Environmental Scoping Assessment (ESA) for the Proposed Construction and Operation of a 25m Lattice Telecommunication Tower located in Kehemu1_North/Rundu Catholic Centre, Kavango East Region: An Application for Environmental Clearance Certificate

ECC Application Reference: APP-005574

Document Version: Final

Author: **Ms. Iyaloo Nakale** Company: **Excel Dynamic Solutions (Pty) Ltd** Telephone: **+264 (0) 61 259 530** Fax2email: **+264 (0) 886 560 836** Email: **info@edsnamibia.com**	Client: **Mobile Telecommunication Company (MTC)** Contact person: **Mr. Tuhafeni Erastus** Telephone: **+264 (0) 81 3251726** Postal Address: **P.O Box 23051, Windhoek, Namibia** Email: **TErastus@mtc.com.na**

APRIL 2025

EXECUTIVE SUMMARY

Introduction

Namibia is experiencing a rapid increase in the use of mobile communication services, which has led to a rise in local pressure for efforts to expand on telecommunications infrastructure. Mobile Telecommunication Company (MTC) (The Proponent) proposes to erect and operate a 25 m Lattice (network) tower in Kehemu1_North/Rundu Catholic Centre, central coordinates (-17° 54' 19.69"S; 19° 47' 5.19"E) located within the Rundu Urban Constituency in Kavango East region as indicated in **Figure 1**.

The rapid expansion of urban development and land use in Rundu has led to a heavy reliance on telecommunications amongst locals, from the use of telephones, mobile phones and other electronic devices for information sharing and connections. This has brought about demand for increase in telecommunications infrastructure and services. In order to facilitate mobile connection services that run smoothly and conveniently, the services infrastructure need to be of good standard in order to provide high quality and better coverage to the mobile users.

The proposed activity will provide additional capacity, reducing congestion problems and improving network coverage in the Kehemu1_North/Rundu Catholic Centre. This will also ensure improved quality of the service provided to mobile users in the area.

Project Description

The current network shortfalls experienced and anticipated to mobile users in the area led to this project site selection. Project activity include establishment (construction), and eventual operations and maintenance of the network tower.

Construction Phase:

There will be minimal earthworks to prepare the site for tower construction. The construction works are expected to last for at least one month. The tower structure will be mounted to a concrete foundation and will not require any supporting cables. The physical assembling of the network structure and the construction of the foundations will take place on the site. The network structure will be earthed to protect it from lightning. For safety reasons, the tower site will be

fenced off with palisade fencing to ensure that access is limited to authorised personnel and to prevent vandalism.

MTC intends to appoint a local contractor to carry out the construction. Works will be carried out during weekdays only. Preference for the construction works will be given to locals, i.e., contractors from Rundu. The appointed contractor will be required to provide appropriate Personal Protective Equipment (PPE) to all their employees while carrying out the construction works on site.

Operational and Maintenance Phase:

This is the phase during which the tower and its associated infrastructure are operational, providing network signal to the residents of the Kehemu1_North/Rundu Catholic Centre. Maintenance of the tower will be done by the Proponent's Maintenance Department, when required. The Proponent should ensure that all employees carrying out maintenance works on site are provided with appropriate PPE.

Services and Infrastructure

Power supply: No electricity is required during the construction of the tower. However, it will be required during the operational and maintenance phase of the tower. The operation of the tower will require an alternative current (AC) power, which will be connected to the Rundu Municipal Grid via a metered connection.

Water supply: Minimal amount of water will be required for the construction. This water will be used for drinking and efficiently used for in-situ concrete mixture, i.e. the amount of water will be sourced from the nearby facilities. This will be upon agreement with the Rundu Town council or relevant water supplier, who can be the nearest home or business owners.

The appointed local construction contractor will be responsible for the sourcing of water.

Site Access: The site is located next to the Usivi road. There is an existing gravel access route leading directly to the site.

Waste Management: The waste generated on site during construction and maintenance phases will be stored and transported to the appropriate (waste type) landfill sites in Rundu. The Proponent will enforce the availability of portable toilets for the construction team (contractors) while on site.

Decommissioning Phase

Decommissioning of the network tower is not anticipated, as long as there is need for use of mobile communications and associated services in the town.

Potential Impacts identified

The potential impacts of the proposed project have been identified as they relate to the project activities in terms of a source-pathway-receptor risk based methodology and in consultation with interested and affected parties. By considering the potential risk areas associated with the receiving biophysical and social environment, the following key impacts have been highlighted for consideration:

Potential positive impacts:

- **Telecommunication convenience:** Current and future residents (mobile users) will have an improved infrastructure and will not have to struggle with network coverage.
- **Employment creation:** Creation of a few temporary jobs during the construction of the tower.
- **General contribution to local economic development** through reliable communications services.

The following potential negative impacts are anticipated:

- **Physical land / soil disturbance:** Excavation activities to erect the tower could potentially lead to the disturbance of site soils.
- **Loss of Biodiversity (Avifauna)**
- **Noise and disturbance:** During tower' construction.
- **Visual impact:** The presence of the tower in the neighbourhood may be a nuisance to locals.
- **Impacts to Human Health:** short and long term impacts of Electromagnetic Radiation on human health.
- **Potential occupational health and safety risks** associated with mishandling of construction and operations equipment.
- **Civil Aviation concerns:** The proposed site designs and locations need to be verified to ensure that it meets the approval of the Directorate of Civil Aviation regarding the height of the masts and the position and stability of transmitters.

- **Environmental pollution:** from improper disposal of waste generated during construction and maintenance phases.
- **Vehicular traffic safety:** from increased number of vehicles moving around the project site and slow-moving trucks transporting project structures during construction, and
- **Archaeological or cultural heritage impact:** through unintentional uncovering of unknown archaeological objects or site by certain project activities such as excavation (the minimal site works).
- **Waste Generation** from improper disposal of waste generated during construction and maintenance.
- **Dust Generation** from construction works and vehicular traffic

The potential negative impacts were assessed, and mitigation measures provided accordingly.

Conclusion

The potential (positive and negative) impacts that are anticipated from the proposed construction of the telecommunication tower and related activities were identified, described, and assessed. Most of the identified potential negative impacts are rated as of Medium Significance. Therefore, in order to reduce the significance from medium to low, it is recommended that the Proponent effectively implement mitigation measures. In order to maintain a low significance, the implementation of measures will need to be continuously monitored in order to reduce to impact to low and bring the impact under control.

It is, therefore, recommended that in the event of an ECC issuance, the conditions provided in this ESA may be appropriate to ensure minimal environmental impact for this project.

Limitations

EDS warrants that the findings and conclusion contained herein were accomplished in accordance with the methodologies set forth in the Scope of Work and Environmental Management Act (EMA) of 2007. These methodologies are described as representing good customary practice for conducting an Environmental Impact Assessment of a property for the purpose of identifying recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist on the subject property conditions that could not be identified within the scope of the assessment, or which were not reasonably identifiable from the available information. The Consultant believes that the information obtained

from the record review and during the public consultation processes concerning the proposed tower' construction activities/works is reliable.

Disclaimer

EDS cannot and does not warrant or guarantee that the information provided by the other sources is accurate or complete. The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluations. No other warranties are implied or expressed.

Some of the information provided in this report is based upon personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records and the personal recollections of those persons contacted.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
Introduction i
TABLE OF CONTENTS vi
LIST OF FIGURES viii
LIST OF TABLES viii
LIST OF APPENDICES ix
LIST OF ABBREVIATIONS ix
1 INTRODUCTION 1
1.1 Project Background and Location 1
1.2 Terms of Reference (TOR), Scope of Work and Document Contents 4
1.3 The Need for the Proposed Project (Motivation) 4
1.4 Appointed Environmental Assessment Practitioner 5
2 PROJECT DESCRIPTION AND PROPOSED ACTIVITIES 5
2.1 Planning and Design Phase 5
2.1.1 Design and Technical Aspects 6
2.2 Construction Phase 7
2.3 Project Input and Resources Requirements 8
2.3.1 Project Personnel and Accommodation 8
2.3.2 Water Supply 8
2.3.3 Power Supply 8
2.3.4 Site Access (Roads) 8
2.2.5 Health and Safety 8
2.3.6 Potential Accidental Fire management 9
2.3.7 Waste Management 9
2.3.8 Site Fencing 9
2.4 Decommissioning Phase 9
2.5 Post-Construction Site Rehabilitation and Decommissioning 9
2.6 Operational and Maintenance Phase 10

3 PROJECT ALTERNATIVES....10
3.1 Types of Alternatives Considered....11
3.1.1 The "No-go" Alternative....11
3.1.2 Locations of the Telecommunication Tower....11
3.1.3 Infrastructure sharing as per the Communications Act of 2009: Tower Sharing....11
4 LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES....12
4.1 The Environmental Management Act (No. 7 of 2007)....12
4.2 The Communications Act (No. 8 of 2009)....12
5 ENVIRONMENTAL BASELINE....23
5.1 Climate....23
5.2 Topography....24
5.3 Soils....24
5.4 Flora and Fauna....25
5.5 Groundwater and Surface Water....27
5.6 Socio-economic Status....27
5.7 Telecommunications....29
6 PUBLIC CONSULTATION PROCESS....29
6.1 Registered Interested and Affected Parties (IAPs)....30
6.2 Communication with I&APs....31
6.3 Public Consultation & Immediate Neighbors' Survey (Forms)....32
7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES....33
7.1 Identification of Potential Impacts....33
7.2 Impact Assessment Methodology....34
7.2.1 Impact Assessment Criteria....34
7.2.2 Impact Significance....37
7.3 Assessment of Potential Negative Impacts: Construction & Operations....38
7.3.1 Soil Disturbance (Land Degradation) and Pollution....38
7.3.2 Potential Impact on Human Health: Non-Ionizing Radiation....39

7.3.3 Potential Impact on Civil Aviation 41
7.3.4 Visual Impact 42
7.3.5 Loss of Biodiversity 42
7.3.6 Dust Generation 43
7.3.7 Noise 44
7.3.8 Waste Generation / Environmental Pollution 44
7.3.9 Occupational Health, and Safety 45
7.3.10 Vehicular Traffic Use and Safety 45
7.3.11 Heritage/Archaeological resources 46
8 RECOMMENDATIONS AND CONCLUSIONS 47
9 LIST OF REFERENCES 48

LIST OF FIGURES

Figure 1: Locality map of the proposed site at Kehemu1_North/Rundu Catholic Centre, in Kavango East Region. 3
Figure 2: A typical red and white painted lattice tower structure 7
Figure 3: Climate date for Rundu (https://en.climate-data.org/africa/namibia/kavango-east-region/rundu-26555/) 23
Figure 4: The Topography of Kehemu1_North/Rundu Catholic Centre, Rundu 24
Figure 5: The Soil 25
Figure 6: The site vegetation map 26
Figure 7: Observed vegetation at Kehemu1_North/Rundu Catholic Centre 26
Figure 8: Hydrology Map 27
Figure 9: Site Notices at Rundu town council and Kavango regional council. 31
Figure 10: Consultations at Kehemu Community Hall 32

LIST OF TABLES

Table 1: Details of the proposed tower' localities 1
Table 2: Applicable national and international legislations governing the proposed project and related activities 14
Table 3: Summary of pre-identified Interested and Affected Parties (I&APs) 30
Table 4: Summary of input from I&APs 33
Table 5: Impact Assessment Criteria employed to assess the potential negative impacts 35
Table 6: Significance rating scale 37
Table 7: Assessment of the impacts of construction activities on site and surrounding soils 38
Table 8: Assessment of the tower on human health (Short and Long-term radiation) 41

Table 9: Assessment of the tower presence on civil aviation....42
Table 10: Assessment of the visual impacts of the network tower....42
Table 11: Assessment of the impacts of the presence of the tower on avifauna....43
Table 12: Assessment of the impacts of the construction activities on air quality....43
Table 13: Assessment of the noise impact....44
Table 14: Assessment of waste generation impact....44
Table 15: Assessment of the impacts of the project activities on health and safety....45
Table 16: Assessment of the impacts of project activities on road use (vehicular traffic)....46
Table 17: Assessment of the impacts of project activities on archaeological resources....46

LIST OF APPENDICES

Appendix A: Copy of the Environmental Clearance Certificate (ECC) Application Form

Appendix B: Draft Environmental Management Plan (EMP)

Appendix C: Curricula Vitae (CV) for the Environmental Assessment Practitioner (EAP)

Appendix D: Background Information Document (BID)

Appendix E: ESA Process Notification in the newspapers (*New Era* and *The Namibian*)

Appendix F: Proof of Consultation of IAPs (direct neighbours to the site) by hand delivery of BIDs

LIST OF ABBREVIATIONS

Abbreviation	Meaning
3G/4G	Third and fourth generation of wireless mobile telecommunications technology.
AC	Alternating Current
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
BID	Background Information Document
CRAN	Communications Regulatory Authority of Namibia
CV	Curriculum Vitae
DEAF	Department of Environmental Affairs and Forestry
EA	Environmental Assessment

Abbreviation	Meaning
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EDS	Excel Dynamic Solutions
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMF or EME	Electromagnetic Fields or Electromagnetic Emission
EMP	Environmental Management Plan
ESA	Environmental Scoping Assessment
GG	Government Gazette
GN	Government Notice
IAPs	Interested and Affected Parties
ICAO	International Civil Aviation Organisation
ICNIRP	International Commission on Non-Ionizing Radiation Protection
MEFT	Ministry of Environment, Forestry and Tourism
MHSS	Ministry of Health and Social Services
MHz	Mega Hertz
MICT	Ministry of Information and Communication Technology
NCAA	Namibia Civil Aviation Authority
NRPA	National Radiation Protection Authority of Namibia
PPE	Personal Protective Equipment
Reg, S	Regulation, Section
TOR	Terms of Reference
WHO	World Health Organization

KEY TERMS AND DEFINITIONS

TERM	DEFINITION
Alternative	A possible course of action, in place of another that would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	That part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes).
Cumulative Impacts/Effects Assessment	In relation to an activity, means the impact of an activity that in it may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decision-maker	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.
Ecological Processes	Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).
Environment	As defined in Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.
Environmental Management Plan	As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.

TERM	DEFINITION
Interested and Affected Party (I&AP)	In relation to the assessment of a listed activity includes - (a) any person, group of persons or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity. Mitigate - practical measures to reduce adverse impacts. Proponent – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. Significant impact - means an impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.
Fauna	All the animals found in an area.
Flora	All the plants found in an area.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Non-Ionizing Radiation	Refers to any type of electromagnetic radiation that does not carry enough energy per quantum to ionize atoms or molecules. e.g. low frequency radiations like radio waves, microwaves, and infrared radiations.
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public Consultation/Involvement	A range of techniques that can be used to inform, consult, or interact with stakeholders affected by the proposed activities.
Protected Area	Refers to a protected area that is proclaimed in the Government Gazette, according to the Nature Conservation Ordinance number 4 of 1975, as amended
Scoping	An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/site to be assessed, obtain local knowledge of site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA.

TERM	DEFINITION
Terms of Reference (ToR)	Written requirements governing full EIA input and implementation, consultations to be held, data to be produced and form/contents of the EIA report. Often produced as an output from scoping.

1 INTRODUCTION

1.1 Project Background and Location

Namibia is experiencing a rapid increase in the use of mobile communication services, which has led to a rise in local pressure for efforts to expand on telecommunications infrastructure. Mobile Telecommunication Company (MTC) (The Proponent) proposes to erect and operate a 25 m Lattice (network) tower in Kehemu1_North/Rundu Catholic Centre, central coordinates (17° 90' 54.70S" 19° 78' 47.75"E) located within the Rundu Urban Constituency in Kavango East region as indicated in **Figure 1**. The network tower will cover a total area of 80 m2 (8m x 10m).

Telecommunication tower and related infrastructure developments are among listed activities that may not be undertaken without an Environmental Clearance Certificate (ECC) under the Environmental Management Act (EMA) (2007) and its 2012 Environmental Impact Assessment (EIA) Regulations. The relevant listed activities as per EIA regulations are:

- *10.1 (g) The construction of masts of any material or type and of any height, including those used for telecommunication, broadcasting, and radio transmission.*

Subsequently, the Proponent has appointed Excel Dynamic Solutions (Pty) Ltd (EDS Namibia), an independent team of Environmental Consultants to apply for the project ECC (through the Competent Authority, Ministry of Information and Communication Technology (MICT)), conduct the required Environmental Scoping Assessment (ESA) process and compile this ESA Report and its Draft Environmental Management Plan (EMP) compiled). These two documents together with associated documents are submitted for evaluation and consideration of an ECC to the Environmental Commissioner at the Department of Environmental Affairs and Forestry (DEAF) of the Ministry of Environment, Forestry and Tourism (MEFT).

The locality details of the site are indicated in **table 2 b**elow.

Table 1: Details of the proposed tower' localities

Site Name:	Kehemu1_North/Rundu Catholic Centre, Rundu
GPS Coordinates:	(17° 90' 54.70S" 19° 78' 47.75"E)
Local Authority:	Rundu Town Council

Regional Administration and Constituency:	Kavango Regional Council and Rundu Urban Constituency

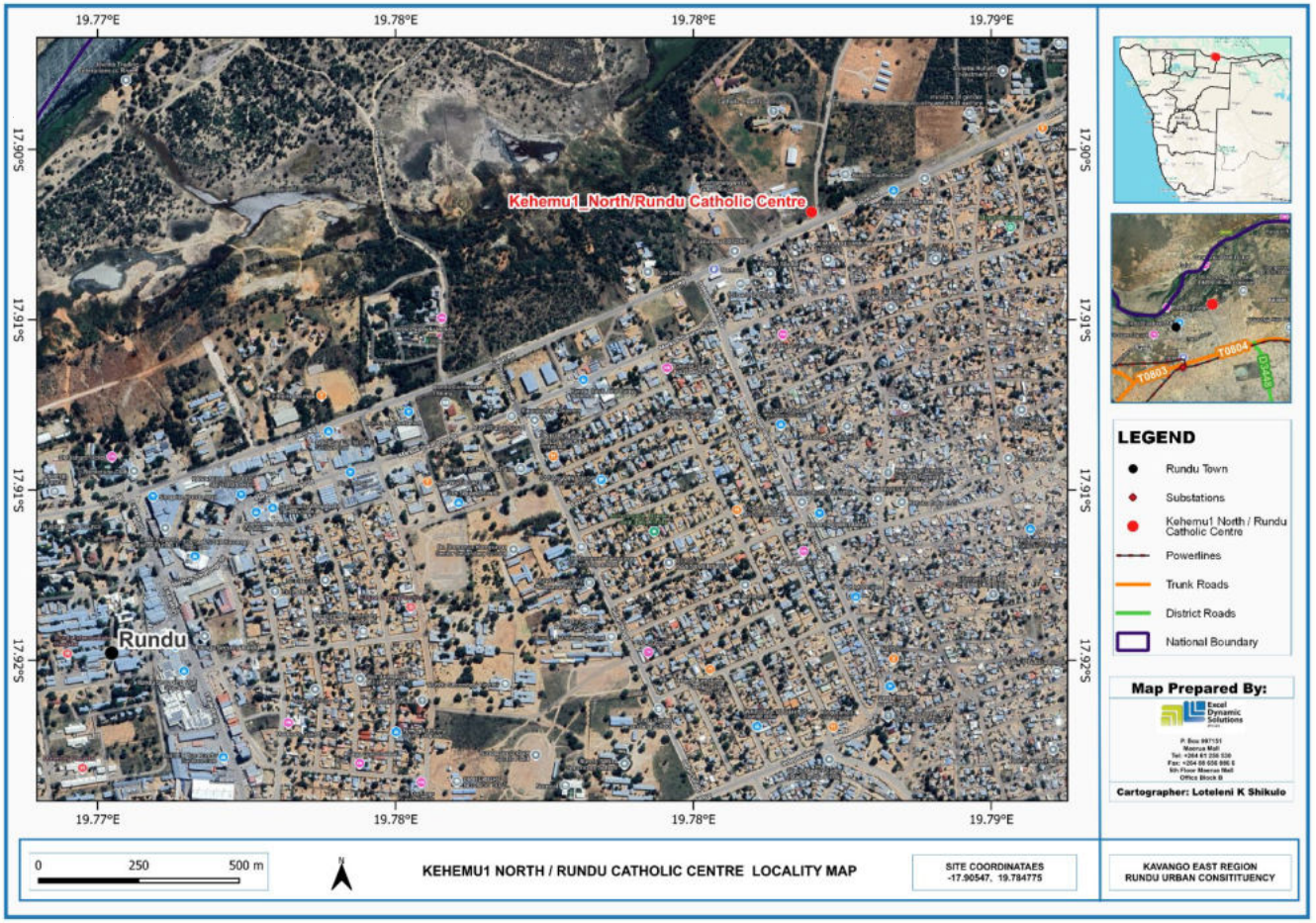

Figure 1: Locality map of the proposed site at Kehemu1_North/Rundu Catholic Centre, in Kavango East Region.

1.2 Terms of Reference (TOR), Scope of Work and Document Contents

This ESA has been conducted according to the Environmental Management Act (EMA) (No. 7 of 2007), and its 2012 Environmental Impact Assessment (EIA) Regulations. In line with the Terms of Reference provided for this project, the scope of works for this project (ESA) entails the following**:**

- Confirm the suitability of the proposed site for the tower construction and suggest alternative site, if required;
- Conduct the required Environmental Scoping Assessment (ESA);
- Consult all potential interested and affected parties (I&APs);
- Compile an ESA report and draft Environmental Management Plan (EMP); and
- Obtain an Environmental Clearance Certificate for the proposed tower.

The main aim of the ESA is to:

- Identify, analyse and assess the bio-physical, socio-economic impacts associated with the proposed activity; and
- compile management action plans (in the form of the draft EMP that will need be implemented by the Proponent and/or their contractor(s) to minimize these impacts, if they cannot be avoided altogether, while maximizing positive impacts.

1.3 The Need for the Proposed Project (Motivation)

Due to the continual growth in mobile communication services in Namibia, the pressure is continuously expanded and the communications network is increasing. MTC have identified the need for the new structure in Kehemu1_North/Rundu Catholic Centre. The planned telecommunication will provide an additional capacity, reducing congestion problem and improves the coverage within that area. This proposed development will ensure that the quality of the service provided to the telecommunication users in the area is improved.

1.4 Appointed Environmental Assessment Practitioner

To satisfy the requirements of the EMA and its 2012 EIA Regulations, the Proponent appointed an independent team of Environmental Consultants at Excel Dynamic Solutions (Pty) Ltd (hereinafter referred to as EDS, The Consultant or Environmental Assessment Practitioner (EAP)) to conduct the required ESA process on their behalf. As mentioned earlier, the findings of the ESA process are incorporated into this Report. The ESA Report and the Draft EMP as well as associated documents will be submitted as part of an application for an ECC to the Environmental Commissioner at the DEAF.

The ESA project is headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced Environmental Assessment Practitioner (EAP). The ESA process and this Report and the Draft EMP were conducted and compiled by Ms. Iyaloo Nakale, an experienced Environmental Assessment Practitioner (EAP). The curriculum vitae (CV) for Mr. Tjelos and Ms. Iyaloo Nakale is presented under **Appendix C.**

2 PROJECT DESCRIPTION AND PROPOSED ACTIVITIES

The description of project activity to be undertaken for the establishment (construction) and eventual operations and maintenance of the network tower are presented as follows:

2.1 Planning and Design Phase

The Communications Act No. 8 of 2009, requires that service providers should first consider sharing existing infrastructure in the area before constructing new structures. There is no other infrastructure that could be shared by MTC to install/mount their antenna, therefore, MTC will need to construct a completely new tower in this area.

There are criteria that are usually employed to optimise the positions of new structures in the telecommunication industry. These include coverage of existing network infrastructure, surrounding topography & built-up environment, established and future urban areas, required footprint and the most appropriate design of the facility (GCS Water & Environmental Consultants, 2017).

Once the Proponent has been issued with the ECC and obtained all relevant and required permitting/licensing such as land use /leasehold agreements), and ready to commence with the construction activities, the planned activities will commence at the site

The planning and design phase which also include the ESA is aimed at presenting some key concepts of the project alongside a general overview of the study area, the legal landscape to be considered, and a preliminary assessment of the main aspects that might affect the feasibility of the project and or its associated activities. Thereafter, the environmental, technical, and financial aspects of the project are assessed by identifying potential risks and proposing mitigation measures where possible. This would also include highlighting 'fatal flaws' wherever mitigation measures are unavailable or impractical with regards to the available finances and other resources.

Prior to commencement of any site work, all personnel (including fully employed, contracted, and casual) will be inducted on the Proponent's Environmental, Health and Safety Policy as well as procedures and processes to follow while conducting the work on site or offsite work related to the project.

2.1.1 Design and Technical Aspects

The proposed tower will be a 25 m Freestanding Lattice structure, 3x dual band panel antennas and 1x micro wave dish will be mounted. The tower site will also include an outdoor cabinet, a perimeter fence, as well as electrical fencing to restrict unauthorized access. The tower will be used to provide 3G/4G coverage, in order to have proper in-door and outdoor coverage. The footprint (surface area) to be covered by the tower and associated equipment/accessories is anticipated to be 80 m2 (12m x12m) with only less of that total dedicated to the actual footprints of the tower. Frequencies are determined by the operators that will utilize the tower.

The typical examples of a Freestanding Lattice tree tower for telecommunication purposes is shown in **Figure 2**.

Figure 2: A typical red and white painted lattice tower structure

2.2 Construction Phase

Tower construction works are expected to last for at least three months, and there will be minimal earthworks to prepare the site for construction. The tower structure will be mounted to a concrete foundation. The rest of the site area will be used for storing the operational and maintenance equipment. For safety reasons, the tower site will be fenced off with palisade fencing. This will also be done to ensure that access to the tower is only limited to authorized personnel and to prevent vandalism of the tower and its associated accessories. The tower structure will be earthed to protect it from lightning.

The physical assemblage of the network tower structure and the construction of the foundations will take place on the site by using manual labour as far as possible. The Proponent will appoint a contractor to carry out the construction. Construction works will be carried out during weekdays only, between 08h00 and 17h00. The number of workers expected for this work will depend on the local contractors appointed and their standard human capacity for development of the project.

If necessary, the appointed construction contractor will need to make arrangements for their workers to be housed in Rundu or nearby places, but not on site. The appointed contractor will be required to provide appropriate Personal Protective Equipment (PPE) to all their employees while carrying out construction works on site

2.3 Project Input and Resources Requirements

In terms of human resources and services infrastructure, the following will be required:

2.3.1 Project Personnel and Accommodation

The number of people that would be employed during the construction of the tower cannot be determined now; it will be determined by the appointed contractor once the ECC is issued. The workforce personnel include both skilled, semi-skilled, as necessary to complete the work.

2.3.2 Water Supply

Minimal amount of water will be required during construction. This water will be used for drinking and efficiently used for in-situ concrete mixture. In other words, the amount of water will be part of the concrete works, which will only be during the foundation casting. The required water will be sourced from the nearby facilities. This will be upon agreement with the town council or relevant water supplier, who can be the nearest home or business owners.

2.3.3 Power Supply

No electricity is required during the construction of the tower. However, it will be required during the operational maintenance phase of the tower. Alternating Current (AC) power will be required for the operation of the tower and will be connected to the 3 Phase AC power from Nored (upon application).

2.3.4 Site Access (Roads)

The site is located in Kehemu1_North/Rundu Catholic Centre and accessible via the Usivi road, Rundu. It will be accessed through the existing gravel road trail leading up to the site.

2.2.5 Health and Safety

Adequate and appropriate Personal Protective Equipment (PPE) will be provided to every project personnel while on and working at site. A first aid kit will be readily available at the site.

2.3.6 Potential Accidental Fire management

A minimum of basic firefighting equipment, i.e., a fire extinguisher will be readily available in vehicles, at each site

2.3.7 Waste Management

Any waste generated on site during construction and maintenance phases will be stored and transported to the appropriate (waste type) garbage skips or landfill sites.

In management during the construction phase, The Proponent will enforce the availability of portable toilets for the construction team (contractors) while on site during the construction phase, for sewage waste management. Chemical toilets with sealed septic tanks will be used as ablution facilities and the sewage waste handled according to the manufacturer's instructions of the facility provided.

2.3.8 Site Fencing

For safety and security reasons, the tower site will be fenced off. This will also be done to ensure that access to the tower is limited to authorized personnel (such as maintenance team) only and to prevent vandalism of the tower and their associated accessories/structures.

2.4 Decommissioning Phase

As long as the use of mobile communications and other associated services is on the increase and the need for better services in Rundu, the decommissioning of the network tower is not anticipated. Regardless, recommendations will be provided in the impact assessment chapter and EMP, in the event that the network tower needs to be decommissioned.

2.5 Post-Construction Site Rehabilitation and Decommissioning

Once construction phase has been completed, the associated works will be ceased, and site cleaned up in preparation for the next phase (operations). The Proponent will need to properly decommission the construction works and rehabilitate disturbed site. The aim is to ensure that the project related disturbed site areas are left close to their pre-work state as much as possible.

2.6 Operational and Maintenance Phase

This is the phase during which the tower and its associated infrastructure will be operational and providing telecommunication signal to the residents of Kehemu1_North/Rundu Catholic Centre and other future land users in this part of the town. Maintenance of the tower is to be carried out by the Proponent's Maintenance Department, as and when required. No onsite accommodation will be required during this phase, as the maintenance works are not expected to last for more than a day. In the event that maintenance works are lasting more than one day, accommodation arrangements are to be made by the Proponent for their maintenance team.

During this phase, radiation concerns might arise and for this reason community requires radiation knowledge that should be implemented by the proponent through awareness campaigns. Compliance with the national and international regulations are also strongly advised. Furthermore, regular radiation monitoring to assess the radiation health and safety conditions during the tower's operational phase is recommended to ensure compliance with national and international regulations. The Proponent is to ensure that all employees carrying out maintenance works on site are provided with appropriate Personal Protective Equipment (PPE).

3 PROJECT ALTERNATIVES

Alternatives are defined as the "*different means of meeting the general purpose and requirements of the activity*" (EMA, 2007). This section will highlight the different ways in which the project can be undertaken and to identify the alternative that will be the most practical, but least damaging to the environment is identified.

Once the alternatives have been established, these are examined by asking the following four questions:

(a) What alternatives are technically and economically feasible?

(b) What are the environmental effects associated with the feasible alternatives?

(c) What is the rationale for selecting the preferred alternative?

The alternatives considered for the proposed MTC tower in Hakusembe/Sikondo village are discussed under the following subsections.

3.1 Types of Alternatives Considered

3.1.1 The "No-go" Alternative

The “No-go” alternative is the option of not proceeding with the activity, which typically implies a continuation of the status quo. In this case, this would mean, the status quo of the proposed site remains unchanged with poor to no network/communication signal. Should the proposed project be discontinued, the poor to no network coverage in this part of Kavango east region will continue and there will be no improvement in local socio-economic development, in terms of communications services.

In considering the proposed activity and its benefits to the local communities, the no-go option is not a preferred option.

3.1.2 Locations of the Telecommunication Tower

The location is strategically chosen whereby MTC uses radio planning tools to select sites and thereafter MTC gets the instruction to apply for the intended sites. In this instance, to address any network coverage issues in this part of Kehemu1_North/Rundu Catholic Centre and provide improved network coverage in the area. During the EA process, residents complained about poor network coverage and how they have to walk some kilometers to the main road to make calls or climb trees in such of better network coverage.

3.1.3 Infrastructure sharing as per the Communications Act of 2009: Tower Sharing

The Communications Act No. 8 of 2009 requires that service providers consider sharing existing infrastructure in the area first, before constructing new structures to avoid cumulative impacts. There are no other telecommunication towers within the vicinity of the new proposed project site that could have been used by the Proponent to mount their communications antenna on to serve the affected communities. Therefore, the distance from the existing structures will not allow compliance with the Communications Act regarding the sharing/using of existing structures in an area.

It is for this reason that the proposed tower (new structures) need to be erected (constructed) so that they can be potentially used (shared) in future with similar services providers, thus promoting infrastructure sharing as per the Communications Act.

4 LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

A review of applicable and relevant Namibian legislation, policies, and guidelines to the proposed development is given in this section. This review serves to inform the project Proponent, Interested and Affected Parties, and the decision-makers at the DEAF of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled to establish the proposed tower' construction and operational activities.

4.1 The Environmental Management Act (No. 7 of 2007)

This ESA was carried out according to the Environmental Management Act (EMA) and its Environmental Impact Assessment (EIA) Regulations (GG No. 4878 GN No. 30). The EMA has stipulated requirements to complete the required documentation in order to obtain an ECC for permission to undertake certain listed activities. These activities are listed under the following Regulations:

- *10.1 (g) The construction of masts of any material or type and of any height, including those used for telecommunication, broadcasting, and radio transmission.*

4.2 The Communications Act (No. 8 of 2009)

The Act provides for the regulation of telecommunications services and networks, broadcasting, postal services and the use and allocation of radio spectrum; for that purpose, the establishment of an independent Communications Regulatory Authority of Namibia; to make provision for its powers and functions; the granting of special rights to telecommunications licensees; the creation of an Association to manage the ".na" internet domain name space and for matters connected therewith.

Applicability to the Proposed Project: The Proponent is required to comply with the relevant Sections and Parts of the Act, and of importance is Part 5 of the Act. This Part (Special Rights of Carriers) states the following in relation to the project:

- ***''Applicability of this Part: Section 59(1)*** *The rights granted by this Part are granted to all holders of technology and service neutral licences and to other licensees to whom and in so far as it has been made applicable to them in terms of section 38(12) or 38(13).*

- ***(3)*** *Subject to subsection (4) and (5), the rights granted by this Part, to install telecommunications facilities, only relate to wires, fibres, or any other form of telecommunication's line as well as facilities used to protect or support such wires, fibres or lines (including poles, stays, ducts and pipes), but do not relate to masts, antennas, tower, pay telephones and other similar equipment.*
- ***Entry upon and construction of lines across any land: Section 60****. A carrier may, for the purposes of provision of telecommunications services, enter upon any land, including any street, road, footpath or land reserved for public purposes, and any railway, and construct and maintain a telecommunications facility upon, under, over, along or across any land, street, road, footpath or waterway or any railway, and alter or remove the same, and may for that purpose attach wires, stays or any other kind of support to any building or other structure.*
- ***Fences: Section 64(1)*** *If any fence erected or to be erected on land over which a telecommunications facility, pipe, tunnel or tube is constructed or is to be constructed by a carrier, renders or would render it impossible or inconvenient for the carrier to obtain access to that land the carrier may at its own expense erect and maintain gates in that fence and must provide duplicate keys therefor, one of which must be handed to the owner or occupier of the land.*
- ***Section 64(2)*** *Any person intending to erect any such fence must give not less than six weeks' notice in writing to the carrier of his or her intention.*
- ***Height or depth of cables and facilities: 66(1)*** *Aerial telecommunication wires or cables along any railway or public or Private Street, road, footpath, or land must be at the prescribed height above the surface of the ground.*
- ***Section 66(2)*** *Underground telecommunication facilities, pipes, tunnels, and tubes must be placed by a carrier at the prescribed depth below the surface of the ground*
- ***Section 66(3****) If the owner of any private land is obstructed in the free use of his or her land by reason of the insufficient height or depth of any telecommunications wire, cable or other facility, pipe, tunnel or tube constructed by that carrier, the carrier must take such steps as are necessary for giving relief to that owner".*

Other applicable legal obligations to the proposed tower constructions and related activities are presented in **Table 3**.

Table 2: Applicable national and international legislations governing the proposed project and related activities

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
NATIONAL, REGIONAL AND LOCAL		
The Constitution of the Republic of Namibia, 1990 as amended	The Constitution of the Republic of Namibia (1990 as amended) addresses matters relating to environmental protection and sustainable development. Article 91(c) defines the functions of the Ombudsman to include: *"…the duty to investigate complaints concerning the over-utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia…"* *Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at the:* *"…Natural resources situated in the soil and on the subsoil, the internal waters, in the sea, in the continental shelf, and in the exclusive economic zone are property of the State."*	By implementing the environmental management plan, the establishment will be in conformant to the constitution in terms of environmental management and sustainability. Ecological sustainability will be main priority for the proposed development.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Assessment Policy of Namibia 1994	The Environmental Assessment Policy of Namibia states Schedule 1: Screening list of policies/ plans/ programmes/ project subject to environment must be accompanied by environmental assessments. “The Proposed tower activities" are on that list.	The establishment of the proposed project triggers the need for environmental assessments prior commencement of civil works as they may alter the environment which could result on the damage of the environment.
	The policy provides a definition to the term “Environment” broadly interpreted to include biophysical, social, economic, cultural, historical, and political components and provides reference to the inclusion of alternatives in all project, policies, programmes, and plans.	The construction of the tower requires the assessment of all possible environmental and social impacts to avoid, minimise or compensate environmental damage associated with the activities.
The Regional Councils Act (No. 22 of 1992)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 “to undertake the planning of the development of the region for which it has been established with a view to physical, social, and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment. The main objective of this Act is to initiate, supervise, manage, and evaluate development.	The relevant Regional Councils are considered to be Interested & Affected Parties and must be consulted during the Environmental Assessment (EA) process. The project site fall under the Erongo Regional Council; therefore, they should be consulted.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Local Authorities Act No. 23 of 1992	To provide for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties and functions of local authority councils; and to provide for incidental matters.	The Rundu Town Council is the Local Authority responsible for the project site. Therefore, the Municipality should ensure that the network tower establishment activities are in compliance with the Act and its Regulations, as relevant to the proposed project.
Atomic Energy and Radiation Protection Act No. 5 of 2005	To provide for adequate protection of the environment and of 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 materials, and controlling and regulating prescribed non-ionising radiation sources; to establish an Atomic Energy Board and to provide for its composition and functions; to establish a National Radiation Protection Authority; to amend the Hazardous Substances Ordinance, 1974 (Ordinance No. 14 of 1974); and to provide for related matters. Under Section 43(1) of the Act, the Non-ionising Radiation Regulations have been made in 2019.	To determine the “safe distance” around the site. The Proponent should comply with the Regulations and requirements of the Act throughout the project life cycle.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Aviation Act, Act No. 74 of 1962	Gives effect to certain International Aviation Conventions and makes provision for the control, regulation, and encouragement of flying within the Republic of Namibia and for other matters incidental thereto.	Provides the regulations for setting up cellular as well as other masts structures in Namibia.
Civil Aviation Act No. 6 of 2016	‘’……; to establish the Air Navigation Services in the Authority; to provide for a civil aviation regulatory and control framework for maintaining, enhancing and promoting the safety and security of civil aviation for ensuring the implementation of international aviation agreements; to establish the Directorate of Aircraft Accident and Incident Investigations. **Section 6(1) The Minister may, by issuing a directive, require the removal of any building structure, tree or other object whatsoever on any land or water which, in the opinion of the Minister on the advice of the Executive Director, may constitute a danger to aircraft flying** in accordance with normal aviation practice.	The applicable part of the Act is the establishment of the Directorate of Aircraft Accident and Incident Investigations and to provide for its powers and functions. The height of the proposed tower might be a threat to the nearest aerodrome site. Therefore, the Proponent should verify these prior to construction with the Namibia Civil Aviation Authority (NCAA).
Soil Conservation Act No. 76 of 1969	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied for soil conservation management measures must be included in the EMP.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Forestry Act No. 12 of 2001	The Act provides for the management and use of forests and related products / resources. It offers protection to any living tree, bush or shrub growing within 100 metres of a river, stream or watercourse on land that is not a surveyed erven of a local authority area. In such instances, a licence would be required to cut and remove any such vegetation. These provisions are only guidelines.	Should there be trees within the actual footprint of the site that need to be removed; the Proponent should notify the nearest Department of Environmental Affairs and Forestry (Forestry Division in Erongo region (DEAF)), The number and/or type of trees to be removed to allow the construction of the tower should also be submitted to DEAF. Should these trees be of a protected species, the permit to remove them should be applied from the DEAF office.
Public Health Act (No. 36 of 1919)	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The Proponent and all its employees or contractors should ensure compliance with the provisions of these legal instruments.
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers.	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Public and Environmental Health Act No. 1 of 2015	The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.	The Proponent and their contractors should ensure that the project infrastructure, vehicles, equipment, and machinery are designed and operated in a way that is safe, or not injurious or dangerous to public health and that the noise which could be considered a nuisance remain at acceptable levels. The Proponent should ensure that the public as well as the environmental health is preserved and remain uncompromised.
Pollution Control and Waste Management Bill	The bill aims to "prevent and regulate the discharge of pollutants to the air, water and land" Of particular reference to the Project is: Section 21 "(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse."	The construction and operation/maintenance activities trigger section 21 and 22 of the Bill, activities like construction works generates lots of waste that require good management practices.
	Section 55 "(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment."	Contractors of the construction works, and maintenance of the project should make it mandatory that they manage their waste in a manner that do not cause environmental threat and risk both to the surroundings and the local communities.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
National Solid Waste Management Strategy	The Strategy ensures that the future directions, regulations, funding, and action plans to improve solid waste management are properly co-ordinated and consistent with national policy, and to facilitate co-operation between stakeholders. The Strategy listed priorities for the strategy to address for effective solid waste management.	The construction and operation/maintenance of the tower can potentially generate significant amount of solid waste that might need proper management by contractors to avoid pollution. Waste management plans should be compiled and implemented prior the commencement of civil works and during tower maintenance.
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto. Should the Proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits will be required.	Mitigation measures should be provided for since the project activities will make use of the public roads.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
National Heritage Act No. 27 of 2004	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration, or excavation of heritage site or remains, while Section 48 sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Section 51 (3) sets out the requirements for impact assessment.	The Proponent should ensure compliance with this Acts' requirement. The necessary management measures and related permitting requirements must be taken. This done by consulting with the National Heritage Council of Namibia.
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological site.	
Labour Act (No. 6 of 1992)	The Ministry of Labour, Industrial Relations and Employment is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act no. 6 of 1992.	The Proponent should ensure that the project construction and operations and maintenance, do not compromise the safety and welfare of workers.
APPLICABLE INTERNATIONAL POLICIES, PRINCIPLES, STANDARDS, GUIDELINES AND CONVENTIONS		
Statue	**Provision**	**Implication for the project and its activities**

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Convention on International Civil Aviation, Annex 14	• Annex 14 to the Convention on International Civil Aviation. • Chapter 4: Obstacle restrictions and removal Chapter 6: Visual aids and donating of obstacles	The proposed new structures may be obstacles to some aerodromes in Namibia. Those that are close to existing aerodromes need to be assessed in accordance with the document. Visual aids to the new structures to make them visible to aircraft need to be applied in accordance with this Convention.
"Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300GHz)" (April 1998 developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP))	Provides international standards and guidelines for limiting the adverse effects of non-ionising radiation on human health and well-being, and, where appropriate, provides scientifically based advice on non-ionising radiation protection including the provision of guidelines on limiting exposure. ICNIRP exposure limits for non-ionizing radiation is 4.5W/m².	Justifies the need for assessing the impact of electromagnetic radiation from the tower, on the nearby residents or community members.

The legal requirements above have been listed and explained as per their relevance to the project. The project is being carried in a specific environment that may be affected in terms of its biophysical and social features. Thus, the environmental and social baseline (receiving environment) of the project area is presented under the next chapter.

5 ENVIRONMENTAL BASELINE

The proposed tower will be constructed and operated in specific environmental and social conditions, and it is crucial to understand these pre-project conditions of the environment. This will aid in laying down background "information" of the status quo and future projections of environmental conditions after the implementation of the project. This also aids in identifying the sensitive environmental and social features that may need to be protected through the effective implementation of impact specific management and mitigation measures.

The baseline information presented below is sourced from different reports of studies conducted in the Kavango east region. The baseline information has also been complemented by review of existing different and relevant data sources conducted in the region and immediate surroundings of the site. The information has been complemented by raw data obtained from observations made on the site on the 11th of April 2025 relevant published reports and books.

The summary of selected biophysical and social baseline information about the project site areas is given below.

5.1 Climate

The climate for Rundu is considered to be BSh according to the Köppen-Geiger climate classification. The average annual temperature is 22.9 °C in Rundu. Months with the highest rainful in December, January, February and March.precipitation falls annually.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	24 °C (75.3) °F	23.6 °C (74.5) °F	23.3 °C (73.9) °F	22.6 °C (72.6) °F	20.7 °C (69.3) °F	18 °C (64.4) °F	17.6 °C (63.7) °F	21.1 °C (70) °F	25.3 °C (77.5) °F	27.8 °C (82) °F	26.4 °C (79.6) °F	24.8 °C (76.7) °F
Min. Temperature °C (°F)	19.6 °C (67.3) °F	19.1 °C (66.5) °F	18.7 °C (65.7) °F	16.9 °C (62.5) °F	13.9 °C (57.1) °F	11 °C (51.9) °F	10.4 °C (50.7) °F	13.2 °C (55.7) °F	17.2 °C (62.9) °F	20.5 °C (68.9) °F	20.4 °C (68.7) °F	19.9 °C (67.8) °F
Max. Temperature °C (°F)	29 °C (84.3) °F	28.7 °C (83.6) °F	28.3 °C (83) °F	28.3 °C (83) °F	27.5 °C (81.4) °F	25.1 °C (77.2) °F	24.9 °C (76.9) °F	28.8 °C (83.9) °F	32.9 °C (91.3) °F	34.8 °C (94.6) °F	32.6 °C (90.8) °F	30.2 °C (86.4) °F
Precipitation / Rainfall mm (in)	170 (6)	132 (5)	110 (4)	23 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	15 (0)	67 (2)	129 (5)
Humidity(%)	67%	69%	67%	53%	38%	37%	33%	25%	20%	25%	43%	61%
Rainy days (d)	14	12	11	4	0	0	0	0	0	3	9	12
avg. Sun hours (hours)	9.3	9.1	8.7	9.7	10.1	9.9	10.0	10.4	10.8	11.2	11.2	10.3

Figure 3: Climate date for Rundu (https://en.climate-data.org/africa/namibia/kavango-east-region/rundu-26555/)

5.2 Topography

The proposed site mainly lies in the Kavango valley landscape is characterized by the presence of the Kavango River, which flows through the valley. The landscape of the Kavango Valley features lush vegetation along the riverbanks, including woodlands, grasslands, and wetlands The site lies at an elevation that ranges from 1058m – 1080m. **Figure 4** shows the topography map and the elevation range for the project area.

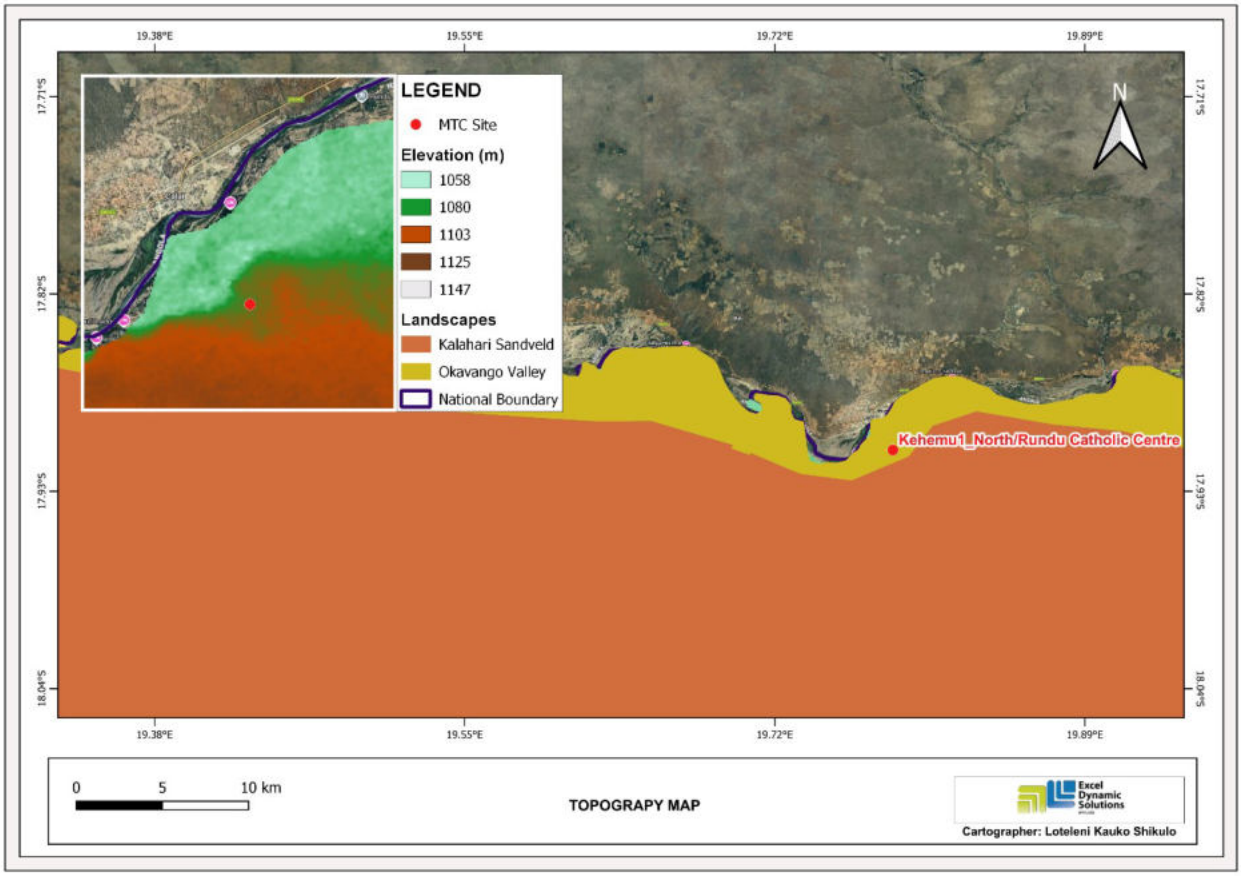

Figure 4: The Topography of Kehemu1_North/Rundu Catholic Centre, Rundu

5.3 Soils

The proposed site is primarily characterized by Eutric Fluvisols, a soil classification within the World Reference Base for Soil Resources (WRB) system. According to Mendelsohn et al, (2002), the eutric soils are fertile with high base saturation, and fluvisols soil means these soils are found along the margins and valleys of larger river courses in eastern Namibia. Additionally, fluvisols

are formed from alluvial deposits, which are materials such as silt, sand, and clay that are carried and deposited by flowing water as shown in **Figure 5**.

It is notable that during the operational phase of the project, soil sampling may be conducted. Therefore, the Soil Conservation Act (No 76 of 1969) should be taken into account to ensure that soils are conserved in a way that does not promote soil erosion. (Refer to the EMP).

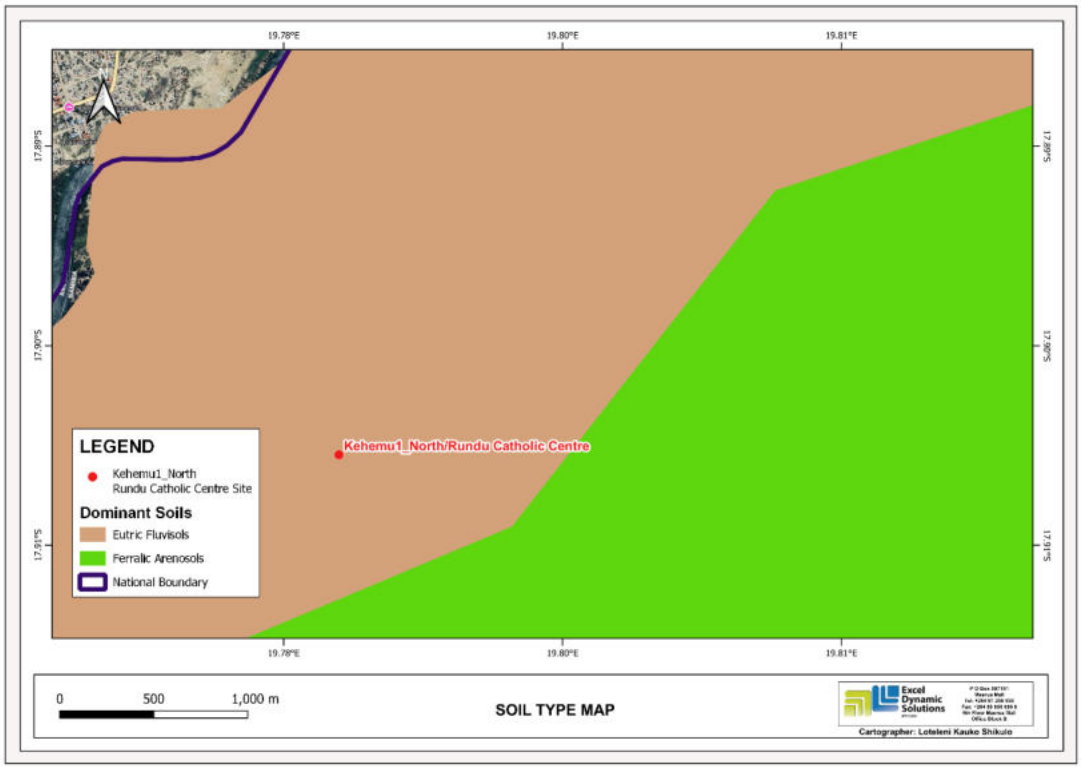

Figure 5: The Soil

5.4 Flora and Fauna

The vegetation varieties present in Rundu include woodlands of Pterocarpus angolensis, Schinziophyton rautanenii, Baikiaea plurijuga, and Burkea africana, along with shrublands of Acacia erioloba, Terminalia sericea, and Bauhinia petersiana. In the Okavango valley, the vegetation comprises of Acacia nigrescens - Peltophorum africanum riverine forest and Combretum imberbe - Catophractes alexandri shrubland. These areas are situated in close proximity within the specified region. The floodplain is predominantly covered by grasslands featuring species such as Vossia cuspidata, Cynodon dactylon, and Setaria sphacelata (Burke,

2002). **Figure 6** shows the vegetation map for the project area. **Figure 7** shows the vegetation observed on site.

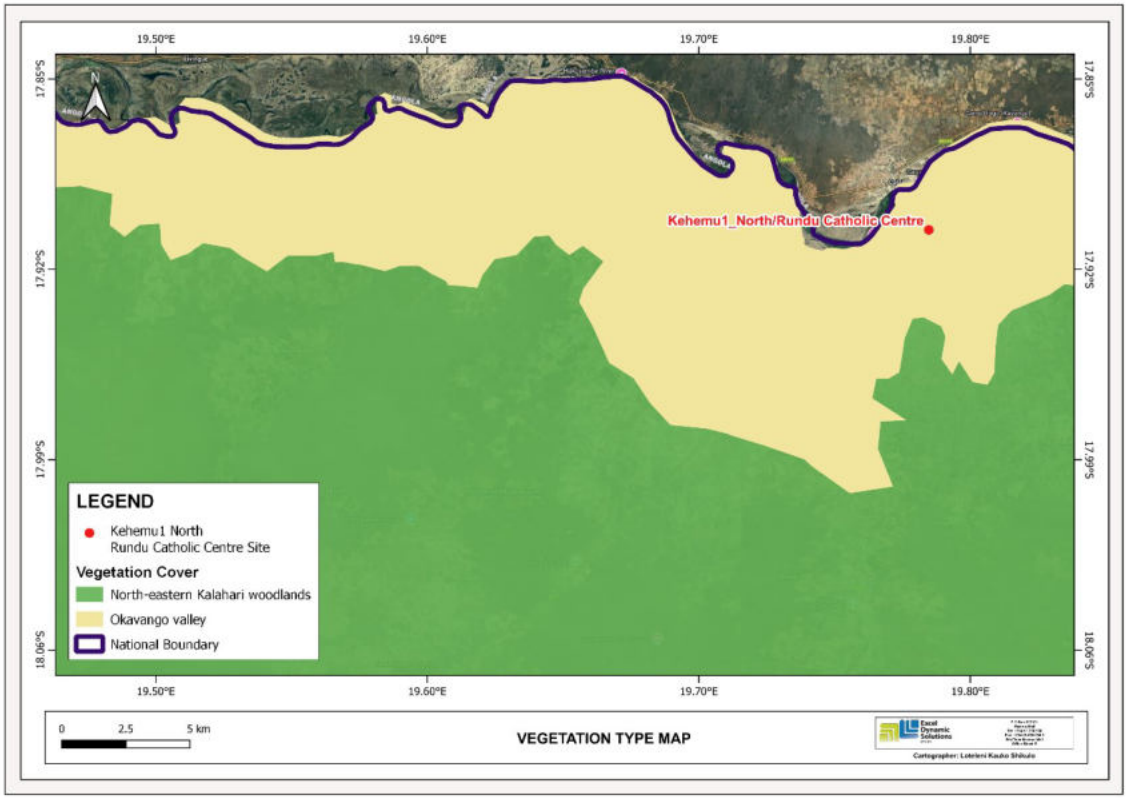

Figure 6: The site vegetation map

Figure 7: Observed vegetation at Kehemu1_North/Rundu Catholic Centre

5.5 Groundwater and Surface Water

The perennial Okavango River shows the features typical of a subtropical river, such as meanders, oxbow lakes and other erosion and deposition features. (Burke, 2002). The project area lies south of the *Okavango* river and east of the ephemeral river *Fontain omuramba* on the over rock bodies with moderate groundwater potential. Groundwater in the project site area is hosted in the porous Kalahari sediments (primary aquifers) with radial flow towards the north (to the Kavango River). **Figure 8** shows the hydrological map of the project area.

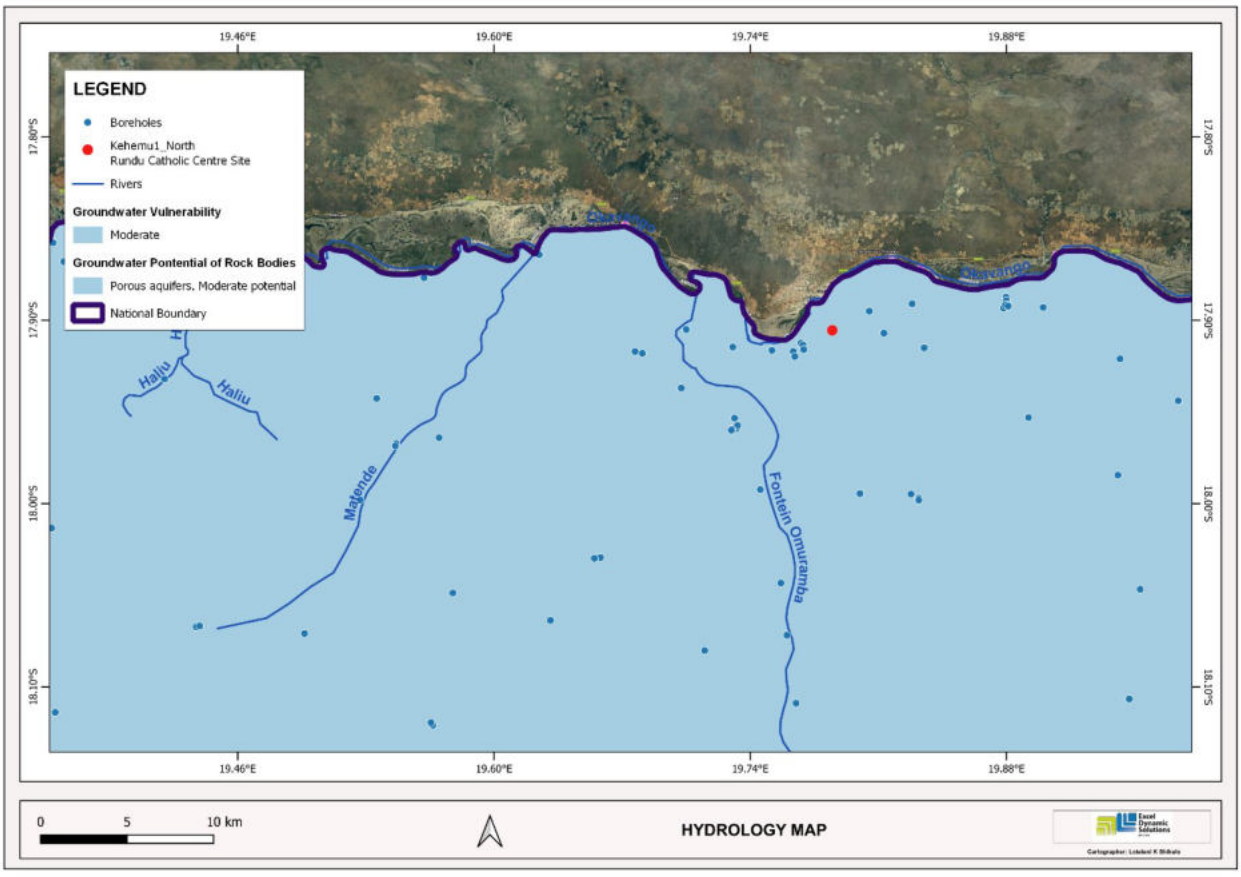

Figure 8: Hydrology Map

5.6 Socio-economic Status

Demography

Based on 2011 Namibia Population and Housing Census, the population of the Kavango Region (before it was split into West and East) was 176,674 (96,559 females and 80,115 males) with a population density of 20.4 people per square kilometer. (Namibia Statistics Agency, 2014). The NSA also indicated that 55% of the population lived in rural areas and 45% in urban areas. The dumpsite in Rundu falls within the Rundu Urban Constituency with a population of 20,676 (11,562 females and 9,114 males).

Services and Infrastructure

The Town of Rundu is well-equipped with services and infrastructure to aid in running the Town. The services include trunk, main and district roads. (Excel Dynamic Solutions (Pty) Ltd, 2022). These services and infrastructure are summarized below:

Roads: The main tarred road is the B10 connecting Rundu to Nkurenkuru, B8 to Grootfontein (to the southwest) and Divundu/Katima Mulilo (to the east) and then to the rest of the country. There are tarred street roads in the Town as well as surrounding gravel roads connecting Rundu to nearby settlements and villages.

Air transport: There is an airport situated approximately 5km southwest of Rundu Town. This airport serves as a convenient route for travellers to the Kavango East Region for business and leisure.

Water supply: The Town is supplied with water by NamWater from Kavango River distributed through the Rundu Town Council water supply system.

Electricity*:* The Rundu Town is supplied with power (electricity) by the Northern Regional Electricity Distributor (NORED).

Education: The Town has five tertiary Institutions in Rundu, namely: University of Namibia Rundu campus, Institute of Open Learning (IOL), Rundu Vocational Training Centre, Namibia College of Open Learning (NAMCOL) and Triumphant College. Additionally, Namibia University of Science and Technology has a center in Rundu that provide support for students who are studying on distance.

Health services: There are 3 hospitals, 30 clinics and one health centre in the Kavango East Region. Of these, one referral hospital and six clinics are found in the Rundu Urban Constituency, and one Private Hospital with admission facilities while the other nine are private health consultation with no admission facilities.

Safety and security: There is a police station as well as private companies offering security services, a positive intervention to aid the national police service efforts in reducing security related crimes within the town.

Financial Institutions: There are four branches of commercial banks namely: First National Bank, Bank Windhoek, Nedbank and Standard bank rendering banking services to the inhabitants of the region in general.

Telecommunication: The constituency is covered with telecommunication and mobile telecom services.

Government services: Within the town, there are several government branch offices that are meant to provide most of the services provided by the respective ministries at the head offices in Windhoek.

5.7 Telecommunications

It is priority for the Government to maintain and upgrade the telecommunication systems in an optimised way. For historical reasons, physical infrastructure in Namibia has been unequally distributed, to the disadvantage of indigenous Namibians. Significant improvement in infrastructure distribution has taken place around the country, however, a proportion of the urban residents continue to live without access to basic services such as water supply, adequate sanitation, electricity supply, and telecommunication services.

The country generally has wide coverage of telecommunication service provision by various service providers. However, some citizens still experience network access issues, which indicate the need for new and enhanced telecommunication infrastructure.

Residence of Rundu are connected to the world through different local network service provider. The main providers of this service in the town are Telecom Namibia and Mobile Telecommunications Company (MTC Namibia).

6 PUBLIC CONSULTATION PROCESS

Public consultation forms an important component of an Environmental Assessment (EA) process. Public consultation provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration as part

of the assessment process. Public consultation has been done in accordance with the EMA and EIA Regulations.

The public consultation process assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent further investigations are needed. Public consultation can also aid in the process of identifying possible mitigation measures.

6.1 Registered Interested and Affected Parties (IAPs)

The Consultant identified relevant and applicable national, regional, and local authorities, local leaders, and other interested members of the public. Pre-identified IAPs were contacted directly, while other parties who contacted the Consultant after project advertisement notices in the newspapers, were registered as IAPs upon their request. Newspaper notices of the proposed tower construction activities were placed in two widely read national newspapers in the region (*The Namibian* and *New Era* Newspapers). The project advertisement/announcement ran for two consecutive weeks inviting members of the public to register as IAPs and submit their comments. The summary of pre-identified and registered IAPs is listed below and the complete list of IAPs is provided in **Appendix D**. The list of pre-identified and registered I&APs is listed in **Table 4** below.

Table 3: Summary of pre-identified Interested and Affected Parties (I&APs)

National (Ministries and State Owned Enterprises)
Ministry of Environment and Tourism
Ministry of Information and Communication Technology
Ministry of Urban and Rural Development
Ministry of Works and Transport
Ministry of Health and Social Services
Ministry of Agriculture, Water and Land Reform
National Radiation Protection Authority
Roads Authority
Namibia Civil Aviation Authority
CRAN
Regional & Local

Kavango East Regional Council
Rundu Town Council
General Public
Interested members of the public / Neighbours

6.2 Communication with I&APs

Regulation 21 of the EIA Regulations details the steps to be taken during a public consultation process and these have been used in guiding this process. Communication with IAPs with regards to the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the proposed facility was compiled **(Appendix E)** and circulated to relevant pre-identified authorities (stakeholders), and upon request to all new registered IAPs,
- Project Environmental Assessment notices were published in *The Namibian newspaper* and *New Era* on 2nd of April 2025) - **Appendix F**, briefly explaining the activity and its locality, inviting members of the public to register as IAPs and submit their comments/concerns.
- Public site notices (size A3) were placed at Rundu Town Council notice board (a), and Kavango regional Council notice board (b) as shown in **(Figure 9)**, to inform members of the public of the EIA process and register as IAPs, as well as submit comments.
- Consultation meetings were held on the 11th of April 2025 in Kehemu1_North/Rundu Catholic Centre as shown in **Figure 10**.

Figure 9: Site Notices at Rundu town council and Kavango regional council.

Figure 10: Consultations at Kehemu Community Hall

6.3 Public Consultation & Immediate Neighbors' Survey (Forms)

A public consultation meeting is one of the most important component of public consultation process as it brings the consultant and affected members of the public (particularly from the affected site area) together. The meeting is usually done in an interactive session form so that the community members or members of the public can express their opinions, give their concerns, and make suggestions to the proposed project.

Given the lack of interest in registration as IAPs by the public and experience with previous similar project where the public shows little to no interest especially attending public meetings of such nature, no public meeting was held.

Subsequently, the Environmental Consultant arranged for a direct or neighbouring property/house-to-property/house or institution/office survey on the 11th of April 2025 in the respective project area to introduce the immediate neighbours to the proposed project as well as the ESA/EIA process. This was done as follows:

- A house-to-house survey was undertaken by explaining the EIA process and importance of public consultation to the available residents. The hard copies of the BID and Comments sheet were than circulated to the immediate houses bordering the planned site and the BID delivery registry was signed as proof.

Table 4: Summary of input from I&APs

Site neighbor (face-to-face interview and community meeting)	• In support of the proposed project because of poor network coverage, and having a tower will improve the service. • The proponent must consider giving job opportunities to community members from the proposed area of interest.

7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

7.1 Identification of Potential Impacts

The proposed activities are usually associated with potential positive and negative impacts. For an environmental assessment, the focus is mainly placed on the negative impacts. This is done to ensure that these impacts are addressed by providing adequate mitigation measures such that an impact's significance is brought under control, while maximizing the positive impacts of the project to promote sustainable development and environmental and social protection. The potential positive and negative impacts that have been identified are listed as follow:

Positive impacts:

- **Telecommunications convenience:** Current and future residents (mobile users) will have an improved infrastructure and will not have to struggle with network coverage.
- **Employment creation:** Creation of a few temporary jobs during the construction of the tower.
- **General contribution to local economic development** through reliable communications services.

Negative impacts:

- **Physical land / soil disturbance:** excavation activities to erect the tower could potentially lead to site soils' disturbance.
- **Noise:** During tower' construction, the presence of the construction team and movement of heavy vehicles and machinery may disturb the immediate neighbours to the site.

- **Visual impact:** The presence of the tower in the neighbourhood may be a nuisance to locals.
- **Impacts to Human Health:** Electromagnetic Radiation emitted from the antennae of cellular structures may affect human health.
- **Potential occupational health and safety risks** associated with mishandling of construction and operations equipment.
- **Civil Aviation concerns:** The proposed site designs and location need to be verified to ensure that it meets the approval of the Directorate of Civil Aviation regarding the height of the masts and the position and stability of transmitters.
- **Environmental pollution** from improper disposal of waste generated during construction and maintenance phases.
- **Vehicular traffic safety** from increased number of vehicles moving around the project site and slow-moving trucks transporting project structures during construction, and
- **Archaeological or cultural heritage impact** through unintentional uncovering of unknown archaeological objects or site by certain project activities such as excavation (the minimal site works).
- **Waste Generation** from improper disposal of waste generated during construction and maintenance.
- **Dust Generation** from construction works and vehicular traffic
- **Loss of Avifaunal Biodiversity**

7.2 Impact Assessment Methodology

The Environmental Assessment is primarily a process used to ensure that potential impacts that may occur from project activity are identified and addressed with environmentally cautious approaches and legal compliance. The impact assessment method used for this project is in accordance with Namibia's Environmental Management Legislation (Environmental Management Act No. 7 of 2007) and its EIA Regulations of 2012.

7.2.1 Impact Assessment Criteria

The identified impacts were assessed in terms of probability (likelihood of occurring), scale/extent (spatial scale), magnitude (severity) and duration (temporal scale) as presented in **Table 6**. To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential

impacts can be addressed in a standard manner so that a wide range of impacts are comparable. It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact.
- Assessment of the pre-mitigation significance of the impact; and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment. The following criteria **(Table 6)** were applied in this impact assessment:

Table 5: Impact Assessment Criteria employed to assess the potential negative impacts

Nature	Description	Rating
Extent (Spatial scale)	An indication of the physical and spatial scale of the impact.	**Low (1):** Impact is localized within the site boundary: Site only. **Low/Medium (2):** Impact is beyond the site boundary: Local. **Medium (3):** Impacts felt within adjacent biophysical and social environments: Regional. **Medium/High (4):** Impact widespread far beyond site boundary: Regional **High (5):** Impact extend National or over international boundaries.
Duration	The timeframe, over which the impact is expected to occur, measured in relation to the lifetime of the project.	**Low (1):** Immediate mitigating measures, immediate progress **Low/Medium (2):** Impact is quickly reversible, short-term impacts (0-5 years) **Medium (3):** Reversible over time; medium term (5-15 years).

Nature	Description	Rating
		Medium/High (4): Impact is long-term. **High (5):** Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources
Intensity, Magnitude / Severity (Qualitative criteria)	The degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative	**Medium/low (4):** Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers. **Low (2):** Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.
Probability of occurrence	Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar project and/or based on professional judgment	**Low (1):** Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards. **Medium/low (2):** Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards. **Medium (3):** Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards. **Medium/High (4):** Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards. **High (5):** Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.

7.2.2 Impact Significance

After the impact has been assessed, its significance is then determined. The impact significance is determined through a synthesis of the above impact characteristics (in **Table 6** above). The significance of the impact "without mitigation" is the main determinant of the nature and degree of mitigation required. Once the above factors **(Table 6)** have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate, or low significance, based on the following significance rating scale **(Table 7)**.

Table 6: Significance rating scale

Significance	*Environmental Significance Points*	*Colour Code*
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	>-60	H

Positive (+) – Beneficial impact

Negative (-) – Deleterious/ adverse Impact

Neutral – Impacts are neither beneficial nor adverse.

For an impact with a significance rating of high (-ve), mitigation measures are recommended to reduce the impact to a medium (-ve) or low (-ve) significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation

measures. To maintain a low or medium significance rating, monitoring is recommended for a period to enable the confirmation of the significance of the impact as low or medium and under control.

The assessment of the construction and operational phases is done for pre-mitigation and post-mitigation.

The risk/impact assessment is driven by three factors:

- **Source:** The cause or source of the contamination
- **Pathway:** The route taken by the source to reach a given receptor
- **Receptor:** A person, animal, plant, eco-system, property or a controlled water source. If contamination is to cause harm or impact, it must reach a receptor.

The potential negative impacts stemming from the proposed activities are described, assessed and management/mitigation measures provided thereof. Further mitigation measures in a form of management action plans are provided in the Draft EMP.

7.3 Assessment of Potential Negative Impacts: Construction & Operations

The main potential negative impacts associated with the construction, operation and maintenance phases of the tower are identified and assessed below:

7.3.1 Soil Disturbance (Land Degradation) and Pollution

The excavations and land clearing to enable erection of project structures and installation of services will potentially result in soil disturbance which will leave the site soils exposed and vulnerable to erosion. This impact would be probable at site areas with no to little vegetation cover to hold the soils in place. The movement of heavy vehicles and equipment may lead to compaction of the soils during construction phase. This will however be short-term and localized impact.

There is also a potential of soil pollution from accidental spills or leaks of fuel from project vehicles and machinery.

The potential impact can be rated as medium if no mitigation measures are implemented. However, with the effective implementation of mitigation measures and monitoring, the impact significance will be reduced to low. The impact is assessed in **Table 8**.

Table 7: Assessment of the impacts of construction activities on site and surrounding soils

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H – 4	L/M - 4	M/H - 4	M – 44
Post mitigation	L/M - 2	L/M – 2	L - 2	L/M - 2	L - 12

7.3.2 Potential Impact on Human Health: Non-Ionizing Radiation

Although tower operational phase health concerns were not specifically raised as a concern during the public participation process, it is a national and international topic that requires investigation, as the tower will be in proximity to some of community members (houses and school).

According to Carstens and Kuliwoye (2012), electromagnetic radiation is emitted from electrical appliances commonly used in most homes today, such as televisions, radios, cell phones, microwave ovens, electrical blankets, and computers. Studies have shown that transceiver base stations emit weaker electromagnetic radiation than most household daily appliances i.e. microwave or cell phone used close to your body.

The health authorities around the world, including Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and the World Health Organization (WHO), have examined the scientific evidence regarding possible health effects from signal transmitting tower. Current research indicates that there are no established health effects from the low radio frequency electromagnetic emission (RF-EME) exposure encountered by the public from broadcast tower (Australian Radiation Protection and Nuclear Safety Agency, 2015).

Despite the above information from ARPANSA, the International Commission on Non-Ionizing Radiation Protection (ICNRP) provides guidance on protecting against the adverse health effects associated with electromagnetic fields (EMF) or electromagnetic emission (EME). These guidelines are based on short-term, immediate health effects such as stimulation of peripheral nerve muscles, shocks and burn caused by touching conducting objects, and elevated tissue temperatures resulting from absorption of energy during exposure to EMF/EME.

The National Radiation Protection Authority of Namibia (NRPA) under the Ministry of Health and Social Services (MHSS) is the responsible or regulatory authority that is tasked with the administration of the Atomic Energy and Radiation Protection Act (Act 5 of 2005). The Act specifically requires that account be taken of any guidelines published by ICNIRP regarding the radiation risks associated with Base Transceiver Station structures (National Radiation Protection Authority, Unknown date). The health impacts of radiation are explained for both short- and long-

term in the Energy Board of Namibia Directive. These effects are summarized (as per the afore-mentioned Directive) as follows:

A. Short-term Radiation (Health) effects

The basic restrictions on the effects of exposure are based on established health effects. Different scientific bases were used in the development of basic exposure restrictions for various frequency ranges. Depending on the frequency, the physical quantities used to specify the basic restrictions on exposure to EMF are current density, SAR (Specific Energy Absorption Rate), and power density. For further information on the short-term effect.

The significance of this impact can be regarded as medium to high but can be reduced to a low significance rating by ensuring that the sufficient mitigations measures governed by the national and international legal standards such as International Commission on Non-Ionizing Radiation Protection (ICNIRP) on infrastructure EMR emissions are adequately implemented.

B. Long-term Radiation (Health) Effects

In the case of potential long-term health effects of exposure, such as an increased risk of cancer, ICNIRP conducted that the available data are insufficient to provide a basis for this setting exposure restriction. Thus, the ICNRIP guidelines alone should not be used as a basis for protection against non-thermal effects or long-term biological effects.

The significance of this impact is considered medium to high because the long-term effect is unknown. In the context of the above, a cautionary approach is adopted, and the Precautionary Principle, which states that if an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is not harmful falls on those taking the action. The effective implementation of measures, the impact significance can be significantly reduced to medium and eventually low. The assessment is shown in **Table 9**.

Therefore, ICNIRP uses a reduction factor of 10 to derive at occupational limits for workers and a factor of about 50 to arrive at exposure limits for the public. This factor serves as a precautionary buffer to compensate for uncertainties in the research. By adhering to the threshold levels of ICNIRP, the precautionary measures should be sufficient to adequately address this impact. However, the risk will not be abolished, and it is recommended that the Proponent keep up to date with regards to any new literature published by ICNIRP.

It is also very crucial that the Proponent to familiarize themselves with the soon to be gazetted Non-ionising Radiation Regulations, 2019: Atomic Energy and Radiation Protection Act, 2005 attached under Appendix I of this Report.

Table 8: Assessment of the tower on human health (Short and Long-term radiation)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M – 3	H – 5	M/H – 8	M/H – 4	M – 64
Post mitigation	L/M – 2	L/M – 2	L/M – 4	L/M – 2	L - 16

7.3.3 Potential Impact on Civil Aviation

Potential impact on civil aviation is attributed to the height and location of the site. Generally, the effective utilisation of an aerodrome can significantly be influenced by natural features and man-made constructions inside and outside its boundary. These features may result in limitations on the distance available for take-off and landing and on the range of meteorological conditions in which take-off and landing can be undertaken. For these reasons certain areas of the local airspace are regarded as integral parts of the aerodrome environment (Carstens and Kuliwoye, 2012).

According to GCS Water & Environmental Consultants (2017), a decrease in aviation safety could have severe impacts on third parties considering the potential for injury, death or damage/loss of third party property associated with aviation accidents. In this regard, the consequences of potential incidents would affect families and communities beyond the project boundary and lifespan. The Civil Aviation Standards of the ICAO dictate that all obstructions to be erected within 8 km from an airport need to be approved by the applicable Civil Aviation Authority.

The proposed height of the tower is 25 m and the Namibia Civil Aviation Regulations (NAMCARS) require that erected structures/obstacle should not be higher than 45 m above the mean level of the landing area. The height of the tower is well within the height limit, therefore complies with the NAMCARS. Without the implementation of any mitigation measures can be considered slightly medium and upon the implementation of the mitigation measures, the impact will receive a low significance rating.

In terms of tower heights, the national Civil Aviation Authority (Namibia Civil Aviation Authority (NCAA)) and Civil Aviation Standards of the ICAO dictate that all obstructions to be erected within 15 km and 8 km from an airport / aerodrome reference point, respectively should be authorized. The proposed site (obstruction) is located about 5 km south west from the Airport/ Airstrip. Due to the distance of the site from the nearest airstrip, the approval from the NCAA will be required. Additionally, the Civil Aviation Authority will need to be consulted throughout the project lifetime.

Without the implementation of any mitigation measures, the impact will receive a medium significance rating, and upon implementing the measures, this significance will be reduced to low. This impact is assessed in **Table 10** below.

Table 9: Assessment of the tower presence on civil aviation

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	L/M - 4	M/H - 4	M - 44
Post mitigation	L/M – 2	L/M – 2	L/M – 4	L/M – 2	L - 16

7.3.4 Visual Impact

The presence of the tower in the area may be a nuisance to locals and or travelers. However, the site is in a vegetated area, where direct visibility is limited owing to vegetation cover. Currently and with no measures implemented, the visual impact can be rated as of medium significance. However, upon effectively implementing the measures, it will be significantly reduced to low. The impact is assessed **Table 11.**

Table 10: Assessment of the visual impacts of the network tower

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	L/M - 4	M – 3	M - 24
Post mitigation	L - 1	L - 1	L - 2	L/M – 2	L - 8

7.3.5 Loss of Biodiversity

The most potentially affected fauna in tower erection projects are birds. According to Partners in Flight (2020), each year, approximately 7 million birds collide with communication towers in North America. Migrating songbirds are attracted to and disoriented by non-flashing obstruction warning lights on towers, especially on foggy and cloudy nights. Birds attracted to lights fly close to towers and often suffer collisions with guy wires or tower structures. However, birds are much less

attracted to flashing tower lights and elimination of the non-flashing tower lights reduces the numbers of bird collisions by as much as 70%.

The proposed tower site in Hakusembe/Sikondo village, is located a few meters away from the nearest residential area, on an elevated piece of shrub land, with no major natural open water sources where birds would fly over, in the near vicinity of the site. Therefore, the impact is minimal. However, this does not rule out the possibility of the area and its surroundings being a migratory route for birds. In that case, the presence of the tower may impact such birds.

Before consideration of mitigation measures, the existence of a tower could lead to potential collision of birds, causing mortality among affected bird species. This impact has a Medium Significance rating, but if care is taken in handling equipment around vegetation on site, the impact will significantly be reduced to a low rating. The assessment of this impact is presented in **Table 12** The recommended mitigation measures are presented below.

Table 11: Assessment of the impacts of the presence of the tower on avifauna

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M - 6	M – 3	M – 30
Post mitigation	L - 1	L - 1	L - 2	L – 1	L - 4

7.3.6 Dust Generation

Dust emanating from site access roads when transporting project equipment, materials, and supply to and from site (time-to-time) may compromise the air quality in the area. Vehicular movements create dust even although it is not always so severe. Not only dust but also the possible emissions of gases from heavy vehicles and machinery. These sources of dust and emissions may lead to air pollution, thus decreasing the air quality in the local project area. This could contribute to short-term decrease in air quality around the working site areas.

The tower site is relatively small and localised, and the period for construction works, short. Therefore, given the relatively limited footprint size and short construction timeframe, dust, and gas emissions during the tower construction would be minimal and short-term in nature. Therefore, can be rated as low to slightly medium (significance) if no mitigation measures are implemented. However, once this is done, the impact significance can be reduced to low - please refer to the assessment below **(Table 13)**.

Table 12: Assessment of the impacts of the construction activities on air quality

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	M - 6	M - 3	M – 49
Post mitigation	L - 1	L - 1	L - 2	L/M - 2	L – 8

7.3.7 Noise

Noise generated by project related vehicles and equipment during construction and operational phase can be a nuisance to the neighbours. This impact is regarded as of minimal significance given the fact that even construction work will only be limited to certain days of the week (Monday – Friday) for the duration of the construction period. Construction related noise will be limited to the working hours between 8am and 5pm. Therefore, the noise level is bound to be limited to the site, affecting the immediate neigbours to the site. The impact can be rated as low to medium significant if no mitigation measures are implemented, but upon implementation, the impact will be of low significance. This impact is assessed in **Table 14** below.

Table 13: Assessment of the noise impact

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M - 6	M - 3	M – 30
Post mitigation	L - 1	L/M - 2	L - 2	L/M - 2	L – 10

7.3.8 Waste Generation / Environmental Pollution

The two significant project phases (construction and, operations and maintenance) will be associated with the generation of different waste, ranging from domestic, sewage, general waste to hazardous. If the generated waste is not disposed of in a responsible way, land pollution may occur not only within the site boundary but also the surroundings. Improper handling, storage and disposal of hydrocarbon products and hazardous materials for instance may lead to soil and groundwater contamination, in case of spills and leakages.

Without any mitigation measures, the general impact of waste generation has a medium significance. The impact will reduce to low significance, upon implementing the mitigation measures. The assessment of this impact is given in **Table 15**.

Table 14: Assessment of waste generation impact

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M - 6	M - 3	M – 30
Post mitigation	L - 1	L - 1	L - 2	L - 1	L – 4

7.3.9 Occupational Health, and Safety

The planned project construction and operational activities can be associated with some health and safety risks. This is possible when workers involved in the project activities are exposed to health and safety risks during operations, which may lead to incidents that cause injury or fatalities. Incidents may include accidents leading to minor injuries (i.e., superficial physical injury) or major injuries (i.e., involving heavy machinery, equipment or vehicles). Construction workers will be working at height during construction of the network tower. The lack of safety measures may potentially lead to injuries. Improper handling of construction material and equipment may cause injury.

The use of heavy equipment, especially during excavation, and erection of the tower structures may result in accidental tripping and falling of such structures. This could pose a safety risk to the project personnel, equipment, and vehicles. If machinery and equipment are not properly stored and packed, there would be risks of falling equipment and injury to workers or site visitors. The impact can be rated as medium significant if no mitigation measures are implemented, but upon implementation, the impact will be of low significance. This impact is assessed in **Table 16** below and mitigation measures provided thereof.

Table 15: Assessment of the impacts of the project activities on health and safety

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 3	M - 6	M/H - 4	M – 48
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L – 12

7.3.10 Vehicular Traffic Use and Safety

The project works will involve the movement of one or two heavy trucks during construction of the tower per site and this may potentially cause short-term increase in traffic in the area. However, the tower construction period is short-term with frequent transportation of material and equipment to site. It should be noted that the site is located along busy streets in the Town and the movement

of project related vehicles for a limited time period of works would not have a significant impact on the roads.

Pre-mitigation, the impact can be rated medium and with the implementation of mitigation measures, the significance will be low as assessed in **Table 17** below.

Table 16: Assessment of the impacts of project activities on road use (vehicular traffic)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	L/M - 4	M/H - 4	M – 44
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L – 12

7.3.11 Heritage/Archaeological resources

During construction works, historical resources may be impacted through inadvertent destruction or damage. This may include the excavation of subsurface graves or other archaeological objects when preparing the site for tower foundation laying and erection. There was no information provided about either known heritage or site(s) of significant cultural values within or near the proposed site. Therefore, the project activities will not have an impact of great significance on these and potentially other archaeological remains, at least on surface and visible resources if any. However, this does not mean rule out the possibility of finding some of these objects during the construction phase. With that said, the potential impact significance is slightly medium if no mitigation measures, are implemented. However, after the implementation of the measures provided below, this impact significance will be low. The assessment of the impact is shown in **Table 18** below.

Table 17: Assessment of the impacts of project activities on archaeological resources

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M -2	L – 16

8 RECOMMENDATIONS AND CONCLUSIONS

The potential (positive and negative) impacts that are anticipated from the proposed construction of the telecommunication tower and related activities were identified, described, and assessed. Most of the identified potential negative impacts are rated as of Medium Significance. Therefore, in order to reduce the significance from medium to low, it is recommended that the Proponent effectively implement mitigation measures. In order to maintain a low significance, the implementation of measures will need to be continuously monitored in order to reduce to impact to low and bring the impact under control.

It is, therefore recommended that in the event of an ECC issuance, the following conditions may be appropriate to ensure minimal environmental impact for this project:

- All required permits, licenses and approvals for the proposed activities should be obtained as required.
- The Proponent complies with the legal requirements governing this type of project and its associated activities.
- All mitigations provided in this Report and the management action plans in the Draft EMP should be implemented and monitoring conducted as recommended.
- All the necessary environmental and social (occupational health and safety) precautions provided should be adhered to.
- Excavated/trenched and other project related disturbed areas on the site where construction activities have been completed should be rehabilitated, as far as practicable, to their original state.
- The monitoring of the implementation of mitigation measures should be conducted, applicable impact's actions taken, reporting done and recorded.
- Environmental (EMP) Compliance Monitoring should be conducted on a weekly basis during the construction phase by the project Safety, Health and Environmental Officer or an independent Environmental Consultant and bi-annually during the operational phase. Environmental Compliance monitoring reports should be compiled and submitted to the DEAF as per provision made on the MEFT/DEAF's Portal.

These recommendations are primarily aimed at improving environmental management, ensuring sustainability and promote harmonious co-existence of the project activities and the host biophysical and social environment.

9 LIST OF REFERENCES

1. Climate Data_Rundu: https://en.climate-data.org/africa/namibia/kavango-east-region/rundu-26555/
2. Burke, A. (2002). Present vegetation in the Kavango Region. Journal of the Namibia Scientific Society, 50, 133-145.
3. Excel Dynamic Solutions (Pty) Ltd (2022). Comprehensive Environmental Management Plan / Environmental Management & Closure Plan (EMCP) & for the Existing Dumping Site in Rundu Town, Kavango East Region.
4. GCS Water & Environmental Consultants. (2017). Environmental Scoping Assessment for the Proposed Construction of MTC Antennae in Rehoboth, Hardap Region. Windhoek. Unpublished.
5. International Commission on Non-Iodizing Radiation Protection (ICNIRP). (unknown date). Retrieved from: https://www.icnirp.org/en/about-icnirp/aim-status-history/index.html
6. Mendelson J., Jarvis A., Roberts C., and Robertson T. (2002). Atlas of Namibia: A Portrait of the Land and its People. Cape Town: David Philip Publishers.
7. Mendelsohn, J., & el Obeid, S. (2004): Okavango River. The flow of a lifeline. – Cape Town & Windhoek: Struik Publishers & RAISON.
8. Namibia Statistics Agency. (2011). 2011 Population and Housing Census: Erongo Region 2011, Census Regional Profile. Kavango: Namibia Statistics Agency.
9. National Radiation Protection Authority. (Unknown date). Atomic Energy Board of Namibia: Directive Issued Under Section 33 (3) of the Atomic Energy & Radiation Protection Act (No 5 of 2005) Relating to the Regulation of Sources of Non-Ionizing Radiation. Windhoek: National Radiation Protection Authority.
10. Partners in Flight. (2020). Reduce Bird Mortality: Reducing Bird Collisions with Tower. Accessible at https://partnersinflight.org/what-we-do/reduce-bird-mortality/bird-collisions/.