



Submitted to: Paratus Telecommunications (Pty) Ltd
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FINAL ESIA REPORT:

THE PROPOSED CONSTRUCTION AND OPERATION OF A BASE TRANSCEIVER STATION (BTS) TOWER AND ASSOCIATED INFRASTRUCTURE FOR PARATUS TELECOMMUNICATIONS (PTY) LTD ON ERF 886, LÜDERITZ, !KARAS REGION, NAMIBIA

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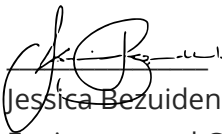
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ABBREVIATIONS

Abbreviation	Description
°	degree
°C	degree celcius
%	percentage
3G/4G	third and fourth generation technology
AERPA	Atomic Energy & Radiation Protection Authority
BID	background information document
BTS	base transceiver station
cd	Candela - unit for light intensity
CIA	cumulative impact assessment
cm	centimetre
CRAN	Communication Regulatory Authority of Namibia

Abbreviation	Description
DEAF	Department of Environmental Affairs and Forestry
E	east
EAP	environmental assessment practitioner
EC	Environmental Commissioner
ECC	Environmental Compliance Consultancy (Pty) Ltd
ECS	Electronic Communications Service
ECNS	Electronic Communications Network Service
EMA	Environmental Management Act, No. 7 of 2007
ESMP	environmental and social management plan
EMF	electromagnetic field
EMR	electromagnetic radiation
Erf	A piece of land or plot within a residential or commercial area. The number assigned to a specific plot of land helps to distinguish one plot from another for the purpose such as ownership, property taxes and planning.
ESIA	environmental and social impact assessment
FCC	Federal Communications Commission
GDP	gross domestic product
GHz	gigahertz
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
I&APs	interested and affected parties
i.e.	that is
IBA	Important Bird Area
ICNIRP	International Commission on Non-Ionising Radiation Protection
IFC	International Finance Corporation
Km	kilometre
kHz	kilohertz
Km ²	kilometre square
km/h	kilometre per hour
LTE	Long-Term Evolution
Ltd.	limited
m ²	square metre
m	metre
MEFT	Ministry of Environment, Forestry and Tourism
MJ/kg	megajoules per kilogram
MHz	megahertz
MICT	Ministry of Information, Communications and Technology
mm	millimetre
MoHSS	Ministry of Health and Social Services
MTC	Mobile Telecommunications Company
Namport	Namibia Port Authority
NamWater	Namibia Water Corporation
NCCA	Namibia Civil Aviation Authority

Abbreviation	Description
NDP	National Development Plan
NHC	National Heritage Council
NSA	Namibia Statistics Agency
NSRs	noise sensitive receptors
No.	number
OLS	obstacle limitation surfaces
PHC	primary healthcare
Paratus	Paratus Telecommunications (Pty) Ltd
PPE	personal protective equipment
Pty	proprietary
RF	radiofrequency
RoD	record of decision
RF-EMF	radiofrequency – electromagnetic fields
S	south
SAR	Specific Absorption Rate
SSE	south southeast
SWAN	Software-defined Wide Area Network
RoD	record of decision
UNICEF	United Nations Children's Emergency Fund
VAT	value added tax
W	watts
WHO	World Health Organisation
W/m ²	watts per square meter

1 INTRODUCTION

1.1 COMPANY BACKGROUND

Environmental Compliance Consultancy (Pty) Ltd (ECC) has been engaged by Paratus Telecommunications (Pty) Ltd (hereto referred to as the Proponent or Paratus) as the environmental assessment practitioner (EAP) to undertake an environmental and social impact assessment (ESIA) and develop an environmental and social management plan (ESMP) (Appendix A) for the proposed construction and operation of a base transceiver station (BTS) tower and associated infrastructure on Erf 886, Lüderitz, in the !Karas Region, Namibia. The ESIA study is undertaken in terms of the Environmental Management Act No. 7 of 2007 (EMA) and its 2012 Regulations. ECC determined, as per Section 32 (1) of the EMA that the Ministry of Information, Communication and Technology (MICT) is the competent authority for the proposed Project. However, the application for the environmental clearance certificate will be submitted to the Ministry of Environment, Forestry and Tourism (MEFT) for a record of decision (RoD).

Paratus Telecommunications (Pty) Ltd is a multi-national organisation and one of Africa's largest privately owned pan-African network operator. Paratus provides reliable, scalable satellite services and unlimited internet access to both business operators and residential customers. As such, Paratus is committed to expanding its services through on-going infrastructure development and advanced network service initiatives. During operations, the consumers will have access to advanced fibre, wireless, satellite services and software-defined wide area network (SWAN) solutions.

The BTS tower will be built at a height of 30 m to ensure effective transmission and reception of telecommunication service signals for all consumers. Overall, the proposed Project will aim to enhance communication services by broadening network coverage, improve internet connectivity and boost telecommunication access for Lüderitz residents, local and commercial businesses operators, schools and healthcare facilities.

Lüderitz is a coastal harbour and mining town in southwestern Namibia. The town boundaries have been rezoned for residential and commercial development, while the areas beyond are within the Tsau //Khaeb National Park (formerly Sperrgebiet National Park) are reserved for ecological, conservation and tourism related activities. As a results of the park's ecological significance, and rich biodiversity, the park is recognised as one of the world's top 25 biodiversity hotspots. However, with increasing pressure from modern development, the MEFT in collaboration with local conservationists actively oversee and regulate tourism practices in the park to ensure such activities do not compromise the park 's unique ecological balance. The Project site is situated within in Lüderitz's general industrial area, along the northern boundary of the town (Figure 1).

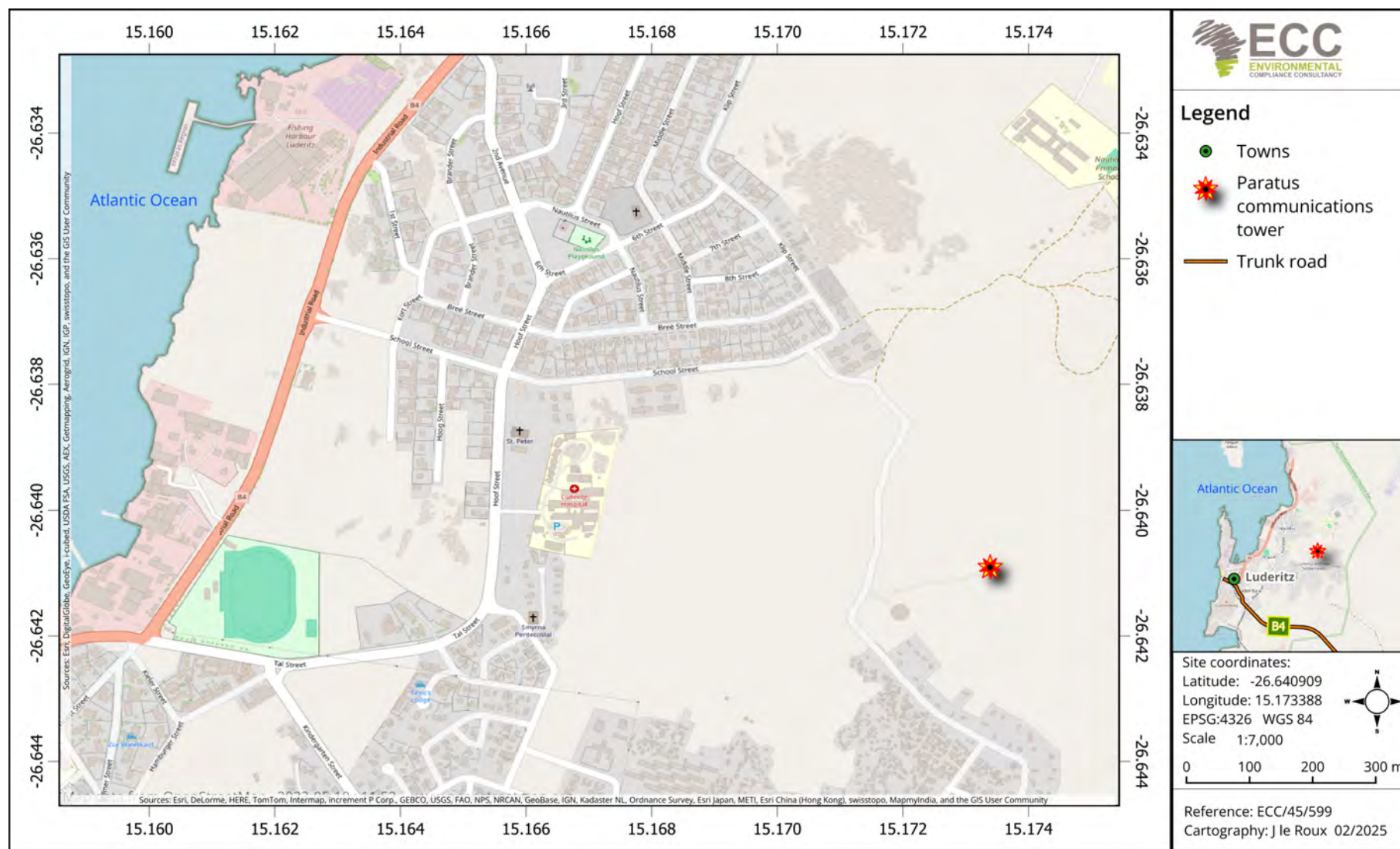


Figure 1 - Location of the proposed Project site

1.2 THE PROPONENT'S DETAILS

The Proponent's details are provided in Table 1.

Table 1 - Proponent's details

Company representative:	Contact details:
Mr. Edward Esterhuyse	Paratus Telecommunication (Pty) Ltd P O Box 90140, Klein Windhoek basie.esterhuyse@paratus.africa Tel: +264 83 300 1000

1.3 ENVIRONMENTAL AND SOCIAL PRACTITIONER

Environmental Compliance Consultancy (Pty) Ltd (ECC) (Reg. No. 2022/0593) has prepared this ESIA report and the ESMP on behalf of the Proponent.

This report has been authored by ECC employees with no material interest in the report's outcome, ECC maintains independence from the Proponent and has no financial interest in the Project apart from fair remuneration for professional fees. Payment of fees is not contingent on the report's results or any government decision. ECC members or employees are not, and do not intend to be, employed by the Proponent, nor do they hold any shareholding in the Project. Personal views expressed by the writer may not reflect ECC or its client's views. The environmental report's information is based on the best available data and professional judgment at the time of writing. However, please note that environmental conditions can change rapidly, and the accuracy, completeness, or currency of the information cannot be guaranteed.

All compliance and regulatory requirements regarding this report should be forwarded by email or posted to the following address:

Environmental Compliance Consultancy (Pty) Ltd.
P O Box 91193, Klein Windhoek, Namibia
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1.4 PURPOSE OF THE SCOPING REPORT

This scoping with impact assessment report summarises the prescribed ESIA process to be followed, provides information on the baseline biophysical and socio-economic environments, Project description and details, identify and assess potential impacts, whether positive or negative and their relative significance, explore alternatives for technical recommendations and identify appropriate mitigation measures.

The scoping with impact assessment report provides information to the public and stakeholders to aid in the decision-making process for the proposed Project by the competent authority and MET. The objectives are to:

- Describe in depth the proposed activity and the site on which the activities are to be undertaken;
- Describe the baseline environment that may be affected by the proposed activities;
- Identify the relevant laws, legislation and guidelines that have been considered in the assessment and preparation of this report;
- Provide details of the public consultation process;
- Provide a high-level analysis of feasible or unfeasible alternatives that were considered; and
- Provide an assessment of potential impacts identified.

This scoping with impact assessment report is submitted to the Ministry of Information, Communication and Technology (MICT), as the competent authority and the Ministry of Environment, Forestry and Tourism (MEFT) – Department of Environmental Affairs and Forestry (DEAF) for review and record of decision on the application for the environmental clearance certificate. MEFT deals with applications for environmental clearance certificates and has determined that an environmental and social management plan (ESMP) be developed to provide a management framework for the planning and implementation of the proposed Project. The ESMP provides development standards and commitments to ensure that the identified potential environmental and social impacts are minimised, mitigated, prevented, and/or enhanced as far as reasonably practicable, and that statutory requirements and other legal obligations are fulfilled.

1.5 ENVIRONMENTAL REQUIREMENTS

The EMA and its 2012 Regulations stipulates that an environmental clearance certificate is required before undertaking any of the listed activities that are identified in the Act and its Regulations. Potential listed activities triggered by the Project are provided in Table 2.

Table 2 - Listed activities triggered by the Project

Listed activity	As defined by the regulations of the Act	Relevance to the Project
Infrastructure	(10.1) The construction of: (g) Communication networks, including towers, telecommunication lines and cables. (j) Masts of any material type and of any height, including those for telecommunication, broadcasting and radio transmission.	- A 30 m BTS tower and associated infrastructure will be constructed. - The Project activities will include developing a staging area, surface preparation, levelling and establishing a storage and stockpiling area for materials and equipment. - Key activities will include assembling tower materials, installing cables, wiring, casting concrete for the foundation, commissioning transmitters and erecting a perimeter security fence. - An inspection and maintenance plan will be developed for operations to enhance the performance of the tower over time, which will guarantee consistent provision of reliable network services during operations.

2 APPROACH TO THE ASSESSMENT

2.1 PURPOSE AND SCOPE OF THE ASSESSMENT

This assessment aims to determine which Project impacts are likely to be significant. The available data is scoped to identify any gaps that need to be filled, enabling a determination of the spatial and temporal scope; and to identify the assessment methodology to be used.

The scope of the assessment was determined by undertaking a preliminary assessment of the proposed Project against the receiving environment. This evaluation included a desktop review of available site-specific literature and a site verification visit.

2.2 THE ASSESSMENT PROCESS

The ESIA methodology applied in this assessment has been developed using the International Finance Corporation (IFC) standards and models, in particular, Performance Standard 1, 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2017) (International Finance Corporation, 2012), which establishes the importance of:

- Integrated assessment to identify the environmental and social impacts, risks, and opportunities of Projects;
- Effective community engagement through disclosure of Project-related information and consultation with local communities on matters that directly affect them; and
- The Proponent's management of environmental and social performance throughout the Project's lifecycle.

Furthermore, the Namibian Draft Procedures and Guidance for ESIA and EMP (Republic of Namibia, 2008), as well as international and national best practice, and over 35 years of combined ESIA experience, were also drawn upon in the assessment process. This impact assessment is a formal process in which the potential impacts of the Project on the biophysical, social and economic environments are identified, assessed and reported, so that the significance of potential impacts can be taken into account when considering whether to grant approval, consent or support for the proposed Project. The process followed, through the assessment, is illustrated in Figure 2.

2.3 SCREENING OF THE PROJECT

The first stages in the ESIA process are to register the Project with the DEAF/MEFT and to undertake a screening exercise to determine triggered listed activities under the Environmental Management Act, No. 7 of 2007 and its Regulations of 2012. The location, scale and duration of Project activities were considered against the receiving environment.

The proposed Project is a listed activity and potential impacts could occur. Thus, it was concluded that a scoping report, with an impact assessment, is required for Project and that an ESMP should be developed and submitted with the scoping report, as part of the application process for the environmental clearance certificate.

1. Project screening	2. Establishing the assessment scope	3. Baseline studies
Complete	Complete	Complete
The first stages in the ESIA process are to undertake a screening exercise to determine whether the Project triggers listed activities under the Environmental Management Act, 2007, and its Regulations. The screening phase of the Project is a preliminary analysis, in order to determine ways in which the Project might interact with the biophysical, social, and economic environments. Stakeholder engagement: • Registration of the project; and • Preparation of the BID.	Where an ESIA is required, the second stage is to scope the assessment. The main aim of this stage is to determine which impacts are likely to be significant; to scope the available data and any gaps that need to be filled; to determine the spatial and temporal scope; and to identify the assessment methodology. The scope of this assessment was determined through undertaking a preliminary assessment of the proposed Project against the receiving environment. The following environmental and social topics were scoped into the assessment, as there was the potential for significant impacts to occur. Impacts that are identified as potentially significant during the screening and scoping phase are taken forward for further assessment in the ESIA process. These are: SOCIOECONOMIC ENVIRONMENT • Employment • Visual • Competition with other service providers • Noise • Air quality (dust) • Cumulative radiological impacts • Revenue to the government • Occupational health and safety • Archaeological impacts BIOPHYSICAL ENVIRONMENT • Avifauna • Soil	A robust baseline is required, in order to provide a reference point against which any future changes associated with a Project can be assessed, and to allow suitable mitigation and monitoring to be identified. The region and general area have been studied for various projects and assessments. The available literature will be referenced. The Project site-specific area has been studied as part of the ESIA process, and the following has been conducted as part of this assessment: • Desktop studies; • Specialist study on cumulative radiological impacts; • Site verification; and • Consultation with stakeholders. The environmental and social baselines are provided chapter 5 of this report.

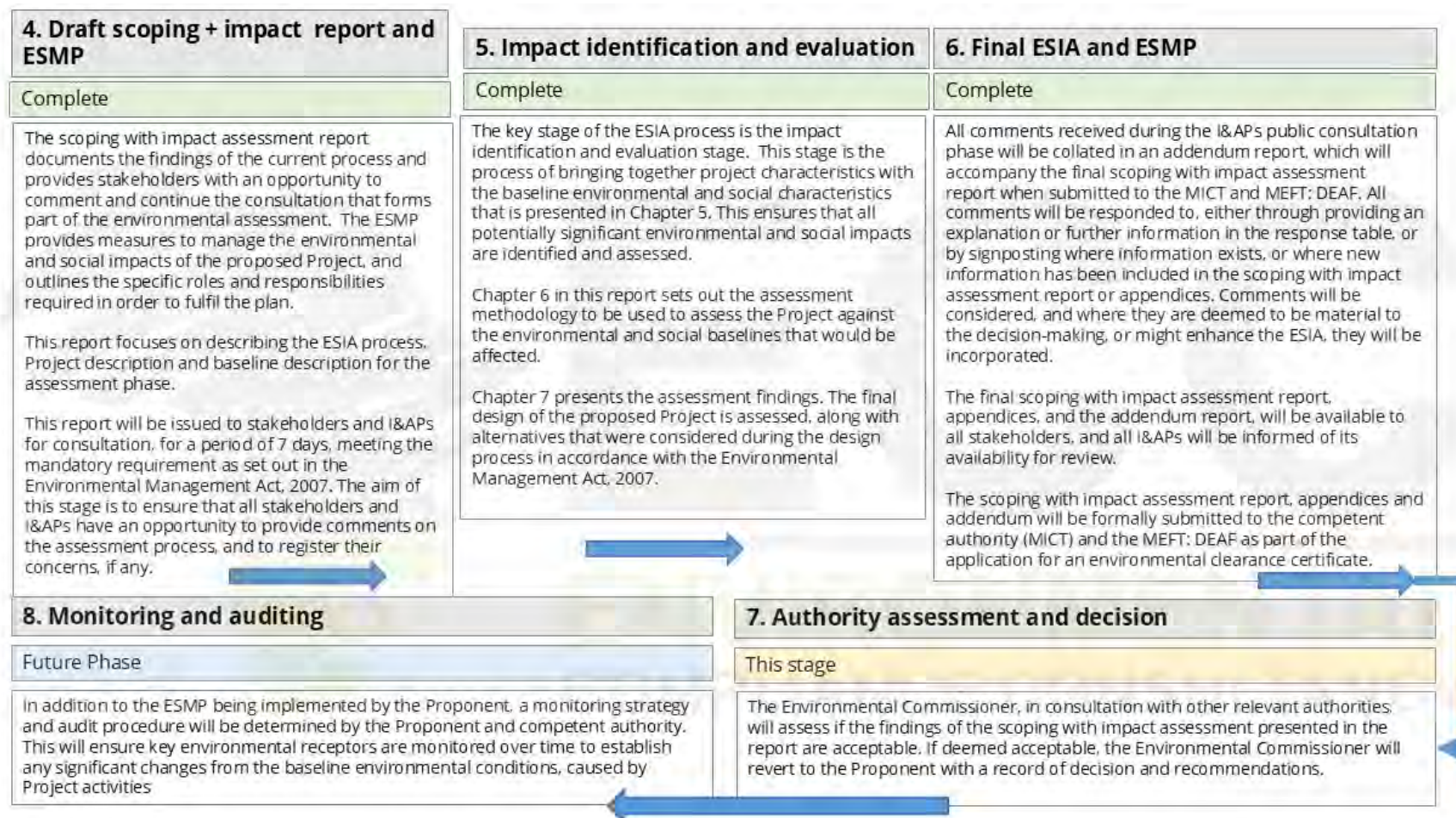


Figure 2 - ECC's ESIA flowchart

2.4 SCOPING AND THE ENVIRONMENTAL ASSESSMENT

Where a detailed assessment is required, the second stage is to scope the assessment. The main aims of this stage are to determine which impacts are likely to be significant; scope the available data and any gaps which need to be filled; determine the spatial and temporal scope and identify the assessment methodology.

The scoping phase of the Project is a preliminary analysis to determine ways in which the Project interacts with the biophysical, social and economic environment. Potential impacts are identified, and the significance is assessed during the screening and scoping phase. Feedback from consultation with the Proponent informs the analysis of the impacts. The ESIA methodology and outcome of the impact assessment are discussed in Chapter 6 and 7 of this report, respectively. The following environmental and social aspects were considered during the initial impact assessment screening phase and their significance were rated in relation to the proposed scope of work:

BIOPHYSICAL ENVIRONMENT

- Ground water;
- Surface water;
- Soils and geology;
- Fauna;
- Avifauna; and
- Flora.

SOCIO-ECONOMIC ENVIRONMENT

- Competition with local service providers;
- Viewshed of the Project area;
- Occupational health and safety;
- Ambient noise;
- Cumulative radiological impacts;
- Air quality (dust);
- Employment opportunities;
- Archaeological impacts; and
- Revenue to the government.

2.5 BASELINE STUDIES

Baseline studies are undertaken as part of the scoping stage, which involves collecting all pertinent information from the status of the receiving environment. This provides a baseline against which changes that occur as a result of the proposed Project can be measured.

For the proposed Project, baseline information was obtained through a desktop study, focusing on environmental receptors that could be affected by the proposed Project, and verified through a site verification visit. The baseline information is covered in Chapter 5.

2.6 THE STUDY AREA

The ESIA study area has been defined according to the geographic scope of the receiving environment and potential impacts that could arise as a result of the proposed Project. The receiving environment is a summary term of the biophysical and socioeconomic environment, as described in Chapter 5 (baseline environment). As shown in Figure 1, the Project site lies within the townland boundaries. The administration, planning, and environmental management of the town are overseen by the Lüderitz Town Council, which serve as the responsible authority for these functions.

2.7 PUBLIC CONSULTATION

Public participation and consultation are a requirement stipulated in Section 21 of the Environmental Management Act, 2007 and its Regulations, for a project that requires an environmental clearance certificate. Consultation is a compulsory and critical component of the ESIA process for achieving transparent decision-making and can provide many benefits. Consultation is ongoing during the entire ESIA process.

The objectives of the public participation and consultation process are to:

- Provide information on the Project, and introduce the overall Project concept and plan in the form of a background information document (BID) (provided in Appendix B);
- Determine the relevant government, regional and local regulating authorities;
- Listen to and understand community issues, record comments and questions;
- Explain the ESIA process and timeframes involved; and
- Establish a platform for ongoing consultation.

Public consultation for the Project commenced on 13 March 2025. The Project was advertised in the local newspapers, and the public was invited to register as interested and affected parties (I&APs).

The advertisements for the public meeting were placed in the following newspapers on 24 March 2025 and 31 March 2025, respectively.

- The Republikein;
- The Namibian Sun; and
- Allgemeine Zeitung.

The public consultation process and related records are discussed in detail in the public consultation document presented in Appendix C.

The draft scoping with impact assessment report (this report) and preliminary ESMP was issued to the registered I&APs from 11 June 2025 to 18 June 2025 (seven (7) days review and commentary period) in terms of Section 23 (2) of the EMA Regulations. No comments were received during the public review period.

2.7.1 IDENTIFICATION OF KEY STAKEHOLDERS AND INTERESTED AND AFFECTED PARTIES (I&APS)

A stakeholder mapping exercise was undertaken to identify individuals or groups of stakeholders and the method in which they will be engaged during the ESIA process. Stakeholders were approached through direct communication (letters and phone calls), the national press, site notices and directly via email.

A summarised list of stakeholders that were engaged during the public consultation process is provided below:

- Lüderitz Town Council;
- !Karas Regional Council;
- Department of Environment Affairs and Forestry (DEAF);
- Ministry of Information, Communication and Technology (MICT);
- Ministry of Health and Social Services (MoHSS);
- Communications Regulatory Authority of Namibia (CRAN);
- National Radiation Protection Authority (NRPA);
- Namibia Civil Aviation Authority (NCAA);
- Cellular network providers (i.e. Mobile Telecommunications Company (MTC) and Telecom Namibia Ltd); and
- The general public with an interest in the Project.

Records of the public consultation process in the form of a summary report and a list of interested and affected parties (I&APs), evidence of consultation, including minutes of the public engagement meeting, advertisements in national newspapers and a summary of the comments and questions raised by the public are provided in the public consultation document presented in Appendix C.

2.7.2 SUMMARY OF ISSUES RAISED

A public meeting was held on 01 April 2025 in Lüderitz to engage the I&APs and record all comments and inputs to enhance the impact assessment process. A summary of the comments and concerns raised by the I&APs are discussed in detail in the public consultation document (Appendix C). From the engagements held, the following key issues were raised by the I&APs:

- Low residents' attendance and engagement in the ESIA process;
- Visual impacts regarding alteration of the landscape and diminished sense of place;
- Partnership with MTC for shared tower infrastructure; and
- Cumulative electromagnetic radiation from two telecommunication towers.

3 REVIEW OF THE LEGAL ENVIRONMENT

3.1 RELEVANT NATIONAL LEGISLATION

This chapter outlines the regulatory framework applicable to the proposed Project. A review of relevant legislation has been conducted to identify the applicable laws, policies and guidelines that aligns with the proposed Project. As stated in Chapter 1, an environmental clearance certificate is required for any activity listed in Government Notice No. 29 of 2012 of the EMA. Compliance to the relevant laws and regulations will ensure that proposed Project activities do not violate fundamental human rights or adversely affect the environment or the welfare of the community.

Table 3 outlines the relevant legal requirements specific to the Project and Table 4 lists specific permits that will be required for the Project.

3.2 RELEVANT NATIONAL POLICIES AND PLANS

Table 3 - Details of the regulatory framework as it applies to the Project

National regulatory framework/ policies/ plans	Summary	Applicability to the Project
Constitution of the Republic of Namibia (1990)	The constitution defines the country's position in relation to sustainable development and environmental management. The constitution refers that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at the following: <i>"Maintenance of ecosystems, essential ecological processes and biological diversity of Namibia, and the utilisation of living, natural resources on a sustainable basis for the benefit of all Namibians, both present, and future."</i>	The Proponent commit to the sustainable use of the environment and has aligned its corporate mission, vision, and objectives with the Constitution of the Republic of Namibia.
Communication Act, No. 8 of 2009 and relevant regulations, subject to the regulations regarding licences as published in the Government Gazette Notice No. 308 of 2012	The Act provides for the regulation of telecommunications services and networks, broadcasting, postal services and the use and allocation of radio spectrum; the establishment of an independent Communication Regulatory Authority of Namibia (CRAN); to make provision for its powers and function; the granting of special rights to telecommunication licences; the creation of an association to manage the internet domain namespace and for matters connected therewith.	The Proponent shall comply with the provisions of the Act and relevant regulations by ensuring that the relevant licences are acquired prior to Project development.

National regulatory framework/ policies/ plans	Summary	Applicability to the Project
Regional Council Act No. 22 of 1992	The Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. Regional Councils are authorised under Section 28 of the Act to undertake the planning of the development of the region for which it has been established with a view of physical, social, and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation patterns and sensitivity of the natural environment.	The !Karas Regional Council office and the Lüderitz Town Council, along with stakeholders holding various management roles, will be engaged throughout the ESIA process.
Local Authority Act No. 23 of 1992	The Act provides for the determination of local government, local authority council, the establishment of such local authority councils, their powers and functions. The Act also provides measures regarding incidental matters.	Erf 886 falls within the townland's masterplan. Other key stakeholders and interested and affected parties (I&APs) will be engaged throughout the ESIA process.
Diamond Act No. 13 of 1999	The Act provides for the establishment of the Diamond Board of Namibia and assigns powers, function and duties of this board. The Act regulates the diamond industry in Namibia.	Lüderitz was historically a diamond mining area, and minerals of varying value may be discovered within the Project area. The Proponent will adhere to the requirement of the Act throughout the Project lifecycle.

National regulatory framework/ policies/ plans	Summary	Applicability to the Project
Public and Environmental Health Act No. 1 of 2015	The Act provides with respect to matters of public health in Namibia. The objectives of the Act are: (a) promote public health and well-being, (b) prevent injuries, diseases and disabilities, (c) protect individuals and communities from the public health risks, (d) encourage community participation in order to create a healthy environment, and (e) provide for early detection of diseases and public health risks.	The Proponent is cognisant of the provisions of the Act and is committed to explore and utilise the best available technologies to safeguard individuals and communities from public health hazards and risks.
Environmental Management Act, (No. 7 of 2007) and its 2012 Regulations, including the Environmental Impact Assessment Regulation, 2007 (No. 30 of 2012)	The Act aims to promote sustainable management of the environment and use of natural resources. The Act requires certain activities to obtain an environmental clearance certificate prior to Project development. The Act states that an ESIA should be undertaken and submitted as part of the environmental clearance certificate application process. The MEFT is responsible for the protection and management of Namibia's natural environment. The Department of Environmental Affairs and Forestry (DEAF), under the MEFT, is responsible for the administration of the EIA process.	The ESIA process has been undertaken in line with the requirements of the Act and its Regulations. This scoping (with impact assessment) report documents the findings of the environmental and social assessment undertaken for the proposed Project. The ESMP discusses mitigation measures aimed at ensuring that potential impacts are effectively mitigated, managed, minimised and monitored.

National regulatory framework/ policies/ plans	Summary	Applicability to the Project
Soil Conservation Act, No. 76 of 1969	The Act makes provision for the prevention and control of soil erosion, and for the protection, improvement, and conservation of soil and vegetation.	The Project site is in a disturbed environment and the Project footprint is relatively small (approximately 100 m ²). It is anticipated that there will be minimal disturbance to the soil profile and horizon during surface preparation.
The Atomic Energy and Radiation Protection Act No. 5 of 2005	This Act provides for adequate protection of the environment and people in current and future generations 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 material, and controlling and regulating prescribed non-ionising radiation sources.	The proposed Project has the potential to emit minimal non-ionising radiation. The impact is discussed in detail in chapter 7 of this report.
National Heritage Act No. 27 of 2004	The Act provides for the protection and conservation of places and objects with heritage significance. Section 55 compels Proponent's to report any archaeological findings to the National Heritage Council (NHC). Section 9 authorises the NHC to issue a consent, subject to any conditions that the Council deems necessary.	Heritage artefacts buried in the subsurface may be discovered or unearthed during site preparation. The relevant regulations stipulated in the Act will be adhered to. The chance find procedure will be incorporated in the ESMP.

National regulatory framework/ policies/ plans	Summary	Applicability to the Project
Guidelines for Limiting Exposure Time - Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz). The guidelines are developed by the International Commission on Non-Ionising Radiation Protection (ICNIRP).	ICNIRP provides international standards and guidelines for limiting adverse effects of non-ionising radiation on human health and well-being, and, where appropriate, provides scientifically bases advise on non-ionising radiation protection including the provision of guidelines on limiting exposure. The ICNIRP publication assessed all health risks to both the public and workers.	A comprehensive assessment will be conducted to evaluate the potential impacts of electromagnetic radiation on nearby residents, employees and the broader community.

3.3 PERMITS AND LICENCES FOR THE PROJECT

Table 4 - Permit/licence(s) required for the Project

Permit or licence	Related activity requiring a permit/licence	Relevant authority	Validity
Environmental clearance certificate	Required for any listed activities in terms of the EMA and its Regulations of 2012.	Ministry of Environment, Forestry and Tourism (MEFT)	Three (3) years
Land lease agreement of Erf 886	Required for the lease of land. The lease agreement is granted by the Lüderitz Town Council.	Lüderitz Town Council	11 months, with the option to renew on an annual basis (Appendix D)
Class Comprehensive Telecommunications Service License (ECS & ECNS)	The license allows the licensee (Proponent) to own, operate a network and provide services to customers.	Communications Regulatory Authority of Namibia (CRAN)	Five (5) years
Spectrum Use Licences	The licence is complementary to the licence required to operate a network or to provide telecommunications or broadcasting services.	Communications Regulatory Authority of Namibia (CRAN)	One (1) year

4 PROJECT DESCRIPTION

4.1 PROJECT DESCRIPTION

The Proponent has secured a land lease agreement from the Lüderitz Town Council to construct and operate a 30 m BTS tower (a lattice self-supporting steel structure), along with associated infrastructure on Erf 886. The land lease agreement is valid until November 2025 and may be renewed on an annual basis (Appendix D). The BTS will have high-performing equipment, including 3G/4G/LTE Access Power Solutions APS6-400 Series, point-to-point microwave antenna, the FibeAir IP-20G radio, panel antennas and the Air Harmony 4000/4200/4400 systems. These systems will significantly improve the transmission and reception of telecommunication signal, thereby improving network services for residents, business operators, education and healthcare institutions.

4.2 NEED FOR THE PROJECT

The Project aims to significantly enhance mobile network coverage in and around Lüderitz. By improving both voice and data services, the Project will ensure better connectivity for residents, business operators and visitors. This will lead to more stable and high-quality mobile phone calls, faster internet speeds and improved overall network performance. Improved coverage will also support a high number of simultaneous connections and increased use of data-driven appliances. The BTS telecommunication will also better position the town for economic development and future growth as better connectivity opens the door for new opportunities, attract investors and new commercial enterprises.

4.3 ALTERNATIVES CONSIDERED

In terms of the Environmental Management Act No. 7 of 2007 and its 2012 Regulations, alternatives considered should be presented and analysed in the scoping with impact assessment report. This requirement ensures that during the design evolution and decision-making process, potential environmental impacts, costs and technical feasibility have been considered, which leads to the best option(s) being identified. The alternatives considered are discussed below.

4.3.1 ALTERNATIVE SITE(S)

The Lüderitz Town Council may not have considered alternative sites for the telecommunication tower due to several factors. Firstly, the proposed site on Erf 886 is already designated for telecommunication use, as there is an existing MTC tower. This makes the site a technically viable and strategically suitable location. Secondly, co-locating infrastructure within the same area can reduce visual impacts, compared to dispersing towers across multiple locations (although this is already the case as there are other telecommunication towers in town). Finally, this may have simplified administrative processes.

The selection of the Project site may also have been guided by radiofrequency (RF) network planning considerations, aimed at ensuring adequate coverage and meeting the capacity requirements of the surrounding area.

4.3.2 PROSPECT FOR INFRASTRUCTURE SHARING

During the planning phase, consideration was given to infrastructure sharing as a means to optimise resource utilisation, reduce capital and operational expenditure and mitigate the cumulative visual impact of multiple telecommunication structures within the same locality. In this context, Paratus formally engaged MTC with a request to co-locate infrastructure on the existing telecommunication tower. However, this proposal for infrastructure sharing was declined by MTC. All correspondences between Paratus and MTC regarding this request and proposal is presented in Appendix E.

4.4 NO-GO ALTERNATIVES

Without the BTS tower in Lüderitz, the current status of telecommunication services in Lüderitz remains unchanged and will not address the existing gaps in service coverage. This would hinder the town's potential for economic development, both in the present and in the future. In light of this, the no-go alternative is not considered a viable option. The BTS operations is expected to make a significant contribution to the town's economic growth and overall development by offering market-driven, fast and reliable telecommunication services. Overall, the Project is expected to compete with the dominant operators to develop the town, enhance competition and market growth.

4.5 PROPOSED ACTIVITIES

4.5.1 PROPOSED BTS TOWER AND ASSOCIATED INFRASTRUCTURE

The planning phase of the Project includes the following:

- Securing the land lease agreement for the Project from the Lüderitz Town Council (already in place) (Appendix D);
- Consent from MTC to erect an additional telecommunication tower on ERF 886; and
- Procurement of tower materials and equipment.

4.6 CONSTRUCTION PHASE

The construction phase is expected to involve low-impact and non-intrusive activities. The key activities during this phase will include:

- Development of the staging area;
- Minor ground preparation, including surface preparation and levelling;
- Storage and stockpiling of materials and equipment for the tower construction;
- Assembling of the BTS structure;

- Installation of cables and wiring;
- Concrete casting;
- Erection of a palisade security fence; and
- Commissioning of transmitters.

The construction phase is expected to last approximately three (3) months.

4.6.1 EQUIPMENT AND MATERIALS

Equipment and materials necessary for the construction phase will be stockpiled in designated staging areas, located in close proximity to the construction site. The tower will be inclined at an angle of 2° and will comprise of the following:

- 3G access power solutions-APS6-400 series;
- High-performance point-to-point microwave antenna;
- FibeAir IP-20G radio;
- Panel antenna; and
- AirHarmony 4000/4200/4400.

Figure 3 shows a typical sketch of a lattice telecommunication tower.



Figure 3 - A typical sketch of a lattice telecommunication tower

The construction equipment and materials will be loaded onto light-to-heavy delivery vehicles and delivered on-site. There will be no abnormal or hazardous loads. The public exposure from the equipment will be less than 10 megajoules per kilogram (MJ/kg) for workers and 2 MJ/kg for the general public. Table 5 presents the maximum output power for these two different exposure categories.

Table 5 - Whole body specific absorption rate (SAR) exclusion power levels (Source: Paratus)

Exposure Category	Maximum output power (rms)
General public	Max. power [W] = general public whole body SAR limit [W/kg]*12.5 kg: 4-year-old child body mass = 1 W
Occupational	Max. power [W] = occupational whole body SAR limit [W/kg] *42 kg: 16-year-old worker body mass = 16.8 W

4.6.2 EMPLOYMENT AND ACCOMMODATION

Three (3) environmental practitioners from Environmental Compliance Consultancy (Pty) Ltd (ECC) have been contracted to conduct the ESIA study for the Project prior to Project initiation and development. Contractors and subcontractors (approximately 10) will be hired for both the construction phase and maintenance phases as specialised skills are required to undertake these activities. It is anticipated that these workers will likely reside in Lüderitz to ensure the Project is completed on time. Workers will also gain practical experience which enhance their employability in future projects.

4.6.3 RESOURCE USE AND WASTE MANAGEMENT

All waste generated, including construction waste, packing waste and any other by-product will be carefully collected and stored in designated waste skips. Once full, the waste will be disposed of at the Lüderitz waste disposal site.

4.7 OPERATIONAL PHASE

During the operational phase, the telecommunication infrastructure will require minimal interventions as a lattice tower is a self-supporting structure. However, inspections will be conducted to assess the performance and integrity of the infrastructure over time. Maintenance will be scheduled strategically to avoid peak business hours to ensure that business operations are least impacted.

4.8 DECOMMISSIONING PHASE

When operations are ceased, the BTS tower and its associated infrastructure will be carefully dismantled. Consultation with the Lüderitz Town Council will be sought to ensure proper disposal of equipment. Furthermore, the site will need to be rehabilitated or reclaimed to restore its state for other future uses.

5 ENVIRONMENTAL AND SOCIAL BASELINE

5.1 BASELINE DATA COLLECTION

Desktop studies relevant to the Project formed part of the current environmental and social assessment conducted for the Project. The baseline studies aim to establish the status quo of the receiving environment, against which potential impacts (positive, negative and cumulative) are likely to be triggered will be assessed. This process ensures that the Project design will effectively avoid, reduce or mitigate the potential adverse environmental impacts and social risks.

This section defines the existing biophysical and socio-economic environment through the review of existing literature, spatial data and publicly available reports. It is an important part of the scoping component of the assessment, as it determines whether there are knowledge gaps that require additional information prior to the assessment phase. The defined environment provides a framework where changes that would occur as a result of the proposed Project can be measured and assessed.

5.2 BIOPHYSICAL ENVIRONMENT

5.2.1 LAND USE

The !Karas Region has a land surface area of approximately 161 325 km² and is the largest region in Namibia (!Karas Regional Council, 2025). The town is renowned as a historic fishing town, characterised by its harbour and coastline, home to seals, penguins, shipwrecks and colonial-era landmarks. The town was mainly established as a fishing and diamond mining town and these two natural resources remain the main economic drivers of the town and the port. Most historic buildings of the town (e.g. the deserted Kolmanskop building, the Lüderitz Lighthouse and the Goerke Haus Museum) and the desert adapted horses are closest to the town. As a result, most tourists' establishments have been established along access routes to the port.

On land, Lüderitz is surrounded by the Tsau //Khaeb National Park (formerly Sperrgebiet National Park) which falls under the management of the Ministry of Environment, Forestry and Tourism (MEFT). Due to diamond mining practices the park remains off limits to the general public and tourists.

Public institutions, such as schools and healthcare facilities are also prominent, and the town is well-connected by transport routes to other regions of Namibia. Currently, the town offers tourists (day visitors) with a range of essential services and facilities. Among these are access to banks, retail shops, gas stations, healthcare facilities and accommodation establishments.

The Lüderitz airport (licenced airport) also accommodates local small fixed winged aircrafts and is a common domestic flight route. These amenities make the town a well-established and convenient stop for tourists exploring the region or passing through on their way to other destinations.

The Lüderitz Town Council is responsible for the overall administration of the town, local land-use planning, zoning and approval of developmental projects within the townland boundaries. This includes managing residential, commercial, public and recreational spaces in accordance with local policies, development plans and urban planning regulations.

5.2.2 METEOROLOGY

Meteorological data from Meteoblue (2025) were used to provide the weather and climate information for the Project area (Lüderitz). The climate in the southern regions of Namibia is typically arid and semi-arid, characterised by hot, dry conditions with low rainfall. The region experiences high temperatures, typically associated with the summer months (November to February). Daytime temperatures often exceed 30°C, while nights are cool, especially during winter (June to August), where temperatures drop to below 5°C (Figure 4).

Rainfall in the southern regions is generally low and occurs sporadically (Figure 5). During the summer months, average annual rainfall ranges between 50 and 100 mm (Alice et al', 2022). The southern regions of the countries are also influenced by the cold Benguela Current along the Atlantic Ocean which bring cool temperatures and fog to coastal areas. Fog defines much of the Namib Desert's climate. It occurs during all months of the year in a band along the coast that may extend more than 100 km inland (Alice et al', 2022).

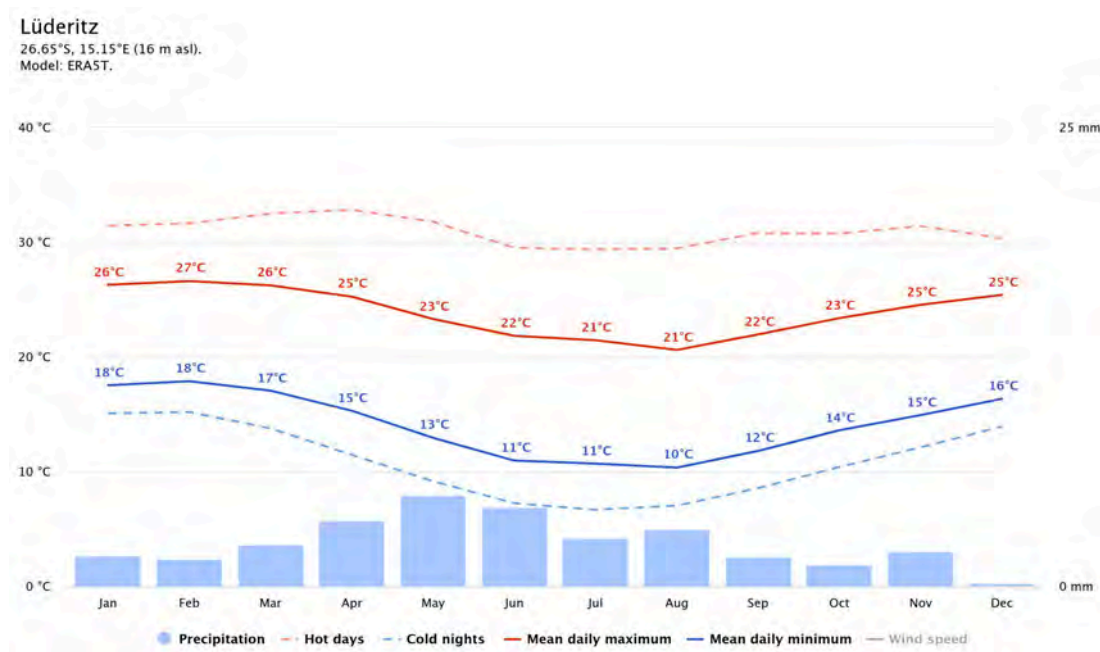


Figure 4 - Average temperatures and precipitation for Lüderitz (Source: Meteoblue, 2025)

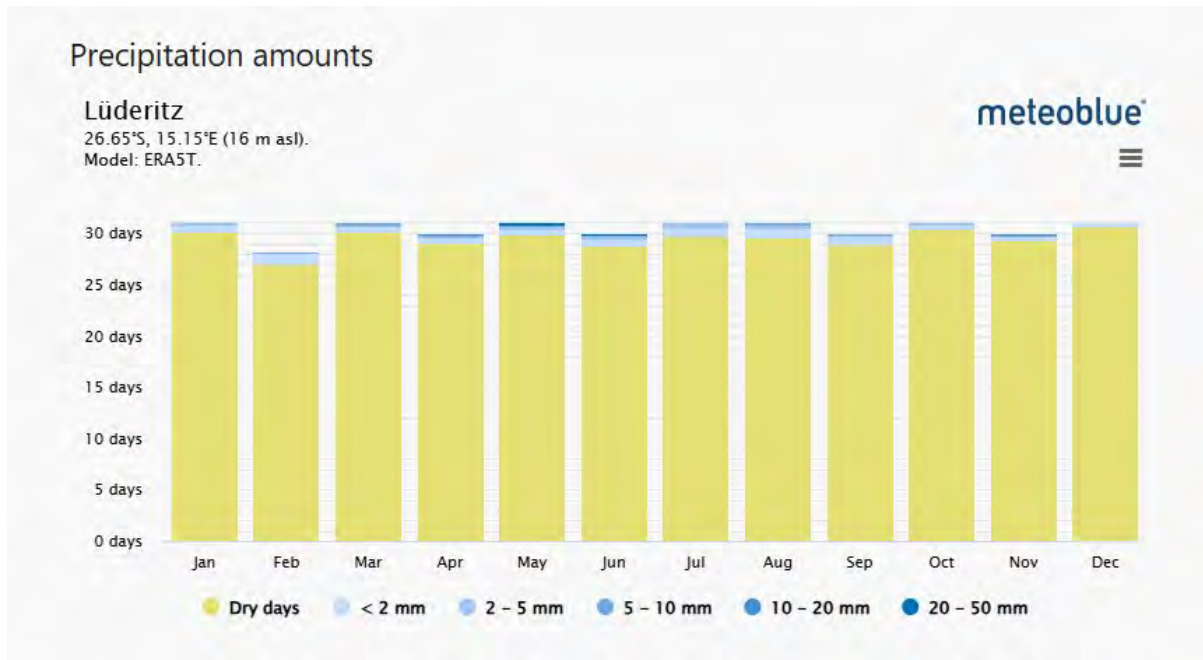


Figure 5 - Monthly average rainfall in the Lüderitz area (Source: Meteoblue, 2025)

The prevailing winds over the greater Lüderitz area typically come from the south (S) and south southeast (SSE) directions, although lighter winds are also observed from various other directions (Meteoblue, 2025) (Figure 6). The average wind speed of these prevailing winds ranges from 30 -50 km/h (Figure 6). On average, Lüderitz is one of the windiest towns in Namibia.



Figure 6 - Average wind direction and speed over the greater Lüderitz area (Source: Meteoblue, 2025)

5.2.3 SOIL, GEOLOGY AND TOPOGRAPHY

As in many parts of Africa, Namibia's soils are generally poor. The country's arid climate with its variable rainfall is often held to be the main factor limiting agriculture, but soils with inherently low fertility and poor physical properties place a major constraint on farming.

The general Lüderitz area is underlain by widespread leptosols and regosols (Alice, et al', 2022). Leptosols are extremely stony and shallow over continuous rock surfaces. They are prevalent in hilly areas where the rate of erosion exceeds the rate of soil formation or sediment accumulation. The thin soil layer and rapid drainage mean leptosols have low potential for crop production. Regosols are found where the soil formation has been inhibited by arid conditions or interrupted by erosion or recent deposition of sediments. They are medium to finely textured and are easily eroded due to their unconsolidated structure. They are also prone to desiccation, which limits their potential for cultivating rainfed crops (Alice et al', 2022).

Lüderitz topography is shaped by its coastal location, the surrounding desert and nearby mountain ranges that forms a rugged terrain. The town lies along the Atlantic Ocean, with rocky cliffs and small sandy beaches. Moving inland, the landscape transitions into the arid expanse of the Namib Desert.

The Lüderitz area is characterised by a mix of geological features such as the Namaqua Metamorphic Complex and the Kalahari and Namib Sand formation, which are linked to both the Rodia and post Gondwana eras. The bedrock is underlain by Precambrian rocks such as granites, gneisses and schists; while moving inland, the Kalahari Group sediments include sand dunes, gravel and clay deposits. This contributes to the distinctive aesthetic landscape of the Namib Desert.

5.2.4 HYDROLOGY AND HYDROGEOLOGY

No permanent natural surface water resources exist near the town of Lüderitz apart from the Atlantic Ocean.

The NamWater Koichab water supply scheme supplies Lüderitz with potable water. The scheme abstracts water from nine (9) boreholes, which source water from the alluvial aquifer formed in a paleo-channel of the Khoichab River. According to Faul et al. (2024), the estimated annual water supply for the scheme is approximately 1 460 000 m³, as shown by the NamWater potable water supply and demand statistics in Figure 7. Future groundwater developments will focus mainly on improving the existing water infrastructure as it is the only known source with a sustainable yield of potable water.



Figure 7 - Potable water supply and demand for Lüderitz 1993-2023 (Source: Faul et al', 2024)

5.2.5 FAUNA AND FLORA

The broader Lüderitz area, extending into the Tsau //Khaeb National Park, forms part of the Succulent Karoo biome, which is characterised by a succulent steppe vegetation type and dwarf shrubland structures. The Succulent Karoo is recognised as a biodiversity hotspot and hosts the world's richest diversity of succulent plant species, endemic plant species and a notable high diversity of reptiles and invertebrates.

The Project site is located in a well-established residential area, which has been developed and utilised for housing, recreation and tourism purposes for some time. The environment has already been disturbed by anthropogenic activities and development has led to the displacement of both fauna and avifauna species. Upon evaluation, the Project area is rocky and does not support any endemic, threatened, rare or sensitive species or habitats of fauna or flora.

5.2.6 AVIFAUNA

Lüderitz falls within an Important Bird Area (IBA). The area is characterised by high species abundance due to the nutrient rich waters. The IBA list consists of four islands: Halifax Island, Penguin Island, Seal and Flamingo Island and the rocky shoreline of the mainland. The islands support more than 10 000 birds, while the rocky shoreline of the mainland support more than 14 000 shorebirds. Historically, anthropogenic pressures have led to the steep decline of bird species. Guano harvesting, collection of their eggs, habitat alteration, shipping noise and oil spills have led to the decline in bird numbers. Some endangered or near threatened birds likely to be found in the Lüderitz area include African Penguins, Bank Cormorants, Crowned Cormorants, Cape Gannets and Greater Flamingos (Faul et al' 2024).

5.3 SOCIAL BASELINE

5.3.1 RADIATION BACKGROUND

Radiation emissions from a telecommunication tower primarily involve radiofrequency (RF) radiation, a form of non-ionising electromagnetic radiation. This form of radiation is used to transmit signals for mobile phones, radio, television and other wireless communication. People living closer to the telecommunication tower may be exposed to higher levels of radiation compared to those farther away. This is the affected groups within the community.

Electromagnetic radiation (EMR) from telecommunication towers primarily consists of high - frequency radio wave or microwaves. There are two types of radiation: ionising and non-ionising radiation. Ionising radiation carries enough energy to detach electrons from atoms, causing the atom to become charged or ionised while non-ionising radiation has less energy and are unable to ionise atoms. Natural sources of ionising radiation are sunlight and thermal radiation, while non-ionising radiation are from microwaves ovens, mobile phones, network towers and powerlines (Adelaja, 2020).

The International Commission for Non-Ionising Radiation Protection (ICNIRP) is an independent scientific body that provides expert advice and guidance on the health and environmental effects of non-ionising radiation to safeguard both people and the environment. Namibia, like many other countries, follows the international guidelines set by the ICNIRP to ensure that exposure to non-ionising radiation remains within safe limits to protect public health. In March 2020, ICNIRP published the revised guidelines for human exposed to radiofrequency – electromagnetic fields (RF-EMF) in a range 100 kHz to 300 GHz. The specific frequency range from the BTS is 1800 MHz and the output power is 40 watts (W) (Table 6). At 1800 MHz, the ICNIRP limits for the public is 10 W/m² and 50 W/m² for occupational workers. The strength and intensity of the radiofrequency diminishes rapidly as the distance between the transmitter and receiver increases. The energy of the signal disperses over a larger area as it travels away from its sources. In addition to distance, the presence of physical barriers such as buildings, trees and even mountains can further attenuate or weaken the radiofrequency signals. These obstacles can absorb, reflect or even scatter the radio waves and reduce their effective range.

Table 6 - ICNIRP RF-EMF safety thresholds for the public and occupational workers (ICNIRP, 2020)

Power	General public level		Occupational levels	
	Frequency range			
	698 - 960 MHz	1710 - 2690 MHz	689 - 960 MHz	1710 – 2690 MHz
	Distance			
2 W	150 cm (59.1 in.)	100 cm (39.4 in.)	70 cm (27.6 in.)	50 cm (19.7 in.)
5 W	230 cm (90.1 in.)	150 cm (59.1 in.)	110 cm (43.3 in.)	70 cm (27.6 in.)
10 W	320 cm (126 in.)	210 cm (82.7 in.)	150 cm (59.1 in.)	100 cm (39.4 in.)

Power	General public level		Occupational levels	
	Frequency range			
	698 - 960 MHz	1710 - 2690 MHz	689 - 960 MHz	1710 – 2690 MHz
	Distance			
20 W	450 cm (177.2 in.)	290 cm (114.2 in.)	210 cm (82.7 in.)	140 cm (55.1 in.)
30 W	550 cm (216.5 in.)	350 cm (137.8 in.)	260 cm (102.4 in.)	160 cm (63 in.)
40 W	640 cm (252 in.)	410 cm (161.4 in.)	290 cm (114.2 in.)	190 cm (74.8 in.)
50 W	710 cm (279.5 in.)	460 cm (181.1 in.)	330 cm (130 in.)	210 cm (82.7 in)
60 W	780 cm (307.1 in.)	500 cm (196.9 in.)	360 cm (141.7 in.)	230 cm (90.1 in.)
70 W	840 cm (330.7 in.)	540 cm (212.6 in.)	390 cm (153.5 in.)	250 cm (98.4 in.)
80 W	900 cm (354.3 in.)	580 cm (228.3 in.)	410 cm (161.4 in.)	270 cm (106.3 in.)
90 W	950 cm (374 in.)	610 cm (240.2 in.)	440 cm (173.2 in.)	280 cm (110.2 in.)

* The row highlighted in green applies to the Project.

The component specifications for 900 MHz and 1800 MHz also applies to 850 MHz and 1900 MHz products, respectively. The specifications can be used to demonstrate compliance with Federal Communications Commission (FCC) guidelines for human exposure to radio frequency electromagnetic fields contained in the FCC.

5.3.2 POPULATION AND DEMOGRAPHY

The !Karas Region, which covers an area of approximately 161 325 km², is Namibia's largest region and covers 19.5% of the country's total land area (!Karas Regional Council, 2025). According to the November 2023 Population and Housing Census conducted by the Namibia Statistics Agency (NSA), the region has a population of approximately 109 893 inhabitants, with 0.7 persons per km², making it the least densely populated region among Namibia's fourteen regions (NSA, 2024). The population data by town shows that Lüderitz has a population of approximately 16 125 residents, with a population density of 1 137.8 persons per km² (NSA, 2023). Compared to 2011, the average household size has decreased across all regions. In the !Karas Region, the average household size decreased from 3.6 people per household in 2011 to 3.1 people per household in 2023 (NSA, 2023). The remoteness of Lüderitz, limited employment opportunities and economic diversification opportunities are some of the contributing factors to the population decline as many residents likely relocate to other urban centers that offer better prospects (Faul et al, 2024).

5.3.3 POVERTY AND UNEMPLOYMENT

According to the preliminary regional labour force data compiled by the Namibia Statistics Agency in 2023, 48 044 individuals are employed in the !Karas Region. The labour force survey conducted in 2018 reports that 73.1% of the households in the region primarily earn their income from salaries and wages, while 5.5% earn their income from business activities and

9.4% receive pension grants. The survey also reported an unemployment rate of 32.2% in the region, with a particularly high youth unemployment rate of 44.7% among the age working group (i.e. 15 to 34 age group) (NSA, 2018). These significant figures highlight the socio-economic challenges faced by the region, particularly among the youth. To tackle these challenges, there is a need for targeted policies that focus on creating employment opportunities, improving access to quality education, skills development and enhancing youth participation in income generating programs.

5.3.4 GOVERNANCE

Since gaining independence in 1990, Namibia has enjoyed a constitutional democracy and politically stable state, which provides a conducive environment for programming and for children to thrive (UNICEF, 2022). As a result of sound governance and stable macroeconomic management, Namibia has experienced rapid socio-economic development. Namibia has achieved the level of medium human development and ranked 145th on the Human Development Index out of 188 countries (World Data Atlas, 2023). The country's governance is guided by the long-term strategic/sustainable development objectives such as Vision 2030, Harambee Prosperity Plan and the National Development Plans (NDP) (National Planning Commission, 2020).

Lüderitz is located within the !NamiǁNûs Constituency, which is one of the seven (7) electoral constituencies in the region. The town has diverse land use patterns as the town features residential areas, comprised of urban houses, informal settlements and businesses spread across the town.

The Lüderitz Town Council is the custodian mandated for the governance and administration of the town. The town council function within the framework of Namibia's decentralisation policy, with elected representatives managing local authority services, development initiatives and addressing community needs.

5.3.5 COMMUNITY HEALTH

Since independence in 1990, the health status of Namibia has increased steadily, with a remarkable improvement in access to primary health facilities and medical infrastructure. In 2015, the World Health organisation recommended strategic priorities for the health system in Namibia, which entailed improved governance, an improved health information system, emergency preparedness, risk reduction and response, preventative healthcare and combating the spread of incurable diseases (WHO, 2016).

Through its ministerial efforts, Namibia's healthcare system has since evolved and improved. The healthcare system is dual in nature, consisting of private services, which cater to approximately 18% of the population with medial aid, while public services serve the remaining 82% (Cristian, 2020). Public healthcare in Namibia is managed by the Ministry of Health and Social Services (MoHSS), which operates a four-tiered health system comprising primary

healthcare (PHC), district hospitals, intermediate hospitals and referral hospitals (Cristian, 2020). The Lüderitz District Hospital and the Lüderitz Clinic are the two healthcare facilities in Lüderitz.

5.3.6 CULTURAL, HERITAGE AND ARCHAEOLOGY

Lüderitz is one of the oldest towns in Namibia as it has several colonial historically significant buildings. The town is also renowned for its diamond mining industry. The town grew around its port area, which remains a historic centre of the town. Several buildings have been declared National Monuments in Lüderitz and these, among others include: the Railway Station Building, the German Lutheran Church, the Deutsche Africa Bank Building and the Krabbenhöft und Lampe Building (Faul et al', 2024).

Shark Island is another significant historic site, as it served as a concentration camp for the Nama and OvaHerero prisoners held by the German colonial army in the early 1900's. On 15 February 2019, Shark Island was officially declared a National Heritage site (Government Notice No. 23 of 2019).

Although the town has significant heritage sites, the Project area does not have any artefacts or building of cultural, heritage or archaeological significance, unless there are artefacts buried beneath the surface. The procedures for preserving any artefacts discovered on-site are outlined in the ESMP.

5.4 ECONOMIC BASELINE

5.4.1 TELECOMMUNICATION SERVICES IN LÜDERITZ

In Lüderitz, telecommunication services are provided by Mobile Telecommunication Company (MTC) and Telecom Namibia, two of the leading service providers in the country. MTC provides mobile network services including voice data and internet access, while Telecom Namibia provides fixed-line telephony, broadband internet and fiber-optic services. These services collectively ensure that residents, business operators, schools and healthcare institutions have access to essential communication tools.

The Project is expected to further enhance the telecommunications and internet landscape in Lüderitz, thereby fostering a more competitive market, enhanced service quality and more affordable pricing for the consumers.

5.4.2 PORT OF LÜDERITZ

The Namibia Port Authority (also referred to as Namport) was established under the Namibia Port Authority Act No. 2 of 1994. Namport manages Namibia's ports in Walvis Bay and Lüderitz. Since 1995, investments have improved the harbour facilities and now handles modern coastal traffic and the needs of the offshore exploration and mining sector.

The port of Lüderitz is Namibia's second port and offers excellent logistical services and links to other towns in Namibia and South Africa. The port serves as a key hub for seasonal cruise ship visits, the local fishing industry, offshore diamond and mining operations, and the export of fruit, particularly grapes from Aussenkehr and the Northern Cape Province, to Europe. Additionally, the harbour serves the mines with imports and exports of mining commodities for the mines in the southern regions of Namibia and north-western South Africa (Nampor, 2025).

5.4.3 TOURISM

In 2018, the hospitality and tourism industry in Namibia contributed N\$5.2 billion directly to the gross domestic product (GDP), which is equivalent to 3.5% of the total GDP (GIZ, 2022). The sector employs over 44 700 employees whereby 2 900 of the jobs are created in community conservation areas (GIZ, 2022).

The region's distinctive history and landscape offers various opportunities for economic benefits from tourism related activities. Lüderitz is located at the core of coastal tourism and as a result, the town provides various prospects beyond the Tsau //Khaeb National Park, including visits to several coastal islands, which attracts birdwatching enthusiasts. Additionally, the town's distinctive architecture and historical sites associated with diamond mining and the colonial era attracts tourists to the town. This stimulates various local micro economic activities. As noted by Leonora (2005), Lüderitz, along with Kolmanskop and nearby towns, have gradually developed into key destinations for film production and tourism.

6 IMPACT IDENTIFICATION AND EVALUATION METHODOLOGY

6.1 INTRODUCTION

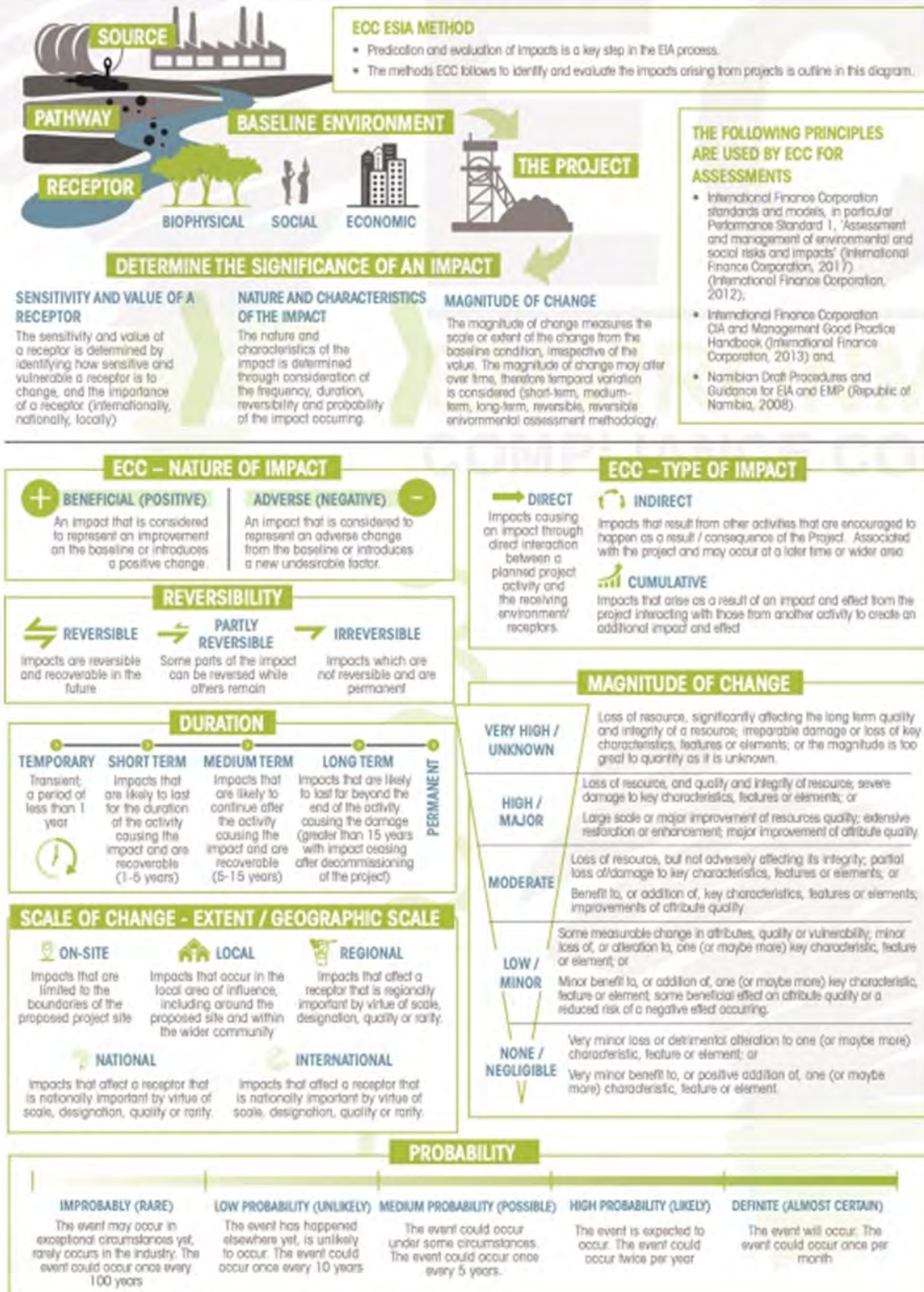
The impact assessment method described in this chapter by ECC is designed to systematically identify and evaluate potential environmental and social impacts that may arise from a proposed Project. The method takes into consideration the baseline characteristics of the Project area and assesses the significance of impacts based on various factors, including the sensitivity and value of environmental and social receptors, the nature and characteristics of the potential impact and the magnitude of potential change.

The method shown in Figure 8 provides assessment guidance that is used to evaluate impacts, and it also acknowledges any limitations, uncertainties and assumptions associated with the assessment methodology. It outlines how impacts are identified and evaluated and how the level of significance is derived. The method also addresses the application of mitigation measures in the assessment and how additional mitigations are identified.

This chapter provides a structured approach for evaluating the potential impacts of the proposed Project on the environment and social aspects. It considers various factors to determine the significance of impacts and provides guidance on how to identify and evaluate potential impacts. It also recognises the limitations and uncertainties associated with impact assessment methodologies, which adds transparency and credibility to the assessment process.

Overall, this chapter provides a comprehensive and systematic approach for conducting impact assessments, which can help ensure that potential environmental and social impacts are thoroughly evaluated and addressed in the decision-making process for the proposed Project.

ECC IMPACT PREDICTION AND EVALUATION METHODOLOGY



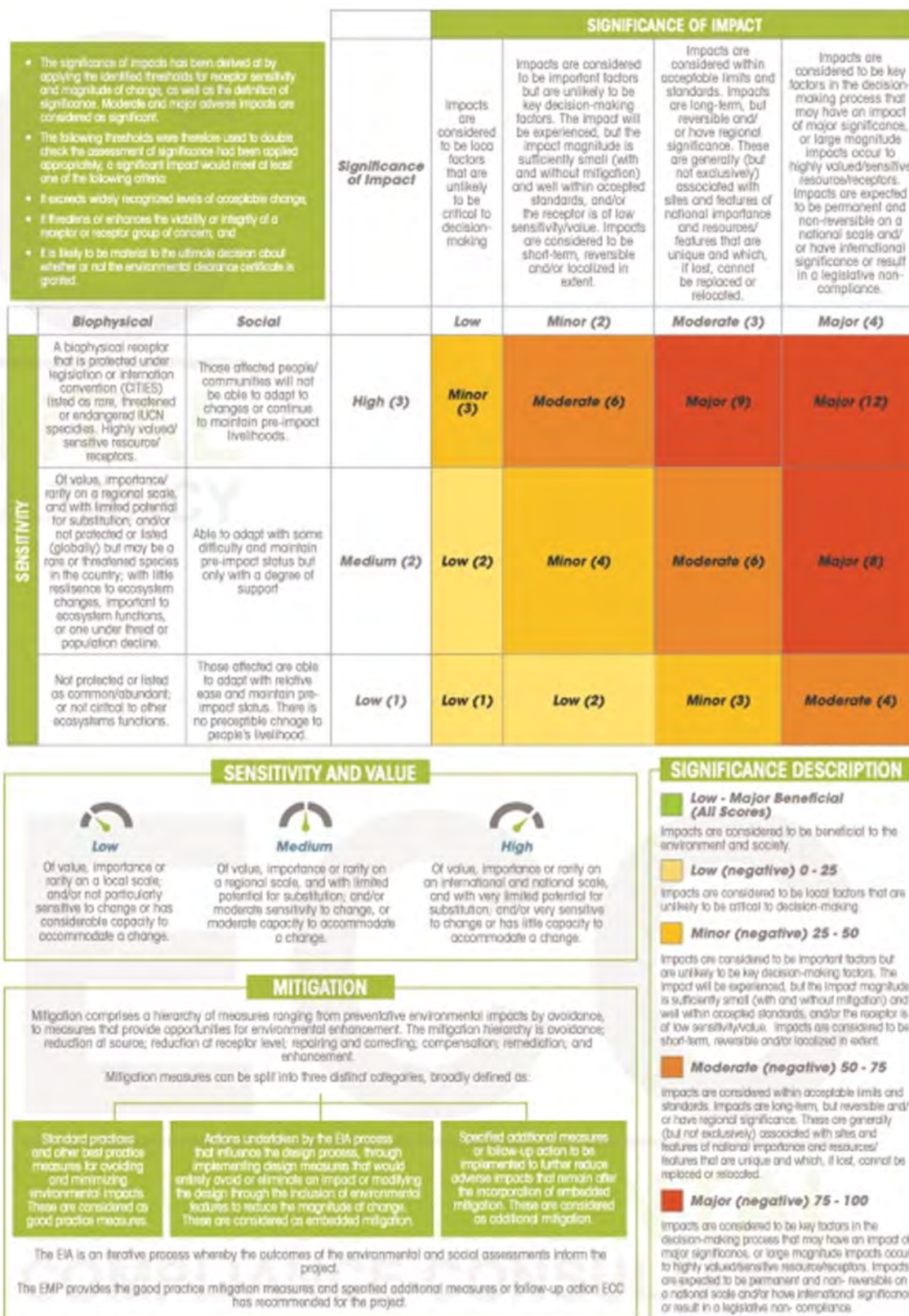


Figure 8 - ECC ESIA methodology based on IFC standards

6.2 ASSESSMENT GUIDANCE

The principal documents used to inform the assessment method are:

- International Finance Corporation (IFC) standards and models, in particular Performance Standard 1, 'Assessment and management of environmental and social risks and impacts' (International Finance Corporation, 2012 and 2017);
- International Finance Corporation Cumulative Impact Assessment (CIA) and Management Good Practice Handbook (International Finance Corporation, 2013); and
- Namibian Draft Procedures and Guidance for EIA and EMP (Republic of Namibia, 2008).

6.3 LIMITATIONS, UNCERTAINTIES AND ASSUMPTIONS

The limitations and uncertainties associated with the assessment methodology in Namibia were observed to include the absence of topic-specific assessment guidance, with a generic methodology being applied based on IFC (International Finance Corporation) guidance and professional judgement with over 35 years of ESIA experience (the EAP CVs are provided in Appendix F). This implies that there may be limitations in terms of tailoring the assessment to specific topics or issues relevant to Namibia, and that the methodology may not fully capture the unique characteristics and nuances of the local context.

It is important to note that the limitations and uncertainties identified in the assessment methodology, shown in Table 7, may introduce potential biases or inaccuracies in the assessment results. Therefore, it is recommended to regularly review and update the methodology to address these limitations and uncertainties, and to ensure that it remains robust and relevant for the specific context of Namibia. Additionally, incorporating stakeholder feedback and local knowledge can also contribute to improving the accuracy and comprehensiveness of the assessment process.

Table 7 - Limitations, uncertainties and assumptions

Topic	Assumption/uncertainty
Topic-specific assessment guidance has not been developed in Namibia.	A generic assessment methodology will be applied to all topics using IFC guidance and professional judgement.
Lack of a detailed construction methodology.	It is understood that the site preparation will involve low impact and non-intrusive activities. This will include digging a trench, which will be filled with concrete to create a foundation. The BTS tower will then be assembled on-site.
The operation of telecommunication in close proximity to one another.	There is limited literature available on the operation of telecommunications towers situated in close proximity to one another. While there are studies that address the general functioning and impact of individual towers, little is documented regarding the specific challenges,

Topic	Assumption/uncertainty
	interactions, and effects when multiple towers are located near each other. The gap in the literature makes it difficult to fully understand the potential implications on signal interference, environmental concerns, and the efficiency of telecommunication networks in such configurations.
Environmental and social baseline data.	There are no specific environmental or social studies available for the Project site, although such studies are not required for this Project. Publicly accessible reports on the town or broader region will be used as reference to inform the impact assessment process.

6.4 CUMULATIVE IMPACTS

Cumulative impacts may arise as a result of other Project activities, or due to the combination of two or more projects in the Project area. A cumulative impact assessment (CIA) will be undertaken by applying the IFC CIA Good Practice Handbook (International Finance Corporation, 2013), which recommends that a rapid CIA is undertaken. A rapid CIA takes into consideration the challenges associated with a good CIA process, which include a lack of basic baseline data, uncertainty associated with anticipated development, limited government capacity, and the absence of strategic regional, sectoral, or integrated resource planning schemes.

The following five-step rapid CIA process will be followed:

1. Scoping – determine spatial and temporal boundaries.
2. Scoping – identify valued environmental and social receptors and identify reasonably foreseeable developments.
3. Determine the present conditions of valued environmental and social receptors (the baseline).
4. Evaluate the significance of the cumulative impacts.
5. Identify mitigation measures to avoid or reduce cumulative impacts.

The following information will be applied to the assessment in line with the above steps and IFC guidance:

- The spatial and temporal boundaries of the CIA are the extent of the Project boundaries and the duration of the construction and operation phases of the proposed Project.
- Valued environmental and social receptors that may be affected.
- A review of existing and reasonable, anticipated and/or planned developments has been undertaken, which is based on the information presented in chapter 4.
- The predicted future conditions of sensitive and common environmental and social receptors have been taken into consideration in the assessment.

- The assessment findings will be presented in the assessment report and will have the CIA applied in combination with professional judgment and published environmental assessment reports.
- A review of mitigation and monitoring measures will be undertaken, with any additional ones identified.

6.5 MITIGATION

Impacts that are identified throughout the ESIA process will be subjected to a process of impact mitigation, which is inherent in all aspects of the ESIA system. Embedded mitigation and good practice mitigation will be considered in the assessment. Additional mitigation measures will be identified when the significance of an impact requires it and causes the impact to be further reduced.

The principal of impact mitigation comprises a hierarchy of measures ranging from preventative environmental impacts by avoidance, to measures that provide opportunities for environmental enhancement and will be applied to all impacts associated with the proposed Project. The mitigation hierarchy is avoidance; reduction at source; reduction at receptor level; repairing and correcting; compensation; remediation; and enhancement. The environmental and social management plan (ESMP) for the Project provides good practice measures of the impact mitigation and specifies additional measures or follow-up action where required. On completion of the impact assessment, the mitigation measures from the impact assessment and recommendations are then incorporated into the ESMP. The ESMP is appended to this report (Appendix A).

Mitigation measures can be split into three distinct categories, broadly defined as:

- Embedded mitigation - actions undertaken by the ESIA process that influence the design process, through implementing design measures that would entirely avoid or eliminate an impact, or, modifying the design through the inclusion of environmental features to reduce the magnitude of change;
- Good practice measures - standard practices or other best practice measures for avoiding and minimising environmental impacts. These are considered good practice measures; and
- Additional mitigation measures - specified additional measures or follow up actions to be implemented, to further reduce adverse impacts that remain after the incorporation of embedded mitigation.

Where additional mitigation is identified, a final assessment of the significance of impacts (residual impacts) will be carried out, taking into consideration the additional mitigation.

The ESMP provides an outline of the good practice measures and specified additional measures or follow up actions to be undertaken. The Project ESMP becomes a legal document once approved by the Department of Environmental Affairs and Forestry (DEAF).

7 IMPACT ASSESSMENT FINDINGS AND PROPOSED MITIGATION MEASURES

This chapter presents the findings of the impact assessment for the proposed Project, with a focus on significant potential impacts. Impacts deemed as not significant are listed (Table 8) and are not discussed further in this report. The design of the proposed Project (as discussed in Chapter 4) and best practice measures were considered during the assessment to identify the likely significant impacts and recommend mitigation measures, as detailed in the ESMP (Appendix A).

The following aspects were considered during the scoping phase:

- Air quality;
- Noise;
- Waste management;
- Potential hydrocarbon spills;
- Domestic effluent (sewage waste);
- Cultural and heritage;
- Traffic;
- Soil and landscape;
- Visual;
- Impacts on biodiversity (fauna, flora and avifauna);
- Social - workers and public exposure to cumulative electromagnetic radiation; and
- Socioeconomic (employment, skills development, local economy and national economy).

Impacts deemed as potentially significant (both positive and negative) are assessed in terms of their severity, duration, probability, sensitivity to receptors, before and after mitigation. Best management practices are stated where required. The ESMP (Appendix A), provides the best environmental practices, management and monitoring measures of all potential impacts discussed in this chapter. Mitigation measures will focus on reducing the effects of the potential impacts and ensure an acceptable measure of operation can be maintained when an impact cannot be avoided completely.

The proposed construction and operational activities of the Project are expected to be low intrusive. The economic impacts associated with the Project activities are expected to be beneficial and would not warrant any mitigation measures.

The impacts deemed as not significant are discussed in section 7.1, whereas the potential significant environmental, social and economic impacts associated with the proposed Project are discussed in detail in section 7.2.

7.1 IMPACTS DEEMED AS NOT SIGNIFICANT

Impacts that have been assessed as not being significant are summarised in Table 8 and are not discussed further. The listed impacts are non-significant and do not render any threat to the environment in a way that adversely challenges its resilience to continue in its modified form. Additionally, the social receptors are unlikely to face significant challenges or impacts that would alter their livelihood dynamics or their abilities to maintain their social affairs and cultural practices that are integral to their daily lives and well-being.

Table 8 - Table of non-significant impacts

Environmental and social topic	Potential impact	Summary of preliminary assessment findings
Vegetation clearing	Potential removal of pristine flora species in the immediate Project area.	- The Project area is in a residential space which has been rezoned and disturbed by anthropogenic activities. - The Project area is predominately characterised by rocky terrain, with no protected species. - The Project footprint is relatively small (~100 m²), and a significant portion of the surrounding area will remain undisturbed.
Land use	The modified land may no longer be suitable for future developmental projects.	- The Project site is within a well-established residential and recreational space and is already disturbed. - At the decommissioning phase, tower infrastructure will be dismantled and properly disposed off. - It is expected that the land will remain in good condition and suitable for future development projects.
Traffic impacts	Traffic congestion and alteration of traffic flow.	- No heavy load vehicles will be used. - The Project site is not accessed via major roadways.
Surface and groundwater quality	Potential penetration and contamination of surface and groundwater resources.	- The Project area is underlain by rock terrains, and it is unlikely that groundwater resources will be intercepted.

Environmental and social topic	Potential impact	Summary of preliminary assessment findings
		- There are no surface water drainage systems within the Project area. - The shallow holes dug for the telecommunication stand poles will not be deep enough to intercept or penetrate groundwater resources. - Concrete pouring for foundation will also not be able to penetrate through the different soil profiles into groundwater resources.
Interruption of operations	Potential cross-frequency interference between telecommunication towers on the same Erf.	- The proposed BTS tower will be located on the same property as the MTC tower. Frequency interference between the two towers is not anticipated as the towers will operate under different frequency licence bands. - The technology and equipment used for each tower are specifically designed to minimise cross-frequency interference. - Telecommunications frequency band allocations are strictly regulated by the Communication Regulatory Authority of Namibia (CRAN). This allows multiple network and internet service providers to operate and function in the same area without conflict.

7.2 SIGNIFICANT IMPACT

7.2.1 SOCIO ECONOMIC ENVIRONMENT – ECONOMIC IMPACTS

The economic impact assessment concept embraces the Project's impacts on the local, regional and national economy. The significant economic impacts associated with the construction and operational phase (including maintenance) of the telecommunication tower include issues such as improved network coverage and services, local markets upliftment, employment creation, skills development and revenue generation for the government.

An overview of the significant socio-economic impacts that have specific interest to the community and stakeholders, before mitigation are shown in Figure 9. Each specific impact is discussed further in this section.

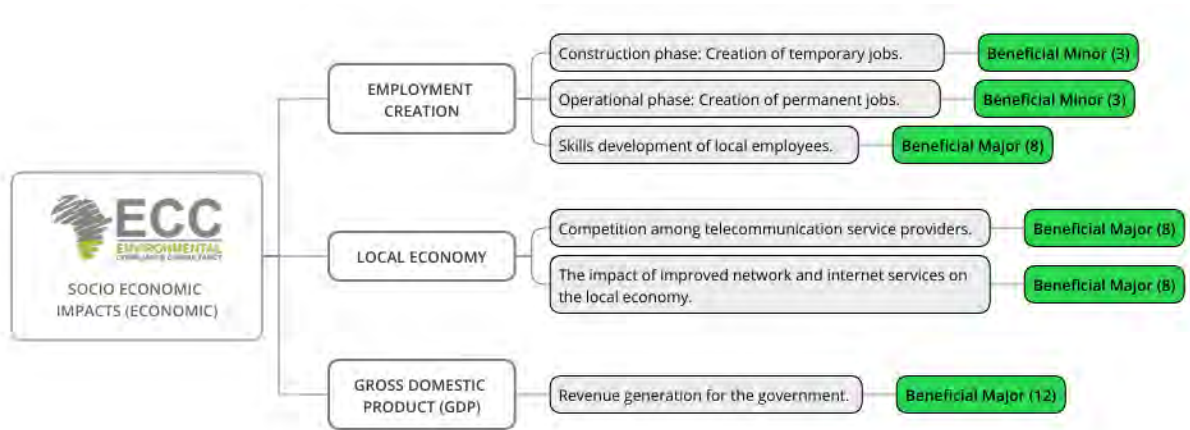


Figure 9 - An overview of the socio-economic impacts

7.2.1.1 Employment creation: creation of temporary jobs during the construction and permanent during the operational phase

Three (3) environmental practitioners from Environmental Compliance Consultancy (Pty) Ltd (ECC) have been contracted to conduct the ESIA study prior to Project initiation and development. The Proponent plans to engage contractors to undertake various construction and operational activities associated with the proposed Project. During the construction phase, approximately 10 employees will be tasked to undertake various construction tasks (i.e. land clearing, levelling storage and stockpiling of materials, foundation preparation, concrete casing, assembling BTS structures, cables and wiring installation and erecting the perimeter fence. During operations, highly skilled and trained tower climbers and technicians will be employed to periodically repair the telecommunication tower equipment and conduct performance enhancing inspections. This will ensure safety standards are met. It is anticipated that specialised skills are required to undertake these activities and thus contractors with a highly skilled and efficient workforce will be engaged/contracted.

The impact is direct and beneficial, as employees will not only enhance their skillsets, but also earn income to spend in the local economy. The impact is definite (expected to occur) as workers will be required for the Project to be initiated. The duration of impact is temporary during the construction phase, as the phase is expected to be completed within three (3) months. However, the impact will be long-term during the operational phase as scheduled inspections and maintenance work would likely be conducted (>20 years). Due to the required skill sets, the extent of the impact could be regional as employees with the required skills may not be available in the local settings and may be sourced from other areas within the region.

The magnitude of impact and sensitivity are rated as low, primarily due to the limited number of employees expected to be engaged during both phases. However, it is anticipated that the earnings of these employees will be spent within the local economy for the duration of their contracts. Overall, the significance of impact is expected to be minor-beneficial (Table 9) for both the construction and operational phases, thus no mitigation measures are required.

7.2.1.2 Skills development: opportunity for local employees to gain skills and work experience

Every organisation strives to develop skills and enhance capacity of its workforce to meet job requirements. Where skills are lacking, training is always provided, in addition to the mandatory occupational health, safety and environmental training. It is expected that contractor employees, especially tower climbers and technicians will possess the necessary skills acquired either through theoretical and practical training from vocational training institutions or past project experiences. The Project will present an opportunity for the workforce to further develop their skills, particularly working under challenging, frequent and strong windy conditions that are experienced in Lüderitz.

The impact is beneficial, direct, permanent and skills that will be acquired will be reversible. The impact is regional as the skills acquired by the workforce can be used for future job opportunities within the region or elsewhere in the ICT industry. The probability of the impact is rated as definite, as skills will be gained through the completion of various Project tasks. The magnitude of change is rated moderate as employees will acquire valuable work experiences which improve their employability. Although the impact is associated with major career uplifting benefits, the sensitivity of impact is rated as medium as the specialised skills may not be easily transferable to others (e.g. to unskilled or semi-skilled workers). The significance of impact is rated beneficial major (Table 9). No mitigation measures are required.

7.2.1.3 Service delivery: impact of enhanced network coverage and improved internet services on (i) local business enterprises (ii) educational institutions and (iii) healthcare facilities within the reception buffer zone

Lüderitz residents currently enjoy stable network coverage and connectivity through Telecom and MTC services. The Project is expected to strengthen and expand connectivity, which is a significant benefit to businesses, healthcare facilities and educational institutions.

The impact is rated beneficial as businesses and institutions will directly benefit from improved network and internet services. The duration of impact is expected to be long-term as the tower is expected to be operational for an extended period (i.e. 20 year or more) and will benefit businesses and institutions within the network reception buffer zone (the broader Lüderitz community within 10 km from the telecommunication tower). Therefore, the impact is expected to be localised.

The magnitude of change is rated high since the impact will boost business operations, which would warrant better economic performances, especially businesses working in the digital and marketing industry and hospitality industry. The sensitivity of impact is rated medium since the local economy will be impacted. Overall, the significance of the impact is rated beneficial moderate (Table 9). No mitigation measures are required.

7.2.1.4 Competition among network service providers: enhanced service delivery and market competition among network and internet service providers

Network and internet services in Lüderitz are offered by two local network providers (MTC and Telecom). These mobile network operators (MNOs) and internet service providers (ISPs) facilitate internet access and connect consumers (i.e. residents and business operators) via mobile phones, landlines and other networked systems. The introduction of the Paratus network and internet services are expected to shift the market and competition landscape by influencing market pricing among other network operators. As a result, consumers will be in a better position in selecting their desired telecommunication service provider or to have multiple service providers.

The Project is expected to positively impact market dynamics through competition and improved service delivery. Generally, competition pushes competitors to improve service delivery and quality. Therefore, the impact is considered beneficial. The impact is rated direct as the Project will directly benefit consumers within the network reception buffer range. The duration of the impact is considered long-term as the tower is expected to remain operational for an extended period (anticipated to be 20 years or more). The magnitude of change is rated as major due to the significant social and economic benefits that are associated with the impact. The scale of the impact is rated as regional, while the sensitivity of the impact is assessed as medium. This is because the tower's 10 km reception buffer range will extend beyond the town's boundaries. This broad reach implies that connectivity will extend over a larger geographic area. The sensitivity of the impact is rated as medium due to the significant changes expected in the market and the increased variety of telecommunication options available to consumers. The significance of impact is rated beneficial major (Table 9). No mitigation measures are required.

7.2.1.5 National economy: generation of revenue for the government (gross domestic product)

The required Project equipment and materials are not available in the local retail market. As a result, the necessary tower materials and equipment will be imported into Namibia through the land borders. This will generate revenue for the government through various income generating streams for the government such as import tax and value-added tax (VAT).

The impact is considered direct, beneficial with a definite probability, as tower materials and equipment are required to ensure Project development, execution and success. The scale of

change is rated as national, as revenue generated by the government is directed to various economic activities or developmental projects. However, the duration of the impact is temporary as these imports are likely anticipated to be a one-time occurrence (pre-construction phase). However, both sensitivity and the magnitude of impact are rated high as the Project, through its operational phase, will continue to impact the economy through tax payments to the government in a form of operational and corporate income taxes, VAT, licences fees etc. Corporate taxation obligations are rated as a long-term impact as it will align with the Project's operational phase. Overall, the impact is expected to be beneficial major (Table 9).

Table 9 - Impacts related to employment creation, skills development, market competition and revenue for the government

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower construction (construction activities)	Contractor employees	Creation of temporal jobs.	Beneficial Direct Reversible Temporal Regional Definite	Low	Low	Beneficial Minor (3)
Tower operations (inspections and maintenance)	Contractor employees	Creation of permanent jobs.	Beneficial Direct Reversible Long-term Regional Definite	Low	Low	Beneficial Minor (3)
Tower operations	Local economy (businesses, healthcare facilities and educational institutions)	The benefit of improved network coverage on the local and regional economy.	Beneficial Direct Reversible Long-term Local Likely	Medium	High	Beneficial Moderate (6)
Tower construction	Contractor employees	Skills development and work experience	Beneficial Direct Reversible Permanent Regional Definite	Medium	High	Beneficial Major (8)
Tower operations	Telecommunication service providers	Competition among telecommuni-	Beneficial Direct Reversible Long-term	Medium	High	Beneficial Major (8)

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
		cation service providers	Regional Definite			
Tower construction	National economy	Revenue generated through payment of import taxes and corporate taxes to government	Beneficial Direct Reversible (Temporary pre-construction) (Long-term – operational phase) National Definite	High	High	Beneficial Major (12)

7.2.2 SOCIO-ECONOMIC ENVIRONMENT – SOCIAL IMPACTS

Social impacts include the consequences to the local population, particularly impacts on people's lives, work or social interactions. An overview of the significant social impacts is shown in Figure 10. Each specific impact is discussed in detail in the sections below.

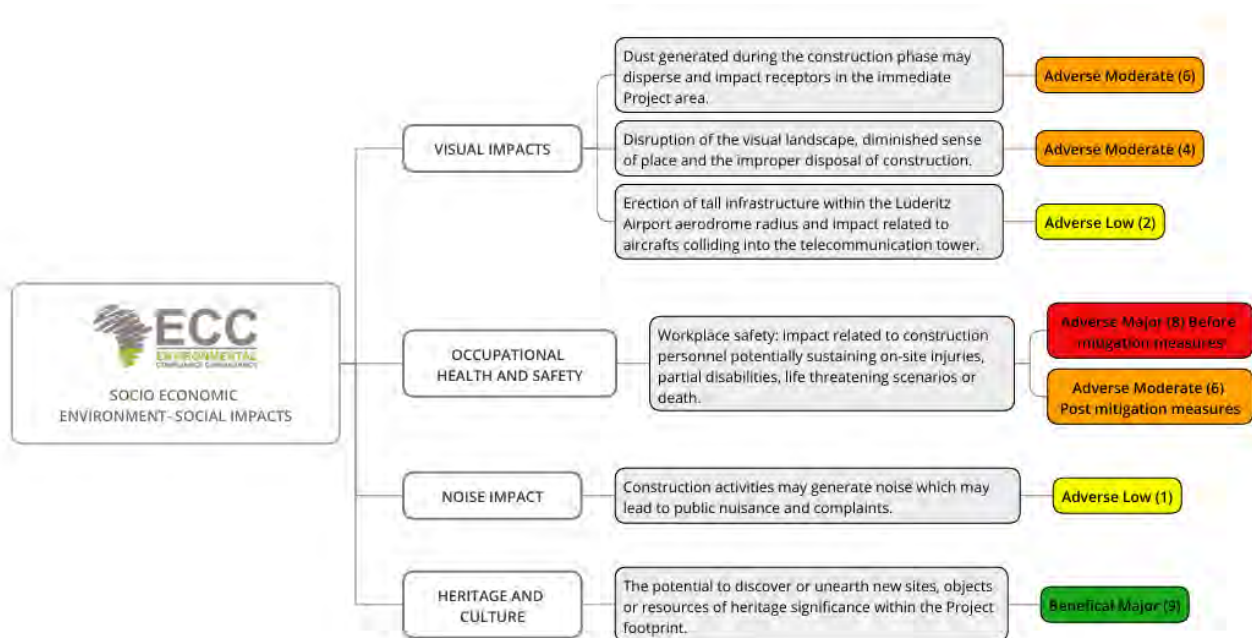


Figure 10 - An overview of the social impacts

7.2.2.1 Visual impact: dust generated during the construction phase may disperse and impact receptors in the immediate Project area

Construction activities and vehicles traveling to and from the Project site are expected to generate dust. The dominant winds in Lüderitz are from south (S) and south southeast (SSE) (Figure 6). As a result, dust generated from the Project site may impact the surrounding environment and neighbouring residents, particularly those located approximately 190 m to the south (S) and 300 m to the east (E) of the Project site (see the oblong areas shown in Figure 11). Although construction activities are expected to be low intrusive, dust generated during land clearing, site levelling and concrete mixing may be carried away by the strong winds and dispersed over long distances from the Project site. In the unlikely event that dust control measures are not implemented, dust-related nuisances and complaints may arise.



Figure 11 – Aerial view of the residential communities adjacent to the Project site (Source: Google Earth, 2025)

The impact is adverse, direct as dust will result from direct construction activities and Project traffic. The duration of impact is temporary and reversible due to the short duration of the construction phase (expected to last for three months). The impact is localised as it is anticipated that the strong S and SSE winds will likely carry away the generated dust over long distances and disperse it within the broader town. The impact probability is rated likely due to the persistent presence of strong winds. The dust generated from the Project site will combine with the existing dust already carried by strong winds from other sources. Therefore, the magnitude of change is rated as moderate, and sensitivity of impact is medium as unmanaged dust emanating from the Project site may potentially lead to community nuisances, potential

health impacts and complaints. Overall, the significance of the impact expected to be adverse moderate (Table 10).

The following dust control measures are also provided in the ESMP:

- Limit land preparation activities and any other construction activities to the actual Project footprint;
- All vehicle, machinery and equipment should be shut down or throttled back between periods of no use;
- Designate a cement handling zone (area);
- Properly cover cement bags and storage areas to prevent them from being dispersed by strong winds;
- Project vehicles should be confined to established roadways;
- When possible, dust generating activities should be avoided during strong wind events; and
- Maintain a complaint register. Complaints received should be investigated and addressed as per the complaint management procedures.

Table 10 - Dust impact assessment ratings

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Land clearing, levelling and concrete mixing (construction activities) and Project vehicles travelling on dirt roads.	Lüderitz residents	Dust generated during the construction phase may impact residents in the immediate Project area.	Adverse Direct Reversible Local Temporary Likely (possible)	Moderate	Medium	Adverse Moderate (6)

7.2.2.2 Visual impact: disruption of the visual landscape and diminished sense of place

Visual impacts are changes to the scenic attributes of the landscape brought about by introduction of visual contrasts, which alters the human experience of the landscape.

The broader visual landscape of the Project area (including the Project erven) is significantly altered. Infrastructure in the broader space include the MTC 30 m telecommunication tower located on the Project erven, overhead powerlines and the wind turbines of the Ombepo Wind Power Project (Figure 12 (a) and (b) and Figure 13 (a)). Additionally, the immediate surrounding area and erven space is in a state of despair and is characterised by windblown debris (Figure 13).

The introduction of the Paratus telecommunication tower is expected to have a cumulative impact on the overall landscape and sense of place. However, the landscape is already disturbed, and it is expected that receptors will gradually adapt to the modified environment over time.

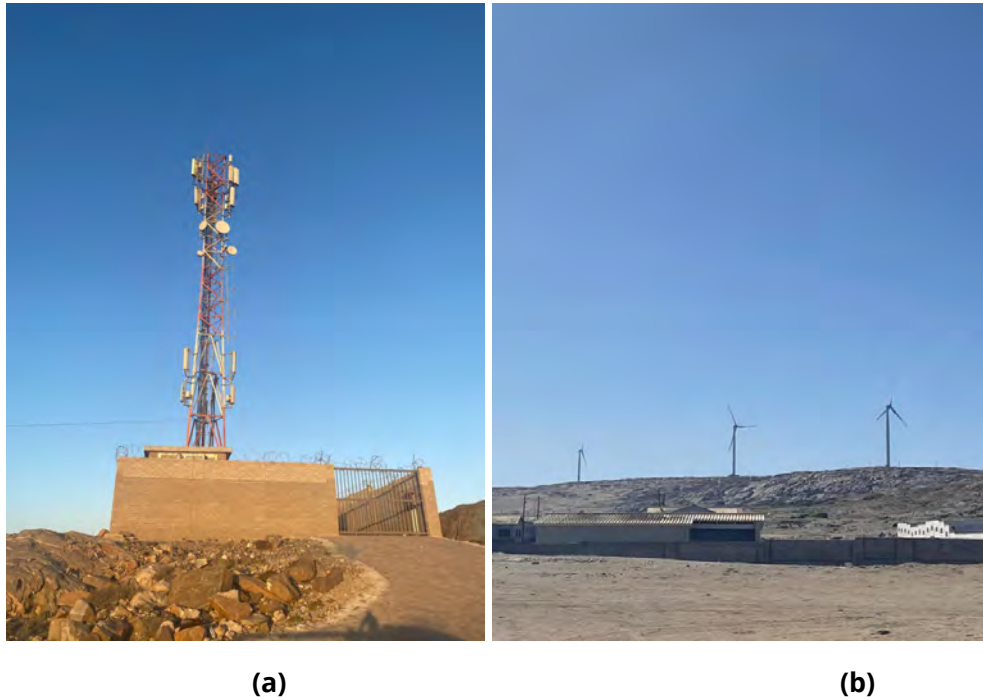


Figure 12 - MTC's 30 m telecommunication tower on Erf 886 (a) and the Ombepo Wind Power Project wind turbines (b) (Source: ECC)

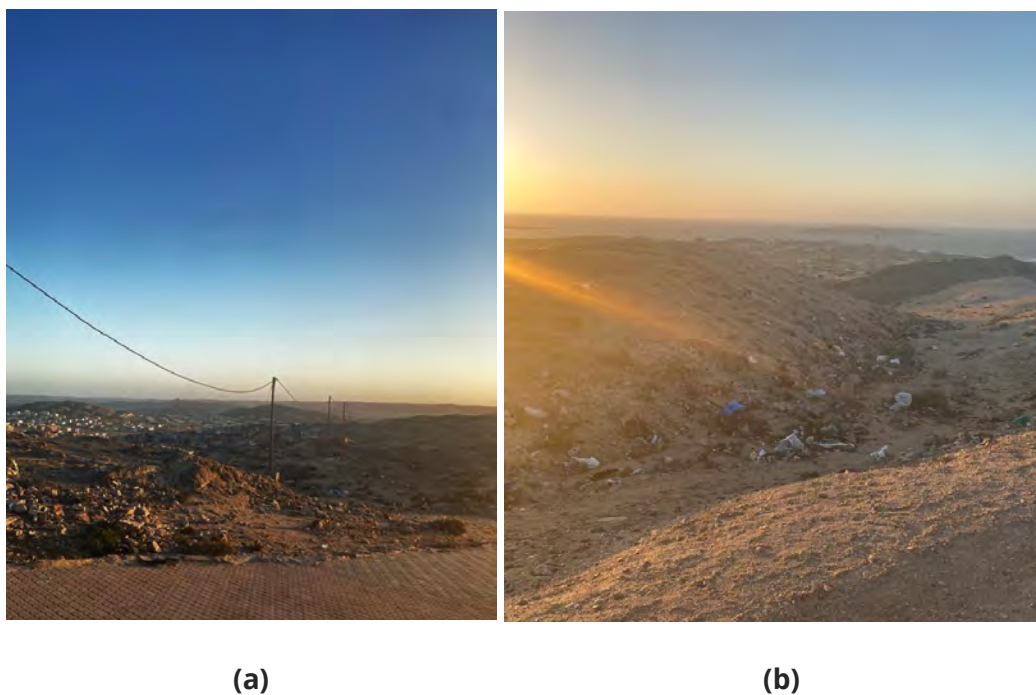


Figure 13 - Overhead powerline in the Project area (a) and windblown debris (b) (Source: ECC)

The visual impact of the Project development is adverse and localised, directly impacting the viewshed of receptors in Lüderitz. The impact is considered cumulative as the tower height will significantly alter the landscape when combined with infrastructure already present in the Project area. The impact is considered long-term, as the tower, like other telecommunication structures across country, is envisioned to remain operational for an extended period (20 years or more). The cessation of the Project or other ongoing operations will reduce the significance of the visual impact. Accordingly, the impact is considered as reversible. Cranes will only be used throughout the construction phase and will likely alter the viewshed of the site for a short duration. The likelihood of impact is rated as definite as the new development is required for the Project to be initiated and remain operational. The magnitude of change is rated as minor (low) as residents are already accustomed to the existing developments and are expected to gradually adapt to the modified environment over time. The sensitivity of the impact is considered low due to the localised nature of the impact and the resident's ability to adapt to the modified environment over time. Overall, the significance of the impact is rated as adverse moderate, as shown in Table 11.

The following mitigation measures are also provided in the ESMP:

- Maintain good housekeeping throughout the construction phase and during scheduled maintenance activities; and
- Cranes and all other tall construction equipment should only be retained on-site for the duration of construction activities.

Table 11 – Impact assessment ratings for visual landscape alteration and sense of place

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower construction and operation	Lüderitz residents	Disruption of the visual landscape and the loss of sense of place.	Adverse Cumulative Reversible Long-term Local Definite	Low	Minor	Adverse Moderate (4)

7.2.2.3 Visual impact: erection of tall infrastructure within the Lüderitz Airport (licensed airport) aerodrome radius and impacts related to local aircrafts colliding into the telecommunication tower

The topographic features of a site and anthropogenic artefacts both inside and outside an airport boundary influences infrastructure use. Objects penetrating the established imaginary obstacle limitation surfaces (OLS) for a given aerodrome or standing outside those surfaces must be mapped and risk assessed because they could be a hazard to air navigation (Morreti

et al, 2023). OLS provide volumes of airspace around and above an aerodrome and its runway(s) to ensure safety for aircraft in flight operations.

The 30 m BTS tower will be constructed within the 15 km aerodrome safety radius of the Lüderitz Airport. The Lüderitz airport accommodates both scheduled traffic for large aircraft and unscheduled traffic for local small fixed winged aircraft and is a common domestic flight destination. In the local context, the Namibian Civil Aviation Technical Standards (NAMCATS) established by the Namibia Civil Aviation Authority (NCCA) mandates the erection of obstacles within or near aerodromes. The NAMCATS ensure that obstacles do not pose a safety hazard to aircraft navigating in the airspace. The NCCA standards established in 2018 outline the following conditions, as applicable to the Project (NCCA, 2018):

Subpart 11 states that:

- **139.11.6 No. 1.5:** Navigation aids that could negatively impact the performance of the radio navigation or instrument landing systems may not be installed without the written approval of the Executive Director of the NCCA;
- **139.11.6 No. 1.6:** Buildings or structures exceeding 45 m in height above the aerodrome elevation may not be erected within a 15 km radius of the aerodrome reference point without prior written approval of the Executive Director of the NCCA; and
- **139.13.3 No3.19:** For obstacles less than 45 m above ground level, low-intensity obstacle lights, Type A or Type B may be used. According to Part 3.10, one or two of these lights must be positioned as close as practicable to the top of the structure. Type A and Type B low-intensity obstacle lights must be red, steady burning (non-flashing), minimum beam spread of 10° and with minimum night luminous intensities of 10 and 32 cd, respectively (NCCA, 2018).

Although the Paratus BTS tower will be constructed within the Lüderitz Airport aerodrome's 15 km radius safety area and may present a potential safety hazard to aircraft operating in the navigable airspace, its height will be 30 m, which is below the 45 m height limit that mandates authorisation from the NCCA. However, because the Lüderitz Airport is equipped with an Air Traffic Control (ATC) system that controls the movement of air traffic at the Lüderitz Airport and within the surrounding Lüderitz Control Zone (CTR) airspace, the Proponent must obtain approval from the Executive Director of the NCCA to ensure that the telecommunication tower's signals do not interfere with the airport's ATC communication systems.

The potential impact of aircraft colliding with the proposed telecommunication tower is considered adverse and direct as the tower will be constructed within the airport's aerodrome safety area. This impact is rated as long-term, as the tower is expected to remain operational for 20 years or more. The impact is localised, primarily impacting low-flying aircraft navigating through the Lüderitz Airports' controlled airspace. However, the likelihood of such collisions is

considered improbable (would rarely occur) as multiple similar tall infrastructure (such as the three Ombepo Power Project wind turbines and the existing MTC tower on the erven) are already present in the immediate vicinity and are clearly marked to support safe aircraft navigation. This means that pilots operating in and around the airport would be aware of the multiple tall infrastructure, which reduces the likelihood of an impact. Collisions are most likely to occur only under specific adverse conditions, such as reduced visibility during foggy weather. The magnitude of change is rated as moderate, and the sensitivity of impact is rated as medium due to the severity and consequences should an accident or incident occur. Overall, the significance of impact is rated adverse low (Table 12).

The following best practice measures are also included in the ESMP:

- **Colour markers:** the telecommunication tower must be equipped with alternating white and red or white and orange markers. The selected colours must provide adequate contrast against the background to ensure visibility (Figure 14);
- **Light marking:** the telecommunication tower must be equipped with low-intensity lights, either Type A or Type B to ensure the tower remains visible to the aircraft navigating in the airspace, particularly at night; and
- **Engagement with NCCA:** any proposed material changes should be communicated with the NCCA to ensure full compliance with all security and safety protocols.

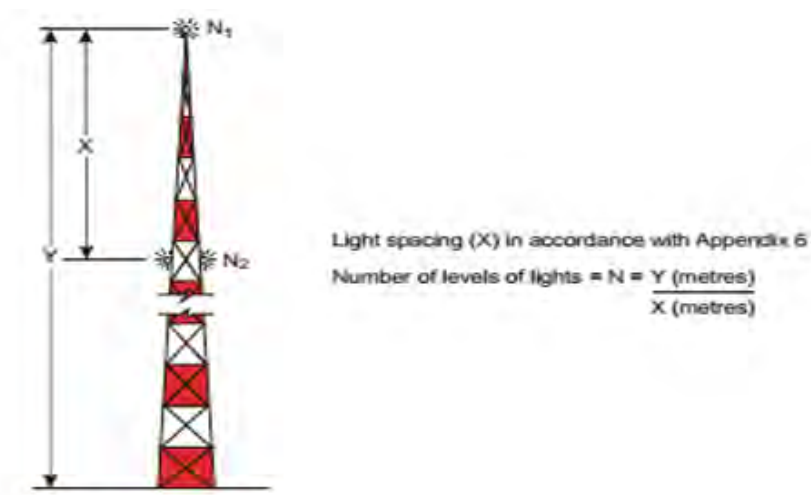


Figure 14 - Visibility markings on the telecommunication tower to enhance aircraft safety navigation (Source: NCCA, 2018)

Table 12 - Impact assessment ratings for the telecommunication tower as a potential obstacle within the Lüderitz Airport aerodrome

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower operation	Local aircraft navigating in the	Potential impact of local aircraft to collide into the	Adverse Direct Reversible Long-term	Medium	Moderate	Adverse Low (2)

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
	Lüderitz Airport airspace.	telecommunication tower.	Local Improbable			

7.2.2.4 Occupational health and safety: impact related to construction personnel potentially sustaining on-site injuries, partial disabilities, life threatening scenarios or death

Employee's health and safety are top priority in the workplace. Injuries sustained in the work environment can lead to partial disabilities and can significantly impact an individual's long-term well-being. These injuries not only compromise the health and well-being of employees but can also limit future employment prospects.

Construction work often involves complex tasks that require the use of heavy machinery and power tools, which requires specific knowledge and experience for safe operation. The fast-paced, high-pressure environment significantly increases the risk of injuries. Common injuries may result from slips, mishandling of power tools or missteps on the tower infrastructure. Minor injuries can include cuts, bruises and sprains, while more severe injuries may include fractures, dislocations, or traumatic head injuries. In extreme cases, fatalities may occur due to machinery accidents or falls from working at heights.

The strong winds experienced in Lüderitz may pose a safety risk to the construction and maintenance personnel. To minimise the risk of injuries or fatalities, the Proponent is expected to appoint a contractor with a competent and skilled workforce capable of working safely under these challenging conditions. Rigger competence certificates are required.

The nature of impact is adverse and will directly affect workers on-site. The duration of impact is rated permanent, although the construction phase is anticipated to be completed within three (3) months. Injuries sustained may be irreversible as they could result in serious, permanent disabilities or even fatalities. Although a competent and skilled workforce will be contracted, the probability for injuries remains high due to challenging and persistent strong windy conditions, which are expected to be intensified by the Project site's elevated location and per the season that construction will commence.

The erven is located on an elevated terrain, approximately 50 metres (m) higher than the adjacent low-lying areas that are characterised by residential development (Figure 15).

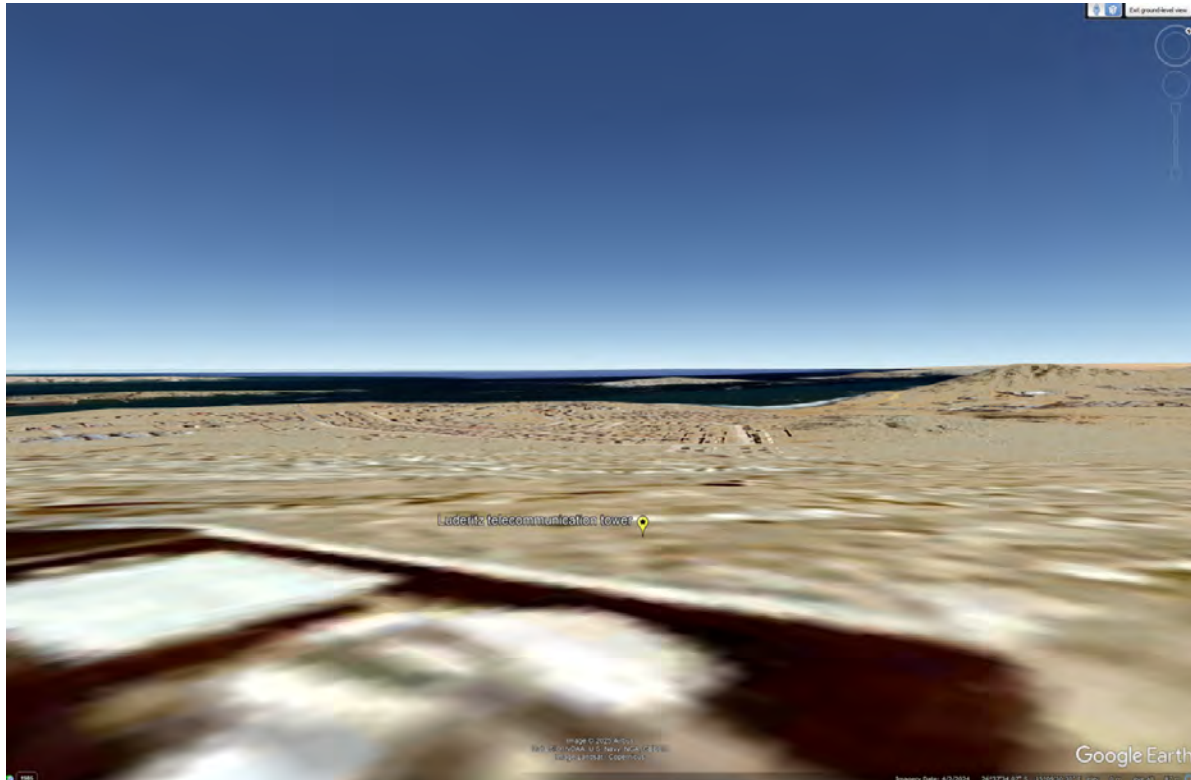


Figure 15 - Project site elevation in relation surrounding low-lying topography (Source: Google Earth, 2025)

The magnitude of impact is rated high due to varying degrees of injuries that could occur, while the sensitivity of impact is rated as medium as injuries could lead to permanent disabilities, which may restrict workers from securing future employment opportunities. It is recommended that all workers adhere to appropriate safety protocols during the undertaking of construction and maintenance activities to ensure their health and safety, particularly when operating cranes or working at heights. Overall, the significance of the impact, before mitigation is rated adverse major. The impact ratings (before mitigation measures) are provided in Table 13.

The Proponent is expected to abide to the following occupational health and safety measures, which are also outlined in the ESMP:

- Incorporate occupational health and safety requirements into the bidding and tendering process to ensure contractors and subcontractors meet such standards;
- Construction personnel must always observe safety precautions, with particular attention during periods of strong winds;
- The consumption of alcoholic beverages is not permitted on-site, and intoxicated workers should not be permitted on-site;
- Ensure that semi-skilled workers (if employed) receive comprehensive training and clear instructions on safe handling of tools and equipment and safely working at heights;

- Conduct regular supervision, site inspections to monitor compliance with safety standards (e.g. personal protective equipment (PPE) gears are appropriately worn and ensuring that tools are securely stored and in a manner that prevent them from free falling); and
- Maintain records of all injury statistics, track corrective actions and record lessons learnt to improve safety practices on-site.

Table 13 - Impact assessment ratings related to occupational health and safety

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower construction	Construction and maintenance personnel	Potential risk of on-site injuries and accidents during the execution of construction activities and maintenance work.	Adverse Direct Irreversible Permanent On-site Likely	Medium	High	Adverse Major (8) ¹

7.2.2.5 Noise impact: construction activities may generate noise which may lead to public nuisances and complaints

This section addresses the potential noise impacts of construction activities on the acoustic environment and noise sensitive receptors (NSRs). Noise is expected to be generated by excavators, cranes and bulldozers used for the site preparation and material transport. Additionally, trucks delivering materials or removing debris from site may generate considerable noise levels. The noise receptors identified are only nearby communities surrounding the Project site, as shown in (Figure 11).

The Project site is within a residential and recreational space and is bordered by homesteads (Figure 11). As a result, these receptors may be exposed to measurable noise levels. Although construction activities, cranes and concrete trucks will generate noise that could lead to disturbances, such as discomfort and interference with communication, intolerable noise levels are not expected to significantly propagate from the Project site. Additionally, construction and maintenance activities are scheduled to occur only during daytime hours to minimise the likelihood of community disturbances and complaints.

Noise impacts are rated adverse and direct as they will result directly from Project construction and maintenance activities. The duration of the impact is rated temporary as construction

¹ Post mitigation, the significance of the impact is expected to be adverse moderate.

activities are anticipated to be completed within three (3) months, while maintenance activities will likely require only one to two days during operations. It is expected that the site's elevation and the town's meteorological conditions will primarily influence the propagation of noise from the Project site towards the surrounding homesteads. As a result, the impact is expected to be localised. Noise levels are expected to diminish with increasing distance from the Project site. Therefore, the noise receptors, located approximately 190 m and 300 m or more from the Project site, will unlikely be significantly impacted. The nature of construction activities further reduces the probability of significant noise generation. No work is expected to occur overnight and therefore rest periods will not be disturbed. As a result, the likelihood of the impact is rated as low. Both the magnitude of the impact and the sensitivity of impact are rated low, as low noise levels are anticipated and there is a low probability of significant noise generation. Overall, the significance of impact is expected to be adverse low (Table 14). Noise attenuation measures are provided in the ESMP.

Table 14 - Noise impact assessment ratings

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower construction	Nearby homesteads (NSRs)	The Project has the potential to generate noise which may lead to public nuisance and complaints	Adverse Direct Reversible Temporary Local Low (unlikely)	Low	Minor	Adverse Low (1)

7.2.2.6 Heritage and culture: potential to discover or unearth new sites, objects or resources of heritage significance within the Project footprint

Archaeological sites and objects in Namibia are protected under the National Heritage Act No. 27 of 2004. This section discusses the impact related to the potential discovery of objects or resources of heritage significance in terms of the Act.

Lüderitz was historically a diamond mining area and today, the town is renowned for its diamond mining practices. Prominent buildings in town are associated with the colonial era of the country and have been declared National Monuments. Among these includes: the Railway Station Building, the German Lutheran Church, the Deutsche Africa Bank Building and the Krabbenhöft und Lampe Building (Faul et al', 2024).

Although the town has a rich diamond mining history, there are no known artefacts or designated exclusive zones within the erven. However, this does not preclude the likely chance of discovering or unearthing precious gemstones, heritage objects or resources that may be buried beneath surface. Although minimal land preparation activities are anticipated, there is a potential that heritage objects could be discovered by chance or unintentionally disturbed by

construction personnel who may be unaware of their aesthetic, cultural or economic significance.

The discovery of new heritage site or objects is considered beneficial as this would demonstrate the Proponent's commitments in preserving archaeological site and artifacts within the Project footprint. These discoveries can be relocated to the national museum for preservation, thereby enriching the town's archaeological history. The likelihood of the impact is rated as medium (possible) due to the town's historical background. Considering the likely scenario of the impact, the magnitude of impact is ranked moderate. Disturbances to resources could occur during the immediate discovery of these resources, although this is likely to be mitigated by the Proponent's prompt response and preservation procedures. The impact is therefore rated partly reversible. The sensitivity of the impact is rated high due to the significant heritage resources that could be discovered within the erven. Overall, the significance of impact is expected to be beneficial major as it will lead to the preservation of heritage objects or resources. The impact ratings are presented in Table 15.

The following management measures related to the preservation and relocation of discovered heritage objects and resources are also included in the ESMP:

- The Proponent is obligated to adhere to the requirements set forth in the Diamond Act No. 13 of 1999 in the event that precious gemstones are discovered within or around the erven;
- The precautionary chance find procedure must be developed and adopted throughout the Project lifecycle; and
- The Proponent must develop standard operating procedures related to the management and preservation of heritage resources or objects within the Project footprint.

Table 15 - Heritage impact assessment ratings

Activity	Receptor	Impact	Nature of impact	Value & sensitivity	Magnitude of change	Significance of impact
Land clearing or excavation activities	Cultural heritage	Potential discovery of new significant archaeological sites, objects or resources within the Project footprint	Beneficial Direct Partly reversible High/major Permanent National Medium (possible)	High	Moderate	Beneficial Major (9)

7.2.3 BIOPHYSICAL ENVIRONMENT – BIODIVERSITY IMPACTS

The biodiversity impact assessment evaluates the potential impacts on flora, fauna and avifauna. Key considerations include habitat and ecosystem disturbance or alteration, changes in behavioural patterns of key species, disruption to species listed under various conservation categories and the potential displacement of these species. In addition to biodiversity, the assessment also considers potential impacts on other environmental components, including soil quality, water resources and overall ecosystem health.

Most of these impacts are not expected to be triggered by the Project as the site is already disturbed and does not support any significant flora or fauna species. It is likely that species have relocated to less disturbed areas due to prior town rezoning, ongoing anthropogenic activities and other factors such as noise and light pollution. An overview of the significant impacts on the biophysical environment is shown in Figure 16 and the impacts are discussed in detail in the sections below.

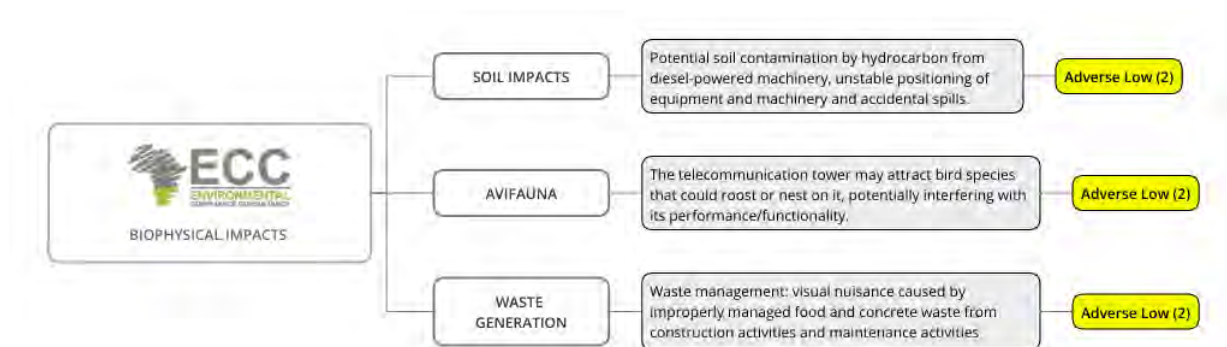


Figure 16 - An overview of the impacts on the biophysical environment

7.2.3.1 Soil impact: potential soil contamination by hydrocarbon from diesel-powered machinery, unstable positioning of equipment and machinery and accidental spills

There is potential for soil contamination on-site during the construction phase due to the use of diesel-powered machinery. Hydrocarbon spills may result from the handling and operation of machinery such as cranes, generators and other manually operated machinery. The operation of these machinery increases the likelihood of fuel leaks, accidental spills, seepage which could degrade soil quality if not properly managed.

The impact is considered adverse, direct, temporary and on-site as contaminations will occur during construction activities. The Project site is situated on a slightly inclined terrain, which may be unstable when positioning equipment and machinery during the construction phase. As a result, hydrocarbon spills could occur due to unstable storage conditions, machinery mishandling, equipment malfunction or accidental incidents. Therefore, the probability of spill

occurrences is rated as medium (possible). This impact is deemed reversible as hydrocarbon spills can be cleaned up effectively and properly treated or disposed of.

The magnitude of change is rated low as minor spills are anticipated and there will be no significant or widespread contaminations. A minor spill, in this context, constitutes a hydrocarbon spill that is less than 500 ml and does not pose an immediate fire, safety, environmental or health hazard to personnel. The sensitivity of impact is rated low considering the limited scale of the impact. Overall, the significance of impact is rated as adverse low (Table 16). Appropriate mitigation measures are provided in the ESMP to ensure the proper handling of machinery, equipment as well as effective clean-up and management of any hydrocarbon spills.

Table 16 - Impact assessment ratings related to soil contamination

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Construction activities	Soil	Potential hydrocarbon contamination from diesel-powered machinery, unstable equipment and machinery positioning and accidental spills.	Adverse Direct Reversible Temporary On-site Medium (possible)	Low	Low	Adverse Low (2)

7.2.3.2 Avifauna impact: the telecommunication tower may attract bird species that could roost or nest on it, potentially interfering with its performance

Lüderitz is located within an Important Bird Area (IBA), known for its high species abundance due to the nutrient rich waters. The IBA list consists of four islands: Halifax Island, Penguin Island, Seal and Flamingo Island and the rocky shoreline of the mainland. The islands support more than 10 000 birds.

The telecommunication tower may attract certain bird species that could roost or nest on the structure. This behaviour has the potential to interfere with the tower's performance and functionality, particularly if nesting materials or droppings accumulate on sensitive equipment or obstruct signal transmission. Additionally, the build-up of bird droppings is a nuisance factor to the service provider and residents, and the equipment can corrode over time. This build-up creates an unsanitary environment, which may contain pathogens, and which increases the risk of respiratory infections and skin irritations (Sabine, 2023).

The telecommunication tower is not expected to attract the shoreline birds such as African Penguins, Bank Cormorants, Crowned Cormorants, Cape Gannets and Greater Flamingos as these species typically prefer shallow coastal waters for wading (Lantz et al, 2011). These birds are more suited to habitats that offer extensive, shallow waters and emergent vegetation, which also provide favourable conditions for foraging and nesting.

Some birds such as Pied crows and Rock pigeons are highly adaptable birds and thrive in urban environments (Johnson and Murn, 2019). These species have resilient and flexible characters that allows them to exploit a variety of habitats, including human-made structures such as buildings, bridges and telecommunication towers. This adaptability enables them to coexist in disturbed or transformed areas. These species often take advantage of available food resources and nesting opportunities within these environments (Johnson and Murn, 2019).

The adverse impact is expected to be direct, long-term and confined to the Project site. Although certain species, such as Pied crows and pigeons may be attracted to the tower, most coastal birds are not expected to be detracted from their preferred home ranges. The duration of impact is rated long-term as the tower is expected to remain operational for an extended period (i.e. 20 years or more). Human presence and other noise-generating activities are expected to deter birds (including seasonal migratory birds) from the vicinity of the town in search for quieter, undisturbed habitats. Therefore, both magnitude of impact and sensitivity of impact are rated low. The likelihood of the impact occurring is assessed as medium (possible), as a certain bird categories may be attracted to the telecommunication tower. The impact will be reduced to an acceptable level as it is unlikely that any threatened or critically endangered species will be impacted. Overall, the significance of the impact is expected to be adverse minor (Table 17). The mitigation measures are provided in the ESMP.

Table 17 - Avifauna impact assessment ratings

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower operation	Avifauna	The tower may attract bird populations that could roost or nest on it, potentially affecting its functionality or performance.	Adverse Direct Reversible Long-term On-site Medium (possible)	Low	Minor	Adverse Low (2)

7.2.3.3 Waste generation: visual nuisance caused by improperly managed food and construction waste from construction and maintenance activities

During the construction phase and scheduled maintenance of the telecommunication tower, various types of waste are expected to be generated. This includes food waste from construction personnel and construction related waste such as concrete debris, packaging materials and off-cuts building materials. If not properly managed, such waste can be a visual nuisance, detract the aesthetic value of the area. Improper disposal of these wastes would undermine the town's environmental management objectives of maintaining cleanliness and preserving its appeal to visitors.

This impact is adverse as waste of any kind disrupts the natural appeal of the environment. It is a direct impact as waste will be generated directly from construction activities. The duration of impact is rated temporary, considering that the construction phase will last approximately three (3) months and scheduled maintenance activities will typically take a day or a week to complete. It is likely that waste may be blown from the Project site by the strong winds experienced in Lüderitz and may be dispersed to other areas of the town. Therefore, the impact may be expected to be localised. The likelihood of improper waste management on-site is rated as medium (possible), primarily due to the prevailing wind conditions. The types of wastes expected to be generated are non-hazardous and are manageable through standard procedures. As a result, both magnitude of impact and sensitivity of impact are rated low. Overall, the significance of impact is rated as adverse low. Contractor personnel are expected to implement best waste management practices, as outlined in the ESMP. The impact assessment ratings are provided in Table 18.

Table 18 - Waste generation impact assessment ratings

Activity	Receptor	Impact	Nature of impact	Value and sensitivity	Magnitude of change	Significance of impact
Tower construction	Avifauna	Construction and food waste generated during the construction phase and maintenance activities may be inappropriately disposed (dispersed to other areas of the town.	Adverse Direct Reversible Temporary Local Medium (possible)	Low	Low	Adverse Low (2)

7.2.4 CUMULATIVE IMPACTS

The ESIA Regulations state that cumulative impacts should be considered as part of the ESIA process. Good practice requires that, as a minimum, cumulative impacts are assessed during the ESIA process. Cumulative impacts can arise when a single resource or receptor is affected by more than one impact from the proposed Project. For example, sensitive receptors could be affected by noise from construction vehicles and dust from ground excavation during the construction phase. In isolation, the impacts of noise and dust may be insignificant, however, when combined the impacts on the receptor (if present) may result in a significant impact (intraspecific cumulative impacts).

Cumulative impacts may also arise because of the combination of two or more projects (interspecific cumulative impacts). A receptor could be impacted by similar types of impact from different developments or a receptor. Cumulative impacts have a wide temporal and spatial scope and are not restricted to a local area nor need to happen at the same time. It is, therefore, crucial to identify a suitable study and assessment area, as well as a timeframe to assess. Cumulative impacts can also be vast and complicated; therefore, it is important to focus on the significant impacts.

The six-step rapid CIA process has been followed:

- Step 1: Scoping – determine spatial and temporal boundaries;
- Step 2: Scoping – identify valued environmental and social receptors and identify reasonably foreseeable developments;
- Step 3: determine the present condition of valued environmental and social receptors (baseline);
- Step 4: assessment of cumulative impacts and evaluation of the significance of the cumulative impacts; and
- Step 5: identification of mitigation measures to avoid or reduce cumulative impacts.

Interspecific cumulative impacts

The intraspecific cumulative impacts are expected to be localised and unlikely to impact adjacent communities, and as such, they are not discussed further in this section. The intraspecific cumulative impact may result from the proposed Project activities is presented in Figure 17. The impact(s) are discussed in detail in the section below.

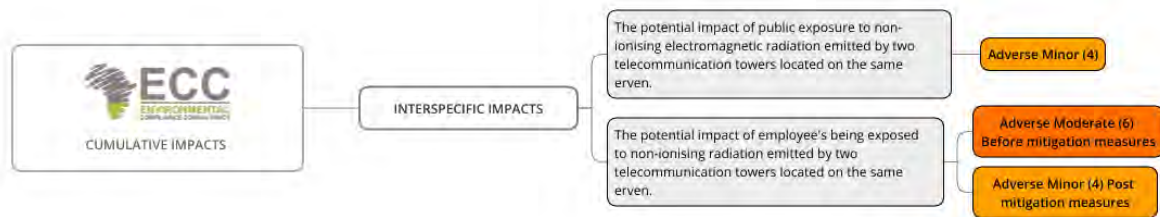


Figure 17 - An overview of the interspecific cumulative impacts

7.2.4.1 *The potential impact of public exposure to non-ionising electromagnetic radiation emitted by two telecommunication towers located on the same erven*

This assessment explores the potential impact of public exposure to non-ionising electromagnetic radiation emitted by two telecommunication towers situated on the same erven. Although the radiation from such towers is typically low in energy and regulated by national and international safety standards, the combined emissions raise concerns about prolonged exposure.

During the public meeting, concerns were expressed regarding the potential health effects of cumulative non-ionising electromagnetic radiation emitted by two telecommunication towers built on the same erven. Post the public meeting, the EAP and the Proponent resolved not to commission a specialist cumulative electromagnetic impact assessment to conduct a detailed, site-specific impact assessment. Instead, the cumulative impact would be addressed through a review and synthesis of existing scientific literature, published studies and internationally recognised guidelines pertaining to public exposure to electromagnetic radiation. However, the Environmental Commissioner (EC) has the mandate to request this specialist study if deemed relevant during the record of decision (RoD) process.

The potential impact of radiation from a telecommunication tower on surrounding communities is typically assessed in terms of electromagnetic fields (EMF) and radiofrequency (RF) radiation. Telecommunication towers emit non-ionising radiation and their energy levels are significantly lower than those of ionising radiation.

The International Commission for Non-Ionising Radiation Protection (ICNRP) is an independent scientific body that provides expert guidance on the health and environmental effects of non-ionising radiation to safeguard both human health (occupational and public) and the environment. In the local context, the National Radiation Protection Authority (NRPA) is the regulatory body responsible for the administration of the Atomic Radiation Protection Authority Act No. 5 of 2005. To ensure compliance with safety standards, this assessment has referred to the ICNRP guidelines to assess whether radiation levels emitted by telecommunication towers surpass the established safe limits.

Literature review

According to Levitt and Lai (2010), populations residing near telecommunication towers have been reported to experience a variety of neurophysiological effects (non-thermal effects) attributed to exposure to non-ionising electromagnetic radiation. These effects include headaches, skin rashes, sleep disturbances, depression, decreased libido, concentration difficulties, dizziness, memory changes and an increased risk of cancer. These are primarily considered short-term impacts, however, there is a growing concern regarding the potential for more severe long-term health impacts (Dua et al, 2022).

According to Levitt and Lai (2010), limited literature exists regarding the effects of long-term exposure to electromagnetic radiation, such as that experienced by individuals residing near telecommunication installations for periods spanning several months or years. However, children and pregnant women are believed to be more vulnerable to the adverse effects of prolonged exposure to radiation.

Electromagnetic propagation distance

According to the International Commission on Non-Ionising Radiation Protection (ICNIRP), the reference density limits for base transceiver station (BTS) operating frequencies are 4.7 W/m^2 for 900 MHz and 9.2 W/m^2 for 1800 MHz. The intensity of radiation emissions from the BTS decreases inversely with increasing distance from the tower. Additionally, signal strength is further attenuated by physical barriers such as buildings, as well as by the surrounding terrain between the emission source and the point of measurement. Therefore, radiation intensity is expected to be higher near the tower and lower at greater distances. Figure 18 shows a visual representation of this concept.

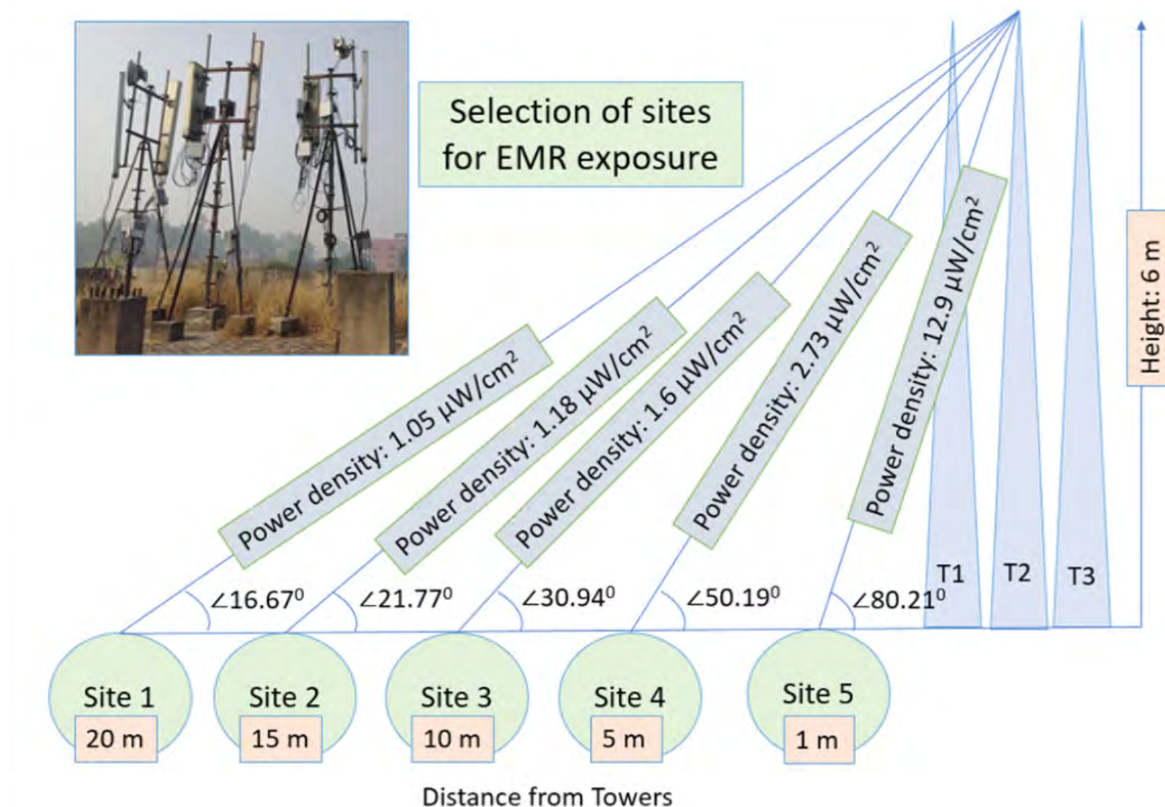


Figure 18 – Variation in electromagnetic field strength at different distances for the telecommunication tower

Impact assessment findings

According to the ICNIRP guidelines, for a base transceiver station of this type, no residential structures should be within 410 cm (4.1 m) of the installation. This minimum safe distance is intended to reduce the risk of exposure to electromagnetic radiation emission by telecommunication towers. In the present context, the nearest homesteads are located approximately 190 m and 300 m to the south and east of the erven, respectively (Figure 11). Although this assessment does not quantify the maximum radiation emissions from the two telecommunication towers and the subsequent exclusive zones, these distances indicate that the public will remain within safe exposure limits. Additionally, radiation intensity is expected to significantly diminish with an increase in distance, therefore radiation at the receptor's points are expected to be relatively low.

The precautionary principle is applied in this assessment as a risk management approach, given the scientific uncertainties and the lack of conclusive evidence concerning the long-term effects of radiation exposure. It is important that the Proponent ensures that the technology and tower materials to be used comply with the ICNIRP guidelines and are approved by the relevant national regulatory authorities in Namibia, such as National Radiation Protection Authority

(NRPA), Communications Regulatory Authority of Namibia (CRAN) and the Namibia Civil Aviation Authority (NCAA).

The impact is assessed as adverse, cumulative and reversible under normal operating conditions, assuming that only approved telecommunication materials are procured and installed, and both telecommunication towers function as intended. This impact is considered localised as the susceptible receptors are located approximately 190 m and 300 m from the Project site. The probability of impact under these conditions is rated as low (unlikely). This is because the homesteads (receptors) fall outside the risk zones and radiation emissions from the two telecommunication towers are expected to decrease with increased distance from the towers. Additionally, radiation emissions from the two towers are expected to be attenuated by the Project site's varied terrain, which includes both elevated and depressed areas. The impact is rated as long-term as the towers will remain operational for an extended period (20 years or more). Although the likelihood of the impact is rated low, the magnitude of change is rated as moderate due to the health risks and implications associated with exposure to radiation, particularly in this instance from two telecommunication towers and the scientific uncertainties regarding long-term effects. The sensitivity of impact is rated as medium as communities are less likely to be significantly impacted, under normal operating conditions. These communities are also expected to have the capacity to adapt to the impact, should a minor exposure occur. Overall, the significance of the impact (before mitigation) is expected to be adverse – minor (Table 19).

Table 19 - Interspecific impact regarding public exposure to cumulative non-ionising electromagnetic radiation

Receptor	Impacts	Significance of impact	Impact management
Lüderitz residents	Activity: Operation of two telecommunication towers on the same erven. Impact: Potential impact of public exposure to non-ionising electromagnetic radiation emitted by two telecommunication towers on the same erven (Erf 886).	Minor (4)	– The Proponent must ensure that tower materials comply with the ICNRIP guidelines and are approved by the relevant national regulatory authorities in Namibia (i.e. CRAN, NRPA and NCAA); – Obtain formal consent from the NRPA concerning public exposure to radiation emitted by the telecommunication tower; – Record and address all community complaints related to potential public radiation exposure. A high volume of complaints should trigger a formal investigation and site-

Receptor	Impacts	Significance of impact	Impact management
			specific specialist studies should be conducted as necessary; - The Proponent shall ensure that the Project site is secured with a palisade fence to prevent unauthorised entries; and - Warning signboards, translated into the local languages such as English, Afrikaans, Oshiwambo etc. should be mounted on the security fence to inform and alert the public about the site's restrictions and safety precautions.

7.2.4.2 The potential impact of employee's being exposure to non-ionising radiation emitted by two telecommunication towers located on the same erven

Construction and maintenance personnel are likely to be within the established occupational 190 cm (1.9 m) risk zone. At close range, employees will be exposed to intense radiation. During the construction phase, personnel will work in close proximity to the MTC tower and be exposed to radiation emitted by the tower, as well as radiation from tower materials through different handling and installation processes. The level of exposure and its potential severity depend on the duration of the construction phase (expected to last approximately three months) and maintenance activities, which are expected to be much shorter, typically ranging from a single day to a week, depending on whether major repairs are required. As a result, the duration of the impact is rated as short-term. The probability of the impact is rated as definite as construction and maintenance works are required for the successful operation of the Project. The magnitude of change is rated as moderate, based on the expectation that employees will consistently adhere to the necessary safety protocols and precautions and will always wear appropriate PPE. The sensitivity of impact is rated as medium as employees are expected to adapt with some difficulty but will maintain their pre-impact condition. It is also noted that experienced personnel are generally accustomed to working in environmental with radiation exposure and will likely be familiar with the relevant safety practices and protective measures. Overall, the significance of the impact before mitigation is rated adverse moderate (Table 20).

Table 20 - Cumulative impact regarding employees' exposure to electromagnetic radiation from two telecommunication towers on the same erven

Receptor	Impacts	Significance of impact	Impact management
Contractor employees	Activity: Operation of two telecommunication towers on the same erven. Impact: Potential impact of employee's exposure to non-ionising electromagnetic radiation emitted by two telecommunication towers on the same erven (Erf 886).	Moderate (6)	- The Proponent must ensure that provision for occupational health and safety requirements are clearly incorporated in the bidding and tendering processes; - Contractor employees must always be equipped with the necessary PPE throughout the construction phase and during scheduled maintenance activities; and - Employees loitering at the Project site is strictly prohibited.

8 CONCLUSION

A scoping, with impact assessment has been undertaken for the proposed Project to identify the potential impacts and evaluate their severity and significance. The potential impacts likely to be triggered by the Project include impacts related to employment creation, noise impacts, occupational health and safety impacts, visual impacts, air quality impacts (dust), socio-economic impacts, potential public risk to non-ionising radiation, potential soil contamination and potential avian and avifauna interaction with the telecommunication tower. No specialist study was undertaken for this ESIA study. However, a key area of concern that requires careful monitoring is public exposure to electromagnetic radiation emitted by two telecommunication towers situated on the same erven. In the event of a high volumes of public complaints, a detailed investigation should be initiated, and a site-specific specialist study must be conducted to assess the potential impact(s) and provide recommendations on the most practical mitigation measures. The management and mitigation measures outlined in the ESMP must be implemented and monitored to ensure that significance impacts are reduced as far as reasonably possible.

Table 21 summarises the impacts after mitigation. On a scale of 1 to 12, low to high, the beneficial (B) and negative (N) impact significance is stated.

Table 21 - Summary of the significance rating before mitigation for the expected impact

Socioeconomic environment:		Socioeconomic Environment: social		Biophysical environment	
Socioeconomic	environment:	Socioeconomic	Environment: social	Biophysical environment	
Impact on employment creation (temporal jobs)	B3	Potential public exposure to radiation (CIA)	N2	Avifauna: nesting and roosting on the tower	N2
Impact on employment creation (permanent jobs)	B3	Potential workers exposure to radiation (CIA)	N4	Soil contamination	N2
Competition with other service providers	B8	Visual impact and sense of place	N3	Waste generation	N2
Revenue generation for the government (GDP)	B12	Air quality (dust)	N4		
Improved network coverage on businesses economic performances	B8	Potential for the tower to interfere with local aircraft operations	N2		
Skills development of local employees	B8	Occupational health and safety	N6		
		Noise impacts	N1		
		Heritage impacts	B9		

The assessment findings conducted for this Project indicate that the Project may have moderate to minor impacts and some beneficial impacts on the receiving environment (Table 21). These areas should be managed as per the commitments outlined in the ESMP (Appendix A). This will ensure that the Project remain compliant with the relevant legislation and environmental best practices.

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APPENDIX A – ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

APPENDIX B – BACKGROUND INFORMATION DOCUMENT

APPENDIX C – PUBLIC CONSULTATION DOCUMENT

APPENDIX D – LAND-USE APPROVAL



**LÜDERITZ TOWN COUNCIL
P. O. BOX 19
LÜDERITZ**

Tel: +09264 63 207800
Ref: Telecommunication Infrastructure
Enquiries: Mr. Otto K. Shipanga

Email: ceo@ltc.com.na

Fax: +09264 63 202971

18 October 2024

Mr. Gert Duvenhage
Chief Operations Officer: Group
Paratus Telecommunications (Pty) Ltd
Windhoek
Tel: +264 83 300 1000
Email: info.na@paratus.africa

Dear Mr. Duvenhage,

**RE: APPLICATION FOR LAND TO ERECT TELECOMMUNICATIONS
INFRASTRUCTURE-PARATUS**

The aforementioned subject bears reference.

The Council at its Ordinary Council meeting held on the 11 July 2024, resolved by means of a Council's Resolution No.: **C48/11/07/2024** as follows:

- a) Council approves to lease a portion of Erf 886, Lüderitz which measure 50 m² to at a rate of N\$ 1.47/ m² to Paratus. The total lease per month will be N\$ 73.50 for 11 months with the option to renew on annual basis.
- b) Council approves that Paratus be responsible for the cost of bring services water, electricity, sewer and road connection to the property.
- c) Should the applicant wish to make any structural alterations, the building plans to be submitted and approved by the Technical Department before commencements of activities.
- d) Paratus to be responsible for the restoration of the property to its original state.
- e) Council approves that the lease to be strictly for Paratus lease is not transferable. Furthermore, no subleasing is allowed.
- f) Paratus has a period of two normal working weeks to officially accept or reject Council's offer. Failure to response will deem the allocation cancelled without further notice.
- g) The erf to revert back to Council after two months of lease if no improvements has been done.
- h) Council approves that further conditions favorable to Council will be outlined in the Lease Agreement by Administration.

All official correspondence must be addressed to the Chief Executive Officer

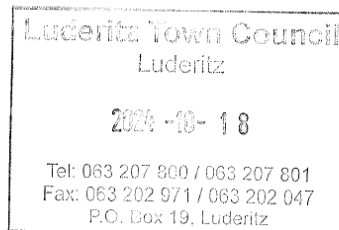
I hope the above is in order.

Yours sincerely,



Mr. Otto K. Shipanga
Acting Chief Executive Officer
Lüderitz Town Council

Cc: All HODs
Mr. Jonas Mahalelo- Control Officer: Properties
Ms. Helena Thomas- Town Planning Officer
Properties Division
Mr. Elwin !Gaoseb- PRO
Ms. Justine Louw- LECD Officer
Mrs. Martha Blockstein- PA to the CEO



All official correspondence must be addressed to the Chief Executive Officer

APPENDIX E – FORMAL ENGAGEMENT BY PARATUS REQUESTING INFRASTRUCTURE SHARING WITH PARATUS

APPENDIX F – EAP CVS