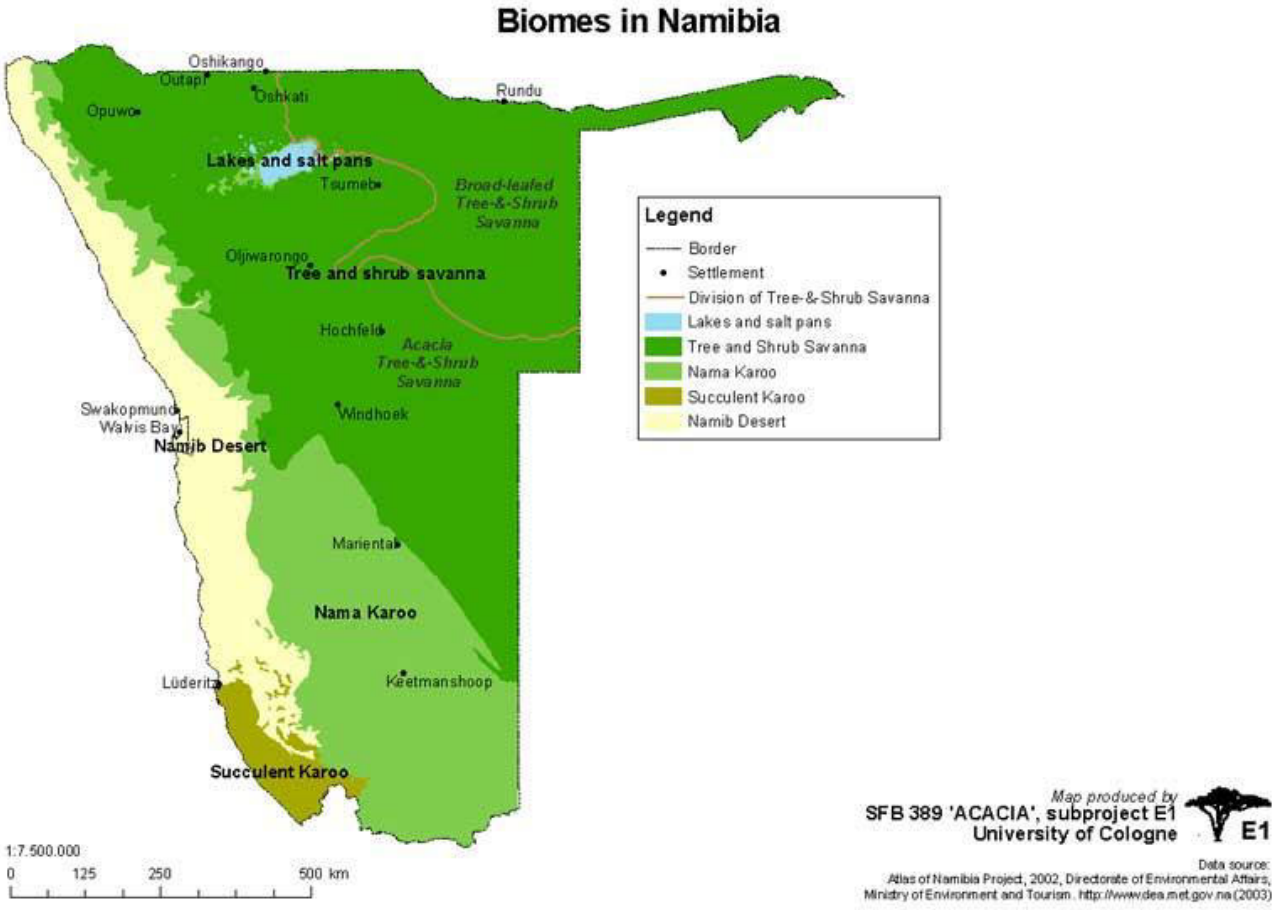

Figure 3-18: Biomes of Namibia

Given its position within this conservation-important biome, the project must ensure that vegetation clearing is kept to the minimum area required, avoiding disturbance to key woodland and savanna structures that support wildlife movement and ecological functioning. In addition, all exploration activities should be planned to prevent exacerbating bush-encroachment pressures, thereby helping safeguard rangeland productivity for surrounding farming operations.

3.7.6 Relevance to the EIA

Although exploration activities are temporary and small-scale, vegetation may be directly affected through:

- clearing for drill pads,
- creation of temporary access tracks,
- equipment staging areas,
- vehicle movement, and
- dust deposition.

Species of concern require:

- micro-siting to avoid individual plants,
- strict compliance with regulations, and
- baseline vegetation recording before drilling.

Given the ecological value of the Tree-and-Shrub Savanna and the economic importance of rangeland vegetation to farming livelihoods, site-sensitive planning and adherence to the EMP are essential to prevent long-term ecological disturbance.

3.8 Fauna

The EPL 10248 area falls within the Central Highlands and Tree-and-Shrub Savanna systems, which support moderate overall faunal diversity compared to Namibia's wetter northeastern regions. National biodiversity gradients show that species richness generally increases from the arid southwest toward the more mesic northeast, meaning the Karibib–Otjiwarongo–Omaruru zone represents a transitional biodiversity band (Mendelsohn et al., 2002). Although the project area is not among Namibia's highest-diversity hotspots, it contains a representative assemblage of mammals, birds, reptiles, amphibians and invertebrates typical of central Namibia. Seasonal movements of wildlife between Waterberg, Etosha, Erongo and surrounding farmlands also contribute to faunal presence in the landscape.

3.8.1 Mammals

Central Namibia supports approximately 61–90 mammal species, which aligns with the diversity expected around the Karibib–Otjiwarongo–Omaruru corridor (Figure 3.19). Species likely to occur include:

- Medium and large herbivores: kudu, oryx, springbok, warthog, red hartebeest, and locally, giraffe
- Carnivores: black-backed jackal, caracal, brown hyena, leopard (transient), and small carnivores (mongooses, genets)
- Small mammals: gerbils, mice, shrews, and a range of bat species

While no species with highly restricted national distributions are expected, the area functions as part of a broader movement corridor between Etosha, Waterberg Plateau and the Central Highlands. Farmland fencing patterns influence these movements, making road access and exploration vehicle traffic key planning considerations

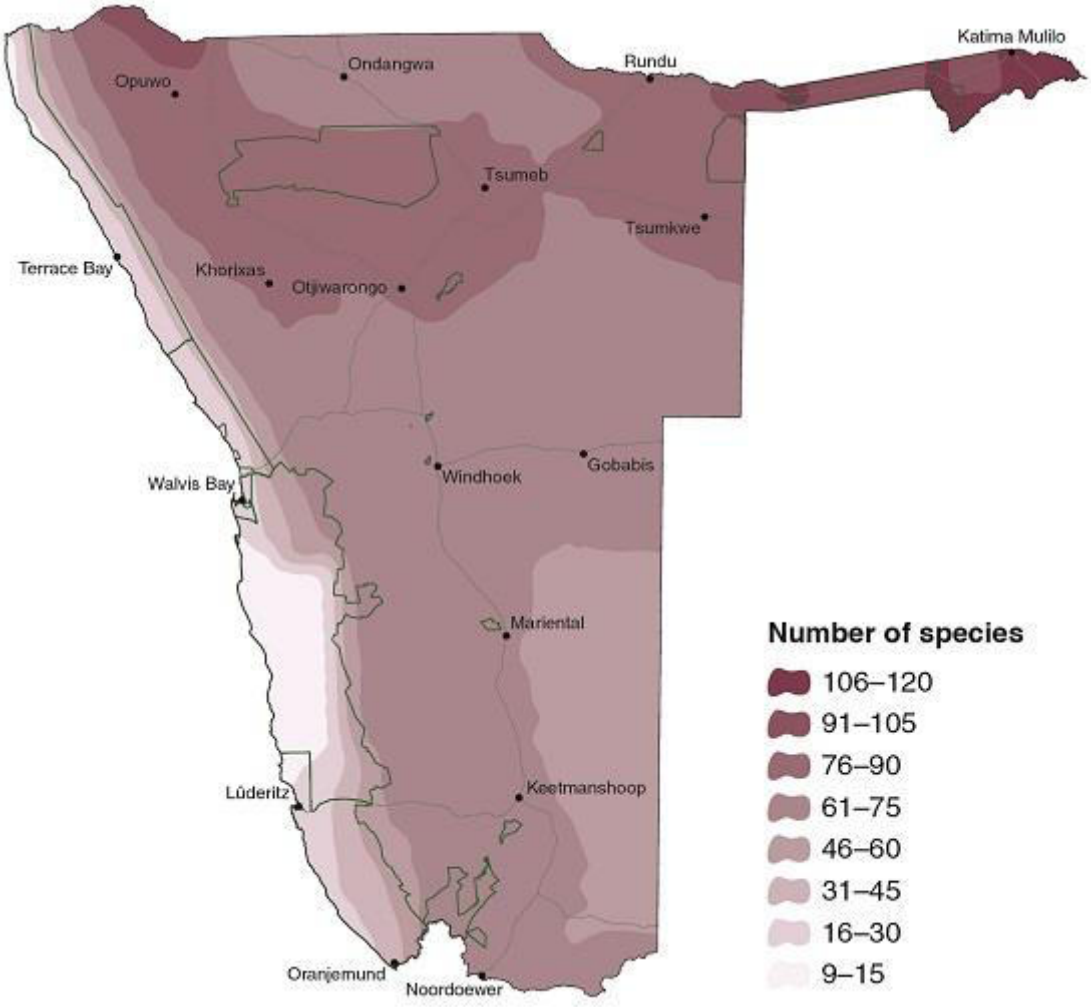

Figure 3-19: Mammal species richness map

3.8.2 Birds

Bird diversity is high in the Central Highlands due to the combination of shrubland, woodland, ephemeral drainage lines and escarpment influences. The EPL area is expected to support 140–170 bird species (Figure 3.20), including:

- Raptors: Lappet-faced Vulture, Bateleur, Martial Eagle, Pale Chanting Goshawk
- Savanna and woodland birds: hornbills, coucals, rollers, starlings, francolins
- Seasonal grassland species: larks, pipits, and seed-eaters following rainfall

Although the EPL does not overlap an officially designated Important Bird Area (IBA), wide-ranging species, including vultures and large eagles, may traverse the area. Tall structures and waste disposal must be planned accordingly.

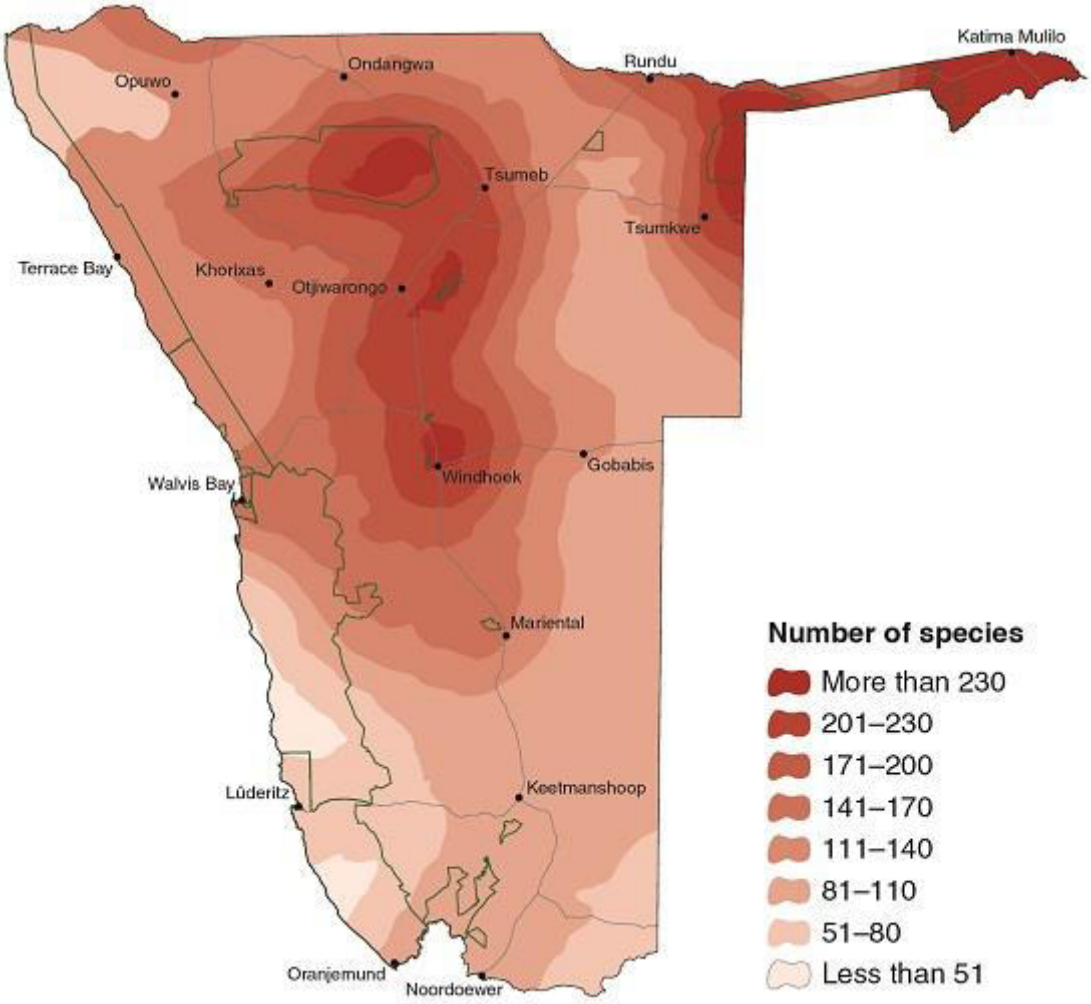

Figure 3-20: Bird species richness map

3.8.3 Reptiles

The region forms part of a moderately high reptile-diversity belt, with 41–70 species expected (Figure 3.21). Diversity is enhanced by the presence of rocky slopes, inselbergs and mixed shrubland.

Likely species groups include:

- Lizards: agamas, plated lizards, geckos, skinks
- Snakes: puff adder, horned adder, mole snake, various harmless colubrids
- Tortoises: leopard tortoise (widespread but protected)

No range-restricted or highly sensitive reptile species are expected, but the area forms part of a broader escarpment-to-highveld diversity gradient.

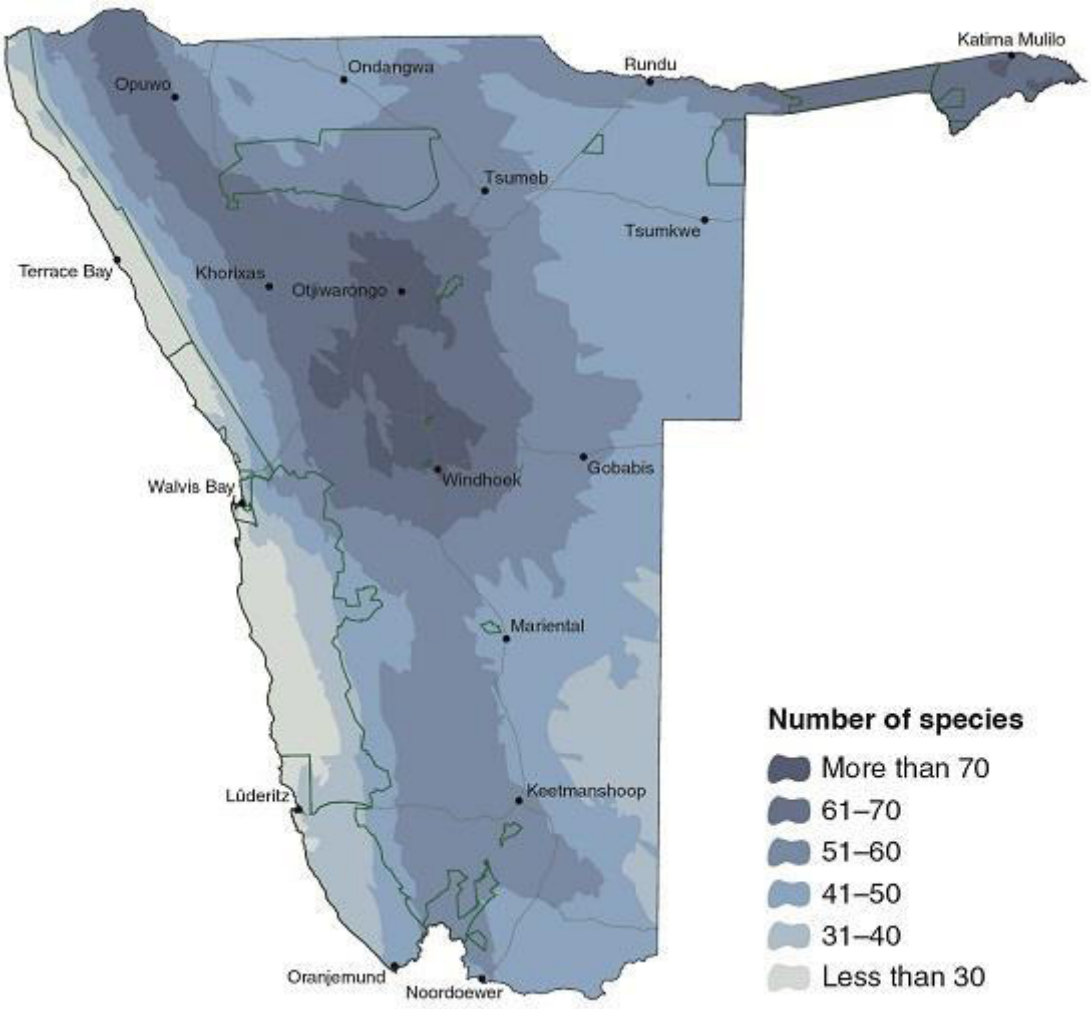

Figure 3-21: Reptile species richness map

3.8.4 Amphibians

Amphibian richness mirrors rainfall patterns. EPL 10248 lies within a zone supporting 9–15 amphibian species (Figure 3.22), including:

- Sand frogs (*Tomopterna spp.*)
- Rain frogs (*Breviceps adspersus*)
- Toads (*Sclerophrys spp.*)

Most amphibians appear only after heavy rainfall events. The absence of perennial waterbodies within the EPL means amphibian populations are seasonal, low in density and low in diversity.

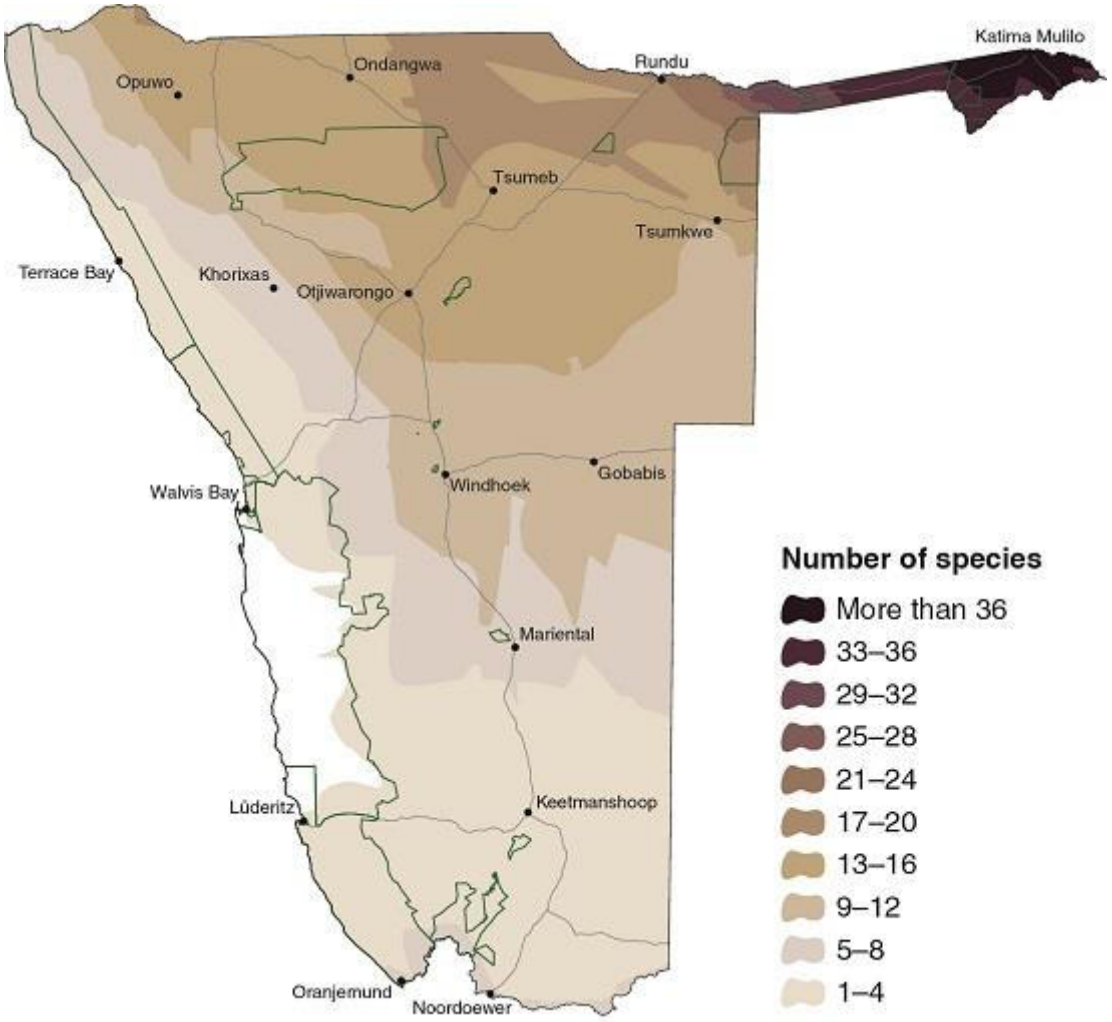

Figure 3-22: Amphibian species richness map

3.8.5 Freshwater Fish

Ephemeral rivers in central Namibia—such as the Omaruru and Swakop systems—typically support 1–4 fish species, introduced during episodic flood events only (Figure 3.23). Given the lack of perennial watercourses within EPL 10248, no resident fish populations are expected (Mendelsohn et al., 2023).

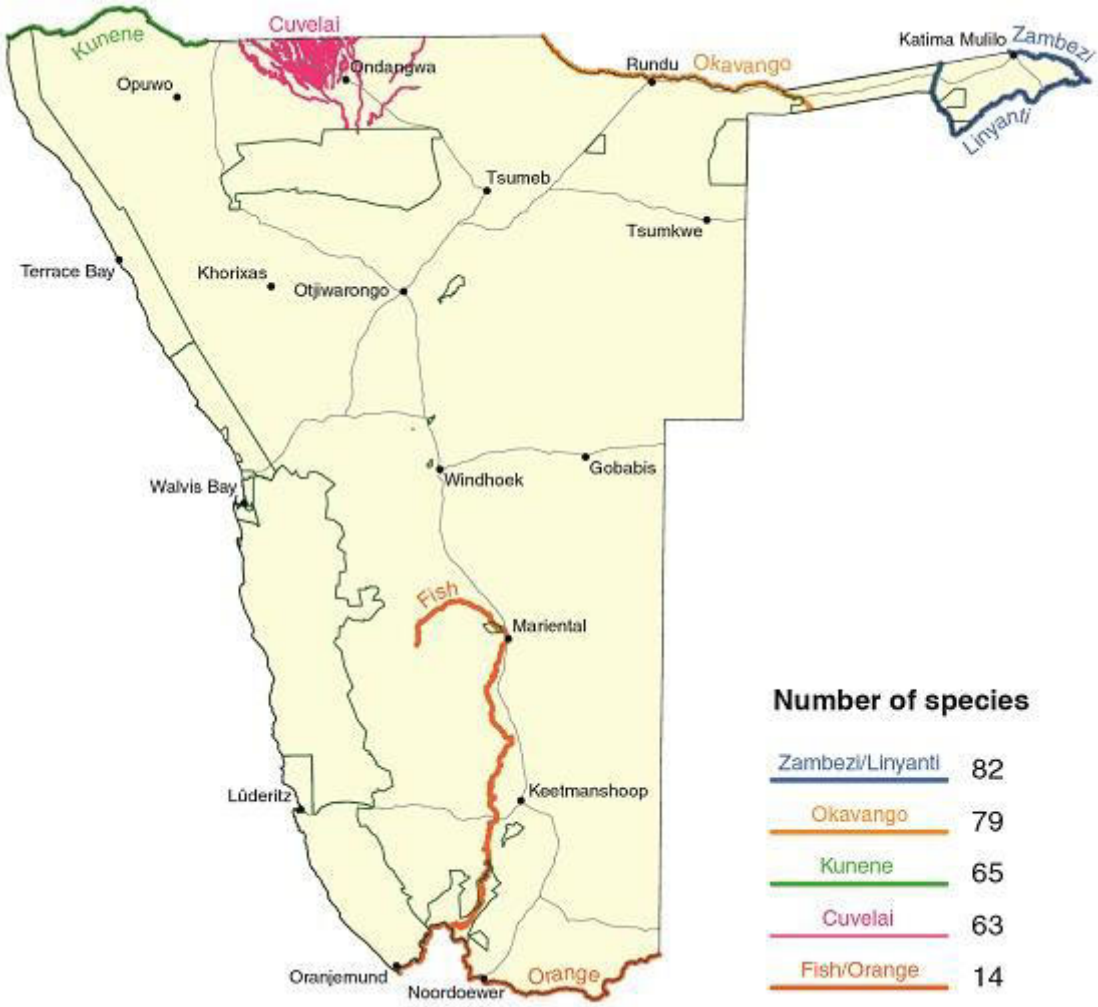

Figure 3-23: Fish species occurrence by catchment

3.8.6 Invertebrates

Invertebrates form the largest faunal group in the Central Highlands, with high diversity particularly among:

- Tenebrionid (darkling) beetles
- Solifuges (sun spiders)
- Scorpions
- Termites
- Ants and pollinating insects

The region's varied microhabitats—rock outcrops, savanna grasslands, sandy patches and shrub zones—produce moderate-to-high invertebrate richness (Figure 3-24). Most species are not of conservation concern, but they contribute significantly to nutrient cycling, soil turnover and ecosystem functioning.

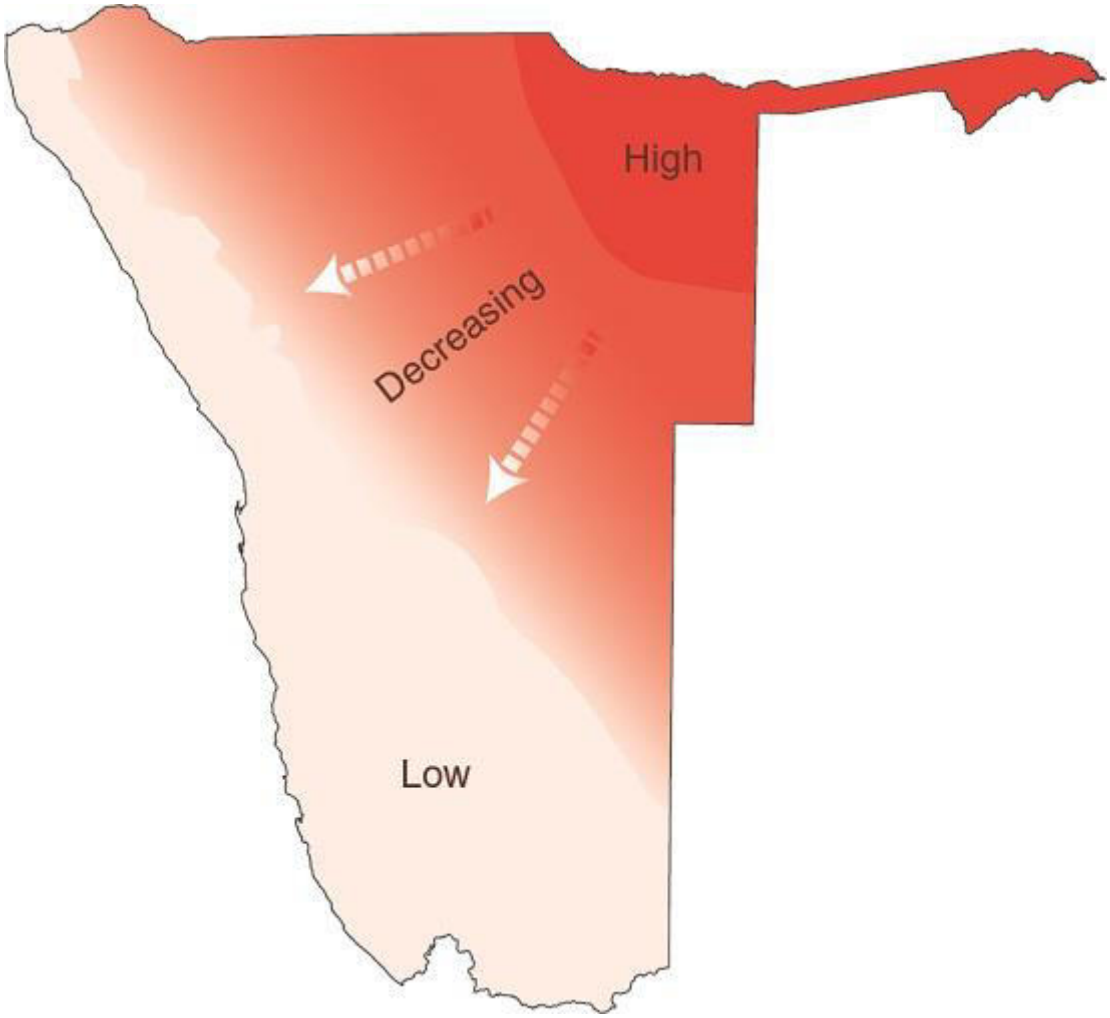

Figure 3-24: Invertebrate richness gradient map

3.8.7 Faunal Sensitivity Summary

Overall, faunal communities in EPL 10248 are representative of central Namibian savannas, with moderate species richness and no highly range-restricted species. Sensitivity arises primarily from:

- Habitat disturbance (removal of shrubs, clearing of grass cover)
- Noise impacts affecting mammals and birds
- Vehicle movement on farm roads (risk to small mammals, reptiles, and nocturnal species)
- Seasonal wildlife movement corridors across farms

From an ecological-planning perspective:

- Micro-siting of drill pads and access tracks is essential to avoid drainage lines, rocky outcrops and known wildlife paths.
- Night driving should be minimised to reduce wildlife collisions.
- Speed controls are critical due to livestock–wildlife shared farm roads.

- Dust suppression reduces impacts on birds and small mammals.

With proper implementation of the EMP, all faunal impacts associated with exploration activities are expected to remain low, localised, and fully reversible.

3.9 Heritage and Archaeological Resources

A separate specialist assessment of heritage and archaeological resources has been undertaken for EPL 10248 in accordance with the National Heritage Act (2004) and best-practice heritage management standards. This assessment identifies potential heritage features, evaluates their significance, and provides site-specific management and mitigation measures applicable to exploration activities. The full Heritage and Archaeological Resources Report is included in the Appendices of this EIA and should be read together with the Environmental Management Plan (EMP) to ensure full compliance during project implementation.

3.10 Environmental Sensitivity Assessment

The environmental sensitivity assessment identifies areas within and surrounding EPL 10248 that may require avoidance, restricted access, or enhanced mitigation during exploration. Sensitivities were evaluated using regional biodiversity datasets, vegetation and hydrology layers, soil maps, conservation planning tools, and known ecological patterns for the Erongo Region and central highlands.

3.10.1.1 Sensitive Habitats

Sensitive habitats in the broader Karibib landscape include ephemeral drainage features, patches of riparian vegetation, structurally intact woodland thickets, and localised high-biodiversity microhabitats such as rocky slopes and inselbergs.

Although EPL 10248 contains no perennial rivers, several ephemeral drainage lines traverse adjacent farm properties. These features are considered ecologically sensitive due to their importance for groundwater recharge, seasonal vegetation regeneration, and wildlife movement. No new access tracks or drill pads should be placed within or across drainage channels.

Rocky ridges and scattered outcrops found in parts of the project area are also sensitive because they often support specialist flora and fauna, provide refugia during drought, and contain shallower soils prone to erosion. These landscape features must be avoided during route selection and should not be disturbed for exploration access.

3.10.1.2 Protected Areas and Conservation Priorities

EPL 10248 is located outside any proclaimed national parks, registered conservancies, or statutory ecological buffer zones. However, the wider Erongo–Karibib–Omaruru system forms part of a central savanna wildlife movement corridor, linking private conservation areas with routes toward Etosha and the Waterberg Plateau.

While no formal constraints apply, exploration activities should avoid unnecessary disturbance that could interfere with seasonal wildlife movements, particularly for large herbivores and wide-ranging carnivores.

No Key Biodiversity Areas (KBAs) or Important Bird Areas (IBAs) fall within EPL 10248, and spatial overlap with Namibia's national conservation priorities is therefore considered low.

3.10.1.3 Vulnerable Flora and Fauna

Red-listed or protected species may occur intermittently across the Karibib landscape, particularly:

- Raptors (e.g., Lappet-faced Vulture, Martial Eagle)
- Wide-ranging carnivores (e.g., leopard)
- Specialist plant species associated with rocky outcrops (e.g., *Aloe* spp., *Commiphora* spp.)

However, due to the small footprint of early-stage exploration and the mobility of most fauna, significant encounters are unlikely.

Areas of dense woodland or structurally intact savanna should be considered moderately sensitive, and vehicle movement must be restricted to existing farm tracks wherever possible.

While no known breeding colonies, dens, or critical habitats have been documented within EPL 10248, a chance-find protocol must be applied to any nests, burrows, dens or sensitive plant specimens encountered during operations.

3.10.1.4 Hydrological and Soil Sensitivities

Soils in EPL 10248 vary from shallow stony soils on higher ground to deeper sandy-loam substrates in valleys and plains. These soils influence erosion potential, access planning, and rehabilitation needs.

Key sensitivities include:

- Erosion susceptibility: Sandy or disturbed soils are prone to wind and water erosion; off-track driving must be avoided.
- Flood-prone zones: Low-lying drainage depressions may accumulate water following heavy rainfall and should not be used for drilling or access routes.
- Groundwater protection: Although no farm boreholes fall directly within proposed drill areas, all exploration drilling must follow strict casing and sealing standards to avoid contaminating fractured-rock aquifers typical of the Erongo highlands.

Overall, hydrological and soil sensitivity for EPL 10248 is assessed as low to moderate, with localised hotspots requiring careful routing.

3.10.1.5 Cumulative Environmental Constraints

When integrating ecological, hydrological, heritage and land-use sensitivities, the following moderate to high sensitivity zones are identified:

- Ephemeral drainage lines and associated riparian vegetation
- Rocky outcrops, ridges and slope complexes
- Dense woodland or areas with elevated biodiversity value
- Areas in proximity to historic or active farmsteads (overlap with heritage sensitivity)

Areas of low sensitivity include homogenous open savanna, previously disturbed farming areas, and existing access tracks, all of which are generally suitable for low-impact exploration.

3.10.1.6 Implications for the Project

To ensure environmentally responsible exploration, the following constraints must guide the layout and implementation of activities on EPL 10248:

- Prioritise low-sensitivity open savanna for drill pads and temporary infrastructure.
- Avoid creation of new tracks in drainage lines, dense woodland, or across rocky ridges.
- Use moderate-sensitivity areas only with strict mitigation, controlled access, and post-exploration rehabilitation.
- Avoid all high-sensitivity areas, applying buffers where appropriate.
- Maintain an active chance-find procedure for both ecological and heritage resources.

With adherence to these spatial and ecological constraints, exploration activities on EPL 10248 are unlikely to generate significant environmental impacts.

4 CHAPER FOUR: PUBLIC CONSULTATION

4.1 Overview

Public consultation is a statutory requirement under the Environmental Management Act (EMA) No. 7 of 2007 and the Environmental Impact Assessment Regulations (GN 30 of 2012). Regulation 21 outlines specific steps to ensure that Interested and Affected Parties (I&APs) are given a fair opportunity to receive information, register concerns, and contribute to the assessment process. For the proposed exploration activities on EPL 10248, all consultation activities were carried out in line with:

- The Environmental Management Act (EMA), 2007
- The EIA Regulations (GN 30 of 2012)
- Regulation 7(1) on public notification
- The project Terms of Reference
- International good practice principles on stakeholder participation

The key objectives of the consultation were to:

- Ensure transparency in project planning and assessment;
- Provide clear and accessible information to potential I&APs;
- Obtain local knowledge of the receiving environment;
- Identify issues of concern early in the process;
- Facilitate meaningful, inclusive, and accountable participation.

A range of communication tools—newspaper notices, Background Information Documents (BIDs), site notices, official letters and community announcements—were used to inform stakeholders. All supporting documentation (notices, letters, BID, proof of publication, attendance sheets, and photographs) is included in the Appendices.

4.2 Methods Used for Public Consultation

The following methods were used to notify and engage I&APs:

4.2.1 Background Information Document (BID)

A BID outlining:

- The project description
- EPL 10248 location
- The EIA process
- Potential environmental considerations
- Contact details for registration

was distributed to stakeholders via email, WhatsApp, and printed copies at community points.

4.2.2 Newspaper Notices

Two statutory notices were published in:

Table 4-1: Newspaper Notices

Method	Area of Distribution	Language	Dates Placed
The Confidante	Nationwide	English	16 to 27 November 2025
Windhoek Observer	Nationwide	English	16 to 27 November 2025

The notices announced:

- The commencement of the EIA
- The project location and description
- The public meeting details
- Invitation to register as I&APs

4.2.3 Site Notices

Public notices were placed at strategic, high-visibility locations in Karibi and areas surrounding the EPL 10248. These notices contained the project description, EIA process explanation, and public meeting details.

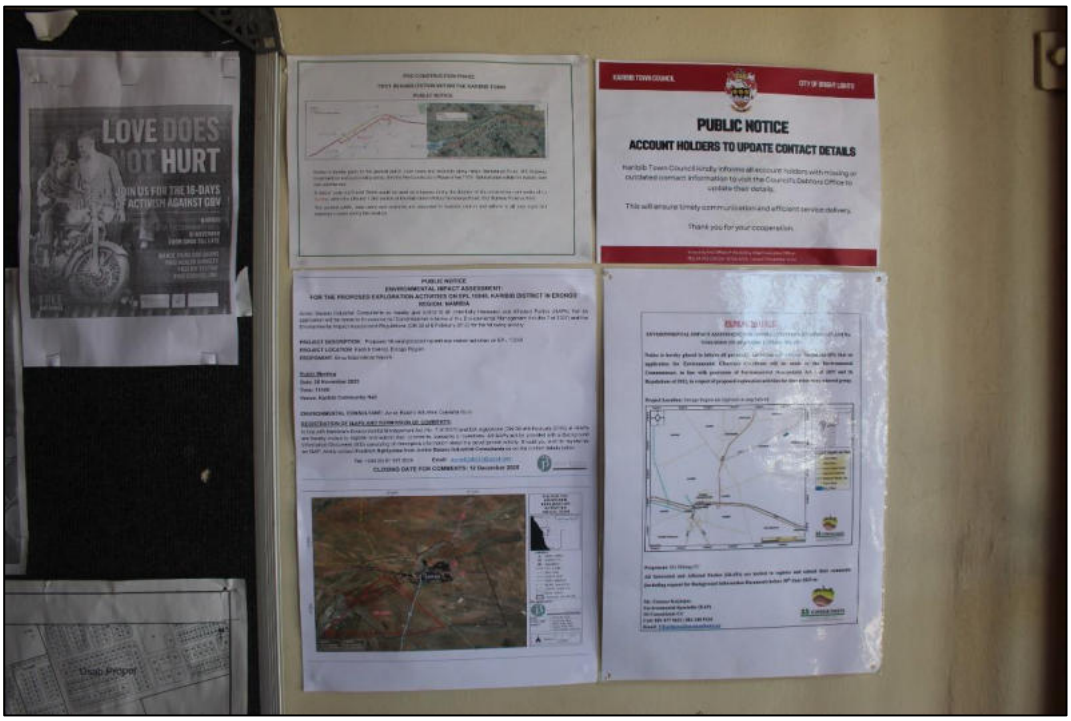

Image 4-1: Site Notice at Karibib Community Hall

Image 4-2: Site Notices 1

Image 4-3: Site Notices 3

4.3 Key Stakeholder Public Meeting

A public meeting was organised as required under the EMA to allow stakeholders to receive information and provide comments.

Meeting details:

- Venue: Karibib Community Hall
- Settlement: Karibib District, Erongo Region
- Date: 28 November 2025
- Time: 11h00

The agenda included:

- Overview of EPL 10248
- Planned exploration activities
- Environmental and socio-economic considerations
- Applicable laws and rights of I&APs
- Open floor for questions and comments

4.3.1 Meeting Outcome

Despite comprehensive notification through all required channels, no community members attended the scheduled public meeting. In recognition of this, additional efforts were made to engage community members who were willing to participate through informal discussions and individual interviews. These engagements allowed community members to express their views and concerns regarding the proposed exploration activities, which were recorded by the EIA team. Details of participant names and signatures are captured in the attendance register provided in the Appendices.

4.4 Identification of Interested and Affected Parties (I&APs)

The EIA team identified and invited:

- Institutional Stakeholders
- Otjozondjupa Regional Council
- Otjiwarongo, Okahandja and Omaruru Local Authorities
- Traditional and local leadership structures
- Environmental and natural resource offices
- Local Communities
- Adjacent farm owners and managers
- General Public

Open invitation through media publications and site notices allowed any interested person to register.

Registration remained open for 14 days, and all I&APs were added to the project database.

4.5 Issues Raised During Public Consultation

Issues and concerns raised during the public consultation process were obtained through individual engagements with community members and stakeholders who were willing to participate, as well as from feedback received during the notification period. Although attendance at the formal public meeting was limited, the issues identified are consistent with those commonly raised in rural farming and peri-urban settings in the Karibib District.

Table 4-2: Summary of Issues Raised

Theme	Key Issues Raised
Economic	• Prioritization of employment opportunities for local residents where feasible. • Expectation that the project should contribute positively to the local economy through procurement of goods and services from Karibib. • Interest in whether exploration activities could lead to longer-term socio-economic benefits if the project advances.
Health & Safety	• Concerns regarding proper handling and disposal of solid waste and wastewater at exploration camps. • Potential dust, noise, and emissions generated by vehicles and drilling equipment. • Need for adequate occupational health and safety measures for workers operating on farms and access routes.
Ecological and Environmental	• Risk of hydrocarbon spills, oil leaks, or chemical contamination affecting soils and groundwater. • Requirement for safe storage, handling, and disposal of hazardous materials and wastes. • Protection of air quality, water resources, and grazing land relied upon by livestock and surrounding farms.
Communication	• Need for clear and ongoing communication between the proponent, landowners, and affected stakeholders. • Requests for better understanding of the exploration process, duration, and scale of activities.

All issues raised were considered during the impact assessment process and have informed the identification of mitigation measures included in the Environmental Management Plan (EMP).

4.6 Conclusion

The public consultation process undertaken for the proposed exploration activities on EPL 10248 was conducted in compliance with the requirements of the Environmental Management Act (EMA), No. 7 of 2007, and the Environmental Impact Assessment Regulations (GN 30 of 2012). Stakeholders were notified through multiple communication channels, including newspaper notices, site notices, background information documents, and direct engagement efforts.

Although no community members attended the formal public meeting, reasonable and genuine opportunities for participation were provided, and additional efforts were made to engage individuals willing to share their views through direct discussions. The concerns raised were typical of exploration-stage projects in rural farming areas and focused primarily on employment, environmental protection, health and safety, and communication.

Importantly, no objections were raised that would preclude the continuation of the Environmental Assessment process. All relevant concerns have been incorporated into the impact assessment and addressed through appropriate mitigation measures in the EMP. On this basis, the public consultation process is considered adequate and complete for the purposes of decision-making.

5 CHAPTER FIVE: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

5.1 OVERVIEW

The proponent recognises the importance of implementing the proposed exploration activities on EPL 10248 in a manner that is environmentally responsible, socially acceptable, and fully compliant with Namibia's legal and regulatory framework. In line with this commitment, an Environmental Management Plan (EMP) is being prepared to guide the planning, execution, and monitoring of all exploration-related activities.

The EMP is designed to identify potential environmental and socio-economic impacts associated with the exploration phase, assess the significance of these impacts, and define appropriate avoidance, mitigation, and management measures. Particular attention is given to impacts related to land disturbance, vegetation clearing, dust and noise generation, water use, waste management, health and safety, and interactions with surrounding farming operations and local service centres in Karibib.

Given the temporary and low-impact nature of exploration activities, the EMP focuses on ensuring that all disturbances are localised, controlled, and fully reversible through good practice measures and rehabilitation. The EMP also aims to enhance potential positive socio-economic impacts, including local employment opportunities, local procurement, and transparent engagement with landowners and stakeholders.

The EMP will be implemented throughout the exploration phase and will be monitored, reviewed, and updated as necessary to ensure continuous improvement. Revisions may be required in response to changes in exploration methods, regulatory requirements, environmental conditions, or stakeholder concerns. Through this adaptive approach, the EMP provides a practical framework for managing risks and ensuring that exploration activities on EPL 10248 are conducted in a responsible and sustainable manner.

5.2 ASSESSMENT OF IMPACTS

This section outlines how the overall methodology to assessing the project is possible environmental and social impacts. Each potential impact must be assessed in order to properly evaluate its significance. The definitions and explanations for each criterion are set out below in Table 5-1.

Table 5-1: Assessment Criteria

Duration – What is the length of the negative impact?	
None	No Effect
Short	Less than one year
Moderate	One to ten years
Permanent	Irreversible
Magnitude – What is the effect on the resource within the study area?	
None	No Effect
Small	Affecting less than 1% of the resource
Moderate	Affecting 1-10% of the resource
Great	Affecting greater than 10% of the resource
Spatial Extent – what is the scale of the impact in terms of area, considering cumulative impacts and international importance?	
Local	In the immediate area of the impact
Regional / National	Having large scale impacts
International	Having international importance
Type – What is the impact	
Direct	Caused by the project and occur simultaneously with project activities
Indirect	Associated with the project and may occur at a later time or wider area
Cumulative	Combined effects of the project with other existing / planned activities
Probability	
Low	<25%
Medium	25-75%
High	>75%

(***Adopted from ECC-Namibia, 2017)***

Table 5-2: Impact Significance

Class	Significance	Descriptions
1	Major Impact	Impacts are expected to be permanent and non-reversible on a national scale and/or have international significance or result in a legislative non- compliance.

2	Moderate Impact	Impacts are long term, but reversible and/or have regional significance.
3	Minor	Impacts are considered short term, reversible and/or localized in extent.
4	Insignificant	No impact is expected.
5	Unknown	There are insufficient data on which to assess significance.
6	Positive	Impacts are beneficial

(Adopted from ECC-Namibia, 2017)

Table 5-3: Environmental Impacts and Aspects Assessment

ENVIRONMENTAL IMPACT	ELEMENT	IMPACT	PHASE	DURATION	MAGNITUDE	EXTENT	TYPE	PROBABILITY	SIGNIFICANCE
TOPOGRAPHY	Topography and Landscape	Localised alteration of micro-topography at drill pads and access tracks	Exploration	Short term	Low	Local	Direct	Probable	Low
	Topography and Landscape	Temporary visual impacts from drill rigs, vehicles and small spoil heaps (drill cuttings)	Exploration	Short term	Low	Local	Direct	Probable	Low
SOILS	Soil	Localised loss or disturbance of topsoil during drill pad preparation	Exploration	Short term	Low	Local	Direct	Highly probable	Moderate
	Soil	Soil contamination from improper waste handling or hydrocarbon spills	Exploration	Short term	Moderate	Local	Direct	Improbable	Low
LAND CAPABILITY & ECOLOGY	Socio-Economic Activities	Temporary restriction of land use at drill sites and access routes	Exploration	Short term	Low	Local	Direct	Probable	Low

ENVIRONMENTAL IMPACT	ELEMENT	IMPACT	PHASE	DURATION	MAGNITUDE	EXTENT	TYPE	PROBABILITY	SIGNIFICANCE
	Terrestrial ecology and biodiversity	Localised reduction in vegetation cover at drill pads and tracks	Exploration	Short term	Low	Local	Direct	Probable	Low
	Groundwater quality	Potential groundwater contamination from drilling fluids or fuel spills	Exploration	Short term	Moderate	Local	Direct	Improbable	Low
	Surface water quality	Increased sediment mobilisation during rainfall from disturbed soil surfaces	Exploration	Short term	Low	Local	Direct	Probable	Low
	Surface water quality	Localised stormwater runoff from cleared drill pads and tracks	Exploration	Short term	Low	Local	Direct	Improbable	Low
AIR QUALITY	Air Quality	Generation of dust from vehicle movement and drilling activities	Exploration	Short term	Low	Local	Direct	Probable	Moderate
NOISE	Noise Pollution	Noise from drilling rigs,	Exploration	Short term	Low	Local	Direct	Probable	Low

ENVIRONMENTAL IMPACT	ELEMENT	IMPACT	PHASE	DURATION	MAGNITUDE	EXTENT	TYPE	PROBABILITY	SIGNIFICANCE
		vehicles and generators affecting nearby farm activities							
LANDSCAPE / VISUAL	Topography and Landscape	Visual impacts due to temporary structures, vehicles and equipment	Exploration	Short term	Low	Local	Direct	Probable	Low
FLORA	Terrestrial ecology and biodiversity	Clearing or damage to vegetation at drill pads and access tracks	Exploration	Short term	Moderate	Local	Direct	Probable	Moderate
	Terrestrial ecology and biodiversity	Disturbance to protected or slow-growing plant species	Exploration	Short term	Moderate	Local	Direct	Improbable	Low
	Terrestrial ecology and biodiversity	Establishment of invasive or bush-encroaching species in disturbed areas	Exploration	Long term	Low	Local	Direct	Probable	Low
	Terrestrial ecology and biodiversity	Risk of uncontrolled or accidental fires during dry season	Exploration	Short term	High	Local	Direct	Improbable	Moderate

ENVIRONMENTAL IMPACT	ELEMENT	IMPACT	PHASE	DURATION	MAGNITUDE	EXTENT	TYPE	PROBABILITY	SIGNIFICANCE
FAUNA	Terrestrial ecology and biodiversity	Temporary disturbance to fauna from noise, vehicle movement and human presence	Exploration	Short term	Moderate	Local	Direct	Highly probable	Moderate
SOCIO-ECONOMIC	Socio-Economic Activities	Temporary employment opportunities for local residents	Exploration	Short term	Low	Local	Direct	Probable	Moderate Positive
	Socio-Economic Activities	Increased activity levels on farms raising security or access concerns	Exploration	Short term	Moderate	Local	Direct	Probable	Moderate
	Socio-Economic Activities	Local procurement of fuel, accommodation and services in Karibib	Exploration	Short term	Moderate	Local	Direct	Highly probable	Moderate Positive
	Contribution to Local Economy	Short-term contribution to the local economy through exploration spending	Exploration	Short term	Moderate	Local	Direct	Probable	Moderate Positive

ENVIRONMENTAL IMPACT	ELEMENT	IMPACT	PHASE	DURATION	MAGNITUDE	EXTENT	TYPE	PROBABILITY	SIGNIFICANCE
HERITAGE	Archaeological / Cultural Heritage	Accidental disturbance of unknown heritage resources during drilling or access	Exploration	Short term	Moderate	Local	Direct	Improbable	Low