

Namibia Power (NamPower)
Corporation (Pty) Ltd
(Proponent)

Final Environmental Impact Assessment (EIA) and
Environmental Management Plan (EMP) Report for the
Proposed 66kV Marble Switching Station Extension,
29.977km long Powerline Route from Marble Station to the
Mining License (ML) No. 204 for Lepidico Chemicals
Namibia (Pty) Ltd, NamPower Metering Station and the
Lepidico Rubicon Substation Developments,
Karibib District, Erongo Region West-Central Namibia



OCTOBER 2020

Namibia Power Corporation (Pty) Ltd
NamPower Centre 15 Luther Street
Windhoek, P.O. Box 2864
WINDHOEK, NAMIBIA

PROPONENT, LISTED ACTIVITIES AND RELATED INFORMATION SUMMARY

TYPE OF AUTHORISATIONS

Environmental Clearance Certificate (ECC) for the Proposed 66kV
Powerline from Marble Station to the Mining Licenses (ML) No. 204, Karibib

MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM (MEFT)

ECC APPLICATION REFERENCE No.

APP-001551

NAME AND ADDRESS OF THE DEVELOPER

Lepidico Chemicals Namibia (Pty) Ltd
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NAME AND ADDRESS OF THE PROPONENT / OPERATOR

Namibia Power Corporation (NamPower) (Pty) Ltd

NamPower Centre 15 Luther Street,

Windhoek, P.O. Box 2864,

WINDHOEK, NAMIBIA

COMPETENT AUTHORITY

Ministry of Mines and Energy (MME)

PROPOSED PROJECT

New Proposed 66kV

Powerline from Marble Station to the Mining Licenses (ML) No. 204,
Karibib District, Erongo Region

PROJECT LOCATION

Karibib District, Erongo Region, West Central Namibia

Latitude: -22.101239, Longitude: 15.997981

Latitude: 22°06'04.5"S, Longitude: 15°59'52.7"E

ENVIRONMENTAL CONSULTANTS



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ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Dr Sindila Mwiya

PhD, PG Cert, MPhil, BEng (Hons), Pr Eng

Summary Profile and Qualification of the Environmental Assessment Practitioner (EAP) / International Consultant Projects Director – Dr Sindila Mwiya

Dr Sindila Mwiya has more than eighteen (18) years of practical field-based technical industry experience in Environmental Assessment (SEA, EIA, EMP, EMS), Energy (Renewable and Non-renewable energy sources), onshore and offshore resources (minerals, oil, gas and water) exploration / prospecting, operation and utilisation, covering general and specialist technical exploration and recovery support, Health, Safety and Environment (HSE) permitting for Geophysical Surveys such as 2D, 3D and 4D Seismic, Gravity and Electromagnetic Surveys for mining and petroleum (oil and gas) operations support, through to engineering planning, layout, designing, logistical support, recovery, production / operations, compliance monitoring, rehabilitation, closure and aftercare projects lifecycles. The great array of highly technical specialist knowledge and field-based practical experiences of Dr Sindila Mwiya has now been extended to supporting the development of Environmentally Sustainable, automated / smart and Climate Change resilient homes, towns and cities.

Through his companies, Risk-Based Solutions (RBS) CC and Foresight Group Namibia (FGN) (Pty) Ltd which he founded, he has undertaken more than 200 projects for Local (Namibian), Continental (Africa) and International (Global) based clients. He has worked and continue to work for Global, Continental and Namibian based reputable resources (petroleum and mining / minerals) and energy companies such as EMGS (UK/ Norway), CGG (UK/ France/Namibia), BW Offshore (Norway/Singapore /Namibia), Shell Namibia B. V. Limited (Namibia/ the Netherlands), Tullow Oil (UK/Namibia), Debmarine (DBMN) (Namibia), Reconnaissance Energy Africa Ltd (ReconAfrica) (UK/Canada/Namibia), Osino Resource Corporation (Canada/Germany/Namibia), Desert Lion Energy Corporation (Canada/ Australia/ Namibia), Petrobras Oil and Gas (Brazil) / BP (UK)/ Namibia, REPSOL (Spain/ Namibia), ACREP (Namibia/Angola), Preview Energy Resources (UK), HRT Africa (Brazil / USA/ Namibia), Chariot Oil and Gas Exploration (UK/ Namibia), NABIRM (USA/ Namibia), Serica Energy (UK/ Namibia), Eco (Atlantic) Oil and Gas (Canada / USA/ Namibia), ION GeoVentures (USA), PGS UK Exploration (UK), TGS-Nopec (UK), Maurel & Prom (France/ Namibia), GeoPartners (UK), PetroSA Equatorial Guinea (South Africa / Equatorial Guinea/ Namibia), Preview Energy Resources (Namibia / UK), Sintezneftgaz Namibia Ltd (Russia/ Namibia), INA Namibia (INA INDUSTRIJA NAFTE d.d) (Croatia/ Namibia), Namibia Underwater Technologies (NUTAM) (South Africa/Namibia), InnoSun Holdings (Pty) Ltd and all its subsidiary renewable energy companies and projects in Namibia (Namibia / France), HopSol (Namibia/Switzerland), Momentous Solar One (Pty) Ltd (Namibia / Canada), OLC Northern Sun Energy (Pty) Ltd (Namibia) and more than 100 local companies. Dr Sindila Mwiya is highly qualified with extensive practical field-based experience in petroleum, mining, renewable energy (Solar, Wind, Biomass, Geothermal and Hydropower), Non Renewable energy (Coal, Petroleum, and Natural Gas), applied environmental assessment, management and monitoring (Scoping, EIA, EMP, EMP, EMS) and overall industry specific HSE, cleaner production programmes, Geoenvironmental, geological and geotechnical engineering specialist fields.

Dr Sindila Mwiya has undertaken and continue to undertake and manage high value projects on behalf of global and local resources and energy companies. Currently, (2020-2023) Dr Sindila Mwiya is responsible for permitting planning through to operational and completion compliance monitoring, HSE and engineering technical support for multiple major upstream onshore and offshore petroleum, minerals and mining projects, Solar and Wind Energy Projects, manufacturing and environmentally sustainable, automated / smart and Climate Change resilient homes developments in different parts of the World including Namibia. Currently, Dr Sindila Mwiya is developing a 16 Ha commercial and residential Mwale Mwiya Park in the Town of Katima Mulilo, Zambezi Region, Namibia as one of first advanced Environmentally Sustainable, automated / smart and Climate Change resilient development in Namibia. He continue to worked as an International Resources Consultant, national Environmental Assessment Practitioner (EAP) / Environmentally Sustainable, automated / smart and Climate Change resilient homes developer, Engineering / Technical Consultant (RBS / FGN), Project Manager, Programme Advisor for the Department of Natural and Applied Sciences, Namibia University of Science and Technology (NUST) and has worked as a Lecturer, University of Namibia (UNAM), External Examiner/ Moderator, NUST, National (Namibia) Technical Advisor (Directorate of Environmental Affairs, Ministry of Environment, Forestry and Tourism (MEFT) / DANIDA – Cleaner Production Component) and Chief Geologist for Engineering and Environment Division, Geological Survey of Namibia, Ministry of Mines and Energy and a Field-Based Geotechnician (Specialised in Magnetics, Seismic, Gravity and Electromagnetics Exploration and Survey Methods) under the Federal Institute for Geoscience and Natural Resources (BGR) German Mineral Exploration Promotion Project to Namibia, Geophysics Division, Geological Survey of Namibia, Ministry of Mines and Energy.

He has supervised and continue to support a number of MScs and PhDs research programmes and has been a reviewer on international, national and regional researches, plans, programmes and projects with the objective to ensure substantial local skills development, pivotal to the national socioeconomic development through the promotion of sustainable natural resources coexistence, management, development, recovery, utilisation and for development policies, plans, programmes and projects financed by governments, private investors and donor organisations. Since 2006 until 2017, he has provided extensive technical support to the Department of Environmental Affairs (DEA), Ministry of Environment, Forestry and Tourism (MEFT) through GIZ in the preparation and amendments of the Namibian Environmental Management Act, 2007, (Act No. 7 of 2007), new Strategic Environmental Assessment (SEA) Regulations, preparation of the updated Environmental Impact Assessment (EIA) Regulations as well as the preparation of the new SEA and EIA Guidelines and Procedures all aimed at promoting effective environmental assessment and management practices in Namibia.

Among his academic achievements, Dr Sindila Mwiya is a holder of a PhD (Engineering Geology/Geotechnical / Geoenvironmental / Environmental Engineering and Artificial Intelligence) – Research Thesis: Development of a Knowledge-Based System Methodology (KBSM) for the Design of Solid Waste Disposal Sites in Arid and Semiarid Environments, MPhil/PG Cert and BEng (Hons) (Engineering Geology and Geotechnics) qualifications from the University of Portsmouth, School of Earth and Environmental Sciences, United Kingdom. During the 2004 Namibia National Science Awards, organised by the Namibian Ministry of Education, and held in Windhoek, Dr Sindila Mwiya was awarded the Geologist of the Year for 2004, in the professional category. Furthermore, as part of his professional career recognition, Dr Sindila Mwiya is a life member of the Geological Society of Namibia, Consulting member of the Hydrogeological Society of Namibia and a Professional Engineer registered with the Engineering Council of Namibia.

Windhoek, Namibia October 2020

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Non-Technical Summary

Lepidico Chemicals Namibia (Pty) Ltd (**the Developer**) is proposing to construct a 29.977km long 66kV overhead powerline to supply electrical power to the proposed Karibib Project in the Mining License (ML) No. 204 situated on Farm Okongava, Karibib District, Erongo Region. The proposed powerline will be from the Marble switchyard to the west of Karibib. From the Marble Station, the line will cross over the existing NamPower 66kV Karibib transmission line, Karibib railway line and B2 national road and run parallel to the 66kV Navachab transmission line at an offset distance of 30m centre to centre, follow the public road D1953 before branching along the D1992 into the ML 204 area. Once completed, the powerline will be operated and maintained by Namibia Power Corporation (NamPower) (Pty) Ltd (**the Proponent**). Lepidico Chemicals Namibia (Pty) Ltd is fully responsible for the construction of the proposed overhead powerline. Lepidico Chemicals Namibia (Pty) Ltd which holds mineral rights under Mining License (ML) No. 204 is 80% owned by Lepidico Limited (“Lepidico”) a lithium exploration and development company focused on unlocking the value of hard rock lithium-rich mica deposits. Lepidico is listed on the Australian Securities Exchange and 100% owner and developer of the L-Max® process technology and has the exclusive rights to the LOH-Max™ technology proprietary processes which have the potential to commercially extract lithium chemicals and other valuable by-products from unconventional mineral sources.

The design of the proposed powerline comprises single wood structures along a straight line and two poles at each turning point with a spacing of 120 m and each pole will be connected by three wires. Aircraft Warning Spheres (AWS) devices will be installed at 20m spacing where national and busy district roads are crossed. Double loop bird flight diverters (BFD) will also be installed at locations as specified in this EIA Report (Fig. 4.2) and in the Specialist Flora and Fauna Report Annex 2 to prevent bird collisions especially around the route sections where birds’ activities likely to cross the proposed powerline route have been identified to be high. The construction of the proposed 29.977km long 66kV overhead powerline falls within the activities that are listed in the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) and cannot be undertaken without an Environmental Clearance Certificate (ECC). This Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) report is prepared by Risk-Based Solutions (RBS) CC to support the application for ECC.

Alternatives to the proposed project development has been considered for the powerline design options, route selection process with respect to the existing electricity infrastructure (distribution and connectivity opportunities), visual, land use and overall environmental sensitivity in terms of habitats and likely avifauna sensitivities. The design as well as the sensitivity of the receiving environment have all been considered in the assessment of possible alternatives for this proposed project. The following is the summary of the activities associated with the proposed route selection, preconstruction, construction, operational and upgrade / rehabilitation stages of the proposed overhead powerline:

1. Planning and clients’ needs assessment.
2. Geographical Information System (GIS) mapping of possible routes options.
3. Evaluation and field-based route assessment verifications and validations.
4. Field-based route and servitude survey.
5. Field-based route and servitude clearing.
6. Digging of the individual pole foundation.
7. Digging of the pole support.
8. Poles and support driving works.
9. Structure mounting.
10. Module clamping.

11. Cabling and electrical equipment installation.
12. Installation of Communication Monitoring.
13. Commissioning.
14. Operational.
15. Monitoring and Maintenance.
16. Powerline Decommissioning, and.
17. Powerline Upgrade.

Keys issues assessed during the environmental assessment process includes the following: Permitting requirements, vehicles and tracks management, temporally storage construction areas, impacts on avifauna, impacts on mammals, impacts on water resources protection and general water usage, positive and negative impacts of socioeconomic setting, health and safety impacts, visual, noise, dust and waste (solid and liquid) management. As part of the environmental assessment process the following mitigation measures have been provided in this report as detailed in Section 6:

1. Regulatory mitigation measures with respect to the implementation of the proposed project activities.
2. Mitigation measures for vehicles and tracks management.
3. Mitigation measures around the distribution station(s) and camps sites.
4. Mitigation measures for avifauna over the powerlines.
5. Mitigation measures for water resources protection and general water usage.
6. Mitigation measures to enhance positive socioeconomic impacts include the following actions to be implemented by the proponent.
7. Mitigation measures to minimise negative socioeconomic impacts.
8. Mitigation measures to minimise health and safety impacts.
9. Mitigation measures to minimise visual impacts, and.
10. Mitigation measures to minimise noise and dust impacts.

The proposed 29.977km long, 66kV overhead powerline will have localised negative impacts on the receiving environment and will not affect unique vertebrate fauna and flora, especially if the proposed recommendations (mitigation measures) are incorporated. The following are the recommended locations for the installation of the double loop bird flight diverters (BFD) to prevent bird collisions especially around the route sections where birds' activities likely to cross the proposed powerline route have been identified to be high (Fig. 7.1):

1. 21°58'33.80"S, 15°51'43.23"E.
2. 21°59'59.02"S, 15°52'53.62"E.
3. 22°1'3.82"S, 15°56'29.01"E, and.
4. 22°3'55.55"S, 15°59'28.68"E.

Other potential location should be monitored for bird fatalities and BFD may be installed if fatalities increases. Based on the findings of this EIA and EMP report, it's hereby recommended that the proposed 29.977km long 66kV powerline from the Marble switchyard to ML No. 204 on Farm Okongava be issued with an Environmental Clearance Certificate (ECC).

1. PROJECT BACKGROUND

1.1 Introduction

Lepidico Chemicals Namibia (Pty) Ltd (**the Developer**) is proposing to construct a 29.977km long, 66kV overhead powerline to supply electrical power to the Karibib Project in the ML 204 (Figs. 1.1 -1.4). The proposed powerline will be from the Marble switchyard to the west of Karibib. From the Marble Station, the line will cross over the existing NamPower 66kV Karibib transmission line, Karibib railway line and B2 national road and run parallel to the 66kV Navachab transmission line at an offset distance of 30m centre to centre, follow the public road D1953 before branching along the D1992 into the ML 204 area (Figs. 1.2 -1.4). Once completed, the powerline will be operated and maintained by Namibia Power Corporation (NamPower) (Pty) Ltd (**the Proponent**).

1.2 The Karibib Project

Lepidico Chemicals Namibia (Pty) Ltd holds mineral rights under Mining License (ML) No. 204, the Karibib Project situated in the Karibib District, Erongo Region, west central Namibia. The ML 204 covering a total area of 6930Ha Ha was granted by the Ministry of Mines and Energy (the Component Authority) on the 19th June 2018 and will expire on the 18th June 2028. The ML 204 is granted for base and rare metals, industrial minerals, precious metals, precious stones and semi-precious stones.

Lepidico Chemicals Namibia (Pty) Ltd is 80% owned by Lepidico Limited (“Lepidico”) a lithium exploration and development company focused on unlocking the value of hard rock lithium-rich mica deposits. Lepidico is listed on the Australian Securities Exchange and 100% owner and developer of the L-Max® process technology and has the exclusive rights to the LOH-Max™ technology. proprietary processes which have the potential to commercially extract lithium chemicals and other valuable by-products from unconventional mineral sources.

The Karibib Project under the ML 204 consists of six deposits which have been mined previously for petalite and certain other minerals including tantalite. The deposits are located within an existing Mining License area which is central to a larger area which covers approximately 1,000 km² and is highly prospective for the discovery of additional lithium deposits. In 2019, Lepidico completed an in-fill drilling program for two larger deposits covering the Rubicon and Helikon 1. Ore Reserves at Karibib, Namibia total 6.7 million tonnes grading 0.46% Li₂O, 2.26% rubidium and 320ppm caesium, a 60% conversion from Mineral Resources of 11.24 million tonnes, which highlights the potential for further Ore Reserve expansion. The project is expected to consist of two open pit mines, a mineral concentrator and associated infrastructure.

The following is the summary of the proposed Karibib Project requiring the electric energy from the proposed powerline and as published by Lepidico:

1. Open pit mines will be developed on Rubicon and Helikon 1 deposits only. Mining will be using conventional diesel-powered mining equipment.
2. Social benefits – creation of 115 direct jobs to benefit local communities and the economy and around 805 indirect jobs, contracts and livelihoods to many Namibians.
3. Symbiotic co-existence with local farmers and communities.
4. Enhancement of local community infrastructure through roads and water supply.
5. Community support programs developed and focused on critical resources, health and education, diversity and sustainable micro business development.
6. A mineral concentrator will be installed close to the Rubicon pit. The processing facilities will use conventional crushing and grinding with mineral separation by froth flotation.

7. The processing rate has been reduced to 330,000 tonnes per annum for up to seven years, then increasing to 540,000 tonnes per annum for a project life (including construction and commissioning) of circa 20 years.
8. The plant tailings will be filtered to a moisture content of circa 15% to recycle process water.
9. The mine waste from Rubicon and the tailings will be co-disposed in a single landform structure to facilitate progressive rehabilitation, closure and stability. Geochemical testing has been completed confirming that the process tailings is low risk.
10. The Project will be supplied by a 66kV powerline to be developed by Lepidico Chemicals Namibia (Pty) Ltd and operated by Namibia Power Corporation (NamPower) (Pty) Ltd as per this BID.
11. The project will use existing infrastructure including the access road, a haul road from Helikon 1 to Rubicon, the borehole field and other minor facilities.
12. Lepidico Chemicals Namibia (Pty) Ltd adheres to the Equator Principles and International Finance Corporation's Environmental and Social Performance Standards. These are to be reflected in the updated documentation.
13. Lepidico Chemicals Namibia (Pty) Ltd has undertaken socioeconomic studies to develop a Corporate Social Responsibility (CSR) program. These have been incorporated into the proposed Karibib Project documentation such the Environmental and Social Impact Assessment (ESIA) and Environmental Social Management Plan (ESMP), and.
14. Sustainable closure – industry best practice closure plans that will rectify mining and processing legacy issues. The Project will be designed for closure in-line with the Best Practice Guide for Mining in Namibia.

1.3 Regulatory Requirements

The activities associated with the construction of the proposed powerline are listed in the Environmental Management Act, 2007, (Act No. 7 of 2007) and cannot be undertaken without an Environmental Clearance Certificate (ECC). In order to obtain the ECC, the Proponent is required to have undertaken Environmental Assessment (EA) comprising Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed listed activities. The Environmental Assessment process shall be undertaken in accordance with the provisions of the Environmental Impact Assessment Regulations, 2012 and the Environmental Management Act, 2007, (Act No. 7 of 2007). In fulfilment of the environmental requirements, the developer has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultant led by Dr Sindila Mwiya as the Environmental Assessment Practitioner (EAP) to undertake the EA to support the application for Environmental Clearance Certificate (ECC) for the proposed 29.977km long 66kV overhead powerline from marble station to the ML 204 on Farm Okongava.

1.4 Project Motivation

The proposed 29.977km long 66kV overhead powerline is important to the successful development of the Karibib Project by supply electrical power to the Project. The proposed Karibib Project will provide many benefits to Namibia. These benefits include the following:

- (i) Provide 115 direct jobs to benefit Namibians with indirect job creation (services and support industries) estimated at seven times that number (The Chamber of Mines of Namibia, 2012) and livelihoods being created to benefit Namibian families.
- (ii) Socioeconomic benefits including upgrading and maintenance of road and water infrastructures in the local farm area for greater benefits of the local community.

- (iii) Greater environmental benefits and Government financial savings through remediation of the targeted previously abandoned and unrehabilitated mine sites around the ML 204 area.
- (iv) Support the value addition to the in-situ potential minerals resources in the area which otherwise would not have been known if the proposed mining and ongoing exploration activities in ML 204 did not take place.
- (v) Through ongoing exploration and the potential discovery of additional economic minerals resources and the expansion of the proposed mining and minerals processing operations will have much greater local (Karibib Area), regional (Erongo Region) and national (Namibia) socioeconomic benefits, and.
- (vi) Additional socioeconomic benefits will also be realised at regional and national levels in terms of capital investments, license rental fees, royalties payable to Government, export earnings, foreign direct investments, and various taxes payable to the Government.

1.5 Project Location and Land Uses

1.5.1 Location

The proposed powerline is located within the Karibib Constituency (or Karibib Magisterial District) in the Erongo Region of Namibia (Figs. 1.1 and 1.2). Karibib is capital of the Karibib Constituency district and principal town. Swakopmund, the regional centre of the Erongo Region and Walvis Bay the main Port, are situated about 170 km and 212 km to the west of Karibib. Windhoek, the capital city of Namibia is located approximately 183 km southeast of Karibib (Figs. 1.1).

The proposed 29.977km 66kV overhead powerline will run from Marble station west of the Town of Karibib to the ML204 situated about 30km to the southeast of the Town of Karibib (Figs. 1.1-1.4). The NamPower Marble Station is situated within the Karibib Townlands and the proposed powerline cuts across only one private Farm Habis No. 71 belonging Dr Herbert Schneider before entry Farm Okongava belonging to the Government of Namibia and where the Karibib Project is situated (Figs. 1.3 and 1.4).

The Environmental Assessment process covers the proposed main route including the recommended alternative bends along the D1952, substation gas for the NamPower Marble Switching Station Extension, the NamPower metering station and the Lepidico Rubicon Substation. It is envisaged that the NamPower Rubicon Metering Station will be constructed adjacent to the Lepidico Rubicon Substation at the mine site (Figs. 1.2-1.4).

1.5.2 Current Land Uses

The main key land use along the proposed 29.977km long 66kV overhead powerline route include townlands (Karibib Townlands) and agriculture comprising cattle and small stock farming in Farms. Farm Habis and Okongava. Minerals exploration and mining operations are well known activities in the surrounding areas covered by EPLs and MLs.

A number of lodges are found in the general surrounding areas but not necessary along the proposed overhead powerline route. Bush thickening or encroachment is viewed as an economic problem in the general area but does not seem to be an issue within the proposed overhead powerline route. The overhead powerline route does not cut across a private or communal conservancy area and there is no nearby protected area.



Figure 1.1: Regional location of the proposed 29.977km 66kV overhead powerline from Marble Station to the Mining License (ML) No. 204 of Lepidico Chemicals Namibia (Pty) Ltd.

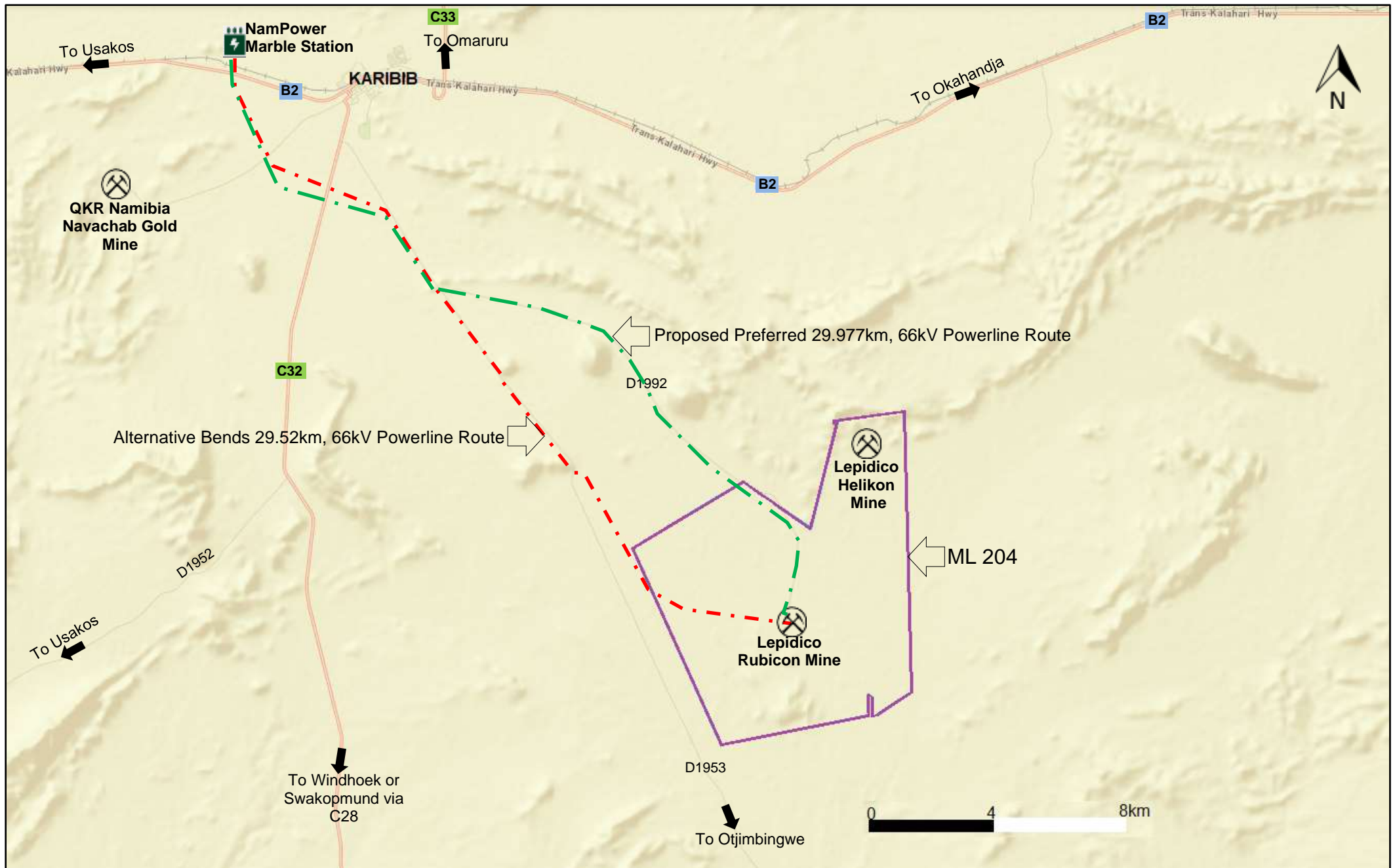


Figure 1.2: Detailed location of the proposed 29.977km 66kV overhead powerline from Marble Station to the Mining License (ML) No. 204 of Lepidico Chemicals Namibia (Pty) Ltd (Source: <http://portals.flexicadastre.com/Namibia>).



Figure 1.3: Farmlands being cuts across by the proposed 29.977 km 66kV overhead powerline from Marble Station to the Mining License (ML) No. 204 of Lepidico Chemicals Namibia (Pty) Ltd (Source: Extract from National Topographic Map, Directorate of Survey and Mapping, 2008).



Figure 1.4: All alternative powerline routes that have been considered in bring power supply to the ML 204 (Lepidico Chemicals Namibia (Pty) Ltd Rubicon and Helikon Mining sites) (Source: Lepidico Chemicals Namibia (Pty) Ltd, 2020).

1.6 Approach, Steps, Assumptions and Structure of the Report

1.6.1 Terms of Reference (ToR) and Approach

The assessment process will take into considerations the proposed activities, trade-offs, alternatives and issues to be considered as outlined in Table 1.1. Further inputs will be provided by the specialist consultants as may be required as well as registered stakeholders during the public consultation process.

The first step in the impact identification process has been to identify the various types of activities associated with each of the developmental stages covering route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline project (Table 1.1).

The overall impact assessment approach has adopted the Leopold matrix framework which is one of the internationally best-known matrix assessment methodology available for predicting the impact of a project on the receiving environment. The Leopold matrix is a two-dimensional matrix cross-referencing the following:

- ❖ The activities linked to the project that are supposed to have an impact on man and the environment, and.
- ❖ The existing environmental and socioeconomic conditions that could possibly be affected by the project.

The activities linked to the route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline are listed on one axis, while the receiving environment (natural, built, socioeconomic, flora, fauna, habitat and ecosystem) conditions are listed on the other axis, and divided in following three (3) major groups:

- ❖ Physical conditions: receiving environment, air, etc..
- ❖ Biological conditions: fauna, flora, ecosystems etc., and.
- ❖ Socioeconomic and cultural conditions: Socioeconomic setting, historical and cultural issues, populations, economy...

The activities of the route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline project have the potential to affect the receiving environment sensitivity (natural, built, socioeconomic, flora, fauna, habitat and ecosystem) in many different ways.

At a high level, the main sources of impact of the proposed powerline project are:

- ❖ Physical disturbance to the local environment during the preconstruction and construction stages.
- ❖ Emissions, discharges and wastes during the preconstruction and construction stages, and.
- ❖ Accidental events associated with avifauna collision at areas along the powerline where it cuts potential flight corridors. The collision events are associated with the operational stage of the proposed project.

Table 1.1: Summary Terms of Reference (ToR) for the proposed activities, alternatives, trade-offs and key issues considered in the Environmental Assessment process.

| PROJECT ACTIVITIES | | ALTERNATIVES CONSIDERED | Key Issues Evaluated and Assessed with Mitigation Measures Developed | |
|---------------------------------|--|--|---|---|
| Route Selection | Planning and clients' needs assessment Geographical Information System (GIS) mapping of possible routes options Evaluation and field-based route assessment verifications and validations | 1. Possible connection points and entire powerline routes and specific route sections. 2. Servitude requirements. | Potential land use conflicts / opportunities for coexistence for the proposed powerline and other existing land uses and infrastructures | |
| | | | Impacts on the Physical Environment | Natural environment such as air, noise, water, dust etc during the preconstruction and construction phases. |
| Preconstruction | Field –based route and servitude survey Field –based route and servitude clearing | 3. Technical design alternatives such as the use of wood structures, Conductor and Earth Wire (OPGW, Aircraft Warning Spheres (AWS) and Bird flight diverters (BFD). | | Built environment such as existing roads, transport systems, existing buildings, energy and water and other supporting infrastructure |
| Construction | Digging of the individual pole foundation Digging of the pole support Poles and support driving works Structure mounting Module clamping Cabling and electrical equipment installation Installation of Communication Monitoring | | 4. Other Alternative Land Uses: Urban land use by the Karibib Town Council and private agricultural farmland, other infrastructures areas such as roads, railways and landing strip / airport | |
| Operation and Monitoring | Commissioning Operational (Supply of Electricity to the mine) Monitoring and Maintenance | 5. Ecosystem Function (What the Ecosystem Does). 6. Ecosystem Services. | | Impacts on the Biological Environment |
| | | | Fauna | |
| Closure or Upgrading | Powerline Decommissioning Powerline Upgrade | 7. Use Values. 8. Non or Passive Use and. 9. The No-Action Alternative | Impacts on the Biological Environment | Avifauna |
| | | | | Habitat |
| | | | | Ecosystem functions, services, use values and non-Use or passive use |

1.6.2 Environmental Assessment Process and Steps

The EIA and EMP process used for this project took into considerations the provisions of the Environmental Impact Assessment (EIA) Regulations, 2012 and the Environmental Management Act (EMA), 2007, (Act No. 7 of 2007) as outlined in Fig. 1.5.

- (i) Project screening process (**Undertaken in April 2020**).

- (ii) Preparation of the Draft BID/Draft Scoping Report with Terms of Reference (ToR) for review by the Proponent (**Undertaken in May / June 2020**).
- (iii) Implement key specialist studies (Fauna and Flora) (**Implemented in April - June 2020**).
- (iv) Preparation of the Public Notice to be published in the local newspapers as part of required public consultation process (**Undertaken in June 2020**).
- (v) Project registration / notification through the completion of the online formal registration / notification form on the MEFT online Portal (www.eia.met.gov.na), together with the hardcopies of the Draft BID/Scoping Report with ToR submitted to the Environmental Commissioner in the MEFT through the Ministry of Mines and Energy (MME) Director of Energy (Competent Authority) for review (**Undertaken in June 2020**).
- (vi) Opened the Stakeholder register (**Undertaken in August 2020**).
- (vii) Invitation / notices to stakeholders and the general public to participate in environmental assessment process issued through the local newspaper advertisements as well as via direct emails communications to key stakeholders institutions such as Line Ministries, Regional and Local Governments as may be applicable (**Undertaken in September and October 2020 for a period of more than 21 days from the 1st publication**).
- (viii) Preparation of the Draft EIA and EMP Report for review by the Proponent and Developer (**Undertaken in September 2020**).
- (ix) The Draft EIA and the Draft EMP Reports made available to all the registered stakeholders for their comments and inputs (**Undertaken in September 2020**).
- (x) Comments and inputs from the client and stakeholder consultations on the Draft EIA and EMP Report used to finalise the EIA and EMP Report (**Undertaken in October 2020**).
- (xi) The final EIA and EMP report to be submitted to the Environmental Commissioner in MEFT through the MME (Competent Authority) in fulfilment of all the requirements of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) for application of the Environmental Clearance Certificate (ECC) for the proposed project (**Undertaken in October 2020**).
- (xii) Following the submission of the application for ECC to the Environmental Commissioner, the public and stakeholders who are interested or affected by the proposed project will have additional **fourteen (14) days** to submit comments / inputs about the proposed project direct to the Environmental Commissioner when the application will be made available for additional comments / inputs by the Environmental Commissioner on the MEFT digital Portal www.eia.met.gov.na.
- (xiii) Wait for the Records or Decisions (RDs) from the Environmental Commissioner (**From October 2020**).

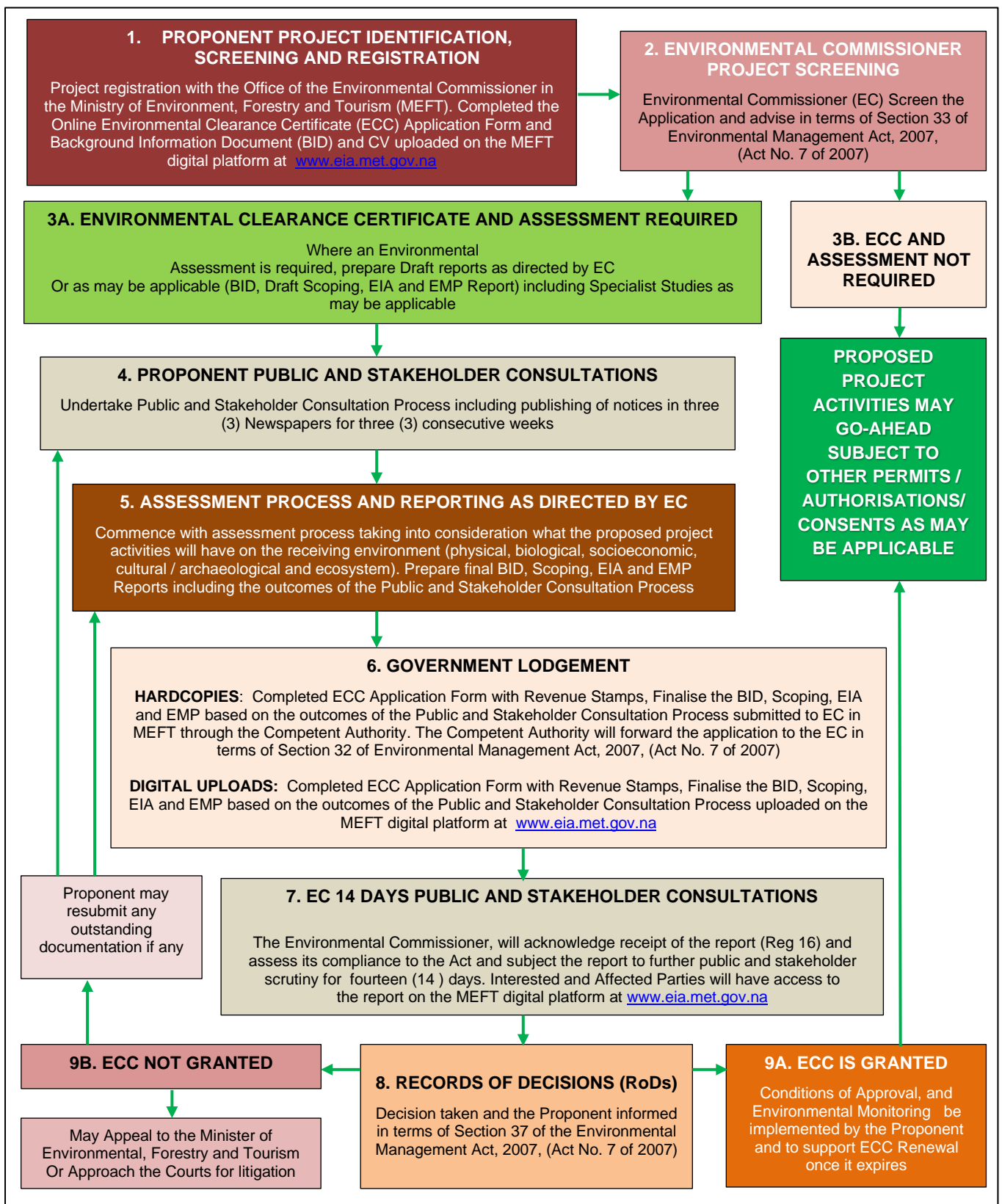


Figure 1.5: RBS Schematic presentation of Namibia's Environmental Assessment Procedure.

1.6.3 Assumptions and Limitations

The following assumptions and limitations underpin the approach adopted, overall outcomes and recommendations for this supplementary EIA and EMP study:

- ❖ The activities of the proposed route and design of the proposed powerline as well as all the plans, maps and appropriate data sets received from the proponent, project partners,

regulators, Competent Authorities and specialist assessments are assumed to be current and valid at the time of conducting the studies and compilation of this supplementary environmental report.

- ❖ The impact assessment outcomes and recommendations provided in this supplementary report are valid for the entire duration of the proposed project covering preconstruction, construction, operational, closure and rehabilitation / upgrade stages.
- ❖ A precautionary approach has been adopted in instances where baseline information was insufficient or unavailable or site-specific locations of the proposed project activities are not yet available, and.
- ❖ Mandatory timeframes as provided for in the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) have been observed throughout the environmental assessment process and will apply to the review and decision of the Competent Authority and the Environmental Commissioner.

1.6.4 Structure of the Report

The following is the summary structure outline of this scoping report.

- ❖ **Section 1: Project Background** covering Introductions, regulatory requirements, project motivation, site description, Environmental Assessment Process and Steps and Structure of report.
- ❖ **Section 2: Description of the Activities covering** route, design and preconstruction, construction, operational, closure and rehabilitation / upgrade stages.
- ❖ **Section 3: Regulatory Framework providing** a summary of the applicable legislations and permitting requirements.
- ❖ **Section 4: Receiving Environment** covering physical environment (climate, water, air quality, and geology), Biological environment (flora, fauna and ecosystem services and functions) and socioeconomic environment.
- ❖ **Section 5: Assessment of Likely Impacts** covering assessment procedure and methods used, results of the likely Impacts of the preconstruction, construction, operational, closure and rehabilitation / upgrade activities on the receiving environment described in Section 4.
- ❖ **Section 6: Environmental Management Plan** covering the mitigation measures for significant impacts with respect to the preconstruction, construction, operational, closure and rehabilitation / upgrade activities on the receiving environment, and.
- ❖ **Section 7: EIA and EMP Conclusions and Recommendations** covering the key issues identified and summarised recommendations.

2. DESCRIPTION OF THE PROPOSED

2.1 Overview

The proposed 66kV overhead powerline from Marble station to the ML 204 will run a total length of 29.977km long with 17 bend points as shown in Table 2.1. The topographic elevation at Marble Station is 1,137m and 1,264m at ML 204 with highest elevation along the entire route being 1,340m.

Table 2.1: Proposed 29.977km 66kV overhead powerline route coordinates of the bend points (Source: Transmission Consulting Services (TCS), 2020).

| BP No | LATITUDE | LONGITUDE |
|--------|--------------------|--------------------|
| | DD, WGS 84 | |
| BP-01 | 21° 55' 43.7885" S | 15° 48' 46.9893" E |
| BP-02 | 21° 55' 44.9377" S | 15° 48' 47.5798" E |
| BP-03 | 21° 55' 47.5890" S | 15° 48' 50.0988" E |
| BP-04 | 21° 56' 18.2922" S | 15° 48' 50.3178" E |
| BP-05 | 21°57'44.44"S | 15°49'28.48"E |
| BP-06 | 21° 58' 24.9306" S | 15° 51' 37.0457" E |
| BP-07 | 21° 59' 53.2203" S | 15° 52' 38.8519" E |
| BP-08A | 22° 00' 06.7225" S | 15° 53' 13.5274" E |
| BP-09A | 22° 00' 27.4250" S | 15° 54' 54.0655" E |
| BP-10A | 22° 01' 03.8073" S | 15° 56' 28.9918" E |
| BP-11A | 22° 02' 41.2582" S | 15° 57' 39.2467" E |
| BP-12A | 22° 03' 29.4075" S | 15° 58' 44.7183" E |
| BP-13A | 22° 03' 56.1636" S | 15° 59' 29.5853" E |
| BP-14A | 22° 04' 52.8352" S | 16° 00' 03.2782" E |
| BP-15A | 22° 05' 49.6582" S | 15° 59' 49.9974" E |
| BP-16 | 22° 05' 54.9683" S | 16° 00' 12.6241" E |
| BP-17 | 22° 05' 56.9259" S | 16° 00' 11.9292" E |

2.2 Description of the Bend Points Route

2.2.1 Main Route Consideration

A potential route corridor from the point of connection was selected from the various route options identified. Route selection preference was focused on utilising areas along already existing infrastructures such as powerlines, roads and generally disturbed grounds within the general project area (Fig. 2.1).

The overall objective has been to utilise as much of the already disturbed areas as possible. Financial considerations were restricted to the distance covered, the number of turns required, and slope classes. The design considerations were based on accessibility to the route from the current existing electricity infrastructure (distribution and connectivity), slope class and the local environment through which the proposed powerline will have to go through including the servitude requirements and land ownership.

Environmental considerations covered the current land uses, sensitivity to disturbance, visual, land use and overall environmental sensitivity in terms of habitats and likely avifauna negative impacts. Guided by the EIA process, areas of potential high visual aspect and high biodiversity of protected / endemic species along the proposed route were avoided as much as possible.

The following is the summary description of the Lines Sections 1-9 of the proposed of the 29.977km long, 66kV overhead powerline route as provided by Transmission Consulting Services (TCS) with the details as shown in Fig. 2.1 and Tables 2.1 and 2.2:

(i) **Line Section 1 (BP-01 to BP-04):**

- ❖ Exit the NamPower Marble Switching Station.

- ❖ Cross over the existing NamPower 66kV Karibib transmission line.
 - ❖ Run pas the farming setup as indicated.
 - ❖ Cross over the Karibib Railway Line and B2 Nation Road observing a vertical clearance crossing height of 10m minimum.
 - ❖ 2 x 22kV Line crossings, and.
 - ❖ Run parallel to the 66kV Navachab transmission line at an offset distance of 30m centre to centre.
- (ii) **Line Section 2 (BP-04 to BP-05):**
- ❖ Continue in a southerly direction crossing one farm access road as well as the Navachab mine access road.
- (iii) **Line Section 3 (BP-05 to BP-06):**
- ❖ Moved BP-05 to the south as proposed by NamPower and bend easterly and cross over the C32 national road, and.
 - ❖ Pass south of the Karibib landing strip. Distance to the edge of the run way is approximately 735m although the start of the runway is not visible.
- (iv) **Line Section 4 (BP-06 to BP-08):**
- ❖ Continue south-easterly running along the D1953 district road observing the minimum 45m road servitude.
 - ❖ Small river crossings are noticed on this section but mainly very flat.
 - ❖ A kraal of circular tree canopy is observed at the halfway mark which should be investigated on site.
 - ❖ The two bends at the mountain pass are required to cross over the road as the straight-line access over the hill is not possible. There is not enough room to fit the line between the hill and the district road mainly due to the very steep sides. The road crossing between BP-06 and 07 were investigated and found to be well suited.
- (v) **Line All Sections Along the D1992 Road (BP-08A to BP-17):**
- ❖ During the fieldwork for route inspection that was undertaken by Mr. Riaan van Zyl of Transmission Consulting Services (TCS) on the 20th May 2020, an alternative route was found run along the existing district road D1992 (Figs. 1.2 -1.4 and Table 2.1). The D1992 is also the main access road to the mining site (ML No. 204) and will be well suited for construction and maintenance of the line.

2.2.2 Alternative Route

The alternative route starts at BP-07 and continues to the mine's substation following the district road all the way. The key bend point coordinates of the alternative route are shown in Table 2.2.

- (i) **Line Section 5 (BP-08 to BP-10):**
- ❖ Continue in a southerly direction crossing over another district road D1992, and.
 - ❖ Bend before the mountain and cross over the D1953 district road.

(ii) **Line Section 6 (BP-10 to BP-12):**

- ❖ Continue in the general southerly direction parallel to the district road. Bend before the mountain again and cross over the road.

(iii) **Line Section 7 (BP-12 to BP-13):**

- ❖ At BP-12, a small farm stead is noticed in this area which should be investigated.
- ❖ Closer to BP-13 a farm setup is again noticed with some small kraal areas.
- ❖ This line section runs outside but next to the Exclusive Prospecting License (EPL) 5555 boundaries. The line could possibly be relocated so that it runs inside the EPL as far as possible if this is advantageous, and.
- ❖ Cross over the district road just before BP-13.

(iv) **Line Section 8 (BP-13 to BP-15):**

- ❖ Run parallel to the district road up to BP-15 before entering the mining area.

(v) **Line Section 9 (BP-15 to BP-17):**

- ❖ The crossing over the access road to the allocated new 66kV Substation at Rubicon in the ML 204.

However, the section of the proposed alternative route between BP-13 to BP-16 runs along a buried NamWater pipeline (Figs. 1.2 -1.4). Building transmission lines in such close vicinity of pipeline is not optimal due to the leakage currents which could cause pipe corrosion. The route along the D1992 road does not come close to this pipeline thus is the preferred route assessed in detail with mitigation measures provided in this report (Figs. 1.2 -1.4).

Table 2.2: The 66kV overhead powerline alternative route coordinates of the bend route following the existing district road D1952 to the Lepidico Mine Site (Source: Transmission Consulting Services (TCS), 2020).

| BP No | LATITUDE | LONGITUDE |
|-------|--------------------|--------------------|
| | DD, WGS 84 | |
| BP-08 | 21° 59' 57.4273" S | 15° 52' 50.5185" E |
| BP-09 | 22° 01' 23.1197" S | 15° 53' 54.1172" E |
| BP-10 | 22° 01' 31.0293" S | 15° 53' 50.6139" E |
| BP-11 | 22° 03' 03.0230" S | 15° 55' 14.4483" E |
| BP-12 | 22° 03' 03.9421" S | 15° 55' 26.5437" E |
| BP-13 | 22° 04' 57.4043" S | 15° 56' 27.7650" E |
| BP-14 | 22° 05' 18.1714" S | 15° 57' 04.5479" E |
| BP-15 | 22° 05' 44.0679" S | 15° 59' 26.1296" E |
| BP-16 | 22° 05' 54.9683" S | 16° 00' 12.6241" E |
| BP-17 | 22° 05' 56.9259" S | 16° 00' 11.9292" E |

2.2.3 Key Observations for Line Design

According to Transmission Consulting Services (TCS), the following crossings were observed that will require particular attention during the final line design (Fig. 2.1 and Table 2.1):

- ❖ 1 x 66kV Transmission line crossing near BP-03.

- ❖ 2 x 22kV existing distribution line crossings between BP-03 & 04.
- ❖ 1 x Railway crossing – This requires TransNamib approval.
- ❖ 1 x National road crossing requiring Roads Authority approval, and.
- ❖ 6 x District road crossing also requiring Roads Authority approval.

2.3 Proposed Structures Alternatives

2.3.1 Overview

The structures to be used for the proposed transmission line will be wooden structure (Plates 2.1 and 2.2).

2.3.2 Alternatives for the 66kV Structure

The wooden crossarm can be replaced with a steel crossarm for additional support and longevity (Fig. 2.1 and 2.2). The bend/angle structures require 5 x stays for structural support. Typical spans lengths range from about 130 to 150m.



Plate 2.1: Example of the 66kV wooden structure with wooden crossarm (Source: Transmission Consulting Services (TCS), 2020).



Plate 2.2: Example of the 66kV wooden structure with steel crossarm (Source: Transmission Consulting Services (TCS), 2020).

The following is the summary of the advantages and disadvantages of the wooden structure as provided by Transmission Consulting Services:

(i) Advantages:

- ❖ Quick and easy to install.
- ❖ Short project construction timeframe.
- ❖ Structure material is readily available, and.
- ❖ Lower initial project costs.

(ii) Disadvantage:

- ❖ Higher maintenance costs.
- ❖ Earth wires cannot be installed thus prone to lightning strikes.
- ❖ Prone to terminate infestation.

- ❖ Higher likelihood of outages or possible line failures compared to a steel structure.
- ❖ Increased number of structures due to relatively short spans, and.
- ❖ Higher electrical losses due to horizontal configuration.

Although initially this structure is cost-effective to install, in the long-term this structure can become unstable due to lightning strikes, termite infestation or possible strong transverse wind conditions. This structure will also have much higher maintenance costs and spares must be kept in stock in the event of structural failure. NamPower will be responsible for the line maintenance and it is recommended that careful consideration should be made about the overall level of maintenance and possible electrical downtime associated with wooden structures.

2.4 Other Key Design Components

2.4.1 Conductor and Earth Wire (OPGW)

According to Transmission Consulting Services, (2020), the following conductor and earth wire or OPGW are allocated for this project:

- ❖ Conductor: 1 x HARE ACSR, and.
- ❖ Earth wire: 1 x OPGW 48FO SMF 12kA.

2.4.2 Aircraft Warning Spheres (AWS)

Aircraft Warning Spheres (AWS) devices as shown in Fig. 2.1 shall be installed at 20m spacing where national and busy district roads are crossed. These devices should be alternating colour between white and orange and must have a diameter of 600mm. These shall be installed close to airport or landing strip sections of the proposed powerline route.

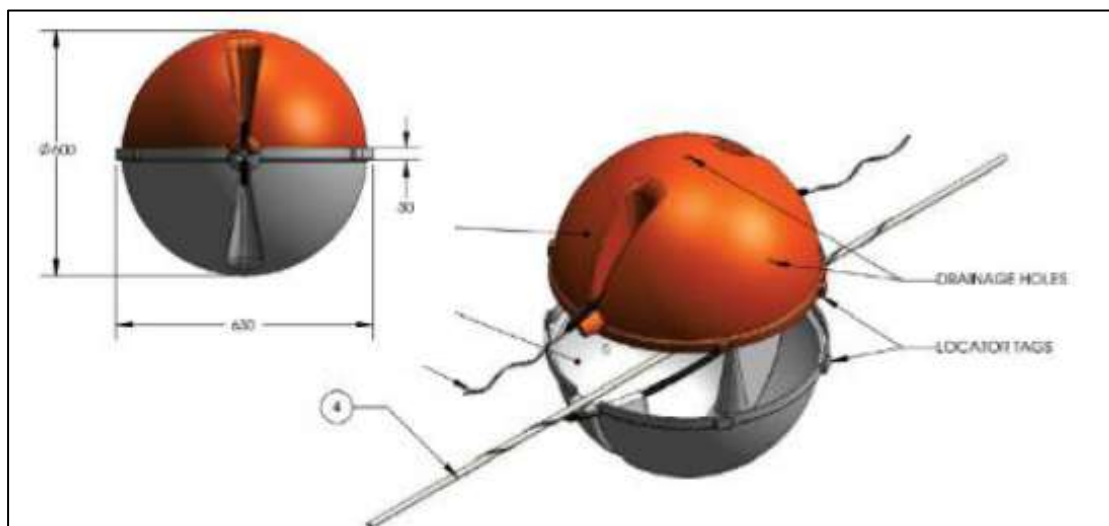


Figure 2.1: Example of the Aircraft Warning Spheres (AWS) devices (Source: Transmission Consulting Services (TCS), 2020).

2.4.3 Bird flight diverters (BFD)

Double loop bird flight diverters (BFD) as shown in Fig. 2.2 can be installed at locations as specified in Chapter 4 of this Report and Annex 2 to prevent bird collisions but especially at large Ephemeral Rivers crossing where higher bird activities are likely to be high. The crossing span as well as the adjacent spans must be equipped with these BFD's at intervals of 15m staggered between the Optical power ground wire (OPGW) and Galvanized Steel Wire (GSW) and with alternating black and white colour.

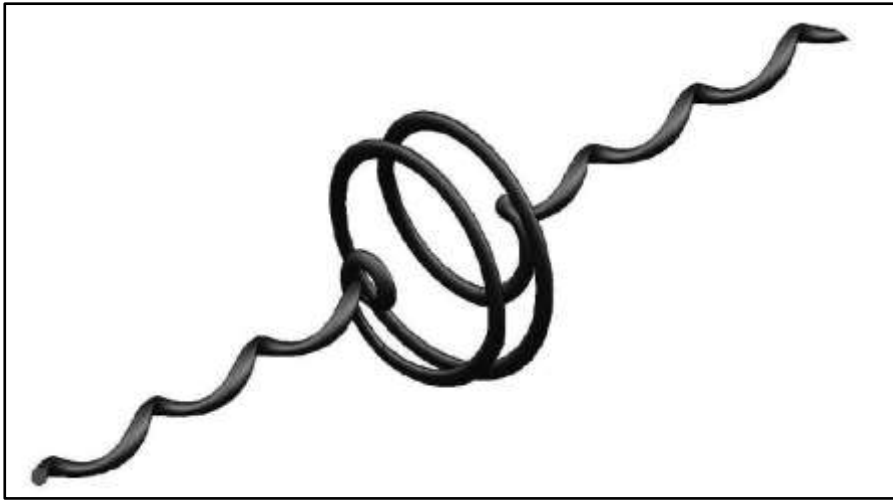


Figure 2.2: Example of the bird flight diverters (BFD) devices (Source: Transmission Consulting Services (TCS), 2020).

2.5 Project Implementation

2.5.1 Preconstruction and Construction

The preconstruction and construction stages of the proposed project will begin once all the agreements have been signed and the relevant permits such as Environmental Clearance Certificate (ECC) have been obtained. It will take approximately six (6) months from the beginning of the preconstruction process to complete construction of the proposed overhead powerline. The following is the summary of the activities associated with the preconstruction and construction stages of the proposed powerline:

- ❖ Route and servitude surveying.
- ❖ Route and servitude minimum clearing for vehicle access.
- ❖ Digging of the individual pole foundations.
- ❖ Digging of the pole support.
- ❖ Poles and support driving works.
- ❖ Structure mounting.
- ❖ Module clamping.
- ❖ Cabling and electrical equipment installation, and.
- ❖ Installation of communication monitoring as may be required.

2.5.2 Equipment and Manpower

The construction of the proposed powerline will be undertaken by a contractor appointed by the developer. The contractor to be appointed will provide the required manpower and equipment as per the tender, regulatory and work standard requirements. Wood structures will be erected using an excavator with rock auger and pole erection attachments. Pole holes will be dug in both soft sediment and hard rock terrains, although soft sediment conditions seem to dominate the proposed route. Pole holes may prove difficult to excavate in some places where fresh rock outcrops may be found along the proposed route. Stringing of the conductors will be completed using a truck mounted pulley system. Other equipment that may be utilised by the contractor onsite included a crane / Hiab truck, 4 X 4 vehicles, elevated work platforms and other hand supporting tools with safety and personnel protective equipment and clothing used at times.

2.5.3 Operational Stage

Once the construction and testing has been completed by the developer, the powerline will be commissioned and formally transferred to NamPower for operation and maintenance. The powerline will be self-sustaining and start to supply electricity to the proposed Karibib Project in the ML 204 during preconstruction, construction and operational stages.

2.5.4 Monitoring and Maintenance

Ongoing field-based and online environmental, technical and security surveillance will be continuously undertaken by the NamPower. The overall objectives will be to preserve and maintain the reliability of the infrastructure as well as improve its coexistence with the natural environment through ongoing maintenance and environmental monitoring.

The maintenance plan activities will comprise the preventive and corrective maintenance operations. The preventative and corrective maintenance activities will be necessary during the whole envisaged lifespan of the powerline to ensure the correct operation, enhance energy transfer, extend the life of all the components and continuously work towards minimising any likely negative impacts on the receiving environment and in particular, minimise any likely avifauna collision impacts.

2.5.5 Closure or Upgrade

The powerline will remain operational unless it is removed or redirected elsewhere beyond the life of the proposed Karibib Project in the ML 204. It is likely that the powerline may be upgraded to a higher voltage and then directed to other areas that may require electricity supply in the general surrounding areas as part of the future electricity network expansion by either NamPower or Erongo Regional Electricity Distributor Company (Pty) Ltd for the Erongo Region.

3. REGULATORY FRAMEWORK

3.1 Introduction

There are four sources of law in Namibia: (1) statutes (2) common law (3) customary law and (4) international law. These four kinds of law are explained in more detail in the other factsheets in this series. The constitution is the supreme law of Namibia. All other laws must be in line with it.

The most important legislative instruments and associated permits \authorisations\concerts\compliances applicable to the powerline development and include: Electricity legislation, environmental management, land rights, water, atmospheric pollution prevention and labour as well as other indirect laws linked to the protection of the receiving environment.

3.2 Key Applicable Legislation

3.2.1 Electricity Legislation

The Electricity Act, 2000 (Act No. 2 of 2000), Electricity Act 2007 (Act No. 4 of 2007) and the Environmental Management Act, 2007, (Act No. 7 of 2007) as well as the associated regulations are the key the legislations linked to the licenses, permits, authorisations and certificates requirements by various Competent Authorities for the proposed powerline development as shown in Table 3.1.

3.2.2 Environmental Management Legislation

The Environmental Assessment (EA) process in Namibia is governed by the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) in the Ministry of Environment, Forestry and Tourism (MEFT).

The objectives of the Act and the Regulations are, among others, to promote the sustainable management of the environment and the use of natural resources to provide for a process of assessment and control of activities which may have significant effects on the environment. The Minister of Environment, Forestry and Tourism (is authorised to list activities which may only be undertaken if an environmental clearance certificate has been issued by the environmental commissioner.

In addition to the requirements for undertaking Environmental Assessment prior to the project implementation, the Environmental Management Act and the EIA Regulations also provide for obligations of the Proponent to provide for project rehabilitation and closure plan as may be required. In the regulations, the definition of “rehabilitation and closure plan” is a plan which describes the process of rehabilitation of the area affected by the activity when such an activity cease.

3.2.3 Water Legislation

Water Act 54 of 1906 under the Minister of Agriculture, Water and Land Reform (MAWLR) provides for the control, conservation and use of water for domestic, agricultural, urban and industrial purposes. In terms of Section 6, there is no right of ownership in public water and its control and use is regulated and provided for in the Act. In accordance with the Act, the proposed activities must ensure that mechanisms are implemented to prevent water pollution.

The Water Act 54 of 1906 is due to be replaced by the Water Resources Management Act 24 of 2004 which is currently being revised. The Water Resource Management Act 2004 *provides for the management, development, protection, conservation and use of water resources.*

3.2.4 Atmospheric Pollution Prevention Legislation

The Atmospheric Pollution Prevention Ordinance, 11 of 1976 falling under the Ministry of Health and Social Services (MHSS) provides for the prevention of the pollution of the atmosphere, and for matters incidental thereto.

Part III of the Act sets out regulations pertaining to atmospheric pollution by smoke. While preventative measures for dust atmospheric pollution are outlined in Part IV and Part V outlines provisions for Atmospheric pollution by gases emitted by vehicles.

3.2.5 Labour, Health and Safety Legislations

The Labour Act, 1992, Act No. 6 of 1992 as amended in the Labour Act, 2007 (Act No. 11 of 2007), falling under the Ministry of Labour, Industrial Relations and Employment Creation (MLIREC) makes reference to severance allowances for employees on termination of a contract of employment in certain circumstances and health, safety and welfare of employees.

In terms of the Health Safety and Environment (HSE), the Labour Act, 2007 protects employees and every employer shall, among other things: provide a working environment that is safe, without risk to the health of employees, and that has adequate facilities and arrangements for the welfare of employees, provide and maintain plant, machinery and systems of work, and work processes, that are safe and without risk to the health of employees, and ensure that the use, handling, storage or transportation of hazardous materials or substances is safe and without risk to the health of employees.

All hazardous substances shall have clear exposure limits and the employer shall provide medical surveillance, first-aid and emergency arrangements as fit for the operation.

3.2.6 Other Applicable National Legislations

Other Important legislative instruments applicable to the proposed powerline preconstruction, construction, operation and closure stages include the following (Table 3.1):

- ❖ National Heritage Act 27 of 2004 – Ministry of Education, Arts and Culture (MEAC).
- ❖ Petroleum Products and Energy Act 13 of 1990 – Ministry of Mines and Energy (MME).
- ❖ Nature Conservation Ordinance, No. 4 of 1975 – Ministry of Environment, Forestry and Tourism (MEFT).
- ❖ Forest Act 12 of 2001 – Ministry of Environment, Forestry and Tourism (MEFT).
- ❖ Hazardous Substances Ordinance 14 of 1974 – Ministry of Health and Social Services (MHSS), and.
- ❖ Public Health Act 36 of 1919 – Ministry of Health and Social Services (MHSS).

Table 3.1 summarises the key selected legislations relevant applicable to the proposed project development.

Table 3.1: Legislation relevant to the proposed powerline development.

| LAW | SUMMARY DESCRIPTION |
|--|--|
| <p>Constitution of the Republic of Namibia, 1990</p> | <p>The Constitution is the supreme law in Namibia, providing for the establishment of the main organs of state (the Executive, the Legislature, and the Judiciary) as well as guaranteeing various fundamental rights and freedoms. Provisions relating to the environment are contained in Chapter 11, article 95, which is entitled "promotion of the Welfare of the People". This article states that the Republic of Namibia shall – "actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at ... maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for all Namibians, both present and future. The Government shall provide measures against the dumping or recycling of foreign nuclear waste on Namibian territory."</p> |
| <p>Electricity Act, 2000 (Act No. 2 of 2000) and Electricity Act 2007 (Act No. 4 of 2007)</p> <p>Ministry of Mines and Energy (MME)</p> | <p>Electricity Act, 2000 (Act No. 2 of 2000) provide for the establishment and functions of the Electricity Control Board; and to provide for matters incidental thereto. The Minister of Mines and Energy has under section 39 of the Electricity Act, 2000 (Act No. 2 of 2000) made the regulations set out in the Schedule which shall come into effect on the date of publication of this notice. The Act commenced on 12 July 2000. Electricity Act 2007 (Act No. 4 of 2007), provides for a wide electricity industry including- "to exercise control over the electricity supply industry and to regulate the generation, transmission, distribution, use, import and export of electricity in accordance with prevailing Government policy so as to ensure order in the efficient supply of electricity.</p> |
| <p>Environmental Management Act (2007) - Ministry of Environment, Forestry and Tourism (MEFT)</p> | <p>The purpose of the Act is <i>to give effect to Article 95(l) and 91(c) of the Namibian Constitution by establishing general principles for the management of the environment and natural resources. to promote the co-ordinated and integrated management of the environment. to give statutory effect to Namibia's Environmental Assessment Policy. to enable the Minister of Environment and Tourism to give effect to Namibia's obligations under international conventions.</i> In terms of the legislation it will be possible to exercise control over certain listed development activities and activities within defined sensitive areas. The listed activities in sensitive areas require an Environmental Assessment to be completed before a decision to permit development can be taken. The legislation describes the circumstances requiring Environmental Assessments. Activities listed as per the provisions of the Act will require Environmental Assessments unless the Ministry of Environment, Forestry and Tourism, in consultation with the relevant Competent Authority, determines otherwise and approves the exception.</p> |
| <p>Water Act 54 of 1906</p> <p>Minister of Agriculture, Water and Land reform (MAWLR)</p> | <p>This Act provides for the control, conservation and use of water for domestic, agricultural, urban, and industrial purposes. In terms of Section 6, there is no right of ownership in public water and its control and use is regulated and provided for in the Act. In accordance with the Act, the proposed project must ensure that mechanisms are implemented to prevent water pollution. Certain permits will also be required to abstract groundwater (already obtained) as well as for "water works". The broad definition of water works will include the reservoir on Site (as this is greater than 20,000m³), water treatment facilities and pipelines. Due to the water scarcity of the area, all water must be recycled (including domestic wastewater). This Act is due to be replaced by the Water Resources Management Act 24 of 2004.</p> |
| <p><i>Forest Act 12 of 2001</i> - Minister of Environment, Forestry and Tourism (MEFT)</p> | <p>The Act provide for the establishment of a Forestry Council and the appointment of certain officials. to consolidate the laws relating to the management and use of forests and forest produce. to provide for the protection of the environment and the control and management of forest fires. Under Part IV Protection of the environment, Section 22(1) of the Act, it is unlawful for any person to: cut, destroy, or remove:</p> <p>(a) any vegetation which is on a sand dune or drifting sand or in a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully or</p> <p>(b) any living tree, bush or shrub growing within 100m of a river, stream, or watercourse.</p> <p>Should either of the above be unavoidable, it will be necessary to obtain a permit from the Ministry. Protected tree species as listed in the Regulations shall not be cut, destroyed, or removed.</p> |
| <p>Hazardous Substance Ordinance 14 of 1974</p> <p>Ministry of Health and Social Services</p> | <p>Provisions for hazardous waste are amended in this act as it provides "<i>for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances. to provide for the prohibition and control of the importation, sale, use, operation, application, modification, disposal or dumping of such substance. and to provide for matters connected therewith</i>"</p> |

Table 3.1: Cont.

| | |
|--|--|
| <p>Agricultural (Commercial) Land Reform Act, 1995, Act No.6 of 1995 Ministry of Agriculture, Water and Land Reform (MAWLR)</p> | <p>This Act provide for the acquisition of agricultural land by the State for the purposes of land reform and for the allocation of such land to Namibian citizens who do not own or otherwise have the use of any or of adequate agricultural land, and foremost to those Namibian citizens who have been socially, economically or educationally disadvantaged by past discriminatory laws or practices. to vest in the State a preferent right to purchase agricultural land for the purposes of the Act. to provide for the compulsory acquisition of certain agricultural land by the State for the purposes of the Act. to regulate the acquisition of agricultural land by foreign nationals. to establish a Lands Tribunal and determine its jurisdiction. and to provide for matters connected therewith.</p> |
| <p>Explosives Act 26 of 1906 (as amended in SA to April 1978) - Ministry Home Affairs, Immigration, Safety and Security (MHAISS)</p> | <p>All explosive magazines are to be registered with the Ministry of Mines and Energy as accessory works. In addition, the magazines must be licensed as required by Section 22. The quantity of explosives and the way it is stored must be approved by an inspector. The inspector has powers to enter the premises at any time to conduct inspections regarding the nature of explosive, quantity and the way it is stored. At closure, all explosives are to be disposed of accordingly.</p> |
| <p>Atmospheric Pollution Prevention Ordinance 11 of 1976. Ministry of Health and Social Services (MHSS)</p> | <p>This regulation sets out principles for <i>the prevention of the pollution of the atmosphere and for matters incidental thereto</i>. Part III of the Act sets out regulations pertaining to atmospheric pollution by smoke. While preventative measures for dust atmospheric pollution are outlined in Part IV and Part V outlines provisions for Atmospheric pollution by gases emitted by vehicles.</p> |
| <p>The Nature Conservation Ordinance, Ordinance 4 of 1975, Ministry of Environment, Forestry and Tourism (MEFT)</p> | <p>During the Mine's activities, care must be taken to ensure that protected plant species and the eggs of protected and game bird species are not disturbed or destroyed. If such destruction or disturbance is inevitable, a permit must be obtained in this regard from the Minister of Environment, Forestry and Tourism. Should the Proponent operate a nursery to propagate indigenous plant species for rehabilitation purposes, a permit will be required. At this stage, however, it is envisaged that this type of activity will be contracted out to encourage small business development.</p> |
| <p>Labour Act, 1992, Act No. 6 of 1992 as amended in the Labour Act, 2007 (Act No. 11 of 2007 Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)</p> | <p>The labour Act gives effect to the constitutional commitment of Article 95 (11), to promote and maintain the welfare of the people. This Act is aimed at establishing a <i>comprehensive labour law for all employees. to entrench fundamental labour rights and protections. to regulate basic terms and conditions of employment. to ensure the health, safety and welfare of employees</i> under which provisions are made in chapter 4. <i>Chapter 5</i> of the act improvises on the <i>protection of employees from unfair labour practice</i>.</p> |
| <p>Petroleum Products and Energy Act 13 of 1990 Ministry of Mines and Energy (MME)</p> | <p>Any consumer installation as envisaged in this Act must be licensed. Appropriate consumer installation certificate will need to be obtained from the Ministry for each fuel installation. The construction of the installation must be designed in such a manner as to prevent environmental contamination.</p> <p>Any certificate holder or other person in control of activities related to any petroleum product is obliged to report any major petroleum product spill (defined as a spill of more than 200ℓ per spill) to the Minister. Such person is also obliged to take all steps as may be necessary in accordance with good petroleum industry practices to clean up the spill. Should this obligation not be met, the Minister is empowered to take steps to clean up the spill and to recover the costs thereof from the person.</p> <p>General conditions apply to all certificates issued. These include conditions relating to petroleum spills and the abandonment of the Site. The regulation further provides that the Minister may impose special conditions relating to the preparation and assessment of environmental assessments and the safe disposal of petroleum products.</p> |
| <p>National Heritage Act 27 of 2004 Ministry of Education, Arts and Culture (MEAC)</p> | <p>This Act provides provisions for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. The proposed activities will ensure that if any archaeological or paleontological objects, as described in the Act, are found during the implementation of the activities, such a find shall be reported to the Ministry immediately. If necessary, the relevant permits must be obtained before disturbing or destroying any heritage</p> |

3.3 Regulator and Competent Authorities

The environmental regulatory authorities responsible for environmental protection and management in relation to the proposed project including their role in regulating environmental protection are listed in Table 3.2 with the summary of the key permits and requirements listed in Table 3.3.

Table 3.2: Government agencies with responsibilities over the proposed project.

| AGENCY | RESPONSIBILITY |
|---|--|
| Office of the Environmental Commissioner (OEC), Ministry of Environment Forestry and Tourism (MEFT) | Issue of Environmental Clearance Certificate (ECC) based on the review and approval of the Environmental Assessments (EA) reports comprising Environmental Scoping, Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) prepared in accordance with the Environmental Management Act (2007) and the Environmental Impact Assessment Regulations, 2012 |
| Ministry of Mines and Energy (MME) | Competent Authority responsible for development and implementation of wider electricity industry legislation and institutional mechanism including – the overall exercise control over the electricity supply industry and to regulate the generation, transmission, distribution, use, import and export of electricity in accordance with prevailing Government policy so as to ensure order in the efficient supply of electricity. |
| Electricity Control Board (ECB) | Falling under the Ministry of Mines and Energy (MME). The Electricity Control Board (ECB) is a statutory regulatory authority established in 2000 under the Electricity Act 2 of 2000. which has subsequently been repealed by the Electricity Act, 4 of 2007. the latter Act having expanded the ECB mandate and core responsibilities. The core mandate of the ECB is to exercise control over the electricity supply industry with the main responsibility of regulating electricity generation, transmission, distribution, supply, import and export in Namibia through setting tariffs and issuance of licenses. The ECB executes its statutory functions through the Technical Secretariat headed by the Chief Executive Officer. |
| NamPower | NamPower is a state-owned enterprise, registered and operating according to the Companies Act, NamPower's core business is the generation, transmission and energy trading within the Southern African Power Pool (SAPP). NamPower supplies bulk electricity to mainly Regional Electricity Distributors (REDs), and to Local Authorities, Farms and Mines (where REDs are not operational) throughout Namibia |
| Regional Electricity Distributors (REDs) NamPower Regional Electricity Distributor | A RED is a regional electricity distributing company tasked with supplying electricity to the residents in a specific region. The proposed project falls within NamPower license area covering Otjozondjupa and Kunene Regions with a customer base of 40 000 and distributes electricity to various towns and settlement areas of central-northern Namibia over an area of approximately 120 000 square kilometres. |
| Ministry of Agriculture, Water and Land Reform (MAWLR) | The Directorate of Resource Management within the Department of Water Affairs (DWA) at the MAWLR is currently the lead agency responsible for management of surface and groundwater utilisation through the issuing of abstraction permits and waste water disposal permits. DWA is also the Government agency responsible for water quality monitoring and reporting. The National Botanical Research Institute's (NBRI) mandate is to study the flora and vegetation of Namibia, in order to promote the understanding, conservation and sustainable use of Namibia's plants for the benefit of all. The Directorate of Forestry (DOF) is responsible for issuing of forestry permits with respect to harvest, transport, and export or market forest resources. |

3.4 International and Regional Treaties and Protocols

Article 144 of the Namibian Constitution provides for the enabling mechanism to ensure that all international treaties and protocols are ratified. All ratified treaties and protocols are enforceable within Namibia by the Namibian courts and these include the following:

- ❖ The Paris Agreement, 2016.
- ❖ Convention on Biological Diversity, 1992.
- ❖ Vienna Convention for the Protection of the Ozone Layer, 1985.
- ❖ Montreal Protocol on Substances that Deplete the Ozone Layer, 1987.
- ❖ United Nations Framework Convention on Climate Change, 1992.

- ❖ Kyoto Protocol on the Framework Convention on Climate Change, 1998.
- ❖ Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal, 1989.
- ❖ World Heritage Convention, 1972.
- ❖ Convention to Combat Desertification, 1994. and
- ❖ Stockholm Convention of Persistent Organic Pollutants, 2001.
- ❖ Southern Africa Development Community (SADC) Protocol on Mining, and.
- ❖ Southern Africa Development Community (SADC) Protocol on Energy.

3.5 Permits, Standards and Guidelines

The environmental regulatory authorities responsible for environmental protection and management in relation to the proposed project including their role in regulating environmental protection are listed in Table 3.3.

Table 3.3: Likely permit requirements.

| ACTIVITY | APPLICABLE LEGISLATION | PERMITTING AUTHORITY | CURRENT STATUS |
|---|---|--|--|
| Completed Infrastructure Transfer and Electricity Supply Agreements | The Electricity Act, 2000 (Act No. 2 of 2000), Electricity Act 2007 (Act No. 4 of 2007) | NamPower | To be Concluded |
| Environmental Clearance Certificate (ECC) | Environmental Management Act (2007) and the Environmental Impact Assessment Regulations, 2012 | Office of the Environmental Commissioner (OEC), MEFT | Still to be Issued |
| Land rights covering the proposed project location including Servitudes requirements | Local Authorities Act, 1992, (Act 23 of 1992) and Agricultural (Commercial) Land Reform Act, 1995, Act No.6 of 1995 | Karibib Town Council and Private Land Owners | To be Concluded |
| Construction, alteration of waterworks with capacity to hold in excess of 20, 000 L. | Water Resources Management Act, 2004 (No. 284 of 2004). | MAWLR | Freshwater Abstraction and Waste Water Discharge Permits not required |
| Abstraction of water other than that provided by NamWater. | | | |
| Discharge of effluents or construction of effluent facility | | | |
| Removal, disturbances or destruction of bird eggs. | Nature Conservation Ordinance 4, 1975. | MEFT | No removals anticipated but if the need arises, appropriate permits will be obtained. |
| Removal, disturbance of protected plants. | | | |
| Removal, destruction of indigenous trees, bushes or plants within 100 yards of stream or watercourse. | Forestry Act, 12 of 2001. | Ministry of Water Affairs and Forestry (MWAFF) | |
| Scheduled processes in controlled area. | Atmospheric Pollution Prevention Ordinance 11 of 1976 | Ministry of Health and Social Services. | No Permits Required but to meet Provisions |
| Solid Waste Disposal Site | Environmental Management Act (2007) and the Environmental Impact Assessment Regulations, 2012 and Municipal Bylaws | Office of the Environmental Commissioner (OEC), MEFT | No permit required because the developer will utilise the already existing town council facility |

Industrial effluent likely to be generated by the proposed activities must comply with provisions of the Government Gazette No 217 dated 5 April 1962 (Table 3.4) while the drinking water quality comparative guideline values are shown in Table 3.5.

The only key missing components to the regulatory frameworks in Namibia are the standards, and guidelines with respect to gaseous, liquid, and solid emissions. However, in the absence of national gaseous, liquid, and solid emission limits for Namibia, the proposed project shall target the Multilateral Investment Guarantee Agency (MIGA) gaseous effluent emission level and liquid effluent emission levels (Table 3.6).

Noise abatement measures must target to achieve either the levels shown in Table 3.7 or a maximum increase in background levels of 3 dB (A) at the nearest receptor location off-site (MIGA guidelines).

Table 3.4: R553 Regional Standards for Industrial Effluent, in Government Gazette No 217 dated 5 April 1962.

| | | |
|------------------------------|---|--------------------|
| Colour, odour and taste | The effluent shall contain no substance in concentrations capable of producing colour, odour or taste | |
| pH | Between 5.5 and 9.5 | |
| Dissolved oxygen | At least 75% saturation | |
| Typical faecal coli | No typical faecal coli per 100 ml | |
| Temperature | Not to exceed 35 °C | |
| Chemical demand oxygen | Not to exceed 75 mg/l after applying a correction for chloride in the method | |
| Oxygen absorbed | Not to exceed 10 mg/l | |
| Total dissolved solids (TDS) | The TDS shall not have been increased by more than 500 mg/l above that of the intake water | |
| Suspended solids | Not to exceed 25 mg/l | |
| Sodium (Na) | The Na level shall not have been increased by more than 50 mg/l above that of the intake water | |
| Soap, oil and grease | Not to exceed 2.5 mg/l | |
| Other constituents | Residual chlorine | 0,1 mg/l as Cl |
| | Free & saline ammonia | 10 mg/l as N |
| | Arsenic | 0,5 mg/l as As |
| | Boron | 1,0 mg/l as B |
| | Hexavalent Cr | 0,05 mg/l as Cr |
| | Total chromium | 0,5 mg/l as Cr |
| | Copper | 1,0 mg/l as Cu |
| | Phenolic compounds | 0,1 mg/l as phenol |
| | Lead | 1,0 mg/l as Pb |
| | Cyanide and related compounds | 0,5 mg/l as CN |
| | Sulphides | 1,0 mg/l as S |
| | Fluorine | 1,0 mg/l as F |
| | Zinc | 5,0 mg/l as Zn |

Table 3.5: Comparison of selected guideline values for drinking water quality (after Department of Water Affairs, 2001).

| Parameter and Expression of the results | | | WHO Guidelines for Drinking-Water Quality 2 nd edition 1993 | | Proposed Council Directive of 28 April 1995 (95/C/13-1/03) EEC | | Council Directive of 15 July 1980 relating to the quality intended for human consumption 80/778/EEC | | U.S. EPA Drinking water Standards and Health Advisories Table December 1995 | | Namibia, Department of Water Affairs Guidelines for the evaluation of drinking-water for human consumption with reference to chemical, physical and bacteriological quality July 1991 | | | |
|---|-------------------------------|--------|--|--------------------------|--|--|---|---------------------------|---|-------------------------|---|---------------|---|--|
| | | | Guideline Value (GV) | Proposed Parameter Value | Guideline Level (GL) | Maximum Admissible Concentration (MAC) | Maximum Contaminant Level (MCL) | Group A Excellent Quality | Group B Good Quality | Group C Low Health Risk | Group D Unsuitable | | | |
| Temperature | t | °C | - | - | 12 | 25 | - | - | - | - | - | - | - | |
| Hydrogen ion concentration | pH, 25° C | - | R <8.0 | 6.5 to 9.5 | 6.5 to 8.5 | 10 | - | - | 6.0 to 9.0 | 5.5 to 9.5 | 4.0 to 11.0 | <4.0 to >11.0 | | |
| Electronic conductivity | EC, 25° C | mS/m | - | 280 | 45 | - | - | - | 150 | 300 | 400 | >400 | | |
| Total dissolved solids | TDS | mg/l | R 1000 | - | - | 1500 | - | - | - | - | - | - | | |
| Total Hardness | CaCO ₃ | mg/l | - | - | - | - | - | - | 300 | 650 | 1300 | >1300 | | |
| Aluminium | Al | µ g/l | R 200 | 200 | 50 | 200 | S | 50-200 | 150 | 500 | 1000 | >1000 | | |
| Ammonia | NH ₄ ⁺ | mg/l | R 1.5 | 0.5 | 0.05 | 0.5 | - | - | 1.5 | 2.5 | 5.0 | >5.0 | | |
| | N | mg/l | - | 1.0 | 0.04 | 0.4 | - | - | 1.0 | 2.0 | 4.0 | >4.0 | | |
| Antimony | Sb | µ g/l | P 5 | 3 | - | 10 | C | 6 | 50 | 100 | 200 | >200 | | |
| Arsenic | As | µ g/l | 10 | 10 | - | 50 | C | 50 | 100 | 300 | 600 | >600 | | |
| Barium | Ba | µ g/l | P 700 | - | 100 | - | C | 2000 | 500 | 1000 | 2000 | >2000 | | |
| Beryllium | Be | µ g/l | - | - | - | - | C | 4 | 2 | 5 | 10 | >10 | | |
| Bismuth | Bi | µ g/l | - | - | - | - | - | - | 250 | 500 | 1000 | >1000 | | |
| Boron | B | µ g/l | 300 | 300 | 1000 | - | - | - | 500 | 2000 | 4000 | >4000 | | |
| Bromate | BrO ₃ ⁻ | µ g/l | - | 10 | - | - | P | 10 | - | - | - | - | | |
| Bromine | Br | µ g/l | - | - | - | - | - | - | 1000 | 3000 | 6000 | >6000 | | |
| Cadmium | Cd | µ g/l | 3 | 5 | - | 5 | C | 5 | 10 | 20 | 40 | >40 | | |
| Calcium | Ca | mg/l | - | - | 100 | - | - | - | 150 | 200 | 400 | >400 | | |
| | CaCO ₃ | mg/l | - | - | 250 | - | - | - | 375 | 500 | 1000 | >1000 | | |
| Cerium | Ce | µ g/l | - | - | - | - | - | - | 1000 | 2000 | 4000 | >4000 | | |
| Chloride | Cl ⁻ | mg/l | R 250 | - | 25 | - | S | 250 | 250 | 600 | 1200 | >1200 | | |
| Chromium | Cr | µ g/l | P 50 | 50 | - | 50 | C | 100 | 100 | 200 | 400 | >400 | | |
| Cobalt | | µ g/l | - | - | - | - | - | - | 250 | 500 | 1000 | >1000 | | |
| Copper after 12 hours in pipe | Cu | µ g/l | P 2000 | 2 | 100 | - | C | TT## | 500 | 1000 | 2000 | >2000 | | |
| | | µ g/l | - | - | 3000 ¹ | - | S | 1000 | - | - | - | - | | |
| Cyanide | CN ⁻ | µ g/l | 70 | 50 | - | 50 | C | 200 | 200 | 300 | 600 | >600 | | |
| Fluoride | F ⁻ | mg/l | 1.5 | 1.5 | - | at 8 to 12 °C: 1.5 | C | 4 | 1.5 | 2.0 | 3.0 | >3.0 | | |
| | | mg/l | - | - | - | at 25 to 30 °C: 0.7 | P,S | 2 | - | - | - | - | | |
| Gold | Au | µ g/l | - | - | - | - | - | - | 2 | 5 | 10 | >10 | | |
| Hydrogen sulphide | H ₂ S | µ g/l | R 50 | - | - | undetectable | - | - | 100 | 300 | 600 | >600 | | |
| Iodine | I | µ g/l | - | - | - | - | - | - | 500 | 1000 | 2000 | >2000 | | |
| Iron | Fe | µ g/l | R 300 | 200 | 50 | 200 | S | 300 | 100 | 1000 | 2000 | >2000 | | |
| Lead | Pb | µ g/l | 10 | 10 | - | 50 | C | TT# | 50 | 100 | 200 | >200 | | |
| Lithium | Li | µ g/l | - | - | - | - | - | - | 2500 | 5000 | 10000 | >10000 | | |
| Magnesium | Mg | mg/l | - | - | 30 | 50 | - | - | 70 | 100 | 200 | >200 | | |
| | CaCO ₃ | mg/l | - | - | 7 | 12 | - | - | 290 | 420 | 840 | >840 | | |
| Manganese | Mn | µ g/l | P 500 | 50 | 20 | 50 | S | 50 | 50 | 1000 | 2000 | >2000 | | |
| Mercury | Hg | µ g/l | 1 | 1 | - | 1 | C | 2 | 5 | 10 | 20 | >20 | | |
| Molybdenum | Mo | µ g/l | 70 | - | - | - | - | - | 50 | 100 | 200 | >200 | | |
| Nickel | Ni | µ g/l | 20 | 20 | - | 50 | - | - | 250 | 500 | 1000 | >1000 | | |
| Nitrate* | NO ₃ ⁻ | mg/l | P 50 | 50 | 25 | 50 | - | 45 | 45 | 90 | 180 | >180 | | |
| | N | mg/l | - | - | 5 | 11 | C | 10 | 10 | 20 | 40 | >40 | | |
| Nitrite* | NO ₂ ⁻ | mg/l | 3 | 0.1 | - | 0.1 | - | 3 | - | - | - | - | | |
| | N | mg/l | - | - | - | - | C | 1 | - | - | - | - | | |
| Oxygen, dissolved | O ₂ | % sat. | - | 50 | - | - | - | - | - | - | - | - | | |
| Phosphorus | P ₂ O ₅ | µ g/l | - | - | 400 | 5000 | - | - | - | - | - | - | | |
| | PO ₄ ³⁻ | µ g/l | - | - | 300 | 3350 | - | - | - | - | - | - | | |
| Potassium | K | mg/l | - | - | 10 | 12 | - | - | 200 | 400 | 800 | >800 | | |
| Selenium | Se | µ g/l | 10 | 10 | - | 10 | C | 50 | 20 | 50 | 100 | >100 | | |
| Silver | Ag | µ g/l | - | - | - | 10 | S | 100 | 20 | 50 | 100 | >100 | | |
| Sodium | Na | mg/l | R 200 | - | 20 | 175 | - | - | 100 | 400 | 800 | >800 | | |
| Sulphate | SO ₄ ²⁻ | mg/l | R 250 | 250 | 25 | 250 | S | 250 | 200 | 600 | 1200 | >1200 | | |
| Tellurium | Te | µ g/l | - | - | - | - | - | - | 2 | 5 | 10 | >10 | | |
| Thallium | Tl | µ g/l | - | - | - | - | C | 2 | 5 | 10 | 20 | >20 | | |
| Tin | Sn | µ g/l | - | - | - | - | - | - | 100 | 200 | 400 | >400 | | |
| Titanium | Ti | µ g/l | - | - | - | - | - | - | 100 | 500 | 1000 | >1000 | | |
| Tungsten | W | µ g/l | - | - | - | - | - | - | 100 | 500 | 1000 | >1000 | | |
| Uranium | U | µ g/l | - | - | - | - | P | 20 | 1000 | 4000 | 8000 | >8000 | | |
| Vanadium | V | µ g/l | - | - | - | - | - | - | 250 | 500 | 1000 | >1000 | | |
| Zinc after 12 hours in pipe | Zn | µ g/l | R 3000 | - | 100 | - | S | 5000 | 1000 | 5000 | 10000 | >10000 | | |
| | | µ g/l | - | - | 5000 | - | - | - | - | - | - | - | | |

P: Provisional
R: May give reason to complaints from consumers
C: Current. P: Proposed. S: Secondary.
T#: Treatment technique in lieu of numeric MCL.
TT##: treatment technique triggered at action level of 1300 µ g/l

Table 3.6: Liquid effluent emission levels (MIGA /IFC).

| Pollutant | Max. Value |
|------------------------|-------------------|
| pH | 6-9 |
| Total suspended solids | 50 mg/l |
| Total metals | 10 mg/l |
| Phosphorous (P) | 5 mg/l |
| Fluoride (F) | 20 mg/l |
| Cadmium (Cd) | 0.1 mg/l |

Table 3.7: Noise emission levels (MIGA /IFC).

| Receptor | Maximum Allowable Leq (hourly), in dB(A) | |
|---|---|----------------------------|
| | Day time (07:00 – 22:00) | Night time (22:00 – 07:00) |
| Residential, institutional, educational | 55 | 45 |
| Industrial, commercial | 70 | 70 |

3.6 Recommendations on Permitting Requirements

It is hereby recommended that the Proponent must follow the provisions of all relevant national regulatory throughout the proposed project lifecycle and must obtain the following permits/authorisations as may be applicable / required as the proposed project develops:

- (i) Valid ECC from the Department of Environmental Affairs in the MEFT.
- (ii) Obtain consent from the land owner with respect to the required servitude, and.
- (iii) All other permits as may be applicable for the proposed powerline preconstruction, construction, operation and monitoring, and closure and rehabilitation activities.

4. RECEIVING ENVIRONMENT

4.1 Regional Physical Geography

The proposed powerline route falls within the Erongo Region in the central western part of Namibia. The proposed powerline route falls within the western edge of the Great Escarpment. The area is characterised by mountains and flat topography, with the exception of local ridges and hills where more competent rocks occur, forming conspicuous topographic elevated surface expressions.

Ephemeral rivers that flow only when it rains and dry most of the year dominate the general drainage networks. The elevation above mean sea level (amsl) ranges from 1350m for most parts of the route area to 1600m and 1700m for the Sargdeckel and Jungfrau mountain summits respectively.

Ephemeral rivers in Erongo region run through from their inland catchment to seawards direction. These rivers include the Swakop River with its main tributary the Khan River, the Omaruru River, Kuiseb and Ugab River (Fig. 4.1).

The surface flows of the ephemeral rivers in the region are short-lived and only their alluvial aquifers provide a source of groundwater. Paleochannels in the Omaruru River form the underground Omaruru delta also providing a significant source of water supply for the central Namib.

4.2 Climatic Settings

4.2.1 Overview

The proposed powerline route falls in an area with daytime warm to hot temperatures throughout the year, while the nights are mild to cool in winter. The mean annual rainfall is highly variable and may range between 200 - 300 mm (Fig. 4.1).

The distribution of rainfall is extremely seasonal with almost all the rain falling in summer - from November to April with occasional with mean annual gross evaporation of about 3300 mm (Fig. 4.1). The local project area has the following three distinct seasons:

- ❖ A dry and relatively cool season from April to August with average daytime highs of 23°C and virtually no rainfall during this period.
- ❖ A hot and dry season from September to December with minimal and variable rainfall falling (<20mm per month) and average daytime highs of 30°C, which regularly exceed 40°C, and.
- ❖ A hot and rainy season from January through to March with >50mm per month falling during this period (although this is extremely variable) and average high temperatures of 29°C.

The project area does not have a weather station with reliable wind records. However, based on the regional wind patterns, the prevailing wind in the area seems to be dominated by winds from the north eastern and southwest quadrants.

Locally, the situation may be different due various influences including topographic effects.

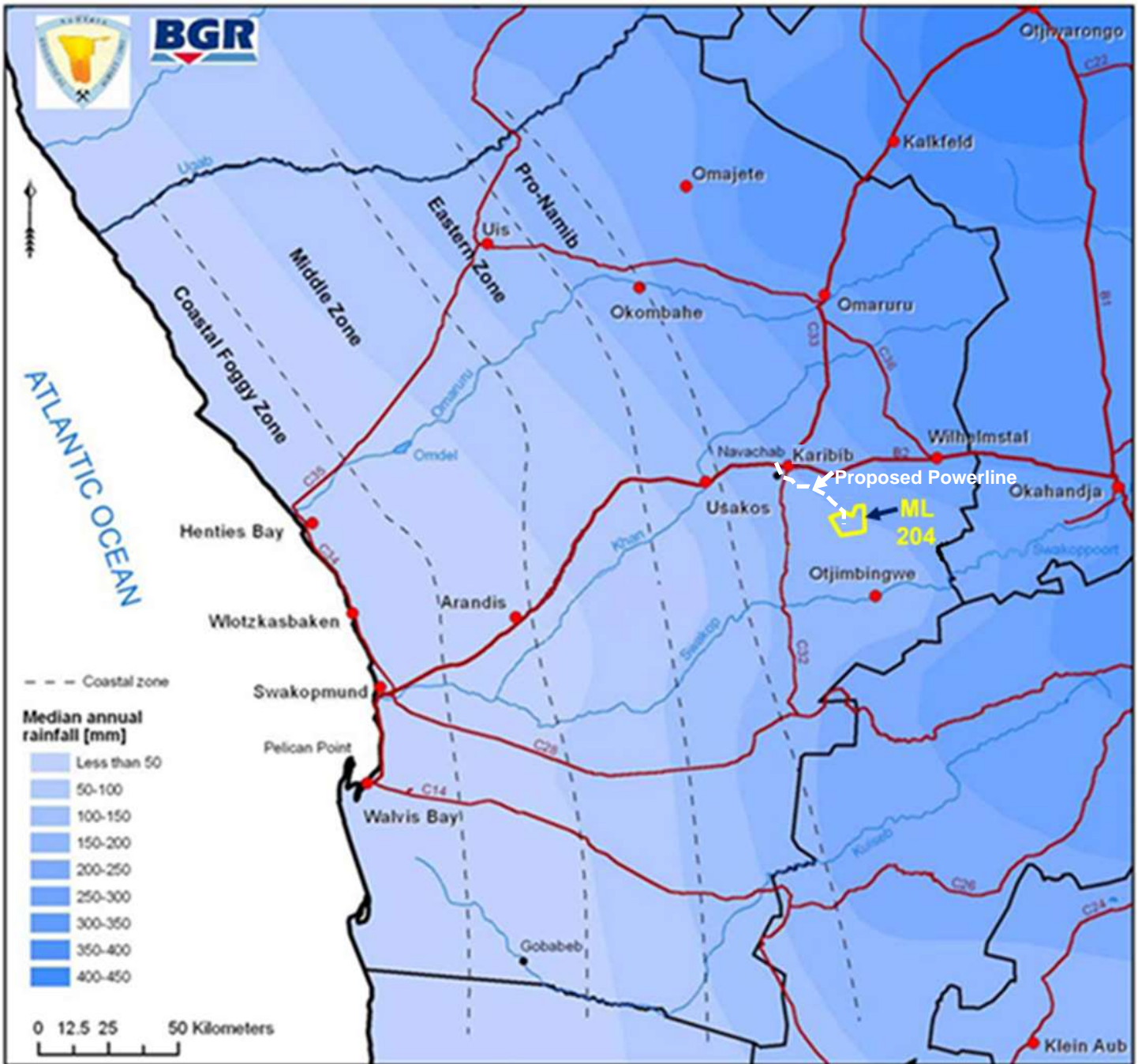


Figure 4.1: Median annual rainfall of central Namib Desert showing the location of the project area (Source: Ministry of Mines and Energy (MME), 2010).

4.2.2 Wind Patterns

The Namib Desert is heavily influenced by high pressure systems, the sub continental high and the South Atlantic high. The coastal winds are driven by the South Atlantic high-pressure systems, resulting in strong winds prevailing from the south or south-west. The cold Benguela Current on the Namibian coastline influences the south-westerly winds.

The stronger winds experienced in the coastal towns and surroundings are mainly north-easterly or east winds. These winds are usually dry and hot with a wind speed of about 27km/hour. This influence is experience to up to 50 days annually between the months of April to September.

Within the project area, stronger winds are dominated by the south-westerly or a north-easterly component. The wind is stronger in winter due to high pressure system of inland regions.

4.2.3 Noise and Air Emissions

Assessment of baseline and future noise and air (dust and air pollutants) emission trends were undertaken as part of the environmental assessment. The main aim of the air quality assessment of the likely impact of the proposed project activities has been to determine the likely contaminant sources, possible pathways and targets with respect to the likely noise and air quality impacts. Considering the fact that the proposed powerline construction process will take place over a limited period (less than 6 months) and the poles structures will be widely spaced (120 m spacing), only localised and limited noise and air quality impacts are anticipated. The likely impacts will be mainly associated with the occupational impacts site-specific impacts. The use of Personnel Protective Equipment (PPE) will result in any likely impacts falling below acceptable limits and will improve compliance to the Labour, Health and Safety Regulations, especially during the preconstruction and construction stages.

4.2.4 Recommendations on the Climatic Components

Based on the regional climatic data sets and the results this EIA and EMP Report, it's likely that a proportion of windblown dust will be generated during the preconstruction and construction stages of the proposed powerline. Due to the proximity of other sources of dust such as the gravel roads, mines and quarries in the area, there will be potential for cumulative impacts on the air quality occurring. This is likely to occur when the threshold wind speed of 4.5 m/s is exceeded.

The threshold wind speed is dependent on the erosion potential of the exposed surface, which is expressed in terms of availability of erodible material per unit area. Any factor that binds the erodible material will significantly reduce the availability of erodible material on the surface, thus reducing the erosion potential of the surface. Namibia does not have air quality standards. Nonetheless, the Proponent, must aim at reducing hazardous air pollutant (HAPs) emissions to levels that comply with long-term regional (SADC) and international standards air quality guidelines.

4.3 Habitat and Ecosystem

4.3.1 Overview

Locally, the powerline route falls within the edge of the central western highlands of Namibia. Central western Namibia in general is regarded as "relatively low to moderate" in overall (all terrestrial species) diversity (Mendelsohn *et al.* 2002). Overall terrestrial endemism in the area on the other hand is "moderate to high" (Mendelsohn *et al.* 2002). The overall diversity and abundance of large herbivorous mammals (big game) is viewed as "moderate" with 3-4 species while overall diversity and density of large carnivorous mammals (large predators) is determined as "moderate" with 4 species expected – e.g. leopard, cheetah, spotted & brown hyena (Mendelsohn *et al.* 2002).

The generally Karibib area is viewed as an area of importance for local endemic plant species, especially the Erongo Mountains with between 26-35 endemic species (Mendelsohn *et al.* 2002). The overall plant diversity (all species) in the general Karibib area is estimated at between 150-299 species and the Erongo Mountain area between 400-499 species (Mendelsohn *et al.* 2002). These estimates are limited to "higher" plants as information regarding "lower" plants is sparse. The greatest variants affecting the diversity of plants are habitat and climate with the highest plant diversity generally associated with high rainfall areas.

Pockets of high diversity are found throughout Namibia in "unique" habitat – often transition zones – e.g. mountains, inselbergs, etc. Plant endemism, other than the Erongo Mountains, is viewed as "medium to high" – with between 6-15 endemics expected from the general area (Mendelsohn *et al.* 2002). Furthermore, Mendelsohn *et al.* (2002) views the overall plant production as medium to low in the general Karibib area and high in the Erongo Mountains, the availability of hardwoods as medium and the grazing and browse as average in the general area. Bush thickening (encroachment) is viewed as problematic between Karibib and Omaruru with *Acacia reficiens* the problem species and patchy between Karibib and Okahandja with *A. mellifera* dominating (Bester 1996, Cunningham 1998, Mendelsohn *et al.* 2002).

The area does not fall within a Communal Conservancy with the closest being †Gaingu located in the Spitskoppe area to the west of Karibib, neither within a Freehold (i.e. commercial) Conservancy with Okawi being the closest, east of Karibib (Mendelsohn *et al.* 2002, NACSO 2006, 2010).

According to Cunningham (2020), it is estimated that at least 75 species of reptile, 7 amphibian, 87 mammal, 217 birds, 74-101 larger trees and shrubs and up to 80 grass species occur in the general/immediate Karibib area of which a high proportion are endemics (e.g. reptiles – 45.3%).

4.3.2 Important Fauna Species

4.3.2.1 Reptiles

The overall reptile diversity and endemism in the general Karibib area is estimated at between 41-70 species and 21-28 species, respectively (Mendelsohn *et al.* 2002). Griffin (1998a) presents figures of between 21-30 and 7-8 for endemic lizards and snakes, respectively, from the general area, while the closest protected areas, the Skeleton Coast and Namib-Naukluft National Parks, have an estimated 77 and 100 species, respectively. Reptile species observed and/or confirmed from the Navachab Gold Mine area included 1 tortoise, 1 terrapin, 5 snakes, 9 lizards, 1 monitor lizard, 2 agamas and 8 geckos (i.e. 27 species) (Cunningham 2011) while reptiles confirmed from the Helikon and Rubicon Mine areas include 2 skinks, 1 Old World lizard and 2 agamas (Cunningham 2013) and 1 python, 1 skink, 2 Old World lizards, 2 agama's and 1 gecko, respectively (Cunningham 2017).

At least 75 species of reptiles are expected to occur in the Karibib area with 34 species being endemic – i.e. 45.3% endemic. These consist of at least 30 snakes (1 blind snake, 2 thread snake, 2 python, 2 burrowing snakes and 23 typical snakes), 11 of which are endemic (33.3%) to Namibia, 2 tortoises, 1 terrapin, 42 lizards (1 worm lizard, 10 skinks, 6 Old World lizards, 2 plated lizards, 1 girdled lizard, 1 monitor lizard, 3 agamas, 1 chameleon and 17 geckos), 23 (54.8%) of which are endemic to Namibia. Skink's (10 species), Old World lizards (6 species) and gecko's (17 species) are the most numerous lizards expected from the general area. Namibia with approximately 129 species of lizards (Lacertilia) has one of the continents richest lizard fauna (Griffin 1998a). Geckos have the highest occurrence of endemics in the general area with 13 of the 17 species (76.5%) expected and/or known to occur in the area, being endemic to Namibia. The IUCN (2020) classifies 6 species as least concern. However, most reptiles have not yet been assessed by the IUCN Red List. Due to the fact that reptiles are an understudied group of animals, especially in Namibia, it is expected that more species may be located in the general area than presented above (Annex 2).

The most important species expected to occur in the general area (Annex 2: Table 1) are viewed as the tortoises *Stigmochelys pardalis* and *Psammobates oculiferus*; pythons – *P. anchietae* and *P. natalensis*; Namibian wolf snake (*Lycophidion namibianum*) – *Varanus albigularis* and some of the endemic and little-known gecko species – e.g. *Pachydactylus* species. Tortoises, snakes and monitor lizards are routinely killed for food or as perceived threats. Other important species are those viewed as "rare" – i.e. *Rhinotyphlops lalandei*, *Mehelya vernayi* and *Afroedura africana* – although very little is known about these species.

However, none of the unique reptiles are expected to be exclusively associated with the proposed pylon route.

The proposed transmission line route passes through freehold farm land and part of the Karibib town land with much anthropomorphic influences (e.g. tar road, gravel roads, rail line, etc.) and not viewed as pristine area although some unique reptile habitat (e.g. rocky outcrops, inselbergs, etc.) occur throughout the area.

Transmission line impact: *The impact of aboveground transmission line infrastructure is not expected to be detrimental to reptiles – i.e. would not impede their movement, etc.*

Access route impact: *The impact of an access route is not expected to be detrimental to most reptiles as there are numerous tracks throughout the general area with large parts of the route following existing roads and the overall footprint is small. However, track discipline should be maintained (e.g. speed limit of 30km/h, no off-road driving, limited nocturnal driving, etc.) and speed humps should be*

incorporated along the route. This should act as mitigation measure for important slow moving, especially nocturnal, reptiles.

Furthermore, none of the unique/important species are exclusively associated with the proposed development area.

4.3.2.2 Amphibians

According to the literature review (Annex 2), at least 7 species of amphibians can occur in suitable habitat in the general Karibib area. The area is under represented, with 2 toads, and 1 species each for rubber, puddle, bullfrog, sand and platanna known and/or expected (i.e. potentially could be found in the area) to occur in the area. Of these, 2 species are endemic (*Poyntonophrynus (Bufo) hoeschi* and *Phrynomantis annectens*) (Griffin 1998b) and 1 species is classified as “near threatened” (*Pyxicephalus adspersus*) (Du Preez and Carruthers 2009) – i.e. high level (42.9%) of amphibians of conservation value from the general area. The IUCN (2020) classifies all the amphibians expected to occur in the general area as least concern.

Two species – *Poyntonophrynus hoeschi* and *Phrynomantis annectens* – were confirmed from the Navachab Gold Mine area (Cunningham 2011), while no amphibians were confirmed from the Helikon and Rubicon Mining areas (Cunningham 2013, 2017).

Important species include the 2 endemics – *Poyntonophrynus hoeschi* and *Phrynomantis annectens* and *Pyxicephalus adspersus* which are classified as “near threatened” in southern Africa (Du Preez and Carruthers 2009). The latter species numbers are decreasing throughout its range in Namibia mainly due to being targeted as food (Griffin pers. com).

The proposed transmission line route passes through freehold farm land and part of the Karibib town land with much anthropomorphic influences (e.g. tar road, gravel roads, rail line, etc.) and not viewed as pristine area although some amphibian habitat (e.g. ephemeral drainage lines, ground dams, rock pools, etc.) occur throughout the area.

Transmission line impact: *The impact of aboveground transmission line infrastructure is not expected to be detrimental to amphibians – i.e. would not impede their movement, etc.*

Access route impact: *The impact of an access route is not expected to be detrimental to amphibians as open surface water is only temporary of nature (i.e. after local flooding) and the overall footprint is small. However, track discipline should be maintained (e.g. speed limit of 30km/h, no off-road driving, limited nocturnal driving, etc.) and speed humps should be incorporated along the route. This should act as mitigation measure for important slow moving, especially nocturnal, amphibians.*

Furthermore, none of the unique/important species are exclusively associated with the proposed development area.

4.3.2.3 Mammals

According to the literature (Annex 2), at least 87 species of mammals are known and/or expected to occur in the general Karibib area of which 9 species (10.3%) are classified as endemic. The Namibian legislation classifies 5 species as “vulnerable”, 2 species as “rare”, 3 species as “specially protected game”, 9 species as “protected game”, 5 species as “insufficiently known”, 4 species as “hunnable game” and 4 species as “problem animals”. Five species of bat are not listed – i.e. according to Monadjem *et al.* (2010) these bats potentially could occur in the general Karibib area according to a habitat modelling programme although not yet actually confirmed.

At least 30.2% (38 species) of the mammalian fauna that occur or are expected to occur in the general Karibib area are represented by rodents of which 6 species (23.1%) are endemic. This is followed by bats 27.9% (24 species) of which 1 species is classified as “rare”. Thirty five species (40.2%) have IUCN, CITES and SARDB international conservation status of which 1 species is classified as “endangered”, 1 species as “rare”, 3 species as “vulnerable”, 16 species as “near threatened”, 7 species as “data deficient”, 7 species as CITES Appendix 1 or 2. The House Mouse (*Mus musculus*) is viewed

as an invasive alien species to the area. *Mus musculus* are generally known as casual pests and not viewed as problematic although they are known carriers of “plague” and can cause economic losses.

Of the 87 species of mammals known and/or expected to occur in the general Karibib area, 9 species (10.3%) are classified as endemic. Rodents (of which 6 species – 23.1% – are endemic) and bats (of which 1 species is classified as “rare”) are the groups least studied. Species of greatest concern in the general area are those viewed as “rare” in Namibia – i.e. Namibian wing-gland bat and Southern African hedgehog – and species classified as “vulnerable” – i.e. cheetah, leopard, Hartmann’s mountain zebra and giraffe and “near threatened” – i.e. Commerson’s round-leaf bat, striped leaf-nosed bat and brown hyena – by the IUCN (2020).

A total of at least 28 species are confirmed from the general area if one includes species identified by Cunningham (2011, 2013, 2017).

The proposed transmission line route passes through freehold farm land and part of the Karibib town land with much anthropomorphic influences (e.g. tar road, gravel roads, rail line, etc.) and not viewed as pristine area although some unique mammal habitat (e.g. ephemeral drainage lines, rocky outcrops, inselbergs, etc.) occur throughout the area.

Transmission line impact: *The impact of aboveground transmission line infrastructure is not expected to be detrimental to mammals – i.e. would not impede their movement, etc. However, some mammals – e.g. small-spotted genet, mongoose – are attracted to the substations and on-pole-mounted switching gear probably for foraging and heat and may cause problems at these structures. This could be mitigated by electrostatic animal and/or squirrel guards on the bushings (Van Rooyen 2003). Other mammals that could be affected by the electrical infrastructure are baboons which often get electrocuted by various types of infrastructure and giraffe. Pole mounted transformers and bushings can be insulated and/or substations could be equipped with electric fencing to prevent baboons entering such areas while giraffe require a minimum clearance of 6270mm for 66kV transmission lines (Van Rooyen 2003).*

Access route impact: *The impact of an access route is not expected to be detrimental to most mammals as there are numerous tracks throughout the general area with large parts of the route following existing roads and the overall footprint is small. However, track discipline should be maintained (e.g. speed limit of 30km/h, no off-road driving, limited nocturnal driving, etc.) and speed humps should be incorporated along the route. This should act as mitigation measure for important slow moving, especially nocturnal, mammals.*

Furthermore, none of the unique/important species are exclusively associated with the proposed development area.

4.3.2.4 Birds

At least 217 bird species [mainly terrestrial “breeding residents”] occur and/or could occur in the general Karibib area at any time (Hockey et al. 2006, Maclean 1985, Tarboton 2001). Twelve of the 14 Namibian endemics are expected to occur in the general area (85.7% of all Namibian endemic species or 5.6% of all the species expected to occur in the area). Eight species are classified as endangered (violet wood-hoopoe, Ludwig’s bustard, white-backed vulture, black harrier, tawny eagle, booted eagle, martial eagle, black stork), 2 as vulnerable (lappet-faced vulture, secretarybird) and 5 as near threatened (Rüppel’s parrot, kori bustard, Verreaux’s eagle, peregrine falcon, marabou stork) (Simmons et al. 2015).

The IUCN (2020) classifies 1 species as critically endangered (white-backed vulture), 4 species as endangered (Ludwig’s bustard, lappet-faced vulture, steppe eagle and black harrier), 2 species as vulnerable (martial eagle, secretarybird) and 1 species as near threatened (kori bustard).

Fifty-seven species have a southern African conservation rating with 8 species classified as endemic (14% of southern African endemics or 3.7% of all the birds expected) and 49 species classified as near endemic (86% of southern African endemics or 22.7% of all the birds expected) (Hockey et al. 2006).

A total of at least 94 species are confirmed from the general area if one includes species identified by Cunningham (2011, 2013, 2017). The most important bird species from the general area are those classified as endemic to Namibia of which the Damara hornbill and Herero chat are viewed as the most important due to the overall lack of knowledge of these species. Although also viewed as important,

Rüppels korhaan is migratory throughout its range while the rockrunner inhabits inaccessible terrain and is widespread throughout mountainous areas in Namibia. Other species of concern are those classified as endangered (violet wood-hoopoe, Ludwig's bustard, white-backed vulture, black harrier, tawny eagle, booted eagle, martial eagle, black stork), vulnerable (lappet-faced vulture, secretarybird) and near threatened (Rüppel's parrot, kori bustard, Verreaux's eagle, peregrine falcon, marabou stork) as classified by Simmons *et al.* (2015) from Namibia as well as all the species classified as critically endangered (white-backed vulture), endangered (Ludwig's bustard, lappet-faced vulture, steppe eagle and black harrier), vulnerable (martial eagle, secretarybird) and near threatened (kori bustard) by the IUCN (2020).

The proposed transmission line route passes through freehold farm land and part of the Karibib town land with much anthropomorphic influences (e.g. tar road, gravel roads, rail line, etc.) and not viewed as pristine area although some unique bird habitat (e.g. ephemeral drainage lines, rocky outcrops, inselbergs, etc.) occur throughout the area.

Transmission line impact: *None of the unique/important species are exclusively associated with the proposed development area although the effect of aboveground transmission line infrastructure is expected to be detrimental to certain birds – e.g. “pylon sensitive species”. Existing transmission line infrastructure, include 22kV and 66kV overhead lines in the Marble Substation area.*

66kV wooden H-Pole structure are proposed for this line. Problems with 66kV lines include bird streamers although this is dependent on the presence of large bird species.

Furthermore, horizontally configured designs experience more problems with bird streamers than vertically configured designs probably due to birds perching/roosting closer to the conductors increasing the probability of flashovers (Van Rooyen 2003). Birds expected to be negatively affected by the transmission line developments include:

- ❖ *Birds flying at pylon height – e.g. bustards, swifts, sandgrouse, ravens, raptors and aquatic and marine species.*
- ❖ *Birds with nocturnal transients – e.g. Palearctic migrants and wetland birds (i.e. coastal area).*
- ❖ *Birds following certain geological and/or landscape features (e.g. rivers; mountain ranges, etc.) whilst foraging and/or migrating – e.g. aquatic/marine species and raptors.*
- ❖ *Birds attracted to the area during rainfall events – e.g. bustards – and temporary water sources in ephemeral rivers/drainage lines – e.g. aquatic/marine species.*

Pylon sensitive species: *Pylon sensitive bird species (See Scott and Scott n.d.) known/expected to occur in the general area include:*

- ❖ *Booted eagle.*
- ❖ *Kori bustard.*
- ❖ *Ludwig's bustard.*
- ❖ *Marabou stork.*
- ❖ *Martial eagle.*
- ❖ *Peregrine falcon.*

- ❖ *Tawny eagle.*
- ❖ *White-backed vulture, and.*
- ❖ *Verreaux's eagle.*

Other potential transmission line issues related to birds would be species that typically nest on such structures.

Nest induced faulting caused by birds (See Scott and Scott n.d.) includes:

- ❖ *Cape crow.*
- ❖ *Pied crow.*
- ❖ *Sociable weaver.*
- ❖ *Red-billed buffalo-weaver.*
- ❖ *Eagles – large.*
- ❖ *Hérons, and.*
- ❖ *Vultures.*

Factors influencing collision risk: *The following factors influence the collision risk for birds (See: Van Rooyen 2003):*

- ❖ *Voltage levels – i.e. correlation between physical size of bird and collision risk.*
- ❖ *Body size and flight behaviour – i.e. birds with a heavy body size and small wing surface are more prone to collisions.*
- ❖ *Flight height and habitat use – i.e. short distance, low altitude, frequency of overhead structures.*
- ❖ *Age (i.e. young birds more prone to collisions).*
- ❖ *Resident versus migratory birds (i.e. movement into unfamiliar terrain increases collisions).*
- ❖ *Weather (i.e. inclement weather increases collisions).*
- ❖ *Time of day (i.e. nocturnal movement increases collisions);*
- ❖ *Land use (i.e. cultivated areas attract birds), and.*
- ❖ *Topography (i.e. mountains/rivers/shorelines act as corridors).*

Access route impact: *The impact of an access route is not expected to be detrimental to birds as there are numerous tracks throughout the general area and the footprint is small. However, track discipline should be maintained (e.g. speed limit of 30km/h, no off-road driving, limited nocturnal driving, etc.) and speed humps should be incorporated along the route. This should act as mitigation measure for important, especially nocturnal, birds.*

Furthermore, none of the unique/important species are exclusively associated with the proposed development area.

4.3.3 Important Flora Species

4.3.3.1 Trees and Shrubs Diversity

Eight species of trees and shrubs (8.8%) expected to occur in the general Karibib area are classified as endemics, 4 species as near endemics (4.4%), 24 species (26.4%) are protected by the Forest Act No 12. of 2001, 5 species (5.5%) are protected under the Nature Conservation Ordinance No. 4 of 1975 while 6 species (6.6%) are classified as CITES Appendix 2 species. Six species are classified as least concern by the IUCN (2020) although most trees have not yet been assessed by the IUCN Red List. All the trees with some kind of conservation and/or protected status are viewed as important in the general Karibib area.

A total of at least 36-52 species are confirmed from the general area if one includes species identified by Cunningham (2013, 2017).

The proposed transmission line route passes through freehold farm land and part of the Karibib town land with much anthropomorphic influences (e.g. tar road, gravel roads, rail line, etc.) and not viewed as pristine area although some unique plant habitat (e.g. ephemeral drainage lines, rocky outcrops, inselbergs, etc.) occur throughout the area.

The most important species expected to occur in the area are *Adenia pechuelii* (elephant's foot – End; Protected F), all the aloe species (e.g. *Aloe dichotoma* – Protected F, NC, C2), all the endemic Commiphora species (Namib, rock and slender corkwood – *C. dinteri*, *C. saxicola*, *C. virgata* – End, Protected F), both *Cyphostemma* species (*Cyphostemma bainesii* [Baines' kobas – End, Protected F] and *C. currorii* [kobas – Protected F, NC]), *Erythrina decora* (Namibian coral tree – End, Protected F), *Manuleopsis dinteri* (Dinter's bush – End) and *Moringa ovalifolia* (phantom tree – Protected F; NC; N-end). The species classified as least concern by the IUCN (2020) are also viewed as important (See Table 5). Most of the important species mentioned above are typically associated with rocky habitat – e.g. outcrops, inselbergs, etc. However, none of the important larger tree and shrub species is exclusively associated with the Lepidico Chemicals Namibia Transmission Line proposed development site(s).

Transmission line impact: *The impact of aboveground transmission line infrastructure is not expected to be detrimental to unique larger trees and shrubs especially if unique habitats such as rocky outcrops, inselbergs, etc. are avoided. Some individual larger trees – e.g. Acacia erioloba and Faidherbia albida, etc. – associated with ephemeral drainage lines may have to be removed (infrastructures) and/or pruned (transmission line). A permit for the removal of these individual trees would have to be obtained from the Department of Forestry prior to development activities.*

Access route impact: *The impact of an access route is not expected to be detrimental to unique larger trees and shrubs as there are numerous tracks throughout the general area with large parts of the route following existing roads and the overall footprint is small. However, track discipline should be maintained (e.g. speed limit of 30km/h, no off-road driving, limited nocturnal driving, etc.) and speed humps should be incorporated along the route. This should act as mitigation measure for dust pollution and erosion related issues.*

Furthermore, none of the unique/important species are exclusively associated with the proposed development area.

4.3.3.2 Grass Diversity

It is estimated that at least 52-72 grasses (Müller 2007 [72sp.], Van Oudshoorn 1999 [52sp.]) – approximate total of 80 species – occur in the general Karibib, central western, Namibia area. Of the approximately 80 grasses that are expected in the general area, 1 species is viewed as endemic (*Eragrostis omahekensis*). According to Müller (1984) the endemic grass *Eragrostis omahekensis* potentially occurs in the general area although the updated Müller (2007) excludes this species suggesting that it probably does not occur in the area.

A total of at least 9-22 species are confirmed from the general area if one includes species identified by Cunningham (2013, 2017).

The most important species expected to occur in the area is the endemic *Eragrostis omahekensis*. However, none of the important grass species is exclusively associated with the Lepidico Chemicals Namibia Transmission Line proposed development site(s).

Transmission line impact

The impact of aboveground transmission line infrastructure is not expected to be detrimental to grasses.

None of the unique/important species are exclusively associated with the proposed development area and are not expected to be adversely affected by the proposed transmission line infrastructure developments.

Access route impact

The impact of an access route is not expected to be detrimental to unique larger trees and shrubs as there are numerous tracks throughout the general area with large parts of the route following existing roads and the overall footprint is small. However, track discipline should be maintained (e.g. speed limit of 30km/h, no off-road driving, limited nocturnal driving, etc.) and speed humps should be incorporated along the route. This should act as mitigation measure for dust pollution and erosion related issues.

Furthermore, none of the unique/important species are exclusively associated with the proposed development area.

4.3.3.3 Other Species

Other species of great importance likely to occur along the proposed powerline route are:

- (i) **Aloes:** Aloes are protected throughout Namibia and those expected to potentially occur in the general area, and also viewed as important are *Aloe asperifolia*, *A. hereroensis* and *A. zebrina* (Rothmann 2004).
- (ii) **Commiphora:** Many endemic *Commiphora* species are found throughout Namibia with Steyn (2003) indicating that *Commiphora crenato-serrata* (not included in the Table 6) potentially also occurring in the general area.
- (iii) **Ferns:** At least 64 species of ferns, of which 13 species being endemic, occur throughout Namibia. Ferns in the general Karibib area include at least 15 indigenous species (*Actiniopteris radiata*, *Asplenium cordatum*, *Cheilanthes dinteri*, *C. eckloniana*, *C. marlothii*, *C. parviloba*, *Marselia aegyptiaca*, *M. ephippiocarpa*, *M. farinosa*, *M. macrocarpa*, *M. nubica*, *M. unicornis*, *M. vera*, *Ophioglossum polyphyllum* & *Pellaea calomelanos*) (Crouch et al. 2011). The general area is undercollected with more species probably occurring in the general area.
- (iv) **Lithop:** Are known to occur in the general area and often difficult to observed, especially during the dry season when their aboveground structures wither. Lithop species known to occur in the general area include *Lithops ruschiorum* var. *ruschiorum* and *L. gracilidelineata* var. *gracilidelineata* (Cole and Cole 2005, Loots 2005).
- (v) **Lichens:** The overall diversity of lichens is poorly known from Namibia, especially the coastal areas and statistics on endemism is even sparser (Craven 1998). More than 100 species are expected to occur in the Namib Desert with the majority being uniquely related to the coastal fog belt (Wirth 2010). Lichen diversity is related to air humidity and generally decreases inland from the Namibian coast (Schults and Rambold 2007). Off road driving is the biggest threat to these lichens which are often rare and unique to Namibia. To indicate how poorly known lichens are from Namibia, the recent publication by Schultz et al. (2009) indicating that 37 of the 39 lichen species collected during BIOTA surveys in the early/mid 2000's was new to

science (i.e. new species), is a case in point. Lichens are known to occur on rocky terrain in the mountainous terrain in the general area, and.

- (vi) **Other species:** Other species with commercial potential that could occur in the general Karibib area include *Harpagophytum procumbens* (Devil's claw) – harvested for medicinal purposes and often over-exploited – and *Citrullus lanatus* (Tsamma melon) which potentially has a huge economic benefit (Mendelsohn et al. 2002).

4.3.4 Important Habitat Areas and Conclusions

4.3.4.1 Important Habitat Areas

The most important areas along the proposed 66kV Lepidico Chemicals Namibia Transmission Line route are:

- (i) **Hills:** Rocky areas generally have high biodiversity and consequently viewed as important habitat for all vertebrate fauna and flora. Escarpments, mountains and inselbergs are generally considered as sites of special ecological importance with granite domes (Karibib and Omaruru districts) high in biotic richness and endemism (Curtis and Barnard 1998) (Fig. 4.2).
- (ii) **Ephemeral drainage lines:** Ephemeral drainage lines usually support larger trees and consequently viewed as important habitat for all vertebrate fauna and flora. Ephemeral rivers are viewed as sites of special ecological importance mainly for its biotic richness; large desert-dwelling mammals; high value for human subsistence and tourism (Curtis and Barnard 1998). Such vegetated rivers in an otherwise extreme arid environment are unique habitat and a virtual lifeline to many desert dwelling fauna (Fig. 4.2).
- (iii) **Bird flyways:** Although very little is known regarding bird flight paths in Namibia, especially species moving/migrating at night, most birds seem to follow the shortest routes between selected habitats – e.g. dams, estuaries, bays, etc. However, unpredictable rainfall events may lure species into areas not normally frequented and storms (e.g. berg winds) may also force birds into areas not regularly visited. Planning for all eventualities is therefore not always possible.

Avifauna is expected to be potentially affected by the 66kV overhead transmission line. Although, none of the unique/important bird species are exclusively associated with the proposed development area, the effect of aboveground transmission line infrastructure(s) is expected to be detrimental to certain birds – e.g. “pylon sensitive” species.

Species potentially affected by the proposed overhead transmission line once operational and at greatest risk would be those larger species flying at pylon height (e.g. bustards, eagles, vultures); nocturnal travellers (e.g. flamingos and Palearctic species) and species potentially visiting the area for roosting/foraging, etc. (e.g. bustards). Although very little is known regarding the actual flight paths used by the birds frequenting the general area, Figs. 4.2 and 4.3 indicate potential flight paths and documented bird mortalities caused by power lines in Namibia.

Anti-perching and anti-collision mechanisms – e.g. coils, flappers, etc. – should be attached to the transmission poles and line in the above-mentioned areas (Fig. 4.2) for such important areas).

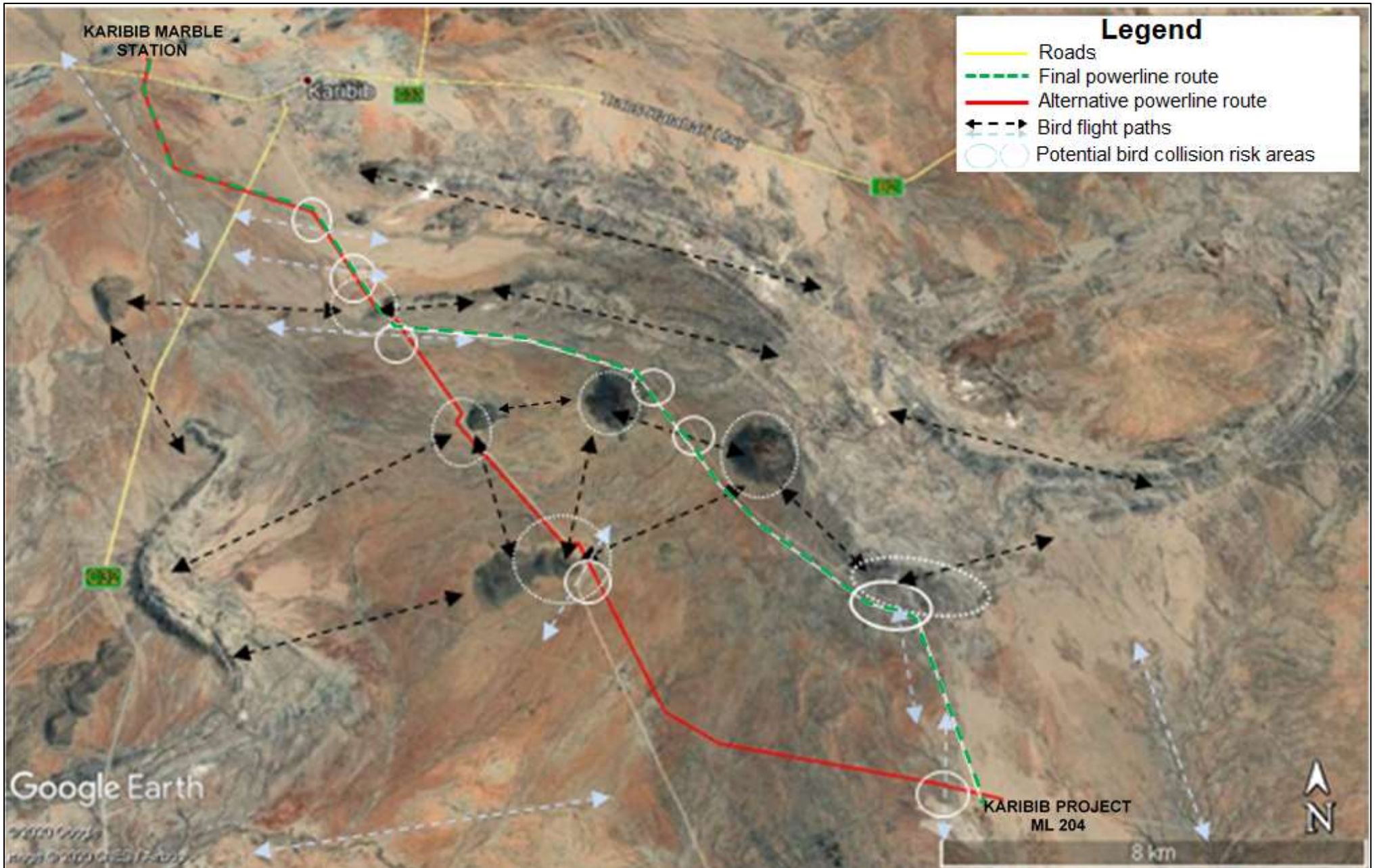


Figure 4.2: Expected bird flight paths between rocky areas (black dashed arrows) and along ephemeral drainage lines (blue dashed arrows) in the general area. Potential bird collision risk areas occur at drainage lines (white circles) and hills (dotted white circles). The proposed 66kV Lepidico Chemicals Namibia routes are indicated by the red line (D1953 route) and white line (D1992 route), respectively.

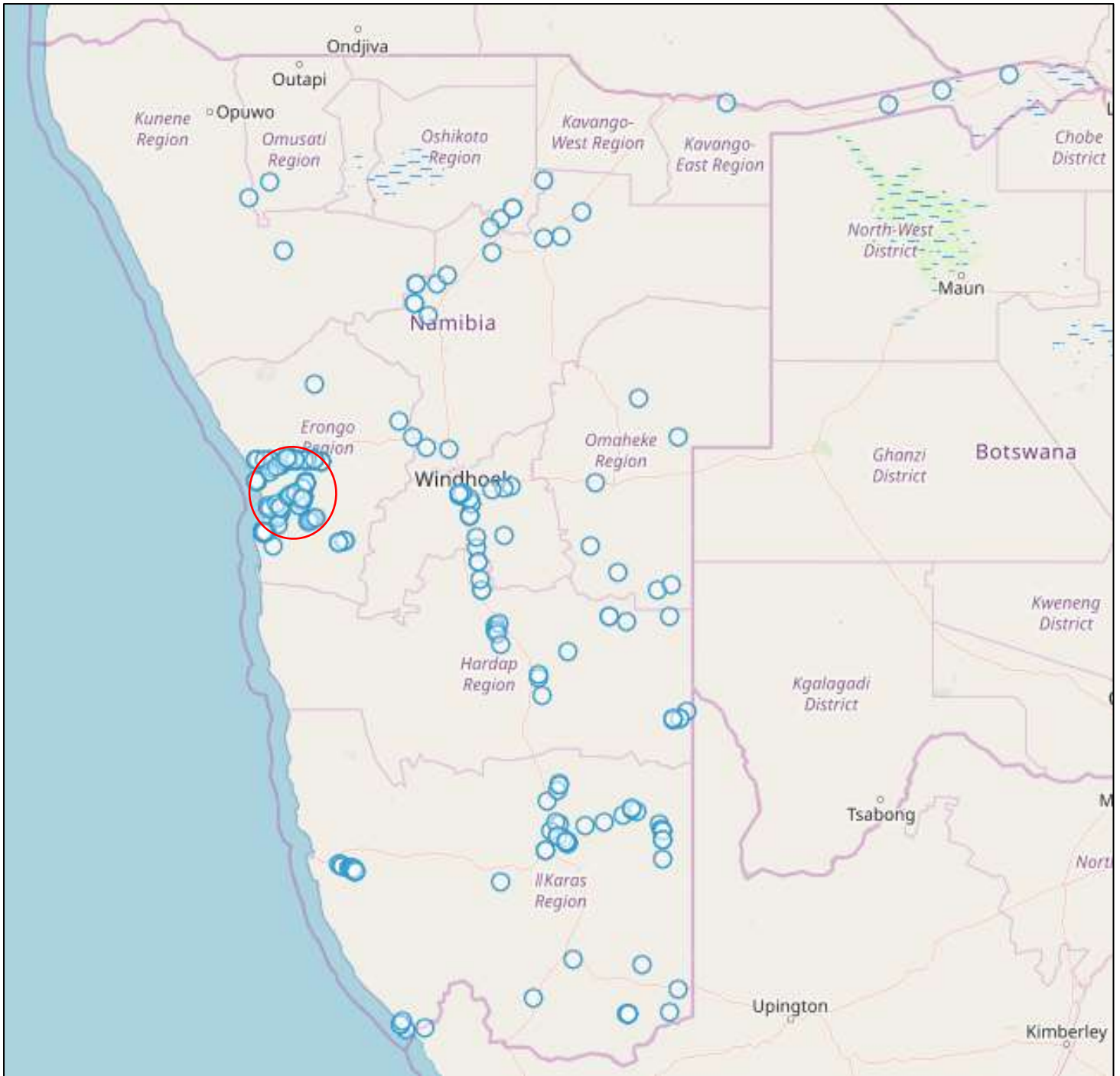


Figure 4.3: Known bird mortalities caused by power lines throughout Namibia (May 2018) are indicated by blue circles. The general Karibib area – indicated by a red circle – is a “hotspot” BIRD collision risk area (Source: www.the-eis.com).

4.3.4.2 Conclusion

As all developments have potential negative environmental consequences, identifying the most important faunal species including high risk habitats beforehand, coupled with environmentally acceptable mitigating factors, lessens the overall impact of such development.

Vertebrate fauna species most likely to be adversely affected by the proposed 66kV Lepidico Chemicals Namibia Transmission Line would be bird species, especially “power line sensitive” species. Species at risk would be larger species flying at pylon height (e.g. kori and Ludwig’s bustard, various large eagles and vultures); nocturnal travelers (e.g. flamingos and Palearctic species) and species potentially visiting the area for roosting/foraging (e.g. bustards, eagles, vultures). Although very little is

known regarding the actual flight paths used by the birds frequenting the general area, Figs. 4.2 and 4.3 indicate potential flight paths and known collision risk sites.

There are various anthropomorphic activities throughout the general area (e.g. existing roads and tracks, pipeline and transmission line activities, farm infrastructure, mining activities, etc.) and the proposed developments would have a small footprint and not be expected to affect any unique amphibians, mammals, reptiles and flora species negatively.

It is not expected that the proposed 66kV Lepidico Chemicals Namibia Transmission Line project and associated infrastructures (e.g. tracks, pylons, transmission line, substation, etc.) would adversely affect any unique vertebrate fauna and flora, if cognisance of the important species and potential environmental impacts are acknowledged and mitigation measures adhered to.

However, introducing avifauna collision avoidance mechanisms are imperative as the proposed 66kV transmission lines (both routes – i.e. D1953 and D1992) pass through expected bird flyway along the various ephemeral drainage lines and around and between rocky outcrops.

4.4 Ground Component

4.4.1 Regional Geology

The proposed powerline route falls within the Central Zone of the Damara Sequence which underlies most of Namibia (Miller, 1992). The oldest rocks within the Central Zone are the pre-Damaran basement that consists of gneiss and granite lithologies found in different parts of the zone (Miller, 1992). According to Miller, (1983a), the sequence was deposited during successive phases of rifting, spreading, subduction and continental collision. Much of the basal succession (Nosib Group), laid down in or marginal to intracontinental rifts, consists of quartzite, arkose, conglomerate, phyllite, calc-silicate, subordinate, limestone and evaporitic rocks. Local alkaline ignimbrites with associated subvolcanic intrusions ranging from 840 to 720 million years in age also form part of the regional geology (Miller, 1992). According to Miller, (1992), widespread carbonate deposition followed and overlapped far beyond early rift shoulders (Kudis, Ugab and basal Khomas Subgroups). interbedded mica and graphitic schist, quartzite (some ferruginous), massflow deposits, iron-formation and local within-plate basic lava point to fairly variable depositional conditions south of a stable platform where only carbonates with very minor clastics occur (Otavi Group). Near the southern margin of the orogen, deep-water fans, facies equivalents of the carbonates were deposited on either side of a Southern Zone ocean separating Kalahari and Congo Cratons (Auas and Tinkas Formations). Thick schistose metagreywacke and metapelite (Kuiseb Formation) overlie the above rocks.

4.4.2 Local Geology

The proposed powerline route cut across the rock of the Swakop Group divided into the Khomas and Ugab Subgroups (Table 4.1). The powerline route is dominated by the carbonate rich Karibib Formation and exhibits considerable thickness variations and conformably overlies the Arandis Formation. Areas where rocks do not outcrop are dominated by sands, gravels and calcretes. The local geology comprises the following lithologies:

- ❖ Quaternary (Qs) sediments comprising unconsolidated surficial deposits.
- ❖ Etendeka basalts and lions Head arkose, shale, mudrock and sandstone covering the Sargdeckel and Jungfpau mountain peaks.
- ❖ Metamorphic Complex augen gneiss, biotite silimatite gneiss.
- ❖ Diorite (NdOv).
- ❖ Pegmatites (N/Epe) belonging to the Namibia to Cambrian age, and.

- ❖ Marble (Nkb) with cal-silicate rocks and mica schists belonging to the Swakop Group – Karibib Formation.

Table 4.1: Partial Lithostratigraphy of the Damara Sequence in Central Namibia (Karibib-Swakopmund Area) (Source: Venmyn Deloitte, 2014).

| GROUP | SUB-GROUP | FORMATION | THICKNES S (m) | LITHOLOGICAL DESCRIPTION |
|---|--------------------|-----------|----------------|--|
| Swakop | Khomas | Kuiseb | 3,000 | Biotite-rich quartzo-feldspathic schist, biotite-garnet-cordierite schist, minor amphibolite schist, quartzite, calc-silicate rock and marble. |
| | | Karibib | 700 | Marble, biotite schist, quartz schist and calc-silicate rock. |
| | | Chuoss | 700 | Diamictite, pebble- and boulder-bearing schist and minor quartzite |
| | Discordance | | | |
| | Ugab | Rössing | 200 | Very variable marble, quartzite, conglomerate, biotite schist, biotite cordierite schist and gneiss, aluminous gneiss, biotite-hornblende schist and calc-silicate schist. |
| Unconformity or conformable transition | | | | |
| Nosib | | Khan | 1,100 | Various gneisses, quartzite, schist, conglomerate, minor marble, amphibolite and calc-silicate rock. |
| | | Etusis | 3,500 | Layered light-red to greyish-brown quartzites with high feldspar content. In-between para-gneisses, biotite schists and conglomerates occur. |

4.4.3 Geotechnical Engineering Considerations

Rocks of varying geotechnical characteristics are expected along the proposed powerline route. Table 4.2 outlines an indicative classification of the various discontinuities that are likely to be found in the area including the dominant marble outcrops. Both low and high order discontinuities are likely to be found along the proposed powerline route.

Table 4.2: General rock structure scheme (Source: Mwiya *at el.*,2004).

| DISCONTINUITY | GEOMETRY | | | CHARACTERISTIC | | | EXAMPLE | INFLUENCE INDICATOR |
|---|------------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|--|--------------------------|------------------------------------|---------------------|
| | LENGTH m | SPACING m | WIDTH m | TRANSMISSIVITY m ² /s | HYDRAULIC CONDUCTIVITY m/s | INFILLING THICKNESS m | | |
| LOW ORDER DISCONTINUITIES. ZONES OUTCROPS | | | | | | | | |
| 1 ST ORDER | >10 ⁴ | >10 ³ | >10 ² | 10 ⁻⁵ - 10 ⁻² | 10 ⁻⁷ - 10 ⁻⁵ AV. [10 ⁻⁶] | 10 ⁰ | Regional major fault systems | 4 V. High |
| 2 ND ORDER | 10 ³ - 10 ⁴ | 10 ² - 10 ³ | 10 ¹ - 10 ² | 10 ⁻⁷ - 10 ⁻⁴ | 10 ⁻⁸ - 10 ⁻⁶ AV. [10 ⁻⁷] | 10 ⁻¹ | Local major fault zones | |
| 3 RD ORDER | 10 ² - 10 ³ | 10 ¹ - 10 ² | 10 ⁰ - 10 ¹ | 10 ⁻⁹ - 10 ⁻⁶ | 10 ⁻⁹ - 10 ⁻⁷ AV. [10 ⁻⁸] | ≤10 ⁻² | Local minor fault zones | |
| HIGH ORDER DISCONTINUITIES: INDEPENDENT OUTCROPS | | | | | | | | |
| 4 TH ORDER | 10 ¹ - 10 ² | 10 ⁰ - 10 ¹ | - | - | 10 ⁻¹¹ -10 ⁻⁹ AV.[10 ⁻¹⁰] | - | Local major joint set or bedding | 3 High |
| 5 TH ORDER | 10 ⁰ - 10 ¹ | 10 ⁻¹ - 10 ⁰ | - | - | 10 ⁻¹² -10 ⁻¹⁰ AV. [10 ⁻¹¹] | - | Local minor joints/ fractures | |
| 6 TH ORDER | 10 ⁻¹ - 10 ⁰ | 10 ⁻² - 10 ⁻¹ | - | - | 10 ⁻¹³ -10 ⁻¹¹ AV. [10 ⁻¹²] | - | Local minor fissures / schistosity | 2 Low |
| 7 TH ORDER | <10 ⁻¹ | <10 ⁻² | - | - | <10 ⁻¹³ | - | Crystalline voids | 1 V. Low |

4.4.4 Sources of Water Supply

Groundwater as well as surface water (only during the rainy season) from ephemeral river channels is the sources of water supply in the area as well as much of the Erongo Region (Department of Water Affairs, 2001). The proposed powerline route has moderate groundwater potential in within the carbonate rock outcrop areas and low groundwater potential in the rest of the rocks. The area with aquifer potential, more or less reflects the rainfall distribution, decreasing westwards. Detailed site-specific knowledge of the aquifers along the proposed powerline route is sparse, due to the low number of boreholes and few on groundwater. Recharge from rainfall is an important parameter determining the groundwater potential as well as the degree of metamorphism of local rocks. The groundwater potential of rocks decreases, as the degree of metamorphism increases. Crystalline rocks normally exhibit a very low tendency to store water, typical of the pegmatite zones and the alternating bands within the banded dolomitic marble and biotite-quartz schist found within the project area. The groundwater potential of these rock units is generally low, to locally moderate. Possible targets for water resources in this area are mainly fractured zones, karsts, solution holes and faults associated with the carbonate terrain.

The area along major ephemeral rivers channels may be more promising due to well developed fractures and faults that give rise to good recharge potential during the rainy season, typical of the local ephemeral spring found in the general area but not necessary along the proposed powerline route. The possible powerline development will not require major water resource except for very limited bottled human consumption.

4.4.5 Evaluation of Water Vulnerability

Vulnerability assessment of surface water covered possible runoff, the presence of source factors and major flow routes such as Ephemeral River Channels, valleys and gullies as pathways and the presence of surface water body as a target. The groundwater assessments covered hydraulic properties and thickness of the unsaturated and saturated zones derived from geological and hydrogeological data. The assessment of the unsaturated characteristics was based on the ability for source factors to influence the system through known pathway factors such as discontinuities. However, groundwater or surface water will only be vulnerable to contamination if there are contaminant sources, if there are pathways for contaminant migration and there are targets (surface water or groundwater) present within the project area.

Overall, the limited local groundwater resources found in the area form part of the unconfined aquifer system that is highly vulnerable to any sources of pollution that may be associated with the proposed project especially fuel or chemical spillages. During the rainy season, surface water bodies can be found along the major Ephemeral River Channels in the area with an active local spring. It is the surface water that often recharges the local groundwater resources along the faults, solutions holes and other discontinuities along the ephemeral rivers in the area.

Surface water in the area could be vulnerable to pollution sources from the localised proposed activities. Management of wastewater from the onsite activities will utilise mobile chemical toilets as may be applicable.

4.5 Socioeconomic Environment of Area

4.5.1 Socioeconomic Baseline Summary

The proposed powerline route and Karibib Project both falls within the Karibib Constituency in the Erongo Region. The total area of Karibib Constituency covers 14 535.8 km² amounting to 22.8 percent of the total area of Erongo Region (National Planning Commission, 2006, 2007 and 2012).

Karibib Constituency is among the least densely populated area in Erongo Region with a population density of approximately 0.9 persons per km². Karibib Constituency is bordered by the Omaruru Constituency in the north, Daures Constituency in the northwest, Arandis Constituency in the southwest and Otjozondjupa and Khomas Regions to the east.

The following is the summary of the key socioeconomic information associated with the proposed powerline route (National Planning Commission, 2006, 2007 and 2012):

(i) Household socio-demographic characteristic:

- ❖ The study revealed a diverse socio-economic profile of inhabitants in the study area while portraying similarities in social setups and lifestyle characteristics.
- ❖ In terms of gender of head of household, the study indicated that across target communities 55.3% and 44.7% of households interviewed were headed by males and females, respectively.
- ❖ Households in Usakos (43%) and Otjimbingwe (40.6%) were headed by relatively older people (>56 years of age) whereas the majority of heads of households in Karibib (42%) and Namdeb (30%) were in the age group of 31–40 years.
- ❖ In line with the observation that majority (59.4%) of residents in the study area were relatively younger people in the age groups of 18–35 years (accounting for 26.1%) and 36–60 years (33.2%), it turned out that majority of the households (57.9%) were headed by unmarried (single) persons.
- ❖ Across target communities, the average size of the household was 5.15, and ranged between 3.6 and 6.3 persons – being slightly higher than the national average. Otjimbingwe had larger household sizes, the largest being 26 members in one household.
- ❖ In terms of household composition, Usakos and Otjimbingwe had relatively more female than male adults, accounting for 19.6% vs. 17.1% and 15.3% vs. 12.7%, respectively. In contrast, Karibib and Namdeb had more male than female adults in the ratio of 19.6% vs. 17.2% and 19.6% vs. 11.8%, respectively
- ❖ The same trend was noticed for male and female youths across the study areas, except for Karibib where male youths accounted for 10.7% and female youths 15.7%.
- ❖ Children accounted for 30.7% (Usakos) to 38.1% (Otjimbingwe), whereas pensioners accounted for 1.3% (Namdeb) to 9.2% (Otjimbingwe) of households.
- ❖ Notably, overall, the larger segment of persons in households consisted of able-bodied persons (59.4%) than children (35.5%) – indicating availability of the critical mass that could be relied upon as labour for various household or community development activities and/or to be tapped into by potential employers, subject to skill-to-job matching.
- ❖ The study revealed that out of a total of 767 children, 89 (11.6%) were orphans. Within the study area, Usakos (with 20.5% of children in the household being orphans) had the highest orphans, followed by Namdeb (10.3%), Otjimbingwe (10.2%) and Karibib (4.8%).
- ❖ As for disability, the study showed that 3% (65 persons) of the sampled population (n = 2,188) had some form of disability. This figure is slightly lower than the national average of 4.7%.
- ❖ In terms of education level of heads of households, one quarter of household heads in Otjimbingwe did not attend any formal education, followed by Usakos (21%), Namdeb (16%) and Karibib (2%). On the same trend, a further 24.4%, 19.5%, 18% and 9.3% of household heads in Otjimbingwe, Usakos, Namdeb and Karibib respectively, ended their academic careers at primary school level.
- ❖ Attendance of secondary/high school by unemployed youth in target communities shows statistics that are higher than the national average. For example, on average 40.8% and

46.1% of unemployed female youth (UFY) and unemployed male youth (UMY) respectively, reached Grade 10. A further 34.8% and 34% of UFY and UMY respectively, reached Grade 12.

- ❖ In light of education levels as well as the diverse skills and experiences possessed by members of the target community, the study revealed that the target communities would have an abundance of low-skilled and unskilled labour – some of whom can be trained through e.g. on-the-job training, short-courses, and adult learning to assume various roles in different sectors and industries.
- ❖ Of relevance to Proponent is the proportion of residents (Karibib – 28%. Namdeb – 18%. and Usakos – 17%) who indicated possession of key experience in mining and/or related fields.
- ❖ For convenience and ease of access, over 90% of pre-primary and primary school learners attended schools in their respective towns/places. However, for Namdeb most pre-primary (61.5%) and primary school (92.3%) learners attended pre-primary and primary schools in Karibib because education institutions are non-existent at that settlement.
- ❖ As regards to Junior and Senior Secondary (High) School, a similar trend in which town-based (local) schools were generally preferred over schools in other places was observed.
- ❖ Of the children (all being in the school-going age) segment within households, 96.8% were enrolled in formal education system, being in concurrence with national average for that age group.
- ❖ On average 14.0%, 34.4%, 21.2%, 24.8% and 2.4% were in pre-primary, primary, junior secondary and senior secondary (high) schools respectively, mainly across the study area.
- ❖ The study revealed that income sources were diverse, with a strong bias on social grants which sustained 27.8% of the households.
- ❖ Further, study noted that a relatively high number of heads of household in Namdeb (72%), Karibib (38%) and Otjimbingwe (18.9%) had no income. Similarly, majority of other household members did not have incomes – Namdeb (86%), Otjimbingwe (63.9%), Karibib (63.3%) and Usakos (46%).
- ❖ The only notable exception was 15% of households who had own businesses for additional income in Usakos. 15% in Otjimbingwe who had members employed as civil servants. and 14.7% who had own businesses in Karibib.
- ❖ Social grants were relied upon as the main income source by 52.8%, 41% and 15.3% of households in Otjimbingwe, Usakos and Karibib, respectively. Interestingly, despite having no reliable income, households in Namdeb also do not draw much from social grants, with only 2% drawing benefits from this grant mechanism of the state.
- ❖ Formal employment accounted for incomes of only 10.7%, 6.5%, 4.0% and 0.6% of household heads in Karibib, Usakos, Namdeb and Otjimbingwe, respectively.
- ❖ Reliable farming income was recorded by only 8.3%, 2.5% and 2.0% of households in Otjimbingwe, Usakos and Namdeb, respectively.
- ❖ Nearly half (48.3%) of the sampled households had a combined monthly income in the range of NAD 0 to 999. This was followed by the income bracket of NAD 1,000 to 2,999 which represented the average of income of 34% of households.

- ❖ Notably, nearly all income-earners (84.0%) residing at Namdeb are in the lowest income category. On the same trend, 93.9% of income-earners in Otjimbingwe were in the bottom two income categories.
- ❖ These observations, coupled with other findings pertaining to the socio-economic situation of residents, clearly confirm Namdeb and Otjimbingwe (and Usakos, to some extent) as multiple deprivation hotspots requiring massive investments and programs in the social development space to effectively address the plight of those in need.

(ii) Service provision and community needs

- ❖ Majority households and key informants are unsatisfied with municipal services due to a magnitude of reasons. At present, the town/village councils in the target communities do not have the financial resources or the professional and administrative capabilities to fulfil their mandate as perceived by communities.
- ❖ Based on survey findings, 52.5%, 40.0%, 12.0% and 36.7% of households in Usakos, Karibib, Namdeb and Otjimbingwe respectively, had access to formal credit facilities and/or financial services (mainly reputable commercial banks, Nampost and a few micro-lenders).
- ❖ Despite the importance of roads, it was evident that the maintenance of roads within the towns of Usakos and Karibib as well as the gravel road between Karibib and Otjimbingwe was sub-standard as per respondent's assertions.
- ❖ About 28.1% of households across the study area owned transport assets.
- ❖ In line with the aspirations of the government – which is to ensure that all Namibians have access to basic services especially water – none of the households confirmed total deprivation from water services.
- ❖ In Usakos, the main water source was piped water connected to dwellings (74.5%) and centralized public taps (24.5%). In Karibib, majority (76.0%) of residents obtained water from public taps and only 22.7% had piped water (22.7%). Namdeb households largely depended on water provided through water tankers (58.0%) and natural open water sources e.g. ponds and rivers (28.0%). In Otjimbingwe, 82.8% obtained water from a public tap, and only 11.1% had water piped into their dwellings.
- ❖ The LAs of Karibib and Usakos as well as the settlement administration in Otjimbingwe try their best to ensure adequate public health conditions, including clean drinking water and acceptable treatment and disposal of human excreta and sewage. However, the LAs have been facing financial challenges which cripple effective service delivery – a key concern being ablution facilities.
- ❖ Considering that a significantly high number of households (Namdeb – 96.0%. Karibib – 72.0% and Otjimbingwe – 64.4%) did not have access/own ablution facilities and the fact that most households in the target communities resorted to 'bush/veld toilet' when nature calls, there is a looming danger which may see a repeat of outbreaks (e.g. Hepatitis E) such as those experienced in Windhoek and a few other towns in the recent years.
- ❖ As part of taking early action including associated preventative measures, the above calls for collection action and expedited investments in servicing new townships and settlements while managing rural-urban migration issues – the root cause of the mushrooming of these settlements or "shanty towns".
- ❖ A lot needs to be done in the health domain, with staffing, ambulance, mortuary, pharmacies, availability of drugs/vaccines, general health care service (which was reported as poor by some respondents as poor) being among the list of key issues requiring urgent attention.

- ❖ Overall, the main key issues with respect to LAs, are:
 - (i) Economic aspects (unemployment, poverty).
 - (ii) Insufficient or lack of basic infrastructure (potable water, agro-marketing, irrigation, roads, ablution and sewage, electricity).
 - (iii) Amenities (sports and playgrounds, public green areas).
 - (iv) Law and order (police station, vehicles).
 - (v) Education (teachers, classrooms, equipment, transportation), and.
 - (vi) Health (staffing, ambulance, mortuary, pharmacies).

(iii) Prioritised needs of target communities:

- ❖ Target communities had very diverse opinions on development priorities – most of which discern from the perspective of service delivery and general destitution. Below are the top 3 broad categories of prioritized needs:
 - (i) Mega projects/investments with high employment creation potential – to be aligned to the relatively abundant and diverse local labour.
 - (ii) Well-equipped vocational centres for tailor-made trainings/skills enhancement, targeting unemployed youth, women or any interested community member(s), and.
 - (iii) Diversification and value addition initiatives for food security enhancement and poverty alleviation, targeting vulnerable groups and farmers.

4.5.2 Conclusions and Recommendation on the Socioeconomic Assessment

The proposed powerline will have indirect positive contribution to economic development and will create employment opportunities to the residents of the Karibib Constituency and the Erongo Region. The proposed development will coexist with the other current and future land uses in area including conservation, tourism, farming and planned minerals exploration and mining projects in the general area. The following is the summary of the key actions that the developer shall implement as part of enhancing the socioeconomic impacts of the proposed project:

- ❖ Stipulate that local residents should be employed for temporary unskilled/skilled and where possible in permanent unskilled/skilled positions as they would reinvest in the local economy. However, due to low skills levels of the local population, it is likely that the majority of skilled positions would be filled with people from outside the area.
- ❖ The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.
- ❖ Ensure that contractors adhere to Namibian Affirmative Action, Labour and Social Security, Health and Safety laws.
- ❖ The local authorities, community organisations and community leaders shall be informed on final decisions regarding the project and the potential job opportunities for local people.
- ❖ Stipulate a preference for local contractors in the tender policy. The procurement of services and goods from local entrepreneurs and the engagement of local businesses people should be favoured and promoted provided that it is financially and practically feasible.

- ❖ Undertake a skills audit, develop a database of local businesses that qualify as potential service providers and invite them to the tender process.
- ❖ Scrutinise tender proposals to ensure that minimum wages were included in the costing.
- ❖ Project offers experience and on job skills development, particularly for low or semi-skilled workers. This would raise the workers experience and skills to secure jobs in future.
- ❖ Promising employees could be identified and training and skills development programme could be initiated.
- ❖ The project could organise business partnerships with local entrepreneurs or small SMEs.
- ❖ Service providers to provide opportunities for skills transfer, and.
- ❖ Provide opportunities for employee's re-skilling beyond mine closure.

4.6 Archaeology

4.6.1 Regional Archaeological Setting

Modern humans and their ancestors have lived in Namibia for more than one million years, and there are fossil remains of lineal hominin ancestors as early as the Miocene Epoch. Namibia has a relatively complete sequence covering the mid-Pleistocene to Recent Holocene period, represented by thousands of archaeological sites mainly concentrated in the central highlands, escarpment, and Namib Desert (Kinahan, 2017).

The Recent Holocene archaeological sequence in Namibia, i.e. the last 5 000 years, is of particular importance because it provides the background evidence for the development and recent history of the indigenous peoples of Namibia before the advent of written historical records during the colonial era. Many archaeological sites from this period are of great significance to the understanding of Namibian history, and some are of global importance.

4.6.2 Local Archaeological Setting

In summary, the three area surveys previously undertaken in the vicinity of the proposed powerline route provide new evidence relating to the last one thousand years, with little indication of earlier occupation. The pre-colonial evidence points to impermanent settlement by groups of probably Khoe pastoralists (Kinahan, 2017). These people formed part of a regional-scale network with links to the Atlantic coast and inland sites where copper was produced.

According to Kinahan, (2017) the large assemblage of ceramic vessels from Habis represent an important addition to the regional archaeological picture. Evidence from the early colonial period relates to mining in the Karibib area and a combination of trade, missionary activity, and wagon repair in the Otjimbingwe area. Both Karibib and Otjimbingwe are centres of historical importance and have several National Monument sites recognized under the National Heritage Act.

4.6.3 Archaeological Desk Assessment

Based on the previous field surveys conducted in the general area (Kinahan, 2017), it is safe to assume that the proposed powerline route will likely pass through some sites of archaeological significance and that these will probably date to the late pre-colonial and early colonial periods.

Early colonial remains are expected to be relatively abundant on along the proposed powerline route, although it is likely that if these are related to historical mining activity.

It is expected that the proposed powerline route will not disturb any remaining pre-colonial or early colonial sites in the near vicinity because of the localised nature and widely spaced digging of the individual powerline poles.

Along the proposed powerline route, the developer must not disturb localised natural cavities that may be unearthed because they could hold some highly significant historical or cultural sites that would require detailed documentation and possibly mitigation measures to be adopted in the event of encroachment by the proposed powerline route and digging of the individual powerline poles.

4.6.4 Archaeological Conclusions and Recommendations

According to the archaeological assessment that was undertaken in the general area, the proposed powerline route probably has archaeological potential, although no archaeological sites have been recorded along some of the key roads that the proposed powerline route will be following. The following is the summary of the expectations based on the fact that the powerline route will be generally following relatively disturbed areas along the existing gravel roads, powerlines and other infrastructures:

- (i) A low likelihood of Holocene age archaeological sites.
- (ii) A low likelihood of late precolonial settlement sites throughout the entire tenement, especially in the vicinity of springs and seepages, and.
- (iii) A low likelihood of early colonial settlement remains relating to the historical occupation of Karibib and Otjimbingwe.

The following are the key recommended actions related to archaeology along the proposed powerline route:

- (i) Contractors working along the proposed powerline route should be made aware that under the National Heritage Act any items protected under the definition of heritage found during development should be reported to the National Heritage Council, and.
- (ii) The Chance Finds procedure as outlined in the EMP must always be implemented.

4.7 Stakeholder Consultations and Engagement

4.7.1 Overview

Public consultation and engagement process have been part of the environmental assessment process for this project. Opportunity for stakeholders and the public to submit written comments / inputs / objections with respect to the proposed powerline were provided from the Thursday 10th September 2020 to Friday 9th October 2020 (Figs. 4.4- 4.10).

4.2.2 Public Consultation Process

Public consultation process was undertaken through newspaper advertisements as shown in Figs. 4.4-4.10. The project was extensively advertised as follows:

- ❖ Confidante newspaper dated 10th to 16th September 2020 (Fig. 4.4).
- ❖ Windhoek Observer newspaper dated 2nd October 2020 (Fig. 4.5).
- ❖ Windhoek Observer newspaper dated 5th October 2020 (Fig. 4.6).
- ❖ Windhoek Observer newspaper dated 6th October 2020 (Fig. 4.7).
- ❖ Windhoek Observer newspaper dated 7th October 2020 (Fig. 4.8).
- ❖ Windhoek Observer newspaper dated 8th October 2020 (Fig. 4.9).
- ❖ New Era newspaper dated 8th October 2020 (Fig. 4.10).

Public notices were published in the local newspapers from the Thursday 10th September 2020 to Friday 9th October 2020 (Figs. 4.4- 4.10). A stakeholder register was opened and despite telephonic inquiries with respect to contracts and employment opportunities, no written objection was received.

4.2.3 Stakeholders and Public Discussions

No inputs/ comments / objections have been received during the consultation period that was provided from the Thursday 10th September 2020 to Friday 9th October 2020.

4.2.4 Stakeholders and Public Consolutions Recommendations

Overall, in meeting the need for continuous public / stakeholder consultation process, this EIA has recommended that the Proponent shall notify the land owners on the implementation of the proposed project once the ECC has been granted and negotiate access agreements as may be applicable.

Such communications shall be maintained throughout the lifecycle of the proposed project.

This recommendation may be included as condition on the ECC to be issued.

PUBLIC NOTICE
APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) BY IMPRINT INVESTMENTS (Pty) Ltd FOR PROPOSED MINERALS EXPLORATIONS IN THE EXCLUSIVE PROSPECTING LICENSE (EPL) No. 3980, OKAHANDJA DISTRICT, OTJOZONDJUPA REGION

Imprint Investments (Pty) Ltd, the Proponent, holds mineral rights under Exclusive Prospecting License (EPL) No. 3980. The EPL 3980 was granted on the 23/06/2008 and will expire on the 01/02/2022. The EPL is granted for base and rare metals, dimension stone, industrial minerals, non-nuclear fuels minerals, precious metals and precious stones. The 145774 ha license area covers the following privately owned commercial farmlands: Oteherane 216, Otjimbuku 136, Ombukambapa 135, Matland 538, Prinsshoek 217, Omarantuba 134, Eendrag, Spytfontein 252, and Otjorutana 251.

The Proponent intends to conduct exploration / prospecting activities starting with desktop studies and aerial surveys, followed by regional field-based reconnaissance work and if the results are positive, implement detailed site-specific field-based activities using techniques such as geological mapping, geophysical surveys, trenching, drilling and sampling for laboratory tests. The proposed prospecting activities are listed in the Environmental Management Act, 2007, (Act No. 7 of 2007) and the EIA Regulations 30 of 2012 and cannot be undertaken without an Environmental Clearance Certificate (ECC).

In fulfillment of these environmental requirements, the Proponent has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultant, led by Dr Sindila Mwiya as the Environmental Assessment Practitioner (EAP) to prepare the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) Reports in order to support the application for ECC. All Interested and Affected Parties (I&AP) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed prospecting activities. A Background Information Document (BID) is available upon registration.

REGISTER BY EMAIL: frontdesk@rbs.com.na and more information contact Dr Sindila Mwiya (EAP) International Resources Technical Specialist Consultant, Email: smwiya@rbs.com.na, Mobile: 0811413229

CONSULTATION DURATION AND DEADLINE FOR WRITTEN SUBMISSIONS IS: THURSDAY 10th SEPTEMBER 2020 to FRIDAY 2nd OCTOBER 2020

Risk-Based Solutions (RBS) CC (URL: www.rbs.com.na)
 International Specialist Consultants (Oil, Gas, Minerals & Energy Exploration, Production & Mining) and Environmental Assessments (SEA, EIA, EMP, EMS)

PUBLIC NOTICE
APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) BY OSINO NAMIBIA MINERALS EXPLORATION (Pty) Ltd FOR PROPOSED MINERALS EXPLORATIONS IN THE EXCLUSIVE PROSPECTING LICENSE (EPL) No. 7361, OMARURU / OTJAWARONGO DISTRICTS, ERONGO / OTJOZONDJUPA REGIONS

Osino Gold Exploration (Pty) Ltd (the "Proponent") holds mineral rights under the Exclusive Prospecting License (EPL) No. 7361 for base and rare metals, dimension stones, industrial minerals and precious metals. The EPL 7361 was granted on the 16/02/2020 and will expire on the 15/02/2023. The EPL 7361 has a total area of 72227 Ha and covers the following private commercial farmlands: Ombonna 89, Ombonnam 222, Omararasu 53, Omejongole, Ombonnam 92, Omejongole, Ego Nord 54, Ego Nord 95, Dinos 477, Omba 96, Okonjas 516, Schone Brunnen 527, Bamla Oviger 105, Gossa Oombutu 124, Oombutu Nord 123, Memory, Kubuse, Rudelsburg 504, Gossa Edendale 506, Groot Ombongwe 503, Zamenkomet 133, Okaturwa, Kuhwarder 114, Excelesior 134, Heleneberg 115 and Ondusa 116.

The Proponent intends to conduct exploration / prospecting activities starting with desktop studies and aerial surveys, followed by regional field-based reconnaissance work and if the results are positive, implement detailed site-specific field-based activities using techniques such as geological mapping, geophysical surveys, trenching, drilling and sampling for laboratory tests. The proposed prospecting activities are listed in the Environmental Management Act, 2007, (Act No. 7 of 2007) and the EIA Regulations 30 of 2012 and cannot be undertaken without an Environmental Clearance Certificate (ECC).

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PUBLIC NOTICE
APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) BY OSINO NAMIBIA MINERALS EXPLORATION (Pty) Ltd FOR PROPOSED MINERALS EXPLORATIONS IN THE EXCLUSIVE PROSPECTING LICENSE (EPL) No. 7511, OUTJO / OTJAWARONGO DISTRICTS, KUNENE / OTJOZONDJUPA REGIONS

Osino Namibia Minerals Exploration (Pty) Ltd (the "Proponent") holds mineral rights under the Exclusive Prospecting License (EPL) No. 7511 for base and rare metals, industrial minerals and precious metals. The EPL 7511 was granted on the 19/12/2019 and will expire on the 18/12/2022. The EPL 7511 has a total area of 7876 Ha and covers the following private commercial farmlands: Ombani-Karambi 155, Juliant 165, Karolsbrunn 35, Noellestam 34, Hazeldene 32 and Paresis 507.

The Proponent intends to conduct exploration / prospecting activities starting with desktop studies and aerial surveys, followed by regional field-based reconnaissance work and if the results are positive, implement detailed site-specific field-based activities using techniques such as geological mapping, geophysical surveys, trenching, drilling and sampling for laboratory tests. The proposed prospecting activities are listed in the Environmental Management Act, 2007, (Act No. 7 of 2007) and the EIA Regulations 30 of 2012 and cannot be undertaken without an Environmental Clearance Certificate (ECC).

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 International Specialist Consultants (Oil, Gas, Minerals & Energy Exploration, Production & Mining) and Environmental Assessments (SEA, EIA, EMP, EMS)

PUBLIC NOTICE
Application for Environmental Clearance Certificate (ECC) for the Proposed New 29.977km Long, 66kV Overhead Powerline from Marble Switching Station to the Mining License (ML) No. 204, Lepidico Chemicals Namibia (Pty) Ltd, Karibib District Erongo Region

Lepidico Chemicals Namibia (Pty) Ltd, which is 80% owned by Lepidico Limited, an Australian Securities Exchange listed company, holds mineral rights under Mining License 204 covering the Rubicon and Helikon Mines (the Karibib Project). Lepidico Chemicals Namibia (Pty) Ltd (the Developer) is proposing to construct a 29.9772km long, 66kV overhead powerline to supply electricity to the Karibib Project from the Karibib Marble Switching Station. From the Marble Station to be expanded, the line will cross over the existing NamPower 66kV Karibib transmission line, Karibib Railway Line and B2 Road and run parallel to the 66kV Navachab transmission line at an offset distance of 30m centre to centre, follow the public road D1953 before branching along the D1962 into the ML 204 area at Rubicon Mine site where the metering and substations will be located. Once completed, the powerline will be operated by NamPower (the Proponent). The proposed powerline project falls under listed activities that cannot be undertaken without an Environmental Clearance Certificate (ECC). In fulfillment of the environmental requirements, the developer has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultants, led by Dr Sindila Mwiya as the Environmental Assessment Practitioner to undertake the EIA and EMP in order to support the application for ECC. The Environmental Assessment process will be undertaken in accordance with the provisions of the Environmental Impact Assessment Regulations, 2012 and the Environmental Management Act, 2007, (Act No. 7 of 2007). All Interested and Affected Parties (I&APs) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed overhead powerline.

REGISTER BY EMAIL: frontdesk@rbs.com.na and more information contact Dr Sindila Mwiya (EAP) International Resources Technical Specialist Consultant, Email: smwiya@rbs.com.na, Mobile: 0811413229

CONSULTATION DURATION AND DEADLINE FOR WRITTEN SUBMISSIONS IS: THURSDAY 10th SEPTEMBER 2020 to FRIDAY 2nd OCTOBER 2020

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Figure 4.4: Copy of the public notice that was published in the Confidante newspapers dated 10th to 16th September 2020.

NOTICE OF ENVIRONMENTAL ASSESSMENT AND PUBLIC PARTICIPATION PROCESS

D & P Engineers and Environmental Consultants hereby gives notice to all potential interested and Affected Parties (I&APs), that an application will be made to the Environmental Commissioner in terms of the Environmental Management Act (No. 7 of 2007) and the Environmental Impact Assessment Regulations (GN 30 of 6 February 2012) for the following:

Project Title: Proposed 44 kV Overhead Powerline from Rosing Mountain T off up to Arandis Town (23km), including a T-off up to the NamPower Lithops substation(4km) in Arandis, Erongo Region-Namibia.

Project Description: Construction and operation of a 44kV OHL, parallel to the existing 33kV OHL, and servitude operated by ErongoGrid.

Project location: The powerline is proposed in Arandis Town, Erongo Region-Namibia.



Proposed: Energized

I&APs are invited to register with the consultant and give their comments and concerns in writing.

NB: Interested and Affected Parties are further invited to a public meeting that will be held on Friday 25 September 2020 at Arandis Town Council Hall, Time: 09:30 AM. The participation and commenting period is effective until 13 October 2020.

To register or request for documents please submit your name, contact information and your interests in writing to the Environmental Consultant:

Tendai E. Kasanganeti
Cell: +264813634904
Fax: +264 61 255 207
Email: kasanganeti@rbs.com.na

NOTICE OF ENVIRONMENTAL ASSESSMENT AND PUBLIC PARTICIPATION PROCESS

D & P Engineering and Environmental Consultants hereby gives notice to all potential interested and Affected Parties (I&APs), that an application will be made to the Environmental Commissioner in terms of the Environmental Management Act (No. 7 of 2007) and the Environmental Impact Assessment Regulations (GN 30 of 6 February 2012) for the following:

Project Title: The Proposed telecommunication base transceiver station (BTS) Tower (South Airline Tower) and Powerline on farm Suidowal 691, Rietvogel Area, Hardap Region, Namibia.

Project Description: Construction and operation of a telecommunication 675 tower & associated infrastructure, including a 4.5km powerline to the tower site.

Project Location: The tower is to be developed on farm Suidowal No. 691, in Rietvogel Area, Hardap Region, Namibia.

Proponent: Powercom (Pty) Ltd

I&APs are invited to register with the consultant and give their comments and concerns in writing.

NB: Interested and Affected Parties are further invited to a public meeting that will be held on Thursday 24 September 2020 at WJD Cloete School at Rietvogel, Time: 09:30 AM. The participation and commenting period is effective until 19 October 2020.

To register or request for documents please submit your name, contact information and your interests in writing to the Environmental Consultant:

Tendai E. Kasanganeti
Cell: +264813634904
Fax: +264 61 255 207
Email: kasanganeti@rbs.com.na



PUBLIC NOTICE

APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) BY OSINO NAMIBIA MINERALS EXPLORATION (Pty) Ltd FOR PROPOSED MINERALS EXPLORATIONS IN THE EXCLUSIVE PROSPECTING LICENSE (EPL), No. 7511, OUTJO / OTJIWARONGO DISTRICTS, KUNENE / OTJOZONDJUPA REGIONS


Osino Namibia Minerals Exploration (Pty) Ltd (the "Proponent") holds mineral rights under the Exclusive Prospecting License (EPL) No. 7511 for base and rare metals, industrial minerals and precious metals. The EPL 7511 was granted on the 19/12/2019 and will expire on the 19/12/2022. The EPL 7511 has a total area of 7876 Ha and covers the following private commercial farmlands: Ombindi-Karambi 155, Jutland 165, Karolsbrunn 35, Noelliesfarm 34, Hazeldene 32 and Paresis 507.

The Proponent intends to conduct exploration / prospecting activities starting with desktop studies and aerial surveys, followed by regional field-based reconnaissance work and if the results are positive, implement detailed site-specific field-based activities using techniques such as geological mapping, geophysical surveys, trenching, drilling and sampling for laboratory tests. The proposed prospecting activities are listed in the Environmental Management Act, 2007, (Act No. 7 of 2007) and the EIA Regulations 30 of 2012 and cannot be undertaken without an Environmental Clearance Certificate (ECC).

In fulfillment of these environmental requirements, the Proponent has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultant, led by Dr Sindila Mwiya as the Environmental Assessment Practitioner (EAP) to prepare the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) Reports in order to support the application for ECC. All Interested and Affected Parties (I&AP) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed prospecting activities. A Background Information Document (BID) is available upon registration.

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PUBLIC NOTICE

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Lepidico Chemicals Namibia (Pty) Ltd, which is 80% owned by Lepidico Limited, an Australian Securities Exchange listed company, holds mineral rights under Mining License 204 covering the Rubicon and Helikon Mines (the Karibib Project). Lepidico Chemicals Namibia (Pty) Ltd (the Developer) is proposing to construct a 29.9772km long, 66kV overhead powerline to supply electricity to the Karibib Project from the Karibib Marble Switching Station. From the Marble Station to be expanded, the line will cross over the existing NamPower 66kV Karibib transmission line, Karibib Railway Line and B2 Road and run parallel to the 66kV Navachab transmission line at an offset distance of 30m centre to centre, follow the public road D1953 before branching along the D1992 into the ML 204 area at Rubicon Mine site where the metering and substations will be located. Once completed, the powerline will be operated by NamPower (the Proponent). The proposed powerline project falls under listed activities that cannot be undertaken without an Environmental Clearance Certificate (ECC). In fulfillment of the environmental requirements, the developer has appointed Risk-Based Solutions (RBS) CC as the Environmental Consultants, led by Dr Sindila Mwiya as the Environmental Assessment Practitioner to undertake the EIA and EMP in order to support the application for ECC. The Environmental Assessment process will be undertaken in accordance with the provisions of the Environmental Impact Assessment Regulations, 2012 and the Environmental Management Act, 2007, (Act No. 7 of 2007). All Interested and Affected Parties (I&APs) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed overhead powerline.

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Figure 4.5: Copy of the public notice that was published in the Windhoek Observer newspaper dated 2nd October 2020.

SPORTS

Summer transfer window 2020 deadline day



After 10 weeks of rumours, speculation and eye-catching deals, there remains plenty to be cleared up on the summer transfer window's deadline day.

The effects of the coronavirus pandemic have limited the spending powers of many, while others have still been able to splash out on big-money signings.

But what else could still be in store?

The window officially closes at 23:00 BST on Monday, 5 October - though a domestic-only window will continue to run until 17:00 BST on 16 October.

That will allow Premier League clubs to trade with their English Football League counterparts only, with transfers between top-flight clubs not permitted in that extended window.

According to Carteret Analytics, Premier League clubs have spent £1.12bn so far this transfer window

- down 13% on the five-year average. Last summer's total transfer spend was £1.41bn, according to Deloitte, with £170m spent on deadline day itself.

Here are some of the names in the frame for a move on deadline day.

Jadon Sancho (20, Borussia Dortmund)

Linked with Manchester United

Perhaps the biggest question on deadline day is whether Manchester United are prepared to improve on their reportedly rejected £91.3m bid for number one transfer target Jadon Sancho.

United have been heavily linked with Borussia Dortmund's England forward throughout the summer window, despite the Bundesliga side setting their own deadline of 10 August for a deal to be agreed.

Dortmund are believed to want more

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CONSULTATION DURATION AND DEADLINE FOR WRITTEN SUBMISSIONS IS: THURSDAY 10th SEPTEMBER 2020 to FRIDAY 9th OCTOBER 2020

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Figure 4.6: Copy of the public notice that was published in the Windhoek Observer newspaper dated 5th October 2020.

SPORTS

Transfer news: Winners and losers after deadline day

Big winners

Aston Villa only secured their Premier League status on the final day of last season - now the club's owners have backed manager Dean Smith in ambitious fashion to make the most of that escape.

And it has not just been with incomings because arguably the most important Villa deal of this window was the one which saw their captain and most influential player Jack Grealish sign a new five-year contract after months of speculation linking him with Manchester United.

The biggest signing was record buy Ollie Watkins, brought in from Brentford for £28m potentially rising to £33m, the 24-year-old well known to Smith from his time in charge at Griffin Park.

Watkins scored 25 goals for Brentford last season and has already made his mark with a brilliant hat-trick in Sunday's remarkable 7-2 win over

champions Liverpool that continued Villa's perfect start to the season.

Emiliano Martinez brings stability to the goalkeeping position after his arrival from Arsenal while the final flourish was a surprise loan deal for Chelsea's Ross Barkley, offering real threat and creation in midfield alongside Grealish. He was on target, along with Grealish, in that astonishing demolition of Liverpool.

Matty Cash has made a fine start at right-back following his £16m move from Nottingham Forest while Lyon's Bertrand Traore is another attacking option.

Everton

Everton's transfer policy since billionaire owner Farhad Moshiri started bankrolling the club in 2016 has been a scattergun shambles under managers Ronald Koeman, Sam Allardyce and Marco Silva along with directors of football Steve Walsh and Marcel Brands. The arrival of Carlo Ancelotti has not only brought a

focused strategy but an A-list manager whose presence alone attracts players who would not, in other circumstances, entertain a move to Everton.

This means that despite finishing 12th last season, Ancelotti has been able to sign Colombian superstar James Rodriguez from Real Madrid, the outstanding Brazil midfielder Allan from former club Napoli and Watford's Abdoulaye Doucoure.

Ancelotti has rebuilt Everton's midfield, which was a matter of urgency, while also adding two highly promising young talents in left-back Niels Nkounkou from Marseille and Norwich City's England under-21 central defender Ben Godfrey in a £25m deal.

He has also brought in Sweden goalkeeper Robin Olsen from Roma on loan to put pressure on error-prone England goalkeeper Jordan Pickford.

It has resulted in a magnificent start



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Figure 4.7: Copy of the public notice that was published in the Windhoek Observer newspaper dated 6th October 2020.

SPORTS

Let our fans return - English FA urge government to allow return of spectators

LONDON - England's Football Association and leagues have urged the government to allow fans to return to stadiums, assuring supporters in an open letter that they can hold matches safely.

The government was hoping to allow the return of 25-33% capacity crowds from October 1 but last month Prime Minister Boris Johnson said those plans were put on hold as part of new restrictions to limit the spread of Covid-19.

Premier League chief executive Richard Masters, FA chief executive Mark Bullingham, FA Director of women's football Kelly Simmons and EFL chief executive David Baldwin have said that they have

been working together to make the venues safe for the return of fans.

"With the EFL, Premier League, Women's Super League and Women's Championship already staging eleven successful test events recently, we have demonstrated that we can deliver matches safely," the letter said.

"The sooner we can return, the sooner we can reunite communities and support local jobs, livelihoods, regional businesses and also the national economy."

Spectators have been either prohibited or allowed in limited numbers as part of pilot programmes at soccer games in England due to the Covid-19 pandemic, which has

claimed more than 42,000 lives in the United Kingdom as per a Reuters tally.

The governing bodies said the clubs have already proven they have all the safety measures in place for safe return of fans, while also remaining open to adopting innovations as part of a mass-testing project.

"We will continue to urge government to allow us to return fans safely to stadiums. It is positive progress that major arts and music venues have been told they can run socially-distanced events indoors," the letter added.

"And now football should be allowed to do the same - in highly regulated and stewarded outdoor environments."

Reuters



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Figure 4.8: Copy of the public notice that was published in the Windhoek Observer newspaper dated 7th October 2020.

SPORTS



Novak Djokovic, 33, had his neck taped during the match on Court Philippe Chatrier and his movements seemed somewhat restricted during the opening set against the world number 18.

Carreno Busta accuses Djokovic of feigning injury concerns

Spaniard Pablo Carreno Busta accused Novak Djokovic of gamesmanship during their French Open quarter-final on Wednesday as he felt the world number one Serb did not have any genuine health issues despite appearing to battle injury problems.

Djokovic, 33, had his neck taped during the match on Court Philippe Chatrier and his movements seemed somewhat restricted during the opening set against the world number 18.

He also called the trainer on court to work on some issue with his upper left arm.

But the top seed recovered well to advance to the semi-finals with a 4-6 6-2 6-3 6-4 victory and later said he had to deal with some physical issues during the early part of his match, without providing much details.

"Each time he is in trouble he usually



Every time a match gets complicated he asks for medical assistance. He has been doing this for a long time. I already knew that. I knew it would happen at the US Open, I knew it would happen here and I know it will keep on happening.

does it, that means to say that he was in trouble, that he wasn't comfortable and that I was playing at a high level and was causing him to doubt himself," Carreno Busta told reporters in Spanish.

"Every time a match gets complicated he asks for medical

assistance. He has been doing this for a long time. I already knew that. I knew it would happen at the US Open, I knew it would happen here and I know it will keep on happening.

"I don't know if it's something chronic in his shoulder or just mental, but he didn't put me off."

It was against the same player that Djokovic was defaulted a month back in the fourth round of the US Open for inadvertently hitting a line judge with the ball.

Djokovic, who is chasing an 18th major, looked stiff on Wednesday and banged his racket against his thigh in frustration as Carreno Busta took the opening set, the first that the Serb lost at this year's claycourt Grand Slam.

"I don't know, maybe it's the pressure or something that he needs to do it. But he continues playing normal, no? I don't know if he's (in) pain really or he has mental (issues). Ask him," Carreno Busta said in English.-subc

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Figure 4.9: Copy of the public notice that was published in the Windhoek Observer newspaper dated 8th October 2020.

WOMEN
From page 1

"We have successfully concluded our nominations over the weekend both for local authorities and constituencies, apart from Omaruru that will be concluded this weekend," he said. He added Swapo remains experiencing a few hiccups hence they are currently consulting with the national leaders assigned to the region. Muhuura added the party was proud women are now at the forefront of taking the lead for the party.

"This is clear as we have nominated five women some of them young, to represent us in five constituencies," said Muhuura. The coordinator also added the party will deploy themselves to vigorously campaign for all their candidates in order for the party to be victorious in the upcoming regional council and local authority elections slated for 25 November.

"Campaigning will definitely be different due to Covid-19 but the Swapo party members will make sure that they adhere to the rules and regulations in terms of Covid-19 and still have successful campaigns," he said.

In January this year, Swapo lost the Walvis Bay Urban constituency after independent candidate Knowledge Ipinge defeated the ruling party candidate Sirie Topolathama following a by-election necessitated by the appointment of Hafeni Ndemiula as member of parliament and subsequently deputy minister of labour. However, Muhuura yesterday said the party was ready to reclaim the constituency through Hangula whom he referred to as a quality candidate. "We are ready to take back our constituency. We know we got this even before we go to the polls as we are very confident in our candidates," he said.

- edeklerk@nepc.com.na

Postmaster robbed of N\$600 000

■ Nousita Ashipala

ONGWEDIVA - The police in Oshana are hot on the trail of four suspects who allegedly robbed a Nampost office employee of N\$600 000 at gunpoint on Monday.

According to the police spokesperson in Oshana Thomas Aiyambo, the money was set to be distributed amongst Nampost branches.

The 58-year-old victim allegedly withdrew N\$1 million from a local bank in Ondangwa in the morning.

He was given the first batch of N\$400 000 and distributed the money amongst Nampost branches in Ondangwa.

Just before midday, he allegedly collected the remaining N\$600 000.

After driving away a distance from the bank, the unknown suspects in a white sedan with



registration number N 4015 G approached him.

"The said suspects smashed both door windows and took the container of money from the car while one was pointing a pistol at the victim," said Aiyambo.

One of the suspects allegedly

had a pistol while the others had rocks.

No arrest has been made and the money has not been recovered.

Aiyambo warned the public to be extra cautious when withdrawing or depositing money at the bank.

He advised the public from carrying huge chunks of money and advised companies to make use of security companies to distribute money.

"Rather use online banking to make payments and transfers and always check in the mirrors when driving to see if there is any strangers following you and alert the police," said Aiyambo.

NANNY
From page 1

It was then I started thinking of what I should do next."

Freia did not stop dreaming because she knew life wasn't going to end at failing grade 12.

She recalls how it suddenly dawned on her that she needed to be serious at school to attain better marks so she could get where eagles fly.

She came to Windhoek to improve her grades with the Namibian College of Open Learning (Namcol) where it took her four years to obtain enough points to qualify for university. "But you know life in the city you have to look for your bread because nobody will feed you every day. Before Windhoek, I had to work as a bar lady to make some money for my subjects at Namcol. After that, I had to be a nanny, the pay was as little as N\$300 sometimes, or if more then it will be N\$500 monthly. I didn't give up because of that little salary. I kept saving little by little because I knew, I had to save so I go to university one day," Freia said.

At some point during 2013, she got tired of being a nanny, and she quit her job because the money was so little. In 2015, she became a security guard while still improving with Namcol and managed to save N\$3 500.

In January 2016, she applied for a nursing qualification at the International University of Management (IUM).

She got admitted and luckily, she was granted a government loan to pay for her studies.

She encountered challenges at university, saying she had her days of studying and sleeping on an empty stomach.

"I had days where I lost hope but I never stopped doing what was supposed to get me to the top. I had days that I felt lost, empty, and neglected but instead of feeling pity for myself, I kept going. It was four good years of training and by the grace of God we stuck to four years of training and obtained our Bachelor Honours Degree in Nursing on 25 September 2020," she described her journey with joy.

She said her top secret was her strong belief in the power of prayer. She believed 'God is able'.

She packs a message for young people that focus on what they want would yield them results.

By setting goals and work towards achieving them.

"When life throws lemons to you, don't throw the lemons back, use them and make lemon juice out of them, but most importantly, don't forget to look for help. Out of your cycle of 10 people please trust two with your problem, they may listen to you and hold your hand so you work together."

But remember this, people will walk with you on your journey, but they will not walk it for you. Be your own best friend. Never burn out in silence, people will only help you if you speak up. They say a problem shared is a problem half solved. So, talk, don't die in silence."

Freia currently works at the Katutura Intermediate Hospital as a registered nurse.

Looking at the future, she has patience in women's healthcare and maternal care, but whatever life gives her in the line of health and wellness, she will grab it with both hands.

- anukala@nepc.com

PUBLIC NOTICE
Application for Environmental Clearance Certificate (ECC) for the Proposed New 23 077ton Long, 66kV Overhead Powerline from Marble Switching Station to the Mining License ML 204, Lepidico Chemicals Namibia (Pty) Ltd, Karibib District Erongo Region

Lepidico Chemicals Namibia (Pty) Ltd, which is 50% owned by Lepidico Limited, an Australian Based Publicly Listed company, holds mineral rights under Mining License 204 covering the Rubicon and Hellos Mines (the Karibib Project). Lepidico Chemicals Namibia (Pty) Ltd (the Developer) is proposing to construct a 23 077 ton long, 66kV overhead powerline to supply electricity to the Karibib Project from the Karibib Marble Switching Station. From the Marble Switching Station to the project, the line will cross over the existing NamPower 66kV Karibib transmission line, Hellos Railway Line and E2 Road and run parallel to the Hellos Hellos-Hellos railway line at an offset distance of 30m centre to centre, follow the public road D1000 before travelling along the CR182 and the ML 204 area of Rubicon Mine site where the existing and substations will be located. Once completed, the powerline will be operated by NamPower (the Proprietor). This proposed overhead project falls under listed activities that cannot be undertaken without an Environmental Clearance Certificate (ECC), in accordance of the environmental requirements, the developer has appointed Responsible Solutions (Pty) Ltd as the Environmental Consultants, led by Dr Sivilla Moya as the Environmental Assessment Practitioner, to undertake the EIA and EMP in order to support the application for ECC. The Environmental Assessment process will be undertaken in accordance with the provisions of the Environmental Impact Assessment Regulations, 2012 and the Environmental Management Act, 2007 (Act No. 7 of 2007). All interested and affected Parties (IAPs) are hereby invited to register and submit written comments / objections / inputs with respect to the proposed overhead powerline.

REGISTER BY EMAIL: environment@rsol.com.na and receive information contact Dr Sivilla Moya (EAP/International Resources Technical Specialist Consultant) Email: sivillamoya@rsol.com.na Mobile: 0811412228

COMBIL TAYLOR BURKSTON AND LEGALISE FOR WRITERS SUBMISSIONS ON: THURSDAY 1st SEPTEMBER 2020 to FRIDAY 8th OCTOBER 2020

Responsible Solutions (Pty) Ltd - URL: www.rsol.com.na

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Figure 4.10: Copy of the public notice that was published in the New Era newspaper dated 8th October 2020.

5. ASSESSMENT OF LIKELY IMPACTS

5.1 Overview

The impact assessment results detailed in this section of this EIA Report is based on the review of the baseline conditions and has taken into account both the positive and negative impacts on the receiving environment associated with the proposed powerline route. The purpose of this EIA and EMP report has been to identify and assess the potential environmental and social impacts assessment that could be a consequence of the proposed activities covering the complete project lifecycle from preconstruction to the closure stages. Through such identification, potentially significant adverse impacts can be avoided, reduced, offset, or managed to the extent feasible, as part of the project design and with mitigation measures as detailed in EMP section of this report.

The impact assessment process has been an iterative process that has taken place during the project design phase and has required close collaborations of the developer, contractor, proponent, environmental and social specialists involved in the proposed powerline development. Throughout the preparation of this EIA and EMP Report, the proposed powerline route and engineering design has been reviewed and refinement.

5.2 Impact Assessment Objectives

The overall objective of the impact assessment undertaken for this project focused attention specifically on the proposed powerline route impacts of potentially significant risk. The following approach has been undertaken regarding the concept of whether assessed key issues need to be actively addressed in the EMP Report:

- ❖ If environmental aspects are evaluated to be of low significance, they do not require specific management plans, and need not be actively addressed in the EMP (although they may still be listed and reported on).
- ❖ A decision on the need to actively address any issue with a "Medium" significance ranking will require consideration of other relevant factors, such as the nature of the impact, risks associated with possible cumulative aspects, and the degree of concern of stakeholders, and.
- ❖ If environmental aspects receive a "High" significance ranking, they must be addressed by means of active management, mitigation, or rehabilitation measures.

For each negative impact of high or medium significance, mitigation objectives are set (i.e. ways of reducing negative impacts), and attainable management actions are subsequently addressed in the EMP Section of this Report for the proposed powerline route. Without management, these impacts would either breach statutory limits or be unacceptable to statutory authorities or to stakeholders, as they would result in a significant deterioration of one or more environmental resources.

5.3 Assessment of Alternatives

The following alternatives were identified and evaluated based on the technical, environmental, economics and socioeconomic characterisation process with respect to the route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline:

- ❖ **Powerline design including underground cabling and overhead options:** An alternative assessment process based on the most favourable design was undertaken. Considerations for the use of either a single pole or two poles system as well as the number of cables for the proposed powerline design have been evaluated in addition to option of building an underground cable system compared to the overhead powerline. Overall, the technical, environmental, economics and socioeconomic considerations favoured an overhead powerline design with wood structure and three (3) cables. The choice of wood structure is largely depend on the economic assessment.

- ❖ **Route selection options:** Various routes were considered with respect to the existing electricity infrastructure (distribution and connectivity) within the surrounding area. The selected route proved to be the shortest and cost-effective options compared to other points of distribution and connectivity.
- ❖ **Other Alternative Land Uses:** The proposed powerline route inclusive of the servitude cuts across municipal townlands. Due to the limited coverage of the proposed powerline route, it's likely that the powerline will coexist with the current and potential future land uses in the areas.
- ❖ **Ecosystem Function (What the Ecosystem Does):** Wildlife habitat, carbon cycling or the trapping of nutrients and characterised by the physical, chemical, and biological processes or attributes that contribute to the self-maintenance of an ecosystem in this area. The proposed powerline activities will not affect the ecosystem function due to the limited scope of the proposed activities covering the route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline.
- ❖ **Ecosystem Services:** Food chain, harvesting of animals or plants, and the provision of clean water or scenic views. The proposed powerline activities will not affect the ecosystem services due to the limited scope and area of coverage of the route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline.
- ❖ **Use Values:** Direct use for other land uses include watching a television shows about the area and its wildlife, food chain linkages that sustains the complex life within this area and bequest value for future generations to enjoy. The proposed powerline activities will not destroy the current use values due to the limited scope of the proposed activities as well as the adherence to the provisions of the EMP as detailed in this report.
- ❖ **Non-Use, or Passive Use:** Preserve what exists (Existence Value) with no consideration for direct use / benefits. The proposed powerline activities will not affect ecosystem due to the limited scope of the proposed activities covering the route selection, preconstruction, construction, operation and closure / upgrade of the proposed powerline.
- ❖ **The No-Action Alternative:** A comparative assessment of the environmental impacts of the 'no-action' alternative (a future in which the proposed powerline and Waterfront Development projects do not take place) has been undertake. An assessment of the environmental impacts of a future, in which the proposed powerline and Waterfront Development to be supported do not take place, is important to understanding what benefits might be lost if the powerline project does not move forward. Key loses that may never be realised if the proposed powerline and the Waterfront Development to be supported do not go-ahead include loss of potential property and taxes and services, direct and indirect contracts and employment opportunities and foreign direct investments. The environmental benefits include no impact on the receiving environment and although land degradation may still happen in the absence of the proposed project due to drought, poor land management practices including the land grabbing, erosion and pollution.

5.4 Overall Impact Assessment Results

5.4.1 Assessment of Likely Sources of Impact

The overall impact assessment approach has adopted the Leopold matrix framework which is one of the internationally best-known matrix assessment methodology available for predicting the impact of a project on the receiving environment.

Table 5.1 summarises the proposed powerline project activities covering route selection, preconstruction, construction, operation and closure / upgrade which are likely to be sources of negative impacts.

In evaluating the degree of potential negative impacts, the following factors have been taken into consideration:

- (i) Impact Severity: The severity of an impact is a function of a range of considerations, and.
- (ii) Likelihood of Occurrence (Probability): How likely is the impact to occur?

Table 5.1: Outline of the proposed project developmental stages and the associated activities as sources of likely negative impacts.

| Project Development Stages | Proposed project activities that are likely to be Sources of Impacts |
|-----------------------------------|--|
| Route Selection | 1. Planning and clients' needs assessment |
| | 2. Geographical Information System (GIS) mapping of possible routes options |
| | 3. Evaluation and field-based route assessment verifications and validations |
| Preconstruction | 4. Field –based route and servitude survey |
| | 5. Field –based route and servitude clearing |
| Construction | 6. Digging of the individual pole foundation |
| | 7. Digging of the pole support |
| | 8. Poles and support driving works |
| | 9. Structure mounting |
| | 10. Module clamping |
| | 11. Cabling and electrical equipment installation |
| | 12. Installation of Communication Monitoring |
| | 13. Commissioning |
| Operation and Monitoring | 14. Operational (Supply of Electricity to the mine) |
| | 15. Monitoring and Maintenance |
| Closure or Upgrading | 16. Powerline Decommissioning |
| | 17. Powerline Upgrade |

5.4.2 Severity Criteria for Environmental Impacts

In evaluating the severity of potential negative environmental impacts, the following factors have been taken into consideration:

- ❖ Receptor/ Resource Characteristics: The nature, importance and sensitivity to change of the receptors / target or resources that could be affected.
- ❖ Impact Magnitude: The magnitude of the change that is induced.
- ❖ Impact Duration: The time period over which the impact is expected to last.
- ❖ Impact Extent: The geographical extent of the induced change, and.
- ❖ Regulations, Standards and Guidelines: The status of the impact in relation to regulations (eg. discharge limits), standards (eg. environmental quality criteria) and guidelines.

The overall impact severity has been categorised using a semi quantitative approach as shown in Table 5.2 for magnitude, Table 5.3 for duration and Table 5.4 for extent.

Table 5.2: Scored on a scale from 0 to 5 for impact magnitude.

| SCALE | | DESCRIPTION |
|-------|--|--------------------------------|
| 0 | | no observable effect |
| 1 | | low effect |
| 2 | | tolerable effect |
| 3 | | medium high effect |
| 4 | | high effect |
| 5 | | very high effect (devastation) |

Table 5.3: Scored time period over which the impact is expected to last.

| SCALE | | DESCRIPTION |
|-------|--|-------------|
| T | | Temporary |
| P | | Permanent |

Table 5.4: Scored geographical extent of the induced change.

| SCALE | | DESCRIPTION |
|-------|--|--|
| L | | limited impact on location |
| O | | impact of importance for municipality. |
| R | | impact of regional character |
| N | | impact of national character |
| M | | impact of cross-border character |

5.4.3 Likelihood (Probability) of Occurrence

The likelihood (probability) of the pre-identified events occurring has been ascribed using a qualitative scale of probability categories (in increasing order of likelihood) as shown in Table 5.5. Likelihood is estimated on the basis of experience and/ or evidence that such an outcome has previously occurred. Impacts resulting from routine/planned events (i.e., normal operations) are classified under category (E).

Table 5.5: Summary of the semi qualitative scale of probability categories (in increasing order of likelihood of occurrence).

| SCALE | | DESCRIPTION |
|-------|--|--|
| A | | Extremely unlikely (e.g. never heard of in the industry) |
| B | | Unlikely (e.g. heard of in the industry but considered unlikely) |
| C | | Low likelihood (egg such incidents/impacts have occurred but are uncommon) |
| D | | Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry) |
| E | | High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken) |

5.4.4 Project Activities Summary of Impacts Results

Assessment results of the magnitude, duration, extent and probability of the potential negative impacts of the proposed project activities interacting with the receiving environment are presented in form of a matrixes as shown in Tables 5.6 – 5.9.

The overall severity of potential environmental impacts of the proposed project activities will have low magnitude (Table 5.6), temporally and permanent duration for some activities (Table 5.7), localised extent (Table 5.8) and low probability of occurrence (Table 5.9).

It is important to note that impacts have been considered without the implementation of mitigation measures. The need for and appropriate mitigation measures as presented in the Section 6 of this report have be determined on the basis of the impact assessment presented in this report.

Table 5.6: Results of the impact assessment of the proposed powerline developmental stages and the associated activities on the receiving environment (natural, built, socioeconomic, flora, fauna, habitat and ecosystem).

| ENVIRONMENTAL IMPACT KEY | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES) | | | | | | |
|-----------------------------|--------------------------------|--|---|--|---|------------------------------|---------------------------------|---|---|
| | | | PHYSICAL ENVIRONMENT | | | BIOLOGICAL ENVIRONMENT | | | |
| SCALE | DESCRIPTION | | NATURAL ENVIRONMENT: Air, Noise, Water Green Space, Climate Change | BUILT ENVIRONMENT: Houses, Roads, Transport Systems, Buildings, Infrastructure | SOCIOECONOMIC AND CULTURAL: Local communities, Human Rights, Natural and Social Capital, Archaeological and Cultural Resources | FLORA (Protected Species) | FAUNA (Avifauna and Mammals) | HABITAT (Carbonate Terrain and Ephemeral River Channels) | ECOSYSTEM [Services, Function, Use Values and Non-Use] |
| 0 | no observable effect | | | | | | | | |
| 1 | low effect | | | | | | | | |
| 2 | tolerable effect | | | | | | | | |
| 3 | medium high effect | | | | | | | | |
| 4 | high effect | | | | | | | | |
| 5 | very high effect (devastation) | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | DEVELOPMENT STAGES | ACTIVITIES | | | | | | | |
| | ROUTE SELECTION | 1. Planning and clients' needs assessment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 2. Geographical Information System (GIS) mapping of possible routes options | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 3. Evaluation and field-based route assessment verifications and validations | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | PRECONSTRUCTION | 4. Field –based route and servitude survey | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 5. Field –based route and servitude clearing | 2 | 0 | 0 | 3 | 3 | 3 | 3 |
| | CONSTRUCTION | 6. Digging of the individual pole foundation | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | 7. Digging of the pole support | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | 8. Poles and support driving works | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | 9. Structure mounting | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | 10. Module clamping | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | 11. Cabling and electrical equipment installation | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | OPERATION AND MONITORING | 12. Installation of Communication Monitoring | 2 | 0 | 0 | 1 | 1 | 1 | 1 |
| | | 13. Commissioning | 0 | 0 | 0 | 1 | 3 | 3 | 1 |
| | | 14. Operational | 0 | 0 | 0 | 1 | 3 | 3 | 1 |
| | CLOSURE OR UPGRADE | 15. Monitoring and Maintenance | 0 | 0 | 0 | 1 | 3 | 3 | 1 |
| | | 16. Powerline Decommissioning | 2 | 2 | 0 | 1 | 1 | 1 | 1 |
| 17. Powerline Upgrade | | 2 | 2 | 0 | 3 | 3 | 3 | 3 | |

Table 5.7: Results of the scored time period over which the likely negative impacts of the proposed powerline developmental stages and the associated activities is expected to last.

| ENVIRONMENTAL IMPACT KEY | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES) | | | | | | |
|-----------------------------|--------------------------|--|---|--|--|------------------------------|---------------------------------|---|---|
| | | | PHYSICAL ENVIRONMENT | | | BIOLOGICAL ENVIRONMENT | | | |
| SCALE | | DESCRIPTION | NATURAL ENVIRONMENT: Air, Noise, Water Green Space, Climate Change | BUILT ENVIRONMENT: Houses, Roads, Transport Systems, Buildings, Infrastructure | SOCIOECONOMIC AND CULTURAL: Local communities, Human Rights, Natural and Social Capital, Archaeological and Cultural Resources | FLORA (Protected Species) | FAUNA (Avifauna and Mammals) | HABITAT (Carbonate Terrain and Ephemeral River Channels) | ECOSYSTEM [Services, Function, Use Values and Non-Use] |
| T | | Temporary | | | | | | | |
| P | | Permanent | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | DEVELOPMENT STAGES | ACTIVITIES | | | | | | | |
| | ROUTE SELECTION | 1. Planning and clients' needs assessment | T | T | T | T | T | T | T |
| | | 2. Geographical Information System (GIS) mapping of possible routes options | T | T | T | T | T | T | T |
| | | 3. Evaluation and field-based route assessment verifications and validations | T | T | T | T | T | T | T |
| | PRECONSTRUCTION | 4. Field –based route and servitude survey | T | T | T | T | T | T | T |
| | | 5. Field –based route and servitude clearing | P | T | T | P | P | P | P |
| | CONSTRUCTION | 6. Digging of the individual pole foundation | P | T | T | P | P | P | P |
| | | 7. Digging of the pole support | P | T | T | P | P | P | P |
| | | 8. Poles and support driving works | P | T | T | P | P | P | P |
| | | 9. Structure mounting | P | T | T | P | P | P | P |
| | | 10. Module clamping | P | T | T | P | P | P | P |
| | | 11. Cabling and electrical equipment installation | P | T | T | P | P | P | P |
| | | 12. Installation of Communication Monitoring | P | T | T | P | P | P | P |
| | OPERATION AND MONITORING | 13. Commissioning | T | T | T | P | P | P | P |
| | | 14. Operational | T | T | T | P | P | P | P |
| | | 15. Monitoring and Maintenance | T | T | T | P | P | P | P |
| | CLOSURE OR UPGRADE | 16. Powerline Decommissioning | T | T | T | T | T | T | T |
| 17. Powerline Upgrade | | T | T | T | P | P | P | P | |

Table 5.8: Results of the scored geographical extent of the induced change caused by the proposed powerline developmental stages and the associated activities.

| ENVIRONMENTAL IMPACT KEY | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES) | | | | | | |
|-----------------------------|---------------------------------------|--|---|--|--|------------------------------|---------------------------------|---|---|
| | | | PHYSICAL ENVIRONMENT | | | BIOLOGICAL ENVIRONMENT | | | |
| SCALE | DESCRIPTION | | NATURAL ENVIRONMENT: Air, Noise, Water Green Space, Climate Change | BUILT ENVIRONMENT: Houses, Roads, Transport Systems, Buildings, Infrastructure | SOCIOECONOMIC AND CULTURAL: Local communities, Human Rights, Natural and Social Capital, Archaeological and Cultural Resources | FLORA (Protected Species) | FAUNA (Avifauna and Mammals) | HABITAT (Carbonate Terrain and Ephemeral River Channels) | ECOSYSTEM [Services, Function, Use Values and Non-Use] |
| L | limited impact on location | | | | | | | | |
| O | impact of importance for municipality | | | | | | | | |
| R | impact of regional character | | | | | | | | |
| N | impact of national character | | | | | | | | |
| M | impact of cross-border character | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | DEVELOPMENT STAGES | ACTIVITIES | | | | | | | |
| | ROUTE SELECTION | 1. Planning and clients' needs assessment | L | L | L | L | L | L | L |
| | | 2. Geographical Information System (GIS) mapping of possible routes options | L | L | L | L | L | L | L |
| | | 3. Evaluation and field-based route assessment verifications and validations | L | L | L | L | L | L | L |
| | PRECONSTRUCTION | 4. Field –based route and servitude survey | L | L | L | L | L | L | L |
| | | 5. Field –based route and servitude clearing | L | L | L | L | L | L | L |
| | CONSTRUCTION | 6. Digging of the individual pole foundation | L | L | L | L | L | L | L |
| | | 7. Digging of the pole support | L | L | L | L | L | L | L |
| | | 8. Poles and support driving works | L | L | L | L | L | L | L |
| | | 9. Structure mounting | L | L | L | L | L | L | L |
| | | 10. Module clamping | L | L | L | L | L | L | L |
| | | 11. Cabling and electrical equipment installation | L | L | L | L | L | L | L |
| | OPERATION AND MONITORING | 12. Installation of Communication Monitoring | L | L | L | L | L | L | L |
| | | 13. Commissioning | L | L | L | L | L | L | L |
| | | 14. Operational | L | L | L | L | L | L | L |
| | CLOSURE OR UPGRADE | 15. Monitoring and Maintenance | L | L | L | L | L | L | L |
| | | 16. Powerline Decommissioning | L | L | L | L | L | L | L |
| 17. Powerline Upgrade | | L | L | L | L | L | L | L | |

Table 5.9: Results of the qualitative scale of probability occurrence of likely negative impacts as a result of the proposed powerline developmental stages and the associated activities.

| ENVIRONMENTAL IMPACT KEY | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES) | | | | | | |
|-----------------------------|--------------------------|--|---|---|---|---------------------------------|---------------------------------------|---|--|
| SCALE | | DESCRIPTION | PHYSICAL ENVIRONMENT | | | BIOLOGICAL ENVIRONMENT | | | |
| A | | Extremely unlikely (e.g. never heard of in the industry) | NATURAL ENVIRONMENT: Air, Noise, Water Green Space, Climate Change | BUILT ENVIRONMENT: Houses, Roads, Transport Systems, Buildings, Infrastructure | SOCIOECONOMIC AND CULTURAL: Local communities, Human Rights, Natural and Social Capital, Archaeological and Cultural Resources | FLORA (Protected Species) | FAUNA (Avifauna and Mammals) | HABITAT (Carbonate Terrain and Ephemeral River Channels) | ECOSYSTEM [Services, Function, Use Values and Non-Use] |
| B | | Unlikely (e.g. heard of in the industry but considered unlikely) | | | | | | | |
| C | | Low likelihood (egg such incidents/impacts have occurred but are uncommon) | | | | | | | |
| D | | Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry) | | | | | | | |
| E | | High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken) | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | DEVELOPMENT STAGES | ACTIVITIES | | | | | | | |
| | ROUTE SELECTION | 1. Planning and clients' needs assessment | A | A | A | A | A | A | A |
| | | 2. Geographical Information System (GIS) mapping of possible routes options | A | A | A | A | A | A | A |
| | | 3. Evaluation and field-based route assessment verifications and validations | A | A | A | A | A | A | A |
| | PRECONSTRUCTION | 4. Field –based route and servitude survey | A | A | A | A | A | A | A |
| | | 5. Field –based route and servitude clearing | B | B | B | D | D | D | D |
| | CONSTRUCTION | 6. Digging of the individual pole foundation | B | B | B | B | B | B | B |
| | | 7. Digging of the pole support | B | B | B | B | B | B | B |
| | | 8. Poles and support driving works | B | B | B | B | B | B | B |
| | | 9. Structure mounting | B | B | B | B | B | B | B |
| | | 10. Module clamping | B | B | B | B | B | B | B |
| | | 11. Cabling and electrical equipment installation | B | B | B | B | B | B | B |
| | OPERATION AND MONITORING | 12. Installation of Communication Monitoring | B | B | B | B | B | B | B |
| | | 13. Commissioning | B | B | B | B | D | D | B |
| | | 14. Operational | B | B | B | B | D | D | B |
| | CLOSURE OR UPGRADE | 15. Monitoring and Maintenance | B | B | B | B | D | D | B |
| | | 16. Powerline Decommissioning | B | B | B | B | B | B | B |
| 17. Powerline Upgrade | | B | B | B | D | D | D | D | |

5.4.5 Assessment of the Overall Significant Impacts

5.4.5.1 Overview

The determination of the significance of the negative impacts of the sources was undertaken based on the environmental baseline results and the intensity of the likely negative impact. The assessment was dependent upon the degree to which the proposed project activities are likely to result in unwanted consequences on the receptor covering the natural environment such as the physical and biological environments. Overall, the assessment of significant impacts was focused on the ecosystem-based approach that considers potential impacts to the ecosystem as part of the receiving environment.

5.4.5.2 Summary of the Sources of Impacts

The main key sources of impacts that have been used to determine significant impact posed by the proposed project activities comprised all the activities associated with the operation and decommissioning stages. Each of the main sources of impacts have been evaluated against the receiving environment (receptor / pathways).

5.4.5.3 Determination of the Overall Likely Significant Impacts

In order to determine the overall significant impact of individual sources associated with the proposed project activities, an impact identification and assessment process was undertaken as part of the EIA. The results of the overall impacts and key issues associated with the proposed project activities as sources of potential impacts with respect to the receiving environment that could potentially be affected, resulting in key issues are presented in Table 5.10.

The EIA impact identification and assessment processes focused on the environment interaction approach with respect to the proposed project activities, the pathways and the likely targets or receptor. In this process, components of the project activities that are likely to impact the natural environment (physical, biological and social) were broken down into individual development stages and activities. The results of the overall significant impacts assessment associated with the proposed project activities / sources of potential impacts with respect to the receiving environment that could potentially be affected, resulting in key issues are presented in Tables 5.10.

Key issues of significant impacts that have been identified from the impacts assessment process includes the following (Table 5.10): Regulatory issues, vehicles and tracks management, siting of distribution station(s) and camps sites, impacts on avifauna, impacts on mammals, impacts on water resources protection and general water usage, positive and negative impacts of socioeconomic setting, health and safety impacts, visual, noise, dust and waste (solid and liquid) management.

Table 5.10: Significant impact assessment of the proposed powerline developmental stages and the associated activities on the receiving environment (natural, built, socioeconomic, flora, fauna, habitat and ecosystem).

| ENVIRONMENTAL IMPACT KEY | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (RESOURCES) | | | | | | | | | |
|-----------------------------|--------------------------|--|---|-----------------------|---------------------|---|--|---|------------------------------|---------------------------------|---|---|
| | | | PHYSICAL ENVIRONMENT | | | BIOLOGICAL ENVIRONMENT | | | | | | |
| IMPACT SEVERITY | IMPACT LIKELIHOOD | | | | | NATURAL ENVIRONMENT: Air, Noise, Water Green Space, Climate Change | BUILT ENVIRONMENT: Houses, Roads, Transport Systems, Buildings, Infrastructure | SOCIOECONOMIC AND CULTURAL: Local communities, Human Rights, Natural and Social Capital, Archaeological and Cultural Resources | FLORA (Protected Species) | FAUNA (Avifauna and Mammals) | HABITAT (Carbonate Terrain and Ephemeral River Channels) | ECOSYSTEM [Services, Function, Use Values and Non-Use] |
| | Extremely Unlikely [0] | Unlikely [1] | Low Likelihood [2] | Medium Likelihood [3] | High Likelihood [4] | | | | | | | |
| Slight [A] | [A0] | [A1] | [A2] | [A3] | [A4] | | | | | | | |
| Low [B] | [B0] | [B1] | [B2] | [B3] | [B4] | | | | | | | |
| Medium [C] | [C0] | [C1] | [C2] | [C3] | [C4] | | | | | | | |
| High [D] | [D0] | [D1] | [D2] | [D3] | [D4] | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | DEVELOPMENT STAGES | ACTIVITIES | SUMMARY OF KEY ISSUES Regulatory issues, vehicles and tracks management, siting of distribution station(s) and camps sites, impacts on avifauna, impacts on mammals, impacts on water resources protection and general water usage, positive and negative impacts of socioeconomic setting, health and safety impacts, visual, noise, dust and waste (solid and liquid) management. | | | | | | | | | |
| | ROUTE SELECTION | 1. Planning and clients' needs assessment | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] |
| | | 2. Geographical Information System (GIS) mapping of possible routes options | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] |
| | | 3. Evaluation and field-based route assessment verifications and validations | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] |
| | PRECONSTRUCTION | 4. Field –based route and servitude survey | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] | [A0] |
| | | 5. Field –based route and servitude clearing | [A2] | [A0] | [A0] | [A0] | [A0] | [C3] | [C3] | [C3] | [C3] | [C3] |
| | CONSTRUCTION | 6. Digging of the individual pole foundation | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | | 7. Digging of the pole support | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | | 8. Poles and support driving works | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | | 9. Structure mounting | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | | 10. Module clamping | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | | 11. Cabling and electrical equipment installation | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | OPERATION AND MONITORING | 12. Installation of Communication Monitoring | [A2] | [A0] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| | | 13. Commissioning | [A0] | [A0] | [A0] | [A0] | [A0] | [A1] | [C3] | [C3] | [C3] | [A1] |
| | | 14. Operational | [A0] | [A0] | [A0] | [A0] | [A0] | [A1] | [C3] | [C3] | [C3] | [A1] |
| | CLOSURE OR UPGRADE | 15. Monitoring and Maintenance | [A0] | [A0] | [A0] | [A0] | [A0] | [A1] | [C3] | [C3] | [C3] | [A1] |
| | | 16. Powerline Decommissioning | [A2] | [A2] | [A0] | [A0] | [A0] | [A1] | [A1] | [A1] | [A1] | [A1] |
| 17. Powerline Upgrade | | [A2] | [A2] | [A0] | [A0] | [A0] | [C3] | [C3] | [C3] | [C3] | [C3] | |

6. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

6.1 Summary Objectives of this EMP

The Environmental Management Plan (EMP) provides a detailed plan of actions required in the implementation of the mitigation measures for minimising and maximising the identified significant negative and positive impacts respectively. The EMP gives commitments including financial and human resources provisions for effective management of the likely environmental liabilities throughout the proposed project developmental stages. Regular monitoring, assessments and evaluation of the environmental liabilities will need to be undertaken and will ensure adequate provision of the necessary resources towards good environmental management at various stages of the proposed project development.

6.2 Mitigation Measures for Key Issues

Key issues that have been identified with respect to the proposed project are: Regulatory issues, vehicles and tracks management, siting of distribution station(s) and camps sites, impacts on avifauna, impacts on mammals, impacts on water resources protection and general water usage, positive and negative impacts of socioeconomic setting, health and safety impacts, visual, noise, dust and waste (solid and liquid) management.

Based on the findings of the impact assessment as detailed in Chapter 5 of this report, the following are the key mitigations measures for the identified key issues which are associated with the route section, preconstruction, construction, operational, closure and or upgrade of the proposed powerline from Marble Station to the location of the Karibib Project in the ML 204:

(i) Regulatory mitigation measures with respect to the implementation of the proposed project activities:

- ❖ All preconstruction permits must be obtained before the implementation of the proposed project and the permits includes: Agreements with NamPower, Environmental Clearance Certificate (ECC), Land ownership / Lease Agreement and all other licenses permits as may be required/ applicable.
- ❖ Adhere to tall national regulatory requirements, standards and all other applicable Competent Authorities / Organs of State with jurisdiction over the proposed powerline.
- ❖ Adhere to all regulatory environmental performance monitoring requirements as may be stipulated in the Environmental Clearance Certificate (ECC).
- ❖ Adhere to all provisions of the Environmental Clearance Certificate, Agreement. Land ownership / Lease Agreement, servitudes and all other licenses permits limits, standards and guideline as may be required, and.
- ❖ Employ an independent environmental officer to ensure environmental compliance during the preconstruction, construction and operational stages.

(ii) Mitigation measures for vehicles and tracks management:

- ❖ Avoid unnecessary affecting areas viewed as important habitat – i.e. ephemeral rivers. rocky features (hills/outcrops/mountains). clumps of protected tree species.
- ❖ Make use of existing tracks/roads as much as possible throughout the area.
- ❖ Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna and unique flora. accidental fires. erosion related problems).
- ❖ Avoid off-road driving at night as this increases mortalities of nocturnal species.

- ❖ Implement and maintain off-road track discipline with maximum speed limits (e.g. 30km/h) as this would result in fewer faunal mortalities and limit dust pollution.
- ❖ Where new tracks have to be made off the main routes, the routes should be selected causing minimal damage to the environment – e.g. use the same tracks. cross drainage lines at right angles. avoid placing tracks within drainage lines. avoid collateral damage (i.e. select routes that do not require the unnecessary removal of trees/shrubs, especially protected species).
- ❖ Rehabilitate all unwanted new tracks created, and.
- ❖ Implement erosion control measures along the powerline route – e.g. cross drains on slopes.

(iii) Mitigation measures around the construction site and other temporary layover:

- ❖ Select temporary construction site and other temporary layover sites with care and must avoid any important habitats such ephemeral rivers valleys.
- ❖ In the absence of municipal sewer line, use portable toilets to avoid faecal pollution along the proposed powerline route.
- ❖ Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and resulting typical problem animal scenarios – e.g. baboon, black-backed jackal.
- ❖ Prevent the killing of species viewed as dangerous – e.g. various snakes – when onsite or along the powerline route.
- ❖ Prevent the setting of snares for ungulates (i.e. poaching) or collection of veld foods (e.g. tortoises, monitor lizard) and unique plants (e.g. various *Aloe*) or any form of illegal hunting activities.
- ❖ Avoid introducing dogs and cats as pets to camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs).
- ❖ Remove and relocate slow moving vertebrate fauna (e.g. tortoises, chameleon, snakes) to suitable habitat elsewhere on property.
- ❖ Avoid the removal and/or damaging of protected flora potentially occurring in the general area – e.g. various *Aloe* species.
- ❖ Avoid introducing ornamental plants, especially potential invasive alien species, as part of the landscaping of the substation/camp sites, etc., but rather use localised indigenous species, should landscaping be attempted, which would also require less maintenance (e.g. water).
- ❖ Remove all invasive alien species on site – e.g. *Prosopis* sp. This would not only indicate environmental commitment, but actively contribute to a better landscape.
- ❖ Prevent and discourage the collecting of firewood as dead wood has an important ecological role – especially during the development phase(s). Such collecting of firewood, especially for economic reasons, often leads to abuses – e.g. chopping down of live and/or protected tree species such as *Acacia erioloba* which is a good quality wood.
- ❖ Attempt to avoid the removal of bigger trees during the development phase(s) – especially with the development of access routes – as these serve as habitat for a

myriad of fauna. Avoid the destruction of larger trees associated with the ephemeral drainage lines.

- ❖ Prevent and discourage fires – especially during the development phase(s) – as this could easily cause runaway veld fires causing problems (e.g. loss of grazing & domestic stock mortalities, etc.) for the neighbouring farmers.
- ❖ Inform contractors/workers regarding the above-mentioned issues prior to construction activities and monitor for compliance thereof throughout.
- ❖ Rehabilitate all areas disturbed by the construction activities – i.e. camp sites, and.
- ❖ Employ an environmental officer to ensure compliance, especially of the rehabilitation of all the affected areas along the proposed powerline route.

(iv) Mitigation measures for avifauna over the powerlines:

- ❖ Introduce bird avoidance mechanisms – e.g. bird flight diverters, flappers, coils, lights, anti-perching devices, alternative perching sites, etc. – along movement corridors as shown in Fig. 4.2 of this report and in Annex 2.
- ❖ Pole design such as the vertical configured designs poses an electrocution risk for vultures. Investigate alternative design as may be applicable.
- ❖ Initiate a bird collision monitoring programme after construction to determine “high collision” areas so as to mitigate these areas as well, once identified.

(v) Mitigation measures for mammals over the powerlines:

- ❖ Maintain the minimum clearance for giraffe of 6.3 m line, and.
- ❖ Pole transformers pose an electrocution risk for genet, baboon, etc. Cover jumper cables on transformer with LDPE (Low Density Polyethelene) pipes if required.

(vi) Mitigation measures for water resources protection and general water usage are:

- ❖ Always use as little water as possible. Reduce, reuse and re-cycle water where possible.
- ❖ All leaking pipes / taps around the camp site must be repaired immediately they are noticed.
- ❖ Measure, monitored, and account for water usage throughout the operations.
- ❖ Always maintain all water related infrastructure.
- ❖ Never leave taps running. Close taps after you have finished using them.
- ❖ Never allow any hazardous substance to soak into the soil, and.
- ❖ No washing of vehicles, equipment and machinery, containers and other surfaces.

(vii) Mitigation measures to enhance positive socioeconomic impacts include the following actions to be implemented by the proponent:

- ❖ Stipulate a preference for local contractors in the tender policy. Preference to local contractors should still be based on competitive business principles and salaries and payment to local service providers should still be competitive.

- ❖ Develop a database of local businesses that qualify as potential service providers and invite them to the tender process.
- ❖ Scrutinise tender proposals to ensure that minimum wages were included in the costing.
- ❖ Tender documents must stipulate that local residents should be employed for temporary unskilled/skilled and where possible in permanent unskilled/skilled positions as they would reinvest in the local economy.
- ❖ Must ensure that potential employees are from the local area, if required, proof of having lived in the area for a minimum of 5 years must be produced.
- ❖ Must ensure that contractors adhere to Namibian Affirmative Action, Labour and Social Security, Health and Safety laws. This could be accomplished with a contractual requirement stipulating that monthly proof should be submitted indicating payment of minimum wages to workers, against their ID numbers, payment of social security and submission of affirmative action data, and.
- ❖ Encouraged to cater for the needs of employees to increase the spending of wages locally.

(viii) Mitigation measures to minimise negative socioeconomic impacts are:

- ❖ The employment of local residents and local companies should be a priority.
- ❖ Address unrealistic expectations about large numbers of jobs being created by holding public local meeting to brief the community through the local Councillor and by not advertising for job recruitment extensively at national level but rather use local and regional advertisement means such as local radio stations or local authority newsletters / local community outreach channels).
- ❖ Temporary construction site if required should be established in close consultation with the land owners.
- ❖ Tender documents could stipulate that contractors have HIV/Aids workplace policies and programmes in place and proof of implementation should be submitted with invoicing.
- ❖ Contract companies could submit a code of conduct, stipulating disciplinary actions where employees are guilty of criminal activities in and around the vicinity of the project area. Disciplinary actions should be in accordance with Namibian legislation.
- ❖ Contract companies could implement a no-tolerance policy regarding the use of alcohol at workplace.
- ❖ Request that the Roads Authority erect warning signs of heavy-duty vehicles on affected public roads.
- ❖ Ensure that drivers adhere to speed limits and that speed limits are strictly enforced particularly around the site, and.
- ❖ Ensure that vehicles are road worthy and drivers are qualified.

(ix) Mitigation measures to minimise health and safety impacts are:

- ❖ Physical hazards: Follow national regulatory and guidelines provisions, use of correct Personal Protective Equipment (PPE) at all times, training programme and

monitoring, as well as the implementation of a fall protection program in accordance with the Labour Act.

- ❖ Some of the public access management measures that may be considered in an event of vandalism occurring are:
 - Control access to the site through using gates on the access road(s), and.
 - Notice or information boards relating to public safety hazards and emergency contact details to be put up at the gate(s) to the powerline or on strategic powerline poles.

(x) Mitigation measures to minimise visual impacts are:

- ❖ When choosing the powerline route, consider the landscape character and the visual impacts of the powerline from all relevant viewing angles, particularly from public roads.
- ❖ Use topography and vegetation screening where applicable for screening.
- ❖ Minimise access / servitude roads and no off-road that could result in land scarring is allowed.
- ❖ Minimise the presence of secondary structures: remove inoperative and redundant support structures, and.
- ❖ Remove all infrastructure and reclaim, or rehabilitate the project powerline route in an event of closure.

(xi) Mitigation measures to minimise noise and dust impacts are:

- ❖ Limit vehicle movements and adhere to the speed of 30 km/h around the powerline route and the official speed limits on all public roads.
- ❖ Vehicles and all equipment must be properly serviced to minimise noise pollution.
- ❖ Use the appropriate Personal Protective Equipment (PPE) as may be required in order to minimise Occupational Health Safety impacts due to noise and dusty pollution along the powerline route, and.
- ❖ National or international acoustic design standards must be followed.

(xii) Mitigation measures for waste (solid and liquid) management are:

- ❖ Burial of waste on anywhere other than an approved waste disposal site is prohibited and all generated solid waste must be disposed at an approved municipal solid disposal site.
- ❖ Mobile chemical toilet facilities must be provided along the proposed powerline route and should not be located close to ephemeral rivers or sensitive habitat.
- ❖ Provide site information on the difference between the following three (3) main types of waste, namely: Building rubbles, general waste and hazardous Waste.
- ❖ Sealed containers, bins, drums or bags for the different types of wastes must be provided.
- ❖ Never dispose of hazardous waste in the bins or skips intended for general waste or construction rubble.

- ❖ All solid and liquid wastes generated from the proposed project activities shall be reduced, reused, or recycled to the maximum extent practicable.
- ❖ Trash may not be burned around the site, except at an approved municipal site and under controlled conditions in accordance with the regulations.
- ❖ Never overfill any waste container, drum, bin or bag because it can be a source of litter around the site.
- ❖ Never litter or throwaway any waste on the site, along any road.
- ❖ No illegal dumping is prohibited, and.
- ❖ Littering is prohibited.

6.3 Roles and Responsibilities

6.3.1 Overview

This section contains the roles and responsibilities with respect to the implementation and monitoring of the Environmental Management Plan (EMP) covering the route section, preconstruction, construction and operational stages of the proposed powerline. A generic organisation structure for the proposed project with respect to the roles and responsibilities for implementation of this EMP is shown in Fig. 6.1.

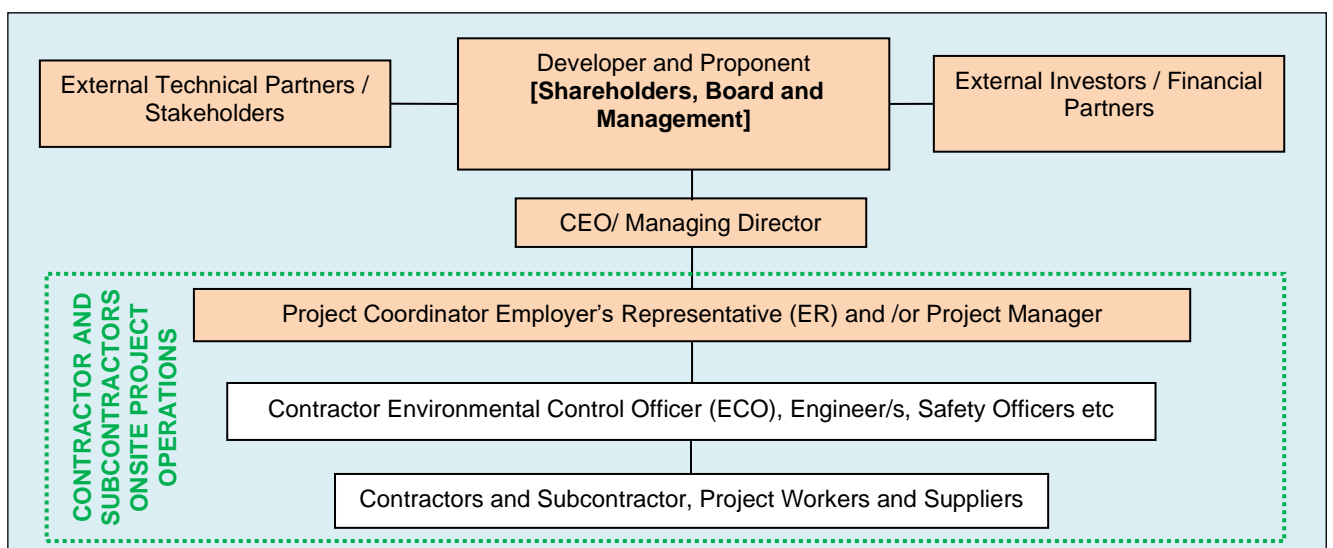


Figure 6.1: Organisational structure for EMP implementation with respect to the proposed powerline.

6.3.2 Onsite Project Manager

The proponent is to appoint an onsite project manager with the following responsibilities:

- ❖ Act as the on-site project manager and EMP implementing agent.
- ❖ Appoint the Environmental Control Officer (ECO).
- ❖ Ensure that the responsibilities of the proponent are executed in compliance with the relevant legislation and this EMP.
- ❖ Ensure that all the necessary environmental authorisations and permits have been obtained before project implementation.

- ❖ Assist the Contractor in finding environmentally responsible solutions to challenges that may arise (with input from the ECO).
- ❖ Should the onsite project manager be of the opinion that a serious threat to or impact on the environment may be caused by the construction operations, he/she may stop work. the proponent must be informed of the reasons for the stoppage as soon as possible.
- ❖ The on-site project manager may be contractually delegated, has the authority to institute disciplinary proceedings in accordance with the provisions of the national laws for transgressions of basic conduct rules and/or contravention of the EMP.
- ❖ Should the Contractor or his/her employees fail to show adequate consideration for the environmental aspects related to the EMP, the on-site project manager can have person(s) and/or equipment removed from the site or work suspended until the matter is remedied.
- ❖ Report to the proponent on the implementation of this EMP on site (with input from the ECO and/or independent environmental auditor).
- ❖ Maintain open and direct lines of communication between the proponent, ECO, Contractor and Interested and Affected Parties (I&APs) with regards to environmental matters, and.
- ❖ Attend all site meetings and inspections.

6.3.3 Environmental Control Officer (ECO)

The **Environmental Control Officer (ECO)** has the following responsibilities:

- ❖ Assist the on-site project manager in ensuring that the necessary environmental authorisations and permits have been obtained.
- ❖ Assist the on-site project manager and Contractor in finding environmentally responsible solutions to challenges that may arise.
- ❖ Conduct environmental monitoring as per this EMP and other regulatory requirements.
- ❖ Recommend on the institution of disciplinary proceedings in accordance with the provisions of the national laws for transgressions of basic conduct rules and/or contravention of the ESMP transgressions of basic conduct rules and/or contraventions of the EMP to the on-site project manager.
- ❖ Advise the on-site project manager on the removal of person(s) and/or equipment not complying with the specifications of this EMP.
- ❖ Carry out regular site inspections (on average once per week) of all construction / operational areas with regards to compliances to this EMP. report any non-compliance(s) to the on-site project manager as soon as possible.
- ❖ Organise for an independent internal audit on the implementation of and compliance to this EMP to be carried out half way through the construction period and one per year during the operational stage and the audit must be reports to be submitted to the on-site project manager who in turn must submit it to the management.
- ❖ Organise for an independent post-construction environmental audit to be carried out.
- ❖ Continuously review this EMP and recommend additions and/or changes to the EMP document.

- ❖ Monitor the Contractor's environmental awareness training for all new personnel coming onto site.
- ❖ Keep records of all activities related to environmental control and monitoring. the latter to include a photographic record of the construction / operational and environmental control and a register of all major incidents. and
- ❖ Attend regular site meetings.

6.3.4 Contractor

The responsibilities of the **Contractor** include:

- ❖ Comply with the relevant legislation and municipal by-laws.
- ❖ Preparation and submission to proponent of the following Management Plans:
 - Environmental awareness training and inductions.
 - Emergency preparedness and response.
 - Waste management, and.
 - Health, Safety and Environment (HSE).
- ❖ Ensure adequate environmental awareness training for all site personnel.
- ❖ Environmental awareness presentations (inductions) to be given to all site personnel prior to work commencement. the ECO is to provide the course content and the following topics, at least but not limited to, should be covered:
 - The importance of complying with the relevant Namibian, international and best practice legislation.
 - Roles and responsibilities, including emergency preparedness.
 - Basic rules of conduct (Do's and Don'ts).
 - EMP: aspects, impacts and mitigation.
 - Fines for failure to adhere to this EMP.
 - Health, Safety Environment (HSE) requirements.
- ❖ Record keeping of all environmental awareness training and induction presentations, and.
- ❖ Attend regular site meetings and environmental inspection.

6.3.5 Construction Supporting Teams

The construction of the proposed powerline will require an array of specialist teams working very closely with their suppliers and core onsite operations team. The following is a summary of some of the specialists that will be required during the route selection, preconstruction and construction phase as part of the team of contractors:

- ❖ All surveyor, environmental team, mechanical engineer and crane contractors and electrical contractors each with their respective subcontractors and suppliers, would report directly to the onsite project manager.

6.4 Environmental Performance Monitoring

The monitoring process of this EMP performances for the proposed powerline is divided into two (2) parts and these are:

- (i) Monitoring activities and effects to be undertaken by the Environmental Control Officer (ECO).
- (ii) Preparation of an Environmental Performance Monitoring reports covering all activities related to the Environmental Management Plan throughout the proposed project lifecycle to be undertaken by the Environmental Control Officer (ECO).

The proponent will be required to report to the Ministry of Environment, Forestry and Tourism, the environmental performances monitoring as may be required / provided for in the conditions of the Environmental Clearance Certificate (ECC).

The reporting process will form part of the ongoing environmental monitoring programme. Environmental monitoring programme is part of this EMP performances assessment and will need to be compiled and submitted as determined by the regulators (the Environmental Commissioner).

The process of undertaking appropriate monitoring as per specific topic and tracking environmental performances targets against the monitoring objectives / targets will be part of internal and external auditing to be coordinated by the Environmental Control Officer (ECO) / External Consultant / Suitable qualified in-house resource person.

The second part of the monitoring of this EMP performance will require an ongoing reporting process outlining all the activities related to the effectiveness of this EMP to be undertaken by the Environmental Control Officer (ECO). The types of the data sets to be collected as part of the environmental compliance monitoring process are outlined in Tables 6.1 - 6.9.

The objective will be to ensure that corrective actions are reviewed and steps are taken to ensure compliance with this EMP implementation as well as all regulatory requirements, standards and guidelines.

Table 6.1: Monitoring of environmental performance implementation / environmental awareness training.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|---|------------|---------------------------|---------|---------|-----------|
| Is there an Environmental awareness training programme? | | | | | |
| How many people have been given environmental awareness training? | | | | | |
| Is a copy of the EMP on site? | | | | | |
| How effective is the awareness training? Do people understand the contents of the EMP? Where are the weaknesses? Ask 3 people at random various questions about the EMP. | | | | | |

Table 6.2: Monitoring of environmental performance for the temporal and permanent structures.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|--|------------|---------------------------|---------|---------|-----------|
| Are the temporal and permanent structures positioned to avoid sensitive potential sensitive sites? | | | | | |
| Has new infrastructure been created? If so, what, and how well planned / built with respect to environment? | | | | | |
| Have toilets been provided? Where are they situated? | | | | | |
| Do receptacles for waste have scavenging animal proof lids? | | | | | |
| What litter is there – who is littering? | | | | | |
| Are there facilities for the disposal of oils / etc and how often is it removed to an approved disposal site? | | | | | |
| Is there evidence of oil / diesel spills? Bunding or not? | | | | | |
| Housekeeping | | | | | |

Table 6.3: Environmental data collection.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|---|------------|---------------------------|---------|---------|-----------|
| Are records being kept? | | | | | |
| Birds' mortality records? | | | | | |
| Noise level? | | | | | |
| Air Quality? | | | | | |
| Dust being generated? | | | | | |
| Have archaeological sites been found / disturbed / described? | | | | | |
| Other key environmental data sets? | | | | | |

Table 6.4: Health, Safety and Environment (HSE).

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|--|------------|---------------------------|---------|---------|-----------|
| All HSE provisions are being implemented including the correct use of protective clothing? | | | | | |
| Is there a First Aid Kit on site? | | | | | |
| Are dangerous areas clearly marked off? | | | | | |
| Do vehicles appear to maintain the recommended speed limits? | | | | | |
| Do vehicles drive with headlights on at all times? | | | | | |

Table 6.5: Recruitment of labour.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|---|------------|---------------------------|---------|---------|-----------|
| What labour source is used? | | | | | |
| How has the recruitment practice been done? | | | | | |

Table 6.6: Management of the natural habitat and surficial materials management.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|--|------------|---------------------------|---------|---------|-----------|
| Has there been any development done on or very close sensitive areas? | | | | | |
| Has anyone been caught with plants or animals in their possession? | | | | | |
| Has there been wilful or malicious damage to the environment? | | | | | |
| Has topsoil / seed bank layer been removed from demarcated development areas and appropriately stored? | | | | | |

Table 6.7: Tracks and off-road driving.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|--|------------|---------------------------|---------|---------|-----------|
| Are existing tracks used and maintained? | | | | | |
| What new tracks have been developed and are they planned? | | | | | |
| What evidence is there of off-road driving? Who appears to be responsible? | | | | | |
| Are corners being cut, what type of turning circle are there? Three-point turns vs. U turns? | | | | | |
| Have unnecessary tracks been rehabilitated and how well? | | | | | |
| Comments | | | | | |

Table 6.8: Management of water resources.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|---|------------|---------------------------|---------|---------|-----------|
| How is potable water supplied and how often? Position of tanks? | | | | | |
| Is water being wasted? | | | | | |
| Is there any leakage from pipes or taps? | | | | | |

Table 6.9: Public relations.

| Monitoring Compliance | Mitigation | Follow-up Action Required | By Whom | By When | Completed |
|---|------------|---------------------------|---------|---------|-----------|
| Have any complaints been made about the construction and or operational activities by the public If so, what, and how was the issue resolved? | | | | | |

7. EIA AND EMP CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary of Conclusions

The preparation of this EIA and EMP report took into considerations the provisions of the Environmental Impact Assessment Regulations, 2012 and the Environmental Management Act, 2007, (Act No. 7 of 2007) with respect to environmental assessment process and requirements in Namibia. The proposed project activities were screened and a BID / Scoping Report with Terms of Reference (ToR) was prepared (Annex 1), followed by the preparation of the specialist fauna and flora report (Annex 2) and this EIA and EMP report. All key specialist recommendations with respect to the proposed powerline have been incorporated and presented in this report (Annex 2).

The proposed powerline is unlikely to have significant adverse effects on unique vertebrate fauna and flora, especially if the proposed recommendations (mitigation measures) are incorporated (Chapter 6). Introducing avifauna collision and “flashover” avoidance mechanisms is highly recommended along potential flight corridors such as the area where the powerline will cross the major Ephemeral Rivers as shown in Fig. 4.2 and Annex 2.

7.2 Summary of the Recommendations

The design of the proposed powerline comprises single wood structures along a straight line and two poles at each turning point with a spacing of 120 m and each pole will be connected by three wires. Aircraft Warning Spheres (AWS) devices will be installed at 20m spacing where national and busy district roads are crossed. Double loop bird flight diverters (BFD) will also be installed at locations as shown in Fig. 7.1 and as recommended in the Specialist Flora and Fauna Report Annex 2 to prevent bird collisions especially around the route sections where birds’ activities likely to cross the proposed powerline route have been identified to be high. Other potential locations should be monitored during the operational phase of the proposed powerline and if bird fatalities increase BFD may be installed on such locations.

Based on the findings of this EIA and EMP report, it’s hereby recommended that the Proponent be issued with an Environmental Clearance Certificate (ECC) for the proposed 29.977km long, 66kV overhead powerline from the Karibib Marble Station to the Karibib Project in the ML 204. Mitigation measures for both positive and negative impacts have been proposed and management strategies are provided in this report for the following developmental stages:

- ❖ Route selection.
- ❖ Preconstruction.
- ❖ Construction.
- ❖ Operation and monitoring, and.
- ❖ Closure or upgrading.

The EMP provisions incorporates all the relevant mitigation measures with respect to likely positive and negative impacts and recommendations have been provided for implementation by the Proponent. The following are the recommended actions to be implemented by the Proponent as a part of the management of the impacts through implementations of the mitigation measures as detailed in Chapter 6 covering the entire lifecycle of the proposed project activities:

- (i) The Proponent shall obtain all other necessary permits, licenses and land consents / ownership as may be applicable before implementation of the project.
- (ii) The Proponent shall implement and adopt precautionary approach by developing and implementing measures aimed at protecting the physical, biological and socioeconomic receiving environments.

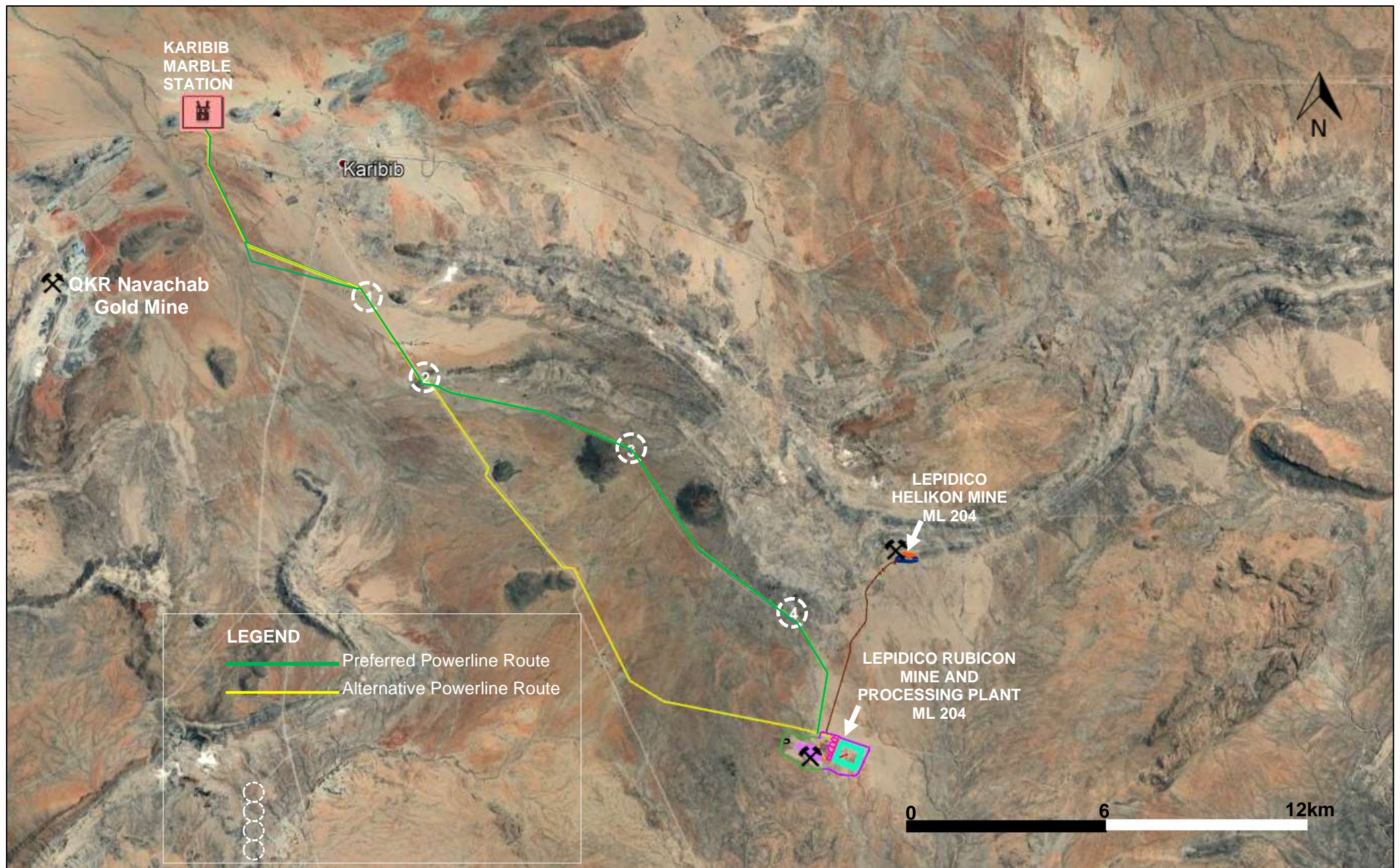


Figure 7.1: Recommended locations for the installation of the double loop bird flight diverters (BFD) to prevent bird collisions especially around the route sections where birds' activities likely to cross the proposed powerline route have been identified to be high. Other potential location should be monitored for bird fatalities and BFD may be installed if fatalities increases (Base map Source: Google Map 2020).

- (iii) The Proponent shall contract an Environmental Control Officer/ Consultant / suitable in-house resources person to lead and further develop, implement and promote environmental culture through awareness raising of the workforce, contractors and subcontractors.
- (iv) The Proponent / Environmental Control Officer/ Consultant / suitable in-house resources person shall work with the local experts in making sure that the mitigation measures to minimise the impacts on receiving environment (physical, biological and socioeconomic environments) are fully implemented and monitoring measures are put place.
- (v) Before undertaking detailed site-specific activities (implementing the actual physical disturbance of the land surface) such as creating internal access routes / servitude, the proponent /Environmental Control Officer/ Consultant / suitable in-house resources person should consider the sensitivity of the local area in terms of the habitat, local flora and fauna or relocation process and may work with or get advice from the fauna and flora specialist consultant / local experts as may be required.
- (vi) The Proponent shall provide human and financial resources, for the implementation of the proposed mitigations measures and effective environmental management and monitoring thereof throughout the lifecycle of the proposed project activities.
- (vii) The Proponent shall develop a simplified environmental induction and awareness programme for all the workforce, contractors and subcontractors and where contracted service providers are likely to cause negative environmental impacts, these will need to be identified and contract agreements need to be developed with costing provisions for environmental liabilities.
- (viii) The Proponent shall develop and implement a monitoring programme that will fit into the overall company's Environmental Policy and Management Systems (EMS), and.
- (ix) The Proponent /Environmental Coordinator / Consultant / Suitable in-house resource person shall regularly (as may be required by the regulators) prepare and submitted to the regulators environmental monitoring reports as maybe required by law.

All the responsibilities to ensure that the mitigation measures and recommendations are executed accordingly, rest with the Developer and the Proponent.

The developer / contractor/ subcontractor shall provide all appropriate resource required for the effective implementation of the mitigation measures. It is the responsibility of the Developer and the Proponent to make sure that all members of the workforce including contractors and subcontractors are aware of the EMP provisions and objectives.

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2. SPECIFIC FAUNA AND FLORA

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9. ANNEXES

- 1. BID/ Scoping Report with ToR**
- 2. Flora and Fauna Specialist Report**