ENVIRONMENTAL IMPACT ASSESSMENT

FOR THE PROPOSED CONSTRUCTION AND OPERATION OF A 50 MW MERCHANT SOLAR PHOTOVOLTAIC PLANT AT TREKKOPJE, ARANDIS DISTRICT IN THE ERONGO REGION, NAMIBIA

ENVIRONMENTAL SCOPING REPORT

FINAL VERSION

APP NO: 5862

NOVEMBER 2025

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Acronyms

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

EXECUTIVE SUMMARY

Junior Baiano Industrial Consultants (JBIC) cc has been appointed by **Helium Energy (Pty) Ltd** to conduct an Environmental Impact Assessment (EIA), develop an Environmental Management Plan (EMP), and apply for an Environmental Clearance Certificate for the Environmental Impact Assessment for the proposed construction and operation of a 50 MW Solar PV Plant at Trekkopje in Arandis district, Erongo Region, Namibia on a 100-hectare (ha) area. In terms of the Environmental Impact Assessment Regulations 2012, the proposed project triggered the application for an environmental clearance certificate because of the following activities:

Environmental Impacts

- Generation of waste during construction and operation.
- Impacts on vegetation and biodiversity through clearing of land during construction.
- Health and safety impacts during construction and operation.
- Surface and groundwater impacts during construction.

Social and Economic Impacts

- Improved energy supply.
- Creation of much-needed employment opportunities
- Facilitation of local and national economic growth
- Utilization of an energy source (solar) is renewable and low emission. This contrasts with conventional fossil fuels that contribute to pollution and climate change.
- Reduction in foreign energy expenditures.
- An EMP has been developed to mitigate any anticipated possible impacts of the project on the environment.

Public Participation Process

Interested and Affected Parties were notified of the project through site notices and newspaper adverts. All relevant information regarding consultation is covered in Chapter 4 of this document and attached in Appendix A.

Recommendation

Based on the Environmental Assessment it is concluded that most of the impacts identified can be addressed through the recommended mitigation and management actions for both the construction and operation phases of the solar plant. Should the recommendations included in this report and the EMP be implemented the significance of the impacts can be reduced to reasonably acceptable standards and duration. All developments could proceed provided that general mitigation measures as set out are implemented at a minimum.

In this respect it is recommended that the proposed solar plant receives an Environmental Clearance Certificate, provided that the recommendations described in this report and the EMP are implemented.

1 CHAPTER ONE: BACKGROUND

1.1 INTRODUCTION

Namibia is poised to tackle climate change, by establishing a green economy that will drive economic recovery as envisioned for African countries in the African Union Continental Green Recovery Action Plan. In this context, the country has ambitious plans to develop green and blue economies as articulated under the economic advancement pillar of the Harambee Prosperity Plan (HPPII).

The feasibility of these plans is underscored by the abundant availability of sunlight throughout the year and proximity to billions of cubic meters of seawater and vast marine resources in the Atlantic Ocean. Namibia has the potential to capture around 10 hours of strong sunlight per day for 300 days per year. As a result, Namibia has some of the highest solar irradiance potentials of any country in Africa, which is sufficient to provide power for the nation and its neighbors (WFC, 2021).

Helium Energy (Pty) Ltd plans to build a 50 MW PV solar plant in response to the country's solar irradiance potential. The proposed plant will be located at Trekkopje, Arandis District, Erongo Region, Namibia. This project is envisaged to promote renewable energy investment and increase the power production capacity in Namibia.

Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012) echoes the need for an Environmental Impact Assessment (EIA) for new projects (such as the proposed development) that are specified by the Act.

Non-compliance to legal obligations presents liabilities and it is in the wake of the need to attain sustainability that Helium Energy (Pty) Ltd has opted to undertake an EIA for its proposed solar power plant. EIA is required to obtain an Environmental Clearance Certificate (ECC) from the Ministry of Environment and Tourism (MET) before the project can proceed. In this context, the company has set out to conduct the Environmental Impact Assessment (EIA) for its upgrade activities.

The EIA is the official appraisal process to identify, predict, evaluate, and justify the ecological, social, and related biophysical impacts of the project on both the environment and, affected and interested stakeholders. It provides insight into alternatives and measures to be adopted to prevent or mitigate any impacts/risks that may ensue from the project and its associated activities.

As per the requirements of the Environmental Management Act No. 7 of 2007, Helium Energy (Pty) Ltd has appointed JBIC to conduct the EIA and develop an Environmental Management Plan (EMP) for the proposed project. In this respect, this document forms part of the application to be made to the DEA's office for an ECC for the proposed project, in accordance with the guidelines and statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts regulations (GN 30 in GG 4878 of 6 February 2012).

1.2 PROJECT LOCATION

The project site is located at Trekkopje, Arandis District, Erongo Region, Namibia. The exact project site is depicted below.

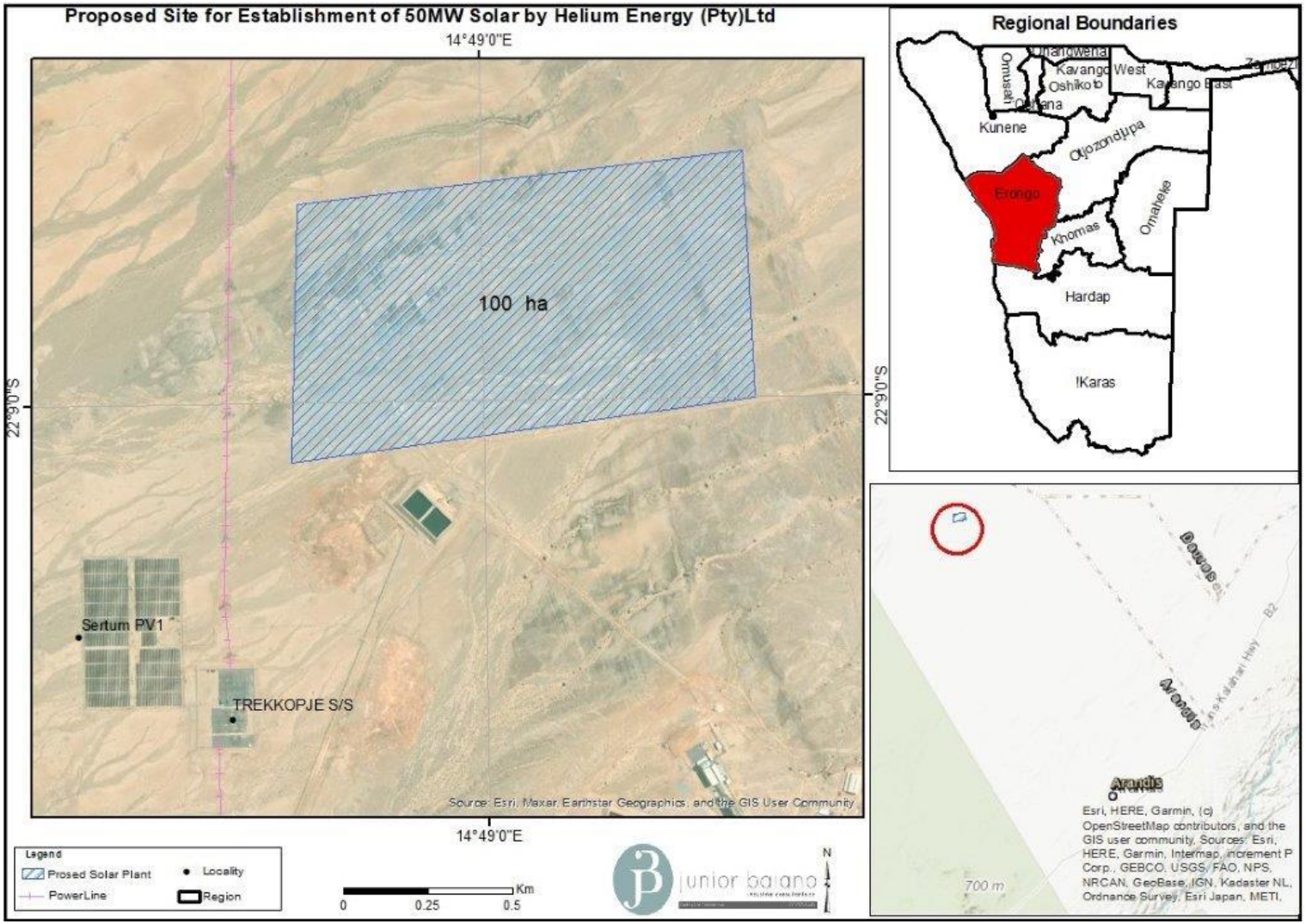

Figure 1-1:Locality map

1.3 PROJECT OVERVIEW

This project entails the transformation of bare land to accommodate the proposed Solar Power plant, associated infrastructure, and services. The Company anticipates that this solar farm will produce approximately 50 MW.

The infrastructure proposed for the entire Solar Power Plant (project) includes but is not limited to the following:

- PV Modules.
- Side-of-Pole Mount for Solar Panel or PV Module
- Administration Block
- Storage room
- Security Room

The project works involve the construction and operation of a solar PV plant which includes:

- Planning and Design of Project Work – this compasses land acquisition and registration; preliminary site investigations e.g. geotechnical assessments and topographical surveys; permit applications; preparation of site plans/drawings and application of the appropriate approvals from the relevant regulatory authorities; assessment of baseline conditions to determine supply and demand for required project services; carry out EIA and obtain the appropriate approvals; etc.
- Site Preparation – this entails grading, landscaping, building roads, and siding of project areas in order to make the sites free of obstruction prior to construction. It may also involve the utilization of heavy machinery/equipment to fully prepare the landscape. This includes physically removing vegetation, any pre-existing concrete foundations, etc. By doing this, the sites are prepared for new concrete foundations and other needed site work.
- Building Foundation - once the site landscaping is fully prepared, getting the project areas mapped out for the foundation is the next critical phase before items can be delivered. The breakdown of the foundation process encompasses the location of conduits into concrete shelters, placing rock in the foundation bed to provide a firm surface for concrete, placing of rebar in framed areas to add extra strength for poured concrete; etc.
- Transportation, Logistics, and Construction - site preparation is complete and the foundation is in place, the next important step is preparing for transportation, logistics,

and construction of the solar plant, transmission lines and other associated infrastructure. This takes into account evaluating all site conditions to make sure they are conducive for the weight of cranes and trucks; planning for transporting very heavy pieces of equipment; execution and control of the procurement; movement and stationing of personnel, material, and other resources; etc.

- Electrical and Grounding - it is necessary to determine and install all necessary electrical and grounding materials needed to power the project areas.
- Operation of the solar power plant.

1.4 ACCESSIBILITY

Trekkopje is located in Erongo Region in the Arandis District, and it is located about 30 km from the national road B2. The settlement is served by the rail way. The photos below show the nature of the roads in and around the project site.

Figure 1-2: Sign board near National B2 Road near to the project site

1.5 INFRASTRUCTURE AND SERVICES

Water will be sourced from Arandis Town Council, and transported onsite, water will be kept in tanks as the project source of water. Soakaway-based ablution facilities are to be used on-site.

1.6 NEED AND DESIRABILITY

With an average of ten hours of sunshine per day, Namibia is one of the world's sunniest countries. As shown in the graph below, it has enormous potential for solar energy yet, 60% of the country's energy is imported from neighbouring countries and 40% of its population is disconnected from the grid (Climate Partner, 2022).

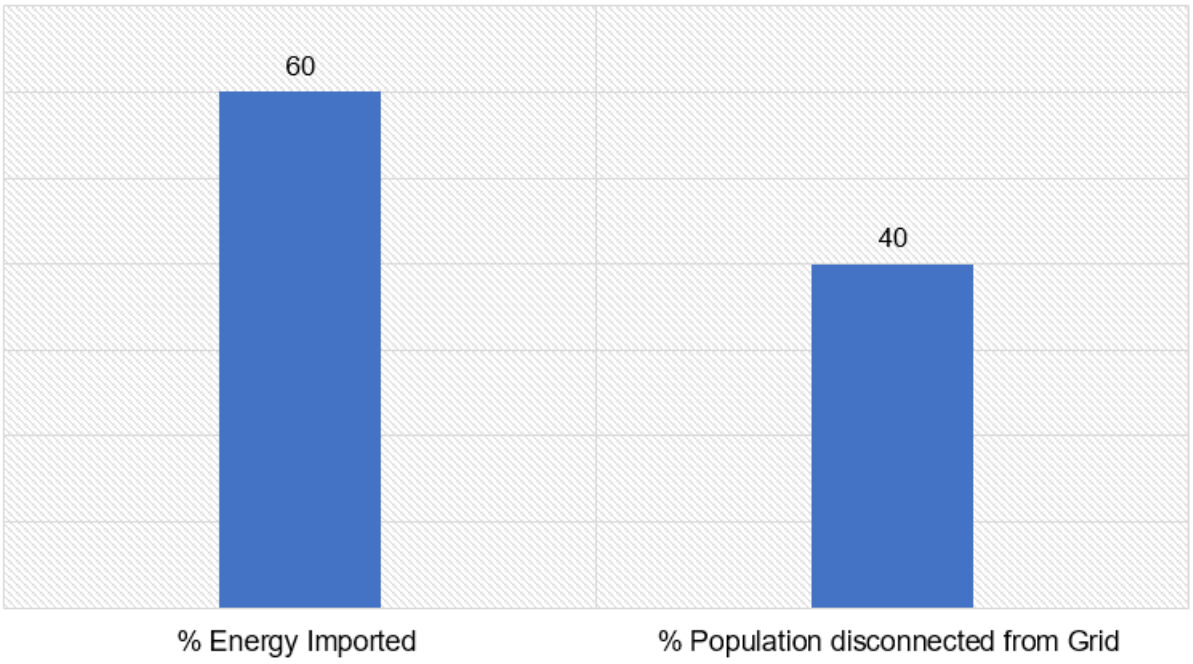

Figure 1-3: % of Energy Import and Disconnected Population

Nonetheless, Namibia has ambitious goals. The Harambee Prosperity Plan (HPPII) articulates ambitious plans to develop green and blue economies in the country. Namibia is uniquely positioned to become the renewable energy hub of the continent and is determined to play a leading role in illustrating how environmentally sustainable business practices can be profitable and transformative undertakings. By 2030, Namibia aims to produce 70% of its energy from renewable energy sources, with independent energy producers feeding renewable energy into its national grid (WEF, 2021).

The 50 MW Solar PV Plant, is thus a major step in addressing the objectives of the developmental plans and targets of the Namibian government. The project will help increase the proportion of renewable energy sources in Namibia's energy mix and improve regional and national supply.

1.7 PROJECT ALTERNATIVES

The project will not be implemented if the No-Go option is selected. The no-project alternative would mean that the various potential impacts/risks emanating from the proposed project would not be experienced. Thus the current uses and value and other potential land uses of the site are likely to be retained.

In addition, there would be no increased pressure on resources such as water which are already under strain. There also would be no increased chances of pollution and other potential negative impacts that would emanate from project activities.

If the project is implemented, it is anticipated that the project will have the following benefits

- Improved energy supply
- Creation of much-needed employment opportunities
- Facilitation of local and national economic growth
- Utilization of an energy source (solar) is renewable and low emission. This contrasts with conventional fossil fuels that contribute to pollution and climate change.
- Reduction in foreign energy expenditures.

These benefits will not be realized if the project does not take place. With the current need for green energy in the region and nation, it is imperative that the solar plant be established. The non-development of the proposed project will further impede economic development and socio-economic progress.

Due to the project's numerous environmental and socio-economic benefits, and that the identified environmental impacts can be suitably mitigated it has been determined that the No Go option can be eliminated. Should the Competent Authorities (CA) refuse the authorization of the proposed project, the 'No Go' option will be "implemented" and the status quo of the site will remain intact - leaving the site in its present state.

Table 1-1: Other Alternative Considerations

Item	Description	Alternatives	Comments
1.	Siting	• Current site	The only area accessible and authorized for the project is the Trekkopjie SIS area.
2.	Transportation	• Road • Rail	Given the location of the project road and rail are the most cost-effective means of transport.
3.	Solid Waste Disposal	• Construction of a solid waste disposal site at the project site • Disposal of solid waste off-site	Construction of a waste disposal on site is not feasible. Thus, the Arandis town waste disposal site will be used for project operations.
4.	Water and Sanitation	• Arandis town council	Water will be sourced from the Arandis town council The soakaway system is to be used ablution facilities.
5.	Energy	• Electricity • Solar • Diesel Generator	Considering investment costs it is cost effective to use electrical energy as an energy source in the initial stages of the project. Solar energy will be used when the project is in its operational phase.

1.7.1 Conclusion

It is recommended that the project goes ahead, with the construction and operation of a 50 MW Merchant Solar PV Plant at Trekkopjie, Arandis District, Erongo Region, Namibia as a viable option as it is a cost-effective and sustainable land use option.

2 CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1 INTRODUCTION

This EIA Report for the solar plant has been prepared in reference to identified Namibian laws and regulations that impinge on the project throughout all its phases. Legislation is one of the most important instruments of government that ensures the following:

- Acceptable pollution control and waste management
- Conservation and utilization of resources
- Sustainable land-use planning and regulation
- Safe and healthy workplace environments
- Determination amongst other things of the rights and responsibilities of individuals and authorities to whom the legislation applies.

The international and national laws, agreements, and treaties that govern the social and environmental issues of the project are outlined in the following sub-section. The sub-section takes into account brief summarises of selected legislation; it does not seek to provide comprehensive details of all legal obligations that apply to the project but rather an overview.

2.2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

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

Table 2-1: Legal Compliance

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
The Constitution of the Republic of Namibia (1990)	Articles 91(c) and 95(i) commit the state to actively promote and sustain the environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include: • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Maintain biological diversity.	Through the implementation of the environmental management plan, the proposed development will be conformant to the constitution in terms of environmental management and sustainability, by bringing development in an environmentally sensitive way.
Vision 2030 and National Development Plans	Namibia's overall Development ambitions are articulated in the Nations Vision 2030. At the operational level, five-yearly national development plans (NDP's) are prepared	The proposed energy generation project is an important element in the

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	in extensive consultations led by the National Planning Commission in the Office of the President. Currently, the Government has so far launched a 4th NDP which pursues three overarching goals for the Namibian nation: high and sustained economic growth; increased income equality; and employment creation.	industrialization of the country as well as FDIs in Namibia.
Environmental Assessment Policy of Namibia 1994	The Environmental Assessment Policy of Namibia requires that all projects, policies, Programmes, and plans that have detrimental effects on the environment must be accompanied by an EIA. The policy provides a definition of the term “Environment” broadly interpreted to include biophysical, social, economic, cultural, historical, and political components and provides a reference to the inclusion of alternatives in all projects, policies, programmes and plans.	The construction and operation of the solar farm and transmission line will only commence after being awarded an environmental clearance certificate, thus by abiding the requirements of the Environmental Assessment Policy of Namibia. The EIA and EMP will cater to the sustainable management of the biophysical environment.

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
Environmental Management Act No. 07 of 2007	The Act aims at • Promoting the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment; • To provide for a process of assessment and control of projects which may have significant effects on the environment; The Act gives legislative effect to the Environmental Impact Assessment Policy. Moreover, the act also provides procedure for adequate public participation during the environmental assessment process.	This document is compiled in a nature that project implementation is in line with the objectives of the EMA. EIA guiding procedures developed by MET were also used in the course of this project.
Electricity Act 4 of 2007	Requires that any generation and or distribution complies with laws relating to health, safety and environmental standards (s 18(4)(b)	HELIUM ENERGY (PTY) LTD to comply with all relevant provisions of the EMA and its regulations.

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	In the event that exemption from acquiring a license is granted, the Minister may impose conditions relating to public health safety or the protection of the environment.	
The Atomic Energy and Radiation Protection Act, Act 5 of 2005:	Provides for the adequate protection of the environment and of people against the harmful effects of radiation by controlling and regulating the production, processing, handling, use, holding, storage, transport and disposal of radiation sources and radioactive materials, and controlling and regulating prescribed non-ionising radiation sources according to the standards set out by the ICNIRP.	Justifies the need for assessing the impact of electromagnetic radiation from the power line, on the nearby settlements.
"Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300GHz)" (April 1998 developed by the	Provides international standards and guidelines for limiting the adverse effects of non-ionising radiation on human health and well-being, and, where appropriate, provides scientifically based advice on non-ionising radiation protection including the provision of guidelines on limiting exposure.	Justifies the need for assessing the impact of electromagnetic radiation from the power line, on the nearby residents.

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
International Commission on Non-Ionizing Radiation Protection (ICNIRP))		
Public Health Act (No. 36 of 1919)	Under this act, in section 119: "No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	• The project proponent will ensure that all legal requirements of the project in relation to protection of the health of their employees and surrounding residents is protected. • Personal protective equipment shall be provided for employees in construction. • The development shall follow requirements and specification in relation to water supply and sewerage handling so as not to threaten public health of future residents on this piece of land.

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
Soil Conservation Act 76 of 1969	The objectives of this Act are to: • Make provisions for the combating and prevention of soil erosion, • Promote the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic.	The project will have a rather localized impact on soils and on the soil through clearance for PV panel stands and powerline poles. Soil protection measures will be employed and preservation of trees as much as possible.
Nature Conservation Ordinance 1996	To consolidate and amend the laws relating to the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.	The proposed project implementation is not located in any known or demarcated conservation area, national park or unique environments. The project site was selected with this ordinance in mind to ensure that Namibian nature is conserved.
Protected Areas and Wildlife Management Bill	This bill, when it comes into force, will replace the Nature Conservation Ordinance 4 of 1975. The bill recognizes that biological diversity must be maintained, and where	Environmental recommendations and considerations on this project has ensured that the proposed activities will

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	necessary, rehabilitated and that essential ecological processes and life support systems be maintained. It protects all indigenous species and control the exploitation of all plants and wildlife.	not fall within the boundaries of any protected area and that the project will not affect heavily endangered vegetation and animals on its site.
Forest Act, 2001 (Act No. 12 of 2001)	The Act gives provision for the protection of various plant species through the Ministry of Agriculture, Water and Forestry (MAWF), Directorate of Forestry).	• Land clearing of an extensive piece of land will be done upon approval from the Directorate of Forestry. • The proponent will also have to ensure that there is no indiscriminate cutting down of trees during construction and operation • The proposed site is sparsely vegetated with white thorn tree species, which are not threatened or protected.

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
National Rangeland Policy and Strategy, 2012	The policy aims at enabling resource users (farmers and managers) to manage their rangeland resources in a sustainable manner and sustainable in that they are economically viable, socially acceptable, environmentally friendly and politically conducive.	This proposed project will ensure that the local community benefits both economically and socially from the project, this in line with the recently declared Harambee Prosperity Plan and NDP 4&5.
National Biodiversity Strategy and Action Plan (NBSAP2)	The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia putting together management of matters to do with ecosystems protection, biosafety, biosystematics protection on both terrestrial and aquatic systems.	• The project proponent has been advised by JBIC and recognises the need for ecosystems protection to manage the changing climatic environment. • This project is one of the drivers to reduce the rate of global environmental change given its contribution, to decreased use of burning fossil fuels for energy generation.

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
National Policy on Climate Change for Namibia, 2010	In harmony with the findings of the IPCC over time and the Earth Summits held annually, the policy seeks to outline a coherent, transparent and inclusive framework on climate risk management in accordance with Namibia's national development agenda, legal framework, and in recognition of environmental constraints and vulnerability. Furthermore, the policy pursues the strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks.	Solar energy harnessing technologies are a positive impact to fighting climate change, thus this development is a positive step towards climate smart energy generation and environmental sustainability.
Wetland Policy, 2004	The policy provides a platform for the conservation and wise use of wetlands, thus promoting inter-generational equity regarding wetland resource utilization. Furthermore, it facilitates the Nation's efforts to meet its commitments as a signatory to the International Convention on Wetlands (Ramsar) and other Multinational Environmental Agreements (MEA's).	• In compliance to this Policy, the development will ensure a standard environmental planning such that it does not affect any wetlands within its locale through recognition of wetlands to promote the

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
		conservation and wise utilization of wetlands resources. • Runoff from the project site is to be controlled so as to prevent pollution of surrounding water bodies.
Water Resources Management Act, 2013 (Act No. 11 of 2013)	This Act provides for the management, protection, development, use and conservation of water resources. This also forms the regulation and monitoring of water resources.	Water supply will be obtained from either boreholes or the nearby . Appropriate water abstraction permits are to be obtained before is drawn from either of the two water sources.
National Heritage Act 27 of 2004	Heritage resources to be conserved in development.	• The graves that are close to the project site are to be fenced off so that they are not disturbed by the project operations. • During the project implementation as soon as objects of cultural and heritage interests are observed

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
		such as graves, artefacts and any other object believed to be order than 50 years, all measures will be taken protect these objects until the National Heritage Council of Namibia have been informed, and approval to proceed with the operations granted accordingly by the Council.
National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979	"No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia: (a) any meteorite or fossil; or (b) any drawing or painting on stone or a petroglyph known or commonly believed to have been executed by any people who inhabited or visited Namibia before the year 1900 AD; or	The proposed site of development is not within any known monument site both movable or immovable as specified in the Act, however in such an instance that any material or sites or archeologic importance are identified, it will be the responsibility of the developer to take

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	(c) any implement, ornament or structure known or commonly believed to have been used as a mace, used or erected by people referred to in paragraph (b); or (d) the anthropological or archaeological contents of graves, caves, rock shelters, middens, shell mounds or other sites used by such people; or (e) any other archaeological or palaeontological finds, material or object; except under the authority of and in accordance with a permit issued under this section.	the required route and notify the relevant commission.
Pollution Control and Waste Management Bill	This bill has not come into force. Amongst others, the bill aims to "prevent and regulate the discharge of pollutants to the air, water and land" Of particular reference to the Project is: Section 21 "(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse."	To control air, water and land pollution as agitated by the Act the proponent will ensure that the project site will have approved drainage on site as well as standard conservancy tanks that do not threaten public health, adding on an integrated pollution management

LEGISLATION/POLICY/ GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	Section 55 "(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment."	strategy following the EMP provided herein.
Convection on Biological Diversity (CBD)	Namibia is a signatory of the Convention on Biological Diversity and thus is obliged to conserve its biodiversity.	The project will preserve flora and fauna species as part of the project plans.
United Nations Convection to combat Desertification	Namibia is bound to prevent excessive land degradation that may threaten livelihoods.	It will be the responsibility of the proponent to conserve vegetation on and around the area, to avoid encroachment of the desert environs in the area.

3 CHAPTER THREE: RECEIVING ENVIRONMENT

3.1 SOCIO-ECONOMIC

Arandis is a town in the Erongo Region of western central Namibia with a constituency area of 13,519.74 km2. Arandis is 57 km to the northeast of the coastal town of Swakopmund, 100 km from the port of Walvis Bay, and 2 km from the B2 main road, linked via railway to Windhoek, Swakopmund and Walvis Bay. Established for the workers of Rössing Uranium in 1978, Arandis town currently has 8,828 inhabitants, most of whom are somehow connected to the mines.

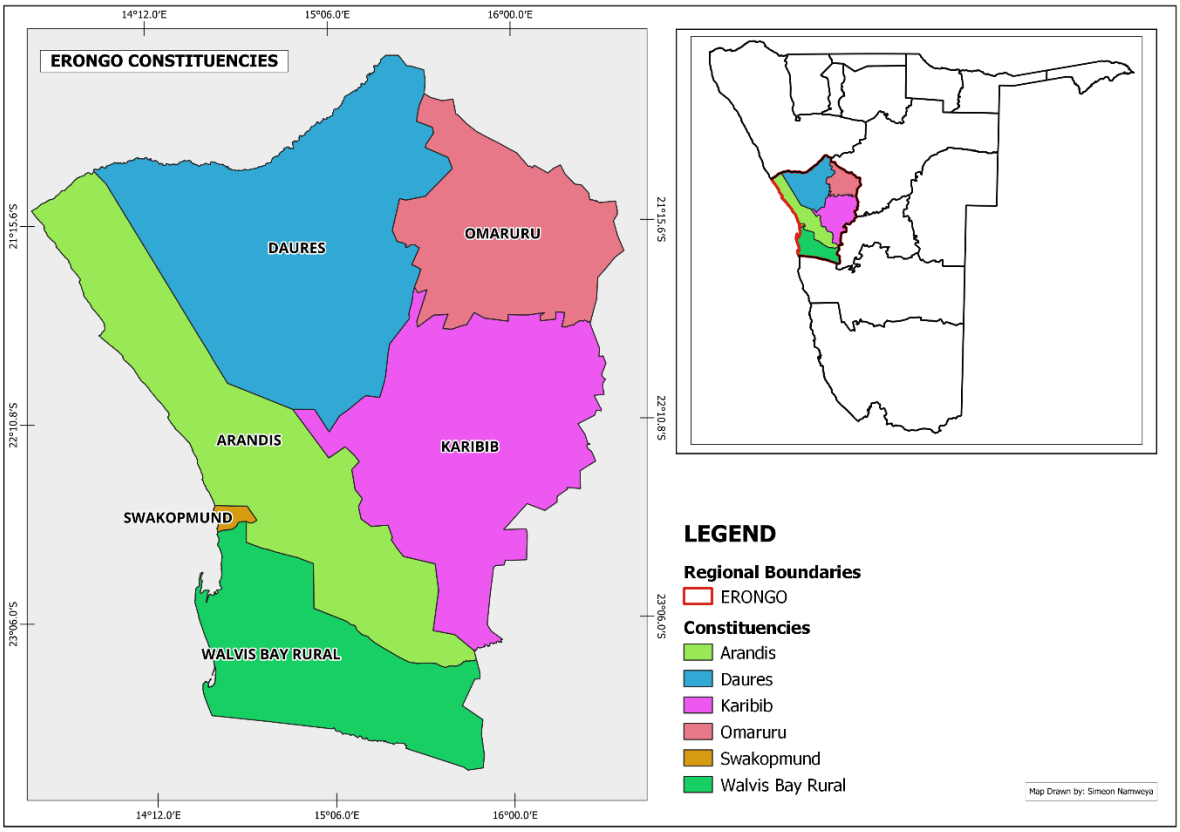

Figure 3-1: Erongo Region

Main Sectors

The business community of Arandis is doing very well thanks to the mining industry and tourist interest.

Mining

Arandis is known for its close relationship with the mining industry. Arandis has been called the Uranium Capital of the World as it is located just 15 km outside the world's largest open-pit uranium mine, the Rössing Uranium Mine. Besides Rössing, Arandis also serves the Husab and Trekkopje uranium mines.

Farming

According to the Namibia Statistics Agency (NSA) 2011 Census data, main agricultural activities in Arandis include Livestock farming (9.0) Crop (7.1), Poultry farming (1.6), Agro-processing (0.1), Horticulture (0.2%), and Others (0.3%).

Tourism

The town and surroundings of Arandis offer many interesting activities and attractions which include; Cave Paintings and Rock Formations, Hiking and Biking, The Dorob National Park, The Grosse Spitzkuppe Nature Reserve, Tsaobis Leopard Nature Park. There are many self-catering units, bed and breakfasts, guest houses, and hotels in the Arandis area to choose from.

Services & Infrastructure

Available services in Arandis include Bed & Breakfasts, Hotels, Lodges, Tourism Cafés and Restaurants, Supermarkets, Medical Services & Pharmacies, Banking Services (Bank Windhoek Branch, Standard Bank Agency and ATMs), Good Infrastructure (Road, rail, air), Safe, Healthy Clean Town and Low crime rate. Arandis town hosts retail facilities, a large petrol station, schools, hotels, a health center, shopping malls, and banking outlets.

Arandis offers ample opportunities for Economic Growth - Uranium rush EPZ status, Residential as well as commercial erven, Industrial Development (Factories, Warehouses), Residential Development (Apartments), various SMEs, and Farming. Arandis sources its power supply from Erongo RED and obtains water from Namwater's main water supply as well as from a desalination plant in the area.

The Arandis Railway Station exists as a crossing loop on the Trans-Namib Railway between Swakopmund and Usakos. Arandis is also linked to the rest of Namibia by air from Arandis Airport.

3.1.1 Administration, Employment and Demography

According to the Namibia Statistics Agency 2023 Population & Housing Census Preliminary Report, the population of Arandis constituency is 13,542 with a total of 6,961 males and 6,581 females and 1.0 persons per km^2. A total population of 5,726 resides in the town (urban locality) of Arandis, of which 3,102 are Males while 2,624 are females, representing 186.7 persons per km^2 over an area of 30,6625 km^2.

Arandis has a household population of 12, 852 with 4, 153 households and an average household size of 3.1

According to the Namibia Statistics Agency 2023 Population & Housing Census Preliminary Report, the population of Erongo is 240, 206 with a total of 122, 322 males and 117, 884 females. This population grew from 150,809 in 2011, representing a 59.3% growth between 2023 and 2011.

The population of the Erongo Region has grown by 40% since the 2001 census to reach 150,809 in 2011. The population of the Karibib Constituency increased by 10% since 2001 to 13,320 in 2011, which calculates to a 1% annual growth.

Table 2: Indicators and values of Erongo region and Arandis District

Indicators		Values	
		Erongo	Arandis
Population Size	Males	79 823	5 241
	Females	70 986	4 852
Sex ratio: Males per 100 females		112	108
Age composition, %	Under 5 years	11	10
	5 – 14 years	17	19
	15 – 59 years	67	64
	60+ years	6	8
Literacy rate, 15+ years, %		97	98
Education, 15+ years, %	Never attended school	6	4
	Currently at school	9	13
	Left school	83	80
Labour force, 15+ years, %	In labour force	79	71
	Employed	70	72
	Unemployed	30	28

	Outside labour force	16	22
	Student	45	49
	Homemaker	11	5
	Retired, too old, etc.	44	46
Main source of income, %	Farming	3	1
	Wages & Salaries	73	72
	Cash remittance	5	3
	Business, non-farming	9	6
	Pension	8	10
Housing conditions, % Households with	Safe water	96	99
	No toilet facility	11	9
	Wood/charcoal for cooking	15	7

Source: Erongo Region – Census Selected Indicators, 2001 and 2011

3.2 CLIMATE

Located at an elevation of 587.71 meters (1928.18 feet) above sea level, Arandis has a Subtropical desert climate (Classification: BWh). The district's yearly temperature is 20.14ºC and it is -4.32% lower than Namibia's averages. Arandis typically receives about 9.55 millimeters of precipitation and has 18.83 rainy days (5.16% of the time) annually.

Table 3: Arandis Climatic conditions

Source: Climate-data.org,

Temperature	Max	Average	Min	
Max Temperature	27.29°C (81.12°F)	18.19°C (64.74°F)	15.16°C (59.29°F)	
Avg Temperature	25.27°C (77.49°F)	16.4°C (61.52°F)	13.14°C (55.65°F)	
Min Temperature	21.23°C (70.21°F)	13.5°C (56.3°F)	11.12°C (52.02°F)	
Dew Point	Max	Average	Min	
Dew Point	12.13°C (53.83°F)	8.15°C (46.67°F)	2.02°C (35.64°F)	
Precipitation	Max	Average	Min	Sum
Precipitation	0.0mm | 0in	0.0mm | 0in	0.0mm | 0in	0.0mm | 0in
Snowdepth	0.0mm | 0in	0.0mm | 0in	0.0mm | 0in	0.0mm | 0in
Wind	Max	Average	Min	
Wind	33.36kmh | 20.73mph	20.64kmh | 12.83mph	11.12kmh | 6.91mph	
Gust Wind	49.53kmh | 30.78mph	35.28kmh | 21.92mph	21.23kmh | 13.19mph	
Sea Level Pressure	Max	Average	Min	
Sea Level Pressure	0.0mb	0.0mb	0.0mb	

3.3 FLORA AND FAUNA

The flora and fauna northwest of Arandis, Namibia, are typical of the Namib Desert's arid environment. The flora is dominated by drought-resistant plants such as *Welwitschia mirabilis*, a unique and ancient plant species, as well as various succulents and sparse grasses like *Stipagrostis*. These plants are adapted to survive with minimal water, often using deep root systems or water-storing tissues.

The fauna includes a range of specialized desert species, such as the Namib Desert beetle, which can collect moisture from fog, and small mammals like gerbils and jackals. Reptiles, such as geckos and lizards, are also common, along with a variety of bird species adapted to the harsh desert conditions (Mendelsohn et al., 2002).

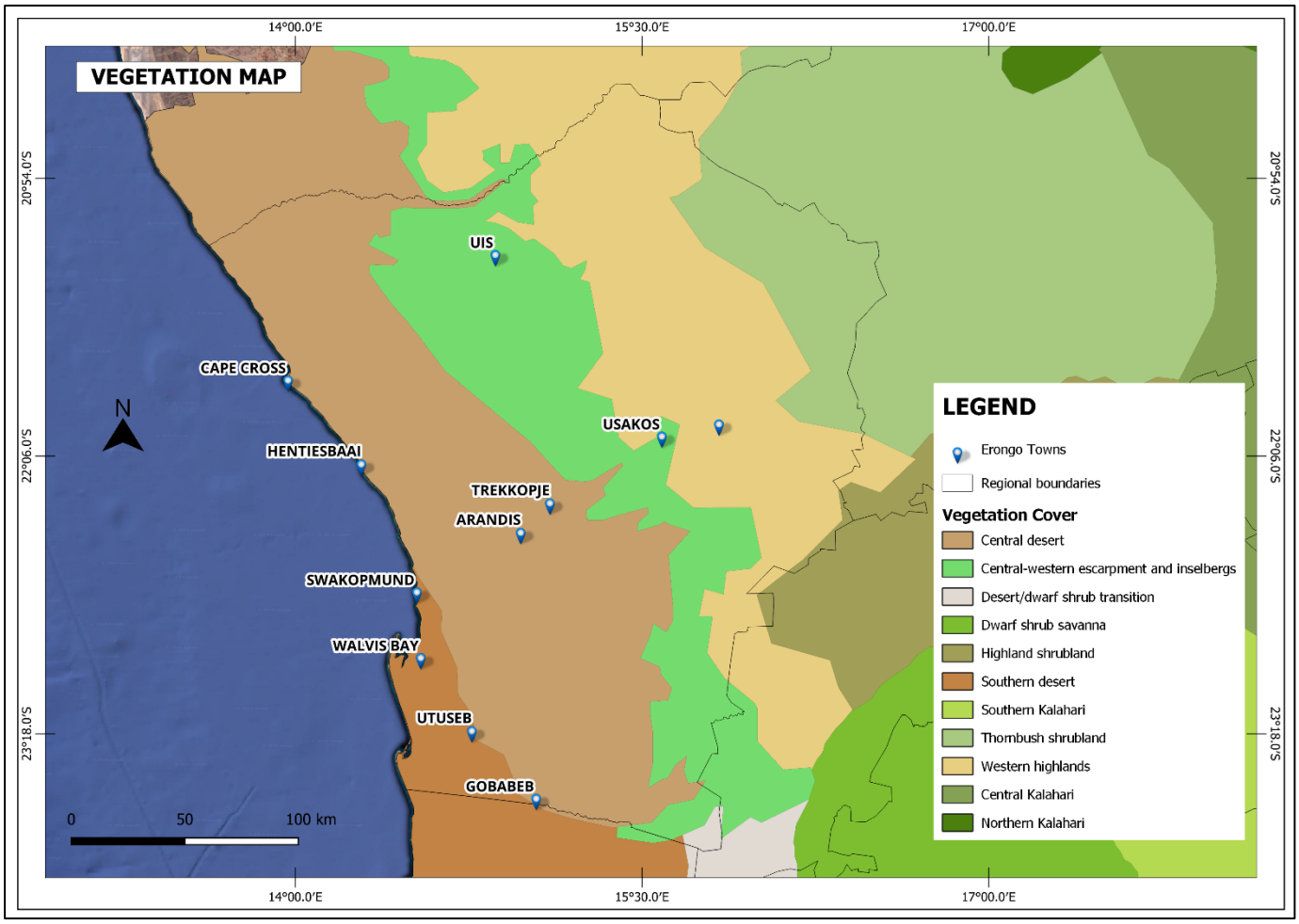

Figure 3-2: Vegetation Map Extract

Domestic animals, small ground-dwelling creatures, reptiles, and local bird species are among the local wildlife that are anticipated to or are known to occur at the location. However, it is reasonable to anticipate that the places nearby that support natural vegetation will also support species that are important for conservation. There is little wildlife in the area around the project area.

3.3.1 Geology

The geology of the project area is dominated by the rocks of the Damara Orogenic Belt, which formed during the Pan-African orogeny around 550 to 600 million years ago. This region features a mix of metamorphic rocks, including schists, gneisses, and marbles, along with igneous intrusions such as granites. The area is also notable for its mineral resources, particularly uranium, with significant deposits that have led to extensive mining activities. The complex geological history of this region is marked by significant tectonic activity, resulting in folded and faulted rock formations (Miller, 2008).

3.3.2 Hydrology

The hydrology of the project area is heavily influenced by the arid climate of the Namib Desert. This area experiences extremely low and irregular rainfall, leading to limited surface water and challenging groundwater conditions.

3.3.3 Surface Water

Surface water is almost nonexistent in this area due to the extremely low rainfall, which averages less than 100 mm per year. Any surface water that does occur is usually the result of brief, intense storms that generate ephemeral rivers and streams. These watercourses, such as the Khan and Swakop Rivers, only flow during or shortly after significant rain events and are typically dry for the remainder of the year. The ephemeral nature of these rivers means they contribute minimally to sustained water resources and are more important for occasional flood events, which may temporarily recharge groundwater through infiltration (Jacobson et al., 1995).

3.3.4 Groundwater

Groundwater is the primary source of water in this region, but it is both limited and difficult to access. The geology of the area, dominated by the Damara Supergroup, consists of fractured metamorphic rocks like schists, gneisses, and marbles. Groundwater is stored in aquifers found within these fractured rocks and along fault zones. The water table is generally deep, reflecting the arid conditions and the minimal recharge that occurs from the scarce rainfall.

The quality of groundwater varies, with many aquifers containing brackish or saline water, which limits its usability for drinking or agriculture without treatment. In some areas, groundwater can be found in alluvial deposits along the ephemeral riverbeds, where infiltration from occasional floods can temporarily enhance water availability. However, these sources are not reliable and often require significant effort and technology to extract (Christelis & Struckmeier, 2001).

3.3.5 Water Use and Challenges

Given the scarcity of water, the region relies heavily on groundwater for all its water needs, including domestic use, agriculture, and mining operations. The mining industry, particularly uranium mining, places a significant demand on these limited water resources. As a result, sustainable water management is crucial, including the careful monitoring of groundwater levels and quality to prevent over-extraction and contamination.

Water scarcity is a critical issue in this area, and the long-term viability of water resources is a growing concern, particularly in light of climate change and the potential for even lower rainfall and higher evaporation rates in the future (Christelis & Struckmeier, 2001).

4 CHAPTER FOUR: PUBLIC CONSULTATION

4.1 OVERVIEW

The public consultation process forms an important component of the Environmental Assessment process. It is defined in the EIA Regulations (2012), as a "*process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters*" (S1). Section 21 of the Regulations details steps to be taken during a given public consultation process and these have been used in guiding the process.

Formal public involvement has taken place via public consultations and focal meetings, newspaper announcements to inform the public that such a large-scale project is under consideration. The public consultation process has been guided by the requirements of Environmental Management Act (EMA) No. 7 of 2007 and the process has been conducted in terms of regulation 7(1) as well as in terms of the EMA Regulations of GN 30 of 6 February 2012.

Its overriding goals have been to ensure transparency in decision-making and to.

- ✓ Ensure stakeholder concerns are incorporated in project design and planning;
- ✓ Increase public awareness and understanding of the project and
- ✓ Enhance positive development initiatives through the direct involvement of affected people.

The objective of public participation is to build credibility through instilling integrity and conducting the EIA, Educate the stakeholders on the process to be undertaken and opportunities for their involvement, and build stakeholders by establishing an agreed framework accordingly. This requires accessible, fair, transparent, and constructive participation at every stage of the process. Inform stakeholders on the proposed project and associate issues, impacts, and mitigation and use the most effective manner to disseminate information.

In this section of the report, the results of consultations with various classes of stakeholders are summarized. The results of consultations with other stakeholders and community members who took part in this EIA are attached as Appendices.

The consultation was facilitated through the following means:

- ❖ A Background Information Document (BID) containing the project description, the EIA process, and an invitation to participate was shared with stakeholders and community members.

- ❖ Invitation to participate notices were published in the local newspapers (e.g. Confidante) as shown in Table 4.1 below and Appendix A of this document.
- ❖ Announcement of the EIA process verbally in the common public meeting points.
- ❖ Placement of public notice at the project site and town center.

Table 4-1: Details of public notification of the EIA study

Method	Area of Distribution	Language	Date Placed
The Confidante	Country Wide	English	18 – 29 March 2024
Windhoek Observer	Coutry Wideu		18 – 29 March 2024
Site notices	Arandis Town	English	1 – 4 April 2024
Public Meeting	Hermanus Van Wyk Hall, Rehoboth	English,	5 April 2024 14h00pm

The photos below show the public consultation notice that was placed for the project. Also shown are photos that were taken during the site visits as well as the public meeting.

Figure 4-1: EIA Public Meeting Public Notice (at project site & in and around Arandis town)

Figure 4-2: Public Meeting Preparations

- ✓ *Key Stakeholder Engagement Meeting*

A public meeting was organised on Friday 5th April 2024 14h00 pm. Proof of public consultation is given in Appendix A of this document as well the attendance register explaining the project and the EIA study. Given below are the details of the meeting which was held:

- ✓ *Identification of Interested and Affected Parties (I&APs)*

The EIA team identified and consulted the following I&APs & key stakeholders for the proposed project:

- ❖ Arandis Town Council
- ❖ NAMPOWER
- ❖ CENORED
- ❖ Community Members.

Other I&APs were allowed to register to the EIA team and compiled a database containing their names and correspondence details. The registration was accomplished over a period of 14 days.

- ✓ *Consultation with Stakeholders*

Experts in relevant fields, leaders of thought in environmental matters, Organs of the State, local communities have been consulted for their opinions on issues relating to the potential ecological and socio-economic impacts of the proposed project. This provided an opportunity for stakeholders and the public at large to engage in the process and to make comments or express their concerns regarding the proposed development.

Table 4-2: Key findings of the public consultation process

SUMMARY OF ISSUES	
THEME	**ISSUE**
Economic	▪ Employment of general labour must consider employing local people from Rehoboth. ▪ The company must take the social responsibility in Rehoboth. ▪ Improve the life being of the local residents.
Health and Safety	▪ Waste management concerns including both solid waste and wastewater. ▪ Potential air, noise and water pollution due to development. ▪ The company must provide enough health care to employees
Ecological	▪ Concerns regarding impacts on and conservation of natural vegetation. ▪ Limited cutting down of trees should be observed by the construction company ▪ Resources such as air and water should not be polluted during operations because communities, wild animals and livestock rely on these resources.
Communication	▪ Clear communication needs to be promoted between relevant authorities and the local community.

5 CHAPTER FIVE: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

5.1 OVERVIEW

The proponent recognizes the importance of undertaking the project operation in line with sustainable development objectives and applicable legal requirements. To this end an Environmental Management Plan (EMP) for the project is being developed in order to address negative environmental impacts and enhance positive impacts. The EMP takes into account identification of potential impacts, assessment of the significance of the risks associated with these impacts and the establishment of preventive actions as well as mitigation measures. The EMP will be monitored, reviewed, and updated as necessary with the aim of continuous improvement, taking into account various changes in project operations, the biophysical environment and socio-economic circumstances.

5.2 ASSESSMENT OF IMPACTS

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

Table 5-1: Assessment Criteria

Duration – What is the length of the negative impact?	
None	No Effect
Short	Less than one year
Moderate	One to ten years
Permanent	Irreversible
Magnitude – What is the effect on the resource within the study area?	
None	No Effect
Small	Affecting less than 1% of the resource
Moderate	Affecting 1-10% of the resource
Great	Affecting greater than 10% of the resource
Spatial Extent – what is the scale of the impact in terms of area, considering cumulative impacts and international importance?	
Local	In the immediate area of the impact
Regional / National	Having large scale impacts
International	Having international importance
Type – What is the impact	

Direct	Caused by the project and occur simultaneously with project activities
Indirect	Associated with the project and may occur at a later time or wider area
Cumulative	Combined effects of the project with other existing / planned activities
Probability	
Low	<25%
Medium	25-75%
High	>75%

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

Table 5-2: Impact Significance

Class	Significance	Descriptions
1	Major Impact	Impacts are expected to be permanent and non-reversible on a national scale and/or have international significance or result in a legislative non- compliance.
2	Moderate Impact	Impacts are long term, but reversible and/or have regional significance.
3	Minor	Impacts are considered short term, reversible and/or localized in extent.
4	Insignificant	No impact is expected.
5	Unknown	There are insufficient data on which to assess significance.
6	Positive	Impacts are beneficial

(Adopted from ECC-Namibia, 2017)

Table 5-3: Environmental Impacts and Aspects Assessment

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure
TOPOGRAPHY	Landscape Scenery	Visual aesthetic impact	Construction and Operation	Moderate	Moderate	Local	Direct	Medium 25 - 75%	Minor	PV Plant & Transmission line
SOIL	Soil	Contamination to soil from waste disposal	Construction and Operations	Moderate	Small	Local	Direct	Low <25%	Minor	PV Plant
	Soil	Spillages of fuel, oil and lubricants.	Construction	Short	Small	Local	Direct	Low <25%	Minor	PV Plant & Transmission line
	Soil	Erosion	Operations	Moderate	Small	Local	Direct	Low <25%	Minor	PV Plant & Transmission line
LAND CAPABILITY	Terrestrial ecology and aquatic ecosystems	Change in land use	Construction and Operations	Permanent	Great	Local	Direct	Low <25%	Moderate	PV Plant
	Carrying capacity	Increase in human activities in the environment	Construction and Operations	Moderate	Moderate	Regional	Direct	Medium 25 - 75%	Moderate	PV Plant & Transmission line
WATER	Surface water quality	Water pollution from oils and lubricants from	Construction and Operations	Moderate	Moderate	Local	Direct	Medium 25 - 75%	Moderate	PV Plant and Transmission line

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure
		vehicles and machinery.								
	Surface water quality	Turbidity and high sediment load	Construction	Moderate	Small	Local	Direct	Low <25%	Moderate	PV Plant
	Soil, Vegetation, Infrastructure	Flooding	Construction& Operation	Permanent	Moderate	Local	Direct	Medium 25 - 75%	Moderate	PV Plant
AIR QUALITY	Air Quality	Construction phase dust	Construction	Short	Small	Local	Direct	Low <25%	Minor	PV Plant
WASTE	Groundwater quality	Hazardous waste such as waste oil and lubricants.	Construction and Operations	Short	Small	Local	Direct	Low <25%	Minor	PV Plant
	Surface water quality	Threatened from plant stormwater discharge into the river.	Construction and operations	Moderate	Moderate	Regional	Direct	Medium 25 - 75%	Moderate	PV Plant
	Topography and Landscape	Visual impacts due to use of unsustainable disposal methods	Construction and Operations	Short	Small	Local	Direct	Low <25%	Minor	PV Plant and transmission line
FAUNA	Terrestrial ecology and biodiversity	Loss of habitat and driving away of local animals and	Construction and Operations	Moderate	Moderate	Local	Direct	High >75%	Minor	PV Plant& Transmission line

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure
		aquatic animal species								
	Avifauna	Bird electrocution, and physical crashes	Operations	Moderate	Small	Local	Direct	Low <25%	Minor	Transmission line
	Aquatic life	Antifouling paints	Operations	Moderate	Small	local	Direct	Low <25%	Minor	PV Plant
	Terrestrial ecology and biodiversity	Destruction of vertebrate fauna (e.g. road kills; fence and powerline mortalities)	Construction and Operations	Long	Moderate	Local	Direct	Low <25%	Minor	PV Plant & Transmission line
FLORA	Terrestrial ecology and biodiversity	Proliferation of invasive species inland	Construction and Operations	Long	Moderate	Local	Direct	High >75%	Moderate	PV Plant & Transmission line
	Terrestrial ecology and biodiversity	Illegal collection of firewood	Construction and Operations	Long	Moderate	Local	Direct	Low <25%	Minor	PV Plant & Transmission line
	Terrestrial ecology and biodiversity	Loss of unique flora and special habitats in the local environment	Construction and operations	None	Small	Local	Direct	Low <25%	Moderate	PV Plant & Transmission line

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure
		because of general nuisance and animal migrate.								
	Terrestrial ecology and biodiversity	Uncontrolled fires	Construction	Long	Great	Regional / National	Direct	Low <25%	Major	PV Plant & Transmission line
SOCIAL	Noise Pollution	Increased noise levels	Construction and operations	Moderate	Small	Local	Direct	Low <25%	Minor	PV Plant & Transmission line
	Socio Economic Activities	Temporary and permanent employment prospects.	Construction and operations	Long	Moderate	Regional	Direct	Medium 25 – 75%	Positive	PV Plant & Transmission line
	Socio Economic Activities	Climate change impacts	Operations	Long	Moderate	Regional / National	Direct	High >75%	Positive	PV Plant & Transmission line
	Contribution to National Economy	Employment, local procurement, duties and taxes.	Construction and Operations	Short	None	Regional / National	Direct	Low <25%	Positive	PV Plant & Transmission line

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance	Infrastructure
Heritage/Archaeology	Graves, artefacts, archaeological high value components	Destruction or affecting heritage, paleontological and archaeological artefacts	Construction and Operation	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate	PV Plant & Transmission line
HEALTH AND SAFETY	Health Sanitation	Poor ablution and waste management facilities may be detrimental to human health.	Construction and Operation	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate	PV Plant & Transmission line
	Property and human life	Electrocution, fires resulting in fatalities, damage to properties, veldt fires and power surges.	Construction and Operation	Moderate	Great	Local	Direct	Medium 25 – 75%	Major	PV Plant & Transmission line