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Environmental Impact Assessment for the Proposed Construction and Operation of a Telecommunication Tower in Katima Mulilo, Zambezi Region

Scoping Report

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Version – Final

August 2025

Mobile Telecommunications Ltd

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EXECUTIVE SUMMARY

Introduction

Mobile Telecommunications Ltd (MTC) proposes to erect a telecommunication tower in Katima Mulilo. MTC aims to strengthen the coverage for mobile and wireless services (inclusive of voice and data services) within the subject area.

This report documents the assessment of the significance of potential impacts from the proposed activity and proposes mitigation measures to reduce impacts to acceptable levels, if not avoid them altogether.

Project Description

MTC proposes to erect a telecommunication tower in Katima Mulilo at Kamunu Mills in Katima Mulilo, Zambezi Region.

Network coverage predictions were used to determine the black holes in wireless and fixed-wireless services that resulted in the selection of the proposed site. This site will be used to improve coverage for mobile services (including voice and data services).

The proposed development will comprise the construction of a 30-meter-high lattice tower. The sites will be fenced in order to limit public access and prevent vandalism. The antenna size will differ depending on the frequency used as well as different types of antennae.

Public Participation

Communication with I&APs about the proposed development was facilitated through the following means, in this order:

- A Background Information Document (BID) containing descriptive information about the proposed activities was compiled (**Appendix D**) and sent out to all identified and registered I&APs on 21 May 2025;
- Notices were placed in The New Era and the Namibian newspapers dated 21 May 2025 and 30 May 2025, briefly explaining the activity and its locality, inviting members of the public to register as I&APs (**Appendix E**);
- A site notice was fixed on the proposed site (See **Appendix G**);
- A public meeting was scheduled at Kamunu Mills on 04 June 2025 at 17h30. However, no members of the public attended the meeting.

Public consultation was carried out according to the Environmental Management Act's EIA Regulations. After the initial notification, the I&APs were given two weeks to submit their comments on the project until **16 June 2025**; and

The Draft Scoping Report was circulated from the **9th of July until the 23rd of July 2025** for public review and comment. This report will highlight issues raised and contain statements of how these are addressed and incorporated into the final document. The comment period will remain open until the final scoping report is submitted to MEFT.

Conclusions and Recommendations

The key potential biophysical and social impacts related to the planning and design, construction, operation/maintenance and decommissioning phases of the proposed project were identified and assessed. Suitable mitigation measures (where required and possible) were recommended. The impacts can be summarised as follows:

- **Impacts on Surrounding Property Owners** (during construction): There is a possibility of disturbance to surrounding property owners due to the presence of the construction team and construction site activities. The construction work will last for a period of two (2) months and is not expected to continue for an extended period. The significance of this impact is rated as *low*.

- **Impacts on Health and Safety** (during construction and decommissioning) Workers may be subject to issues of health and safety during construction on site. Improper handling of construction materials and equipment may cause injuries. With no mitigation measures in place, this impact would receive a *medium-to-high* significance rating. However, with the implementation of applicable safety measures, the impact would be reduced to a *low* rating.

- **Impacts of Waste** (during construction and decommissioning): Construction activities generate waste – food waste and ablutions from site personnel, bulk construction wastes (scrap metal and packaging) - which leads to environmental pollution if not properly handled, and a negative visual impact to observers in the surroundings. Without mitigation measures implemented, the impact is rated as *medium* significance. After the implementation of mitigation, the impact will be reduced to a *low* significance rating.

- **Impacts of dust and noise** (during construction): Dust and noise generation may occur during construction. Without mitigation measures implemented, the impact is rated as *medium* significance. After the implementation of mitigation, the impact will be significantly reduced to a *low* rating.

- **Impacts on Health and Safety** (Potential radiation during operational phase): Health concerns, as they relate to potential radiation from telecommunication sites, are a national and international topic that require investigation. The significance of this impact can be reduced to *low* significance by ensuring that sufficient mitigation measures governed by national and international standards, such as those of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for infrastructure electromagnetic radiation (EMR) emissions are implemented.
- **Impact on mobile users** (of decommissioning): The affected residents and businesses will lose network coverage if the tower is decommissioned and no alternative cellular service infrastructure is put in place. In the unlikely event that the tower was to be removed in the future, it would most probably be replaced with improved infrastructure of the same purpose.

Based on the information provided in this report, and provided the measures recommended in the Environmental Management Plan (EMP) are implemented and monitored effectively, GCS is confident the identified risks associated with the proposed development can be reduced to acceptable levels.

It is recommended that the project receive Environmental Clearance, provided that the EMP is fully implemented.

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1 INTRODUCTION

Mobile Telecommunications Ltd ("MTC") proposes to erect a telecommunication tower at Kamunu Mills in Katima Mulilo, which aims to strengthen the coverage for mobile and wireless services (inclusive of voice and data services) within the subject area. The location of the proposed site is shown in **Figure 1-1** below.

1.1 The Need for an Environmental Assessment (EA)

Under the 2012 Environmental Impact Assessment (EIA) Regulations of the Environmental Management Act (EMA) No. 7 of 2007, the proposed development is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). This activity is listed under the following relevant sections:

- *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.*

To fulfil the requirements of the EMA and its 2012 EIA Regulations, Mobile Telecommunications Ltd ("MTC") appointed GCS Water and Environmental Engineering Namibia (Pty) Ltd ("*GCS*") as an independent, registered Environmental Assessment Practitioner (EAP), to conduct an Environmental Assessment (EA) (including public consultation) and to submit the required documents in support of an application for an ECC. The findings of the EA process are incorporated into an environmental scoping report (this report) which, together with the draft Environmental Management Plan (EMP), will be submitted as part of an application for an ECC to the Environmental Commissioner at the Department of Environmental Affairs and Forestry (DEAF), Ministry of Environment, Forestry and Tourism (MEFT).

Ndeshihafela Neliwa, a qualified Environmental Assessment Practitioner (EAP) conducted this EA process under the supervision of Paula Tolksdorff, a qualified and experienced EAP. The curriculum vitae of the consultants is attached as **Appendix A** at the end of this report.

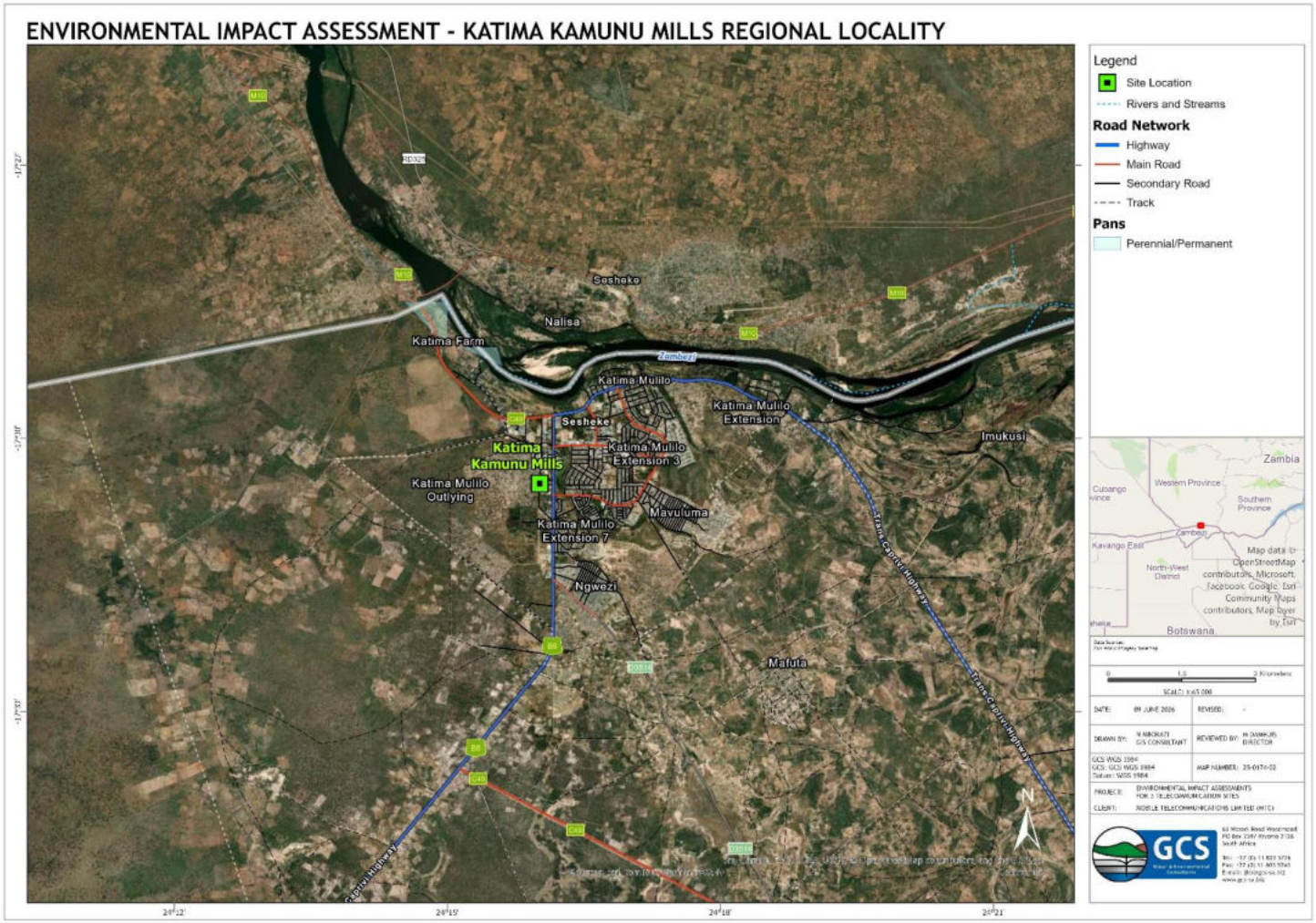

Figure 1-1: Locality of proposed Telecommunication Tower in Katima Mulilo

1.2 Need for and Desirability of the Project

Due to the constant growth in the use of mobile and wireless communication services in Namibia, the pressure to expand the communications network is increasing. MTC identified the need for the new structure at the proposed site that will increase capacity and improve mobile coverage in this particular area. This proposed development will ensure that the quality of the service provided to telecommunication users in the area is improved.

1.3 Scope of Work

This scoping study was carried out in accordance with the Environmental Management Act (EMA) (7 of 2007) and its 2012 EIA Regulations (GG No. 4878 GN No. 30). After opening an application for an ECC with the DEAF, the first stage in the EA process is to submit a scoping report. This report is structured as follows:

Table 1-1: Structure of the Scoping Report

Description	Section of the Report
The need and desirability of the proposed project	Subchapter 1.2
Project description and the need for it	Chapter 2
Alternatives considered for the proposed project in terms of no-go option and tower sharing	Chapter 3
The relevant laws and guidelines pertaining to the proposed project	Chapter 4
Baseline environment in which the proposed activity will be undertaken	Chapter 5
The public consultation process followed (as described in Regulation 7 of the EMA Act) whereby interested and affected parties (I&APs) and relevant authorities are identified, informed of the proposed activity and provided with a reasonable opportunity to give their concerns and opinions on the project;	Chapter 6
The identification of potential impacts, impacts description, assessment, mitigation measures and recommendations	Chapter 7
Recommendations and Conclusions to the report	Chapter 8

The next chapter will be focusing on the description of the proposed project and its associated activities.

2 PROJECT DESCRIPTION

2.1 Description of Activity

2.1.1 Site Location

Network coverage predictions were used to determine the black holes in wireless and fixed-wireless services which drove the selection of the proposed site. This site will be used to improve coverage for mobile services, which include voice and data services. Details of the proposed site are provided in the table below.

Table 2-1: Site location details

Site Name	Kamunu Mills
Erf number	N/A
GPS Coordinates	S17.508271 E24.266916
Local Authority	Katima Mulilo Town Council
Region:	Zambezi Region

2.1.2 Site Design

The proposed development will include the construction of a 30-meter-high lattice tower. **Figure 2-1** below depicts the type of lattice tower that will be constructed in the project.

The site will be fenced in order to limit public access and to prevent vandalism.

2.1.3 Infrastructure and Services

Water will be used only during the construction period, more specifically for the foundation works. The contractor will be responsible for the sourcing of water and is likely to bring it in by dispensing tanker.

Access to the site will be prohibited to anyone except the construction team and MTC.

AC power will be required for the operation of the tower and will be connected to the respective electricity provider's grid.

Figure 2-1: Example of the proposed tower

2.1.4 Resources and Working Team

Construction workers will be required for the following:

- excavation of the foundation;
- steel fixers for the fixing of reinforced steel;
- casting of concrete for both tower and equipment room; and
- riggers for the erection of the tower.

Materials for construction will be stored on site during the construction period. The workforce will not reside on site.

3 PROJECT ALTERNATIVES CONSIDERED

Alternatives are defined as: “different means of meeting the general purpose and requirements of the activity” (Environmental Management Act (2007) of Namibia (and its regulations (2012)). This chapter 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.

The above-mentioned alternatives considered for the proposed activity are discussed in the following subchapters.

3.1 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. This would mean that the proposed tower would not be installed at the proposed site. Should the proposed project be discontinued, none of the potential impacts (positive and negative) identified would occur. Therefore, the network coverage for the area will remain unchanged and would not be improved.

In considering the purpose of the proposed project, the ‘no-go’ option cannot be considered as the preferred alternative.

3.2 Tower Location

Network coverage predictions were used to determine the black holes in wireless and fixed-wireless services which drove the selection of the proposed site. In light of the above, the site is considered to be the preferred site.

3.3 Tower Sharing

In accordance with the Communications Act No. 8 of 2009, service providers should consider using other existing structures first before constructing new ones. This is done to avoid cumulative impact. However, the Proponent intends to construct a multi-user tower for future service providers to be able to mount their antennae onto this proposed tower.

3.4 Conclusions on the Considered Alternatives

The alternatives considered for the project are summarized as follow:

- **No-go vs. continuation of the proposed project**: The no-go alternative is not considered to be the preferred option. This would mean that the proposed tower would not be installed on the proposed site. Should the proposed project be discontinued, none of the potential impacts (positive and negative) identified would occur. Therefore, the network coverage for the area will remain unchanged and would not be improved.
- **Tower location**: Network coverage predictions were used to determine the black holes in wireless and fixed-wireless services which drove the selection of the proposed site. The selected site is a viable location option for this kind of development due to the relevant zoning, topography, and accessibility.
- **Tower sharing**: The sharing of another tower in this case will not be a viable option since there is no other tower infrastructure near this location. The Proponent intends to construct a multi-user tower for future service providers to be able to mount their antennae onto this proposed tower.

4 LEGAL FRAMEWORK

A review of applicable and relevant Namibian legislation, policies and guidelines to the proposed development are given in this chapter. This review serves to inform the Proponent (MTC), 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 in order to undertake the proposed activities.

4.1 The Environmental Management Act No. 7 of 2007

This scoping assessment 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 Environmental Clearance Certificate (ECC) for permission to undertake certain listed activities.

4.2 The Constitution of Namibia Act (No 1 of 1990)

According to Legal Assistance Centre (LAC), there is no clear right to health in the Namibian Constitution. But under the Article 95 of the Namibian Constitution that deals with Principles of State Policy, the Namibian Constitution states that “the state shall enact legislation to ensure consistent planning to raise and maintain an acceptable standard of living for the country’s people” and to improve public health.

4.3 The Communications Act (No.8 of 2009)

This 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.

The full list of all applicable legislation identified and conducted during the EA process are presented in **Table 4-1** below.

Table 4-1: Applicable and relevant Namibian and international legislation, policies and guidelines conducted during the EA process

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act EMA (No 7 of 2007)	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). Details principles which are to guide all EAs.	The EMA and its regulations should inform and guide the EA process.
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21). Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).	
The Constitution of Namibia Act No. 1 of 1990	According to Legal Assistance Centre (LAC), there is no clear right to health in the Namibian Constitution. But under the Article 95 of the Namibian Constitution that deals with Principles of State Policy, the Namibian Constitution states “the state shall enact legislation to ensure consistent planning to raise and maintain an acceptable standard of living for the country’s people” and to improve public health.	The Proponent should ensure compliance with the conditions set in the Act.
Namibian Communications Act 8 of 2009	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.	Provides the standards for setting up cellular, wireless and satellite services.
Local Authorities Act (No. 23 of 1992)	Provides 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.	Katima Mulilo Town Council is the responsible Local Authority of the area in which the proposed development will be located, and they should be consulted for this EA.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Atomic Energy and Radiation Protection Act, Act 5 of 2005	Provides for the adequate protection of the environment and of people against the harmful effects of radiation by controlling and regulating the production, processing, handling, use, holding, storage, transport and disposal of radiation sources and radioactive materials, and controlling and regulating prescribed non-ionising radiation sources according to the standards set out by the ICNIRP.	To determine the "safe distance" around the site.
"Guidelines for Limiting Exposure to Electromagnetic Fields (100kHz to 300GHz)" (March 2020, 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.	Justifies the need for assessing the impact of electromagnetic radiation from the antennae, on the nearby residents.
The Aviation Act, Act 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 structures in Namibia.
Namibian Civil Aviation Regulations, 2001	Section 139.01.34 outlines the obstacle limitations and marking outside aerodromes	The proposed project should adhere to the limitations outlined in the act.
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.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Labour Act (No. 6 of 1992)	Ministry of Labour (MOL) 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.	MTC should ensure that construction, operation and maintenance of the towers, the safety and welfare of workers are not compromised.

The environmental baseline (features) of the project area and the surrounding areas are presented and discussed in the following chapter.

5 ENVIRONMENTAL BASELINE

The proposed project will be undertaken in a specific biophysical and social environment. The baseline conditions of these environmental features are described in the following subchapters.

5.1 Biophysical Environment

5.1.1 Climate

The Zambezi has a tropical climate with higher rainfall, less evaporation and a warmer winter than the rest of the country. The average annual temperature ranges between 21-22°C as indicated in Figure 4 below. The average maximum temperature for Katima Mulilo below varies between 34 and 36°C with the average minimum temperature between 2 and 4°C (Robertson, Jarvis, Mendelsohn, & Swart, 2012).

Rainfall is mostly experienced during the summer, with the average annual rainfall being more than 600 mm per year. Most of the rain in Katima Mulilo is experienced between November and early April.

5.1.2 Topography, Soils, Geology, Hydrology and Hydrogeology

The Zambezi Region is relatively flat with the highest areas occurring in the western part of the region. The region is covered in thick deposits of Kalahari sand leaving very little underlying geology exposed (Robertson, Jarvis, Mendelsohn, & Swart, 2012). The soil in the region is characterized by the Kalahari Basin, which is dominated by sand dunes. Katima Mulilo falls within the Kalahari Woodland land type indicated as beige in **Figure 5-1** below.

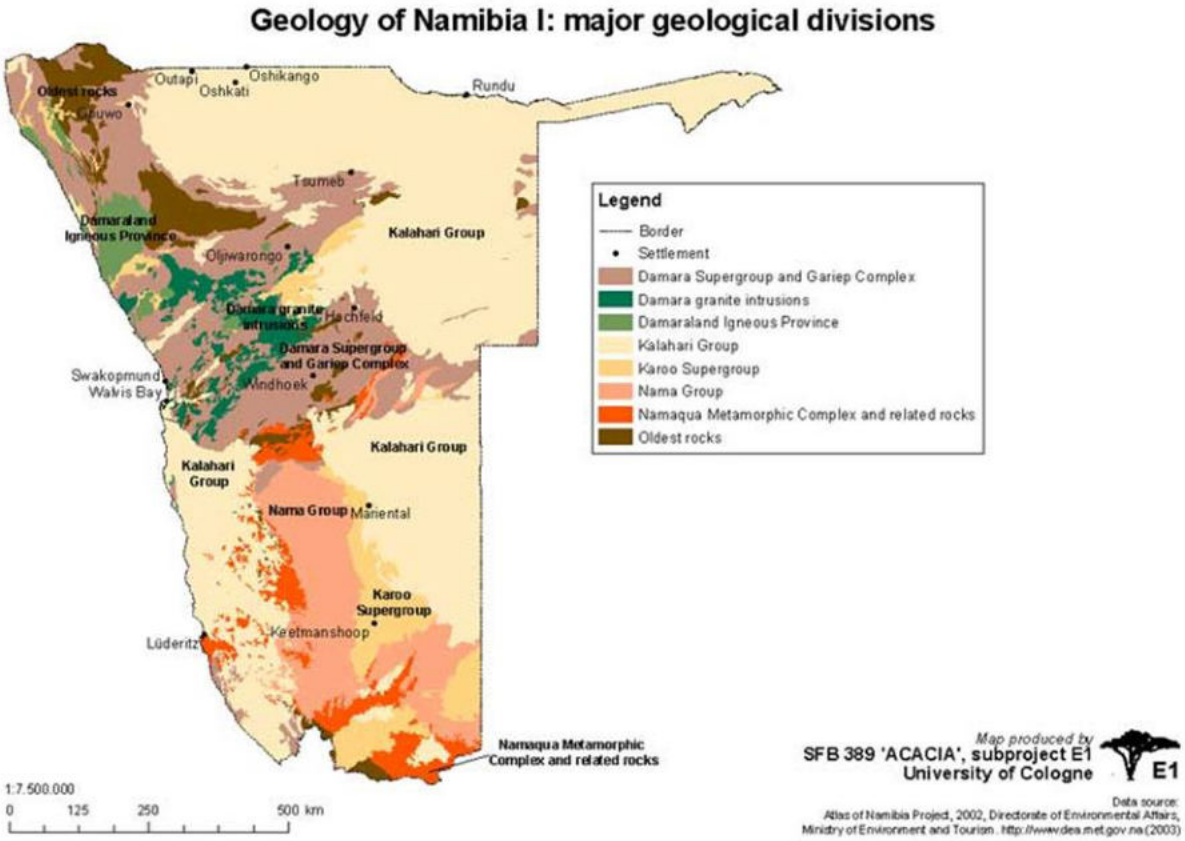

Figure 5-1: Geology of Namibia (http://www.uni-koeln.de/sfb389/e/e1/download/atlas_namibia/pics/physical/geology.jpg)

One of the most important features in the region is the perennial Zambezi River that flows into the Indian Ocean and is shared between eight Southern African countries (Ministry of Agriculture Water and Rural Development, 2011). The region is defined by four perennial rivers: the Zambezi, Kwando, Linyanti and Chobe. Lake Liambezi is an ephemeral lake in the Linyanti-Chobe-Zambezi River system.

Groundwater in the region is considered to be generally good, particularly within 5-20 km from the rivers as they recharge the aquifers (Ministry of Agriculture Water and Rural Development, 2011). Boreholes concentrated along the main roads have been drilled in the region to provide water for people and livestock. Water has additionally been supplied via pipelines due to the varying water quality and unreliable yields **Figure 5-2** below.

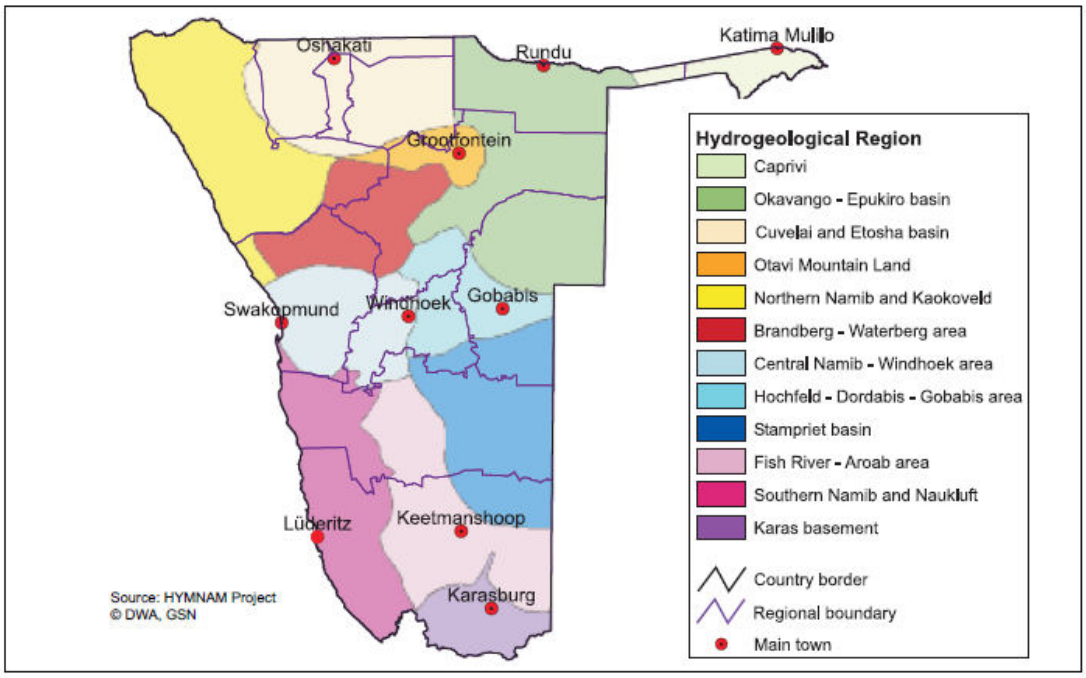

Figure 5-2: Groundwater basins and hydrogeological regions in Namibia (Ministry of Agriculture Water and Rural Development, 2011)

5.1.3 Fauna and Flora

The Zambezi Region falls within the broader Tree-and-Shrub Savanna biome and forms part of the Broadleaved Tree-and -shrub Savanna sub-biome. The Broadleaved Tree-and -shrub Savanna sub-biome is characterized by many species of tall trees which often form thick canopies (Mendelsohn, Jarvis, Roberts & Roberston, 2002). The Zambezi Region can be divided into four vegetation units namely floodplains, mopane woodlands, riverine woodlands and Kalahari woodlands.

The project site is situated in an existing urban area on developed land and is surrounded by roads and developed plots. There are scattered shrubs and trees located on the subject site. **Figure 5-3** below depicts the vegetation commonly found within the subject area.

Figure 5-3: Vegetation commonly located within the subject area

5.1.4 Archaeological and Anthropological Resources

No archaeological and heritage sites are known to be located within the proposed development area.

5.2 Social Environment

5.2.1 Demography

According to Namibia Statistics Agency (2023), the population of Zambezi Region is 142 373 people, with the population of the Katima Mulilo Urban Constituency being 46 401 people (Namibia Statistics Agency, 2023).

5.2.2 Economy

Wages and salaries are the main source of income in this region (57%), while other income sources include farming (12%), business (28%) etc.(Namibia Statistics Agency, 2023).

5.2.3 Land Uses

The subject site is currently zoned for industrial Purposes. The surrounding land uses are predominantly Business Space with some General Residential, Single Residential, and Office Space zoned erven found in proximity to the site.

6 PUBLIC CONSULTATION

6.1 Objective

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 both the EMA and its EIA Regulations.

The public consultation process assists the EAP in identifying all potential impacts, which in turn informs decisions to commission further investigations or specialist studies. Public consultation may also contribute to identifying mitigation measures.

6.2 Approach

6.2.1 Interested and Affected Parties (I&APs)

An I&AP is identified under the Environmental Management Act (2007) as:

- (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”.

GCS identified specific I&APs, who were considered interested in and/or affected by the proposed activities through the following means:

- Information for the applicable local authorities was obtained from the existing GCS stakeholder database;
- Notices were placed in the local newspapers requesting any potentially affected or interested members of the public to register as I&APs.

A summary of the I&APs identified are presented in **Table 6-1**. The complete list of I&APs is provided in **Appendix C.**

Table 6-1: Summary of Identified IAPs

	Description
List of IAPs	**Ministry of Environment, Forestry and Tourism**
	Ministry of Information and Communication Technology
	National Radiation Protection Authority
	Katima Mulilo Town Council
	Neighbouring Property Owners

6.2.2 Communication with I&APs

Regulation 21 of the EIA Regulations details steps to be taken during a given public consultation process and these have been used in guiding this process.

Communication with I&APs about the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing descriptive information about the proposed activities was compiled (**Appendix D**) and sent out to all identified and registered I&APs on 21 May 2025;
- Notices were placed in The New Era and The Namibian newspapers dated 21 May 2025 and 30 May 2025, briefly explaining the activity and its location, and inviting members of the public to register as I&APs (**Appendix E**);
- A site notice was fixed on the proposed site (See **Appendix G**);
- A public meeting was scheduled to be held at Kamunu Mills, on 04 June 2025 at 11h00. However, no members of the public attended the meeting;

Public consultation was carried out according to the Environmental Management Act's EIA Regulations. After the initial notification, the I&APs were given two weeks to submit their comments on the project, until **16 June 2025**.

The Draft Scoping Report was circulated from the **9th of July until the 23rd of July 2025** for public review and comment. This report will highlight issues raised from the public on the documents and contain statements of how these are addressed and incorporated into the final document. The comment period will remain open until the final scoping report is submitted to MEFT.

7 IMPACTS IDENTIFICATION, DESCRIPTION AND ASSESSMENT

7.1 Impact Assessment Methodology

The proposed activities have impacts on biophysical and social features. 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 7-1, Table 7-2, Table 7-3** and **Table 7-4.** The rating is performed using a semi-quantitative numeric scale to ensure consistency and standardisation. However, the numeric values assigned are not to be interpreted as integer based quantitative values.

It is assumed that the 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 on the project for various features of the biophysical and social environment.

The following criteria were applied in this impact assessment:

7.1.1 Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact**. Table 7-1** shows rating of impact in terms of extent of spatial scale.

Table 7-1: Extent or spatial impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Impact is localised within the site boundary: Site only	Impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	Impact extend National or over international boundaries

7.1.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. **Table 7-2** shows the rating of impact in terms of duration.

Table 7-2: Duration impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long-term	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

7.1.3 Intensity, Magnitude / severity

Intensity refers to 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. These were also taken into consideration during the assessment of severity. **Table 7-3** shows the rating of impact in terms of intensity, magnitude or severity.

Table 7-3: Intensity, magnitude or severity impact rating

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
Qualitative	Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration, or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.

7.1.4 Probability of occurrence

Probability describes the likelihood of the impact's actually occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. See **Table 7-4** for impact rating in terms of probability of occurrence.

Table 7-4: Probability of occurrence impact rating

Low (1)	Medium/Low (2)	Medium (3)	Medium/High (4)	High (5)
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.

7.1.5 Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact "without mitigation" is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this chapter, for this assessment the significance of the impact without prescribed mitigation actions was measured.

Once the above factors (**Table 7-1, Table 7-2, Table 7-3,** and **Table 7-4**) have been ranked for each potential impact, the impact significance of each is 'calculated' 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 7-5**).

Table 7-5: 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

For an impact with a significance rating of high, mitigation measures are recommended to reduce the impact to a low or medium 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 of time to enable the confirmation of the significance of the impact as low or medium and under control.

The impact assessment for the proposed activities is given in subchapter **7.2, 7.3** and **7.4**.

7.2 Construction Phase Impact Assessment

The main potential impacts identified are:

- Vegetation loss
- Soil erosion
- disturbance to neighbouring property owners,
- Dust and Noise
- health and safety
- waste generation, and
- Archaeological and Heritage Impacts.

7.2.1 Impact on Surrounding Property Owners

During the construction of the proposed tower, the presence of the construction team will disturb the surrounding property owners. The construction work will last for a period of two (2) months and is not expected to continue for an extended period. Additionally, the immediate neighbouring properties are currently not occupied. Therefore, the likelihood of this impact's occurring is low. The assessment of this impact is presented in **Table 7-6.**

Table 7-6: Assessment of the impacts on surrounding property owners

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	1	4	3	**M - 21**
Post-mitigation	1	1	2	1	L - 4

7.2.1.1 Mitigation

- Construction work to take place during working hours only (07h00 – 17h00).
- Should construction need to be done outside of normal working hours, neighbouring property owners need to be informed in writing prior to construction commencing.

7.2.2 Impact on Health and Safety

Construction workers will be working at height, lifting heavy objects, and working in proximity to large moving equipment (dozers, crane) when constructing the proposed structure. The lack of safety measures will potentially lead to injuries. Improper handling of construction materials and equipment such as working with electrical installations and welding may cause injuries. With no mitigation measures in place, this impact will receive a *medium to high* significance rating. However, with the implementation of applicable safety measures, the impact can significantly be reduced to a *low* rating. The assessment of this impact is presented in **Table 7-7.**

Table 7-7: Assessment of the impacts on health and safety

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	3	3	8	4	**M - 56**
Post-mitigation	2	2	2	2	L - 12

7.2.2.1 Mitigation

- Develop a comprehensive health and safety system for the project including hazard assessments (HIRARCH), Safe Work Procedures and incident reporting, and train construction worksite personnel in appropriate behaviour and procedures.
- The contractor(s) should ensure that all personnel are provided with personal protective equipment (PPE), such as gloves, safety boots, safety glasses and hard hats etc, to be worn at all times on the construction site.
- No workers should be allowed to drink alcohol during working hours.
- No workers should be allowed on site if under the influence of alcohol.

7.2.3 Impact of Waste Generation

Construction activities usually generate wastes that lead to environmental pollution, unless properly stored and disposed of. Litter may also pose negative visual impacts to the surrounding residents and observers. Without any mitigation measures implemented, the impact can be rated as of a medium significance. After the implementation of the mitigations, the impact significance will be reduced to low rating. The assessment of this impact is presented in **Table 7-8**.

Table 7-8: Assessment of the impacts of waste generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	2	6	3	**M - 30**

Post-mitigation	1	1	2	1	L - 4

7.2.3.1 Mitigation

- The construction site should be kept tidy at all times.
- All domestic and general construction wastes produced on a daily basis should be contained in covered bins and disposed of regularly.
- No waste may be buried or burned on site or anywhere else.
- Separate waste containers for hazardous and bulk construction wastes must be provided on site, eg. used oils and greases should be stored in covered drums until they can be sent to Windhoek for processing.
- Wherever machines or vehicles are repaired or are leaking oil, they are to be placed on a sump and the oil/ greases captured and collected in covered drum/s
- Construction labourers should be sensitised to dispose of wastes in a responsible manner and not to litter.
- No wastes may remain on site after the completion of the project.

7.2.4 Impact of Dust

Dust generation may occur during construction. Dust suppression interventions need to be incorporated if dust levels are found to be significant. Without any mitigation measures implemented, the impact can be rated as of a medium significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The assessment of this impact is presented in **Table 7-9**.

Table 7-9: Assessment of the impacts of dust generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	2	8	3	**M - 36**
Post-mitigation	1	1	6	2	L - 16

7.2.4.1 Mitigation

- Dust abatement techniques should be implemented e.g. Spraying of water.

7.2.5 Impact of Noise

Construction equipment and machinery may produce high levels of noise when operating. Without any mitigation measures implemented, the impact can be rated as of a medium significance. After the implementation of the mitigations, the impact will be significantly reduced to a low rating. The assessment of this impact is presented in **Table 7-10**.

Table 7-10: Assessment of the impacts of noise generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	2	8	3	**M - 36**
Post-mitigation	1	1	6	2	L - 16

7.2.5.1 Mitigation

- Construction work to take place during working hours only (07h00 – 17h00) unless otherwise arranged with neighbouring property owners.
- Ensure all machinery is in optimal working order
- Noise levels should adhere to the South African National Standard (SANS 10103).

7.2.6 Impact Assessment of Archaeological and Heritage Impacts

The proposed activity is not taking place in an area that has significant archaeological or heritage resources. However, should these be encountered during the construction activities, mitigation measures need to be in place to ensure that these resources are not harmed. The assessment of this impact is presented in **Table 7-11.**

Table 7-11: Assessment of the impacts of the proposed activities on Archaeological and Heritage Impacts

	Impact Type	Ratings				Significance
		Extent	Duration	Intensity	Probability	
Pre-mitigation	**Negative**	**1**	**2**	**2**	**1**	**6**
Post-mitigation		**1**	**1**	**1**	**1**	**4**

7.2.6.1 Mitigations and recommendation to Archaeological and Heritage Impacts

- All works are to be immediately ceased in an affected area should an archaeological or heritage resource be discovered.
- The National Heritage Council of Namibia (NHCN) should advise with regards to the removal, packaging, and transfer of the potential resource.
- Should a heritage site or archaeological site be uncovered or discovered during the construction phase of the project, a “chance find” procedure should be applied as outlined in the EMP.

7.3 Operations and Maintenance Phase Impact Assessment

The main potential impacts associated with operational and maintenance phases identified are:

- health and safety, and
- civil aviation concerns.

7.3.1 Impact on Health and Safety (Electro-magnetic Radiation)

Although health concerns were not specifically raised as a concern during the public participation process, electro-magnetic radiation from communications installations is a national and international topic that requires further investigation, and due to the proximity of the structure to neighbouring properties.

Electromagnetic radiation is emitted from electrical appliances commonly used in most homes today, such as Ts's, 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 phones used close to your body (Carstens and Kuliwoye, 2012).

The International Commission on Non-Ionizing Radiation Protection (ICNRP) provides guidance on protecting against the adverse health effects associated with electromagnetic fields (EMF). 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.

The National Radiation Protection Authority of Namibia (NRPA) is charged with the administration of the Atomic Energy and Radiation Protection Act (Act 5 of 2005) that specifically require that account be taken of any guidelines published by ICNIRP regarding the radiation risks associated with BTS structures (National Radiation Protection Authority, Unknown date).

7.3.1.1 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.

The significance of this impact can be reduced to a low significance rating by ensuring that the sufficient mitigation measures governed by the national and international legal standards such as International Commission on Non-Ionizing Radiation Protection (ICNIRP) on infrastructure EMR emissions are implemented. The impact is assessed in **Table 7-12**.

Table 7-12: Assessment of the impacts of the antennae on health and safety: Short term radiation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	3	4	8	3	**M - 45**
Post-mitigation	2	2	4	2	L - 16

7.3.1.2 Mitigation

- MTC should ensure that the proposed tower and its EMR are within the standards of The Atomic Energy and Radiation Protection Act, Act 5 of 2005 and Guidelines for Limiting Exposure to Electromagnetic Fields (100kHz to 300GHz) (March 2020, developed by the ICNIRP)
- The design standards to be applied for the antennae should comply with the internationally accepted public exposure guidelines.
- MTC should ensure that the site is registered once operational, as required by regulation 4 of the non-ionising radiation gazetted in June 2020.
- MTC should ensure that all potential operations acquired pre-approval from the National Radiation Protection Authority.
- The National Radiation Protection Authority should be involved during this phase (operational) to assess the possible emissions from antennae.

7.3.1.3 Long-term Radiation (Health) Effects

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

The significance of this impact is considered high, because the long-term effect is unknown. In the context of the above, the Precautionary Principle should be adopted, 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.

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. The impact is assessed in **Table 7-13**.

Table 7-13: Assessment of the impacts of the antennae on health and safety: Long term radiation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	3	5	8	4	H - 64
Post-mitigation	2	2	4	2	L - 16

7.3.1.4 Mitigation

- MTC should ensure that tower construction and its EMR are within the standards of the Atomic Energy and Radiation Protection Act, Act 5 of 2005 and Guidelines for Limiting Exposure to Electromagnetic Fields (100kHz to 300GHz) (March 2020) developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP))
- The design standards to be applied for the antennae should comply with the internationally accepted public exposure guidelines.
- The National Radiation Protection Authority should be involved during this phase (operational) to assess emissions from antennae.

7.3.2 Impact on Civil Aviation

Potential impact on civil aviation due 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).

It is required that the proposed structure comply with the regulations of the Namibia Civil Aviation Act in terms of limitations and markings. Therefore, this impact will receive a significantly low rating. This impact is assessed in **Table 7-14** below.

Table 7-14: Assessment of the impacts of the antennae on civil aviation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	3	4	6	4	**M - 52**
Post-mitigation	1	1	2	2	L - 8

7.3.2.1 Mitigation

- MTC should ensure that the structures adhere to the Namibia Civil Aviation Regulations (NAMCARs) Part 139 Aerodromes and Heliports: licencing and Operation.

7.3.3 Visual Impact

Network towers usually cause a visual impact on the environment. If not planned properly, the network tower presence will contrast the surrounding landscape and thus potentially become a visual intrusion. Crrently and with no measures implemented, the visual impact would be rated as of medium significance. However, upon effectively implementing the measures, it will be reduced to a low significance rating. This impact is assessed in **Table 7-16** below.

Table 7-15: Assessment of the visual impacts

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	2	6	3	**M - 30**
Post-mitigation	2	1	2	1	L - 5

7.3.3.1 Mitigation

All the necessary options to improve the aesthetic of the site should be considered so that it blends in with the surrounding area or at least enhance it for a better appeal to the public

7.4 Decommissioning Phase

7.4.1 Impact of the Decommissioning on Mobile Users

The affected residents and businesses will lose good network coverage in the area, if the antennae are decommissioned and no other alternative cellular service infrastructure is put in place. This is an unlikely case due to the fact that the modern world is advancing on a daily basis, and there will always be a need for improved mobile services. Even if the tower is to be removed in the future, it will most likely be replaced by a better infrastructure for the same purpose. Pre-implementation of the necessary mitigation measures, this impact can be rated as "low to medium" and with the implementation of the necessary mitigation measures, the impact significance will be low. This impact is assessed in **Table 7-16** below.

Table 7-16: Assessment of the impacts of the antennae decommissioning

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	2	6	3	**M - 30**
Post-mitigation	2	1	2	1	L - 5

7.4.1.1 Mitigation

- Mobile services network providers should ensure that mobile coverage is not compromised, by putting up an alternative cellular infrastructure.

7.4.2 Impact Assessment on Surrounding Property Owners

During the removal and destruction of infrastructure of the tower, the presence of the construction team will disturb the surrounding property owners. The construction work is not expected to continue for an extended period. Therefore, the likelihood of this impact is low. The assessment of this impact is presented in **Table 7-17.**

Table 7-17: Assessment of the impacts on surrounding property owners

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	2	1	4	3	**M - 21**
Post-mitigation	1	1	2	1	L - 4

7.4.2.1 Mitigation

- Decommisioning work to take place during working hours only (08h00 – 17h00).

- Should decommissioning need to be done outside of working hours, neighbouring property owners need to be informed in writing prior to construction commencing.

7.4.3 Impact Assessment on Health and Safety

Improper handling of demolished materials and equipment may cause injuries. With no mitigation measures in place, this impact will receive a "medium to high" significance rating. However, with the implementation of applicable safety measures, the impact can significantly be reduced to a low rating. The assessment of this impact is presented in **Table 7-18.**

Table 7-18: Assessment of the impacts on health and safety

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	3	3	8	4	**M - 56**
Post-mitigation	2	2	2	2	L - 12

7.4.3.1 Mitigation

- The contractor(s) should ensure the implementation of a health and safety system that includes HIRARCH analysis, Safe Work Procedures and incident reporting and that site workers are comprehensively trained in safe work practices;
- The Contractor should provide all personnel are provided with personal protective equipment (PPE), such as gloves, safety boots, safety glasses and hard hats, and that they use them continuously on site.
- No workers should be allowed to drink alcohol during working hours.
- No workers should be allowed on site if under the influence of alcohol.
- Decommisioning workers should be trained on how to handle materials and equipment on site in order to avoid injuries.

7.4.4 Impact Assessment of Waste Generation

The decommissioning of infrastructure will result in the generation of waste which may lead to environmental pollution if not properly stored and disposed of. This may pose a negative visual impact on the surrounding environment. Without any mitigation measures implemented, the impact can be rated as of a "medium" significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The assessment of this impact is presented in **Table 7-19**.

Table 7-19: Assessment of the impacts of waste generation

	Extent	Duration	Intensity	Probability	Significance

Pre-mitigation	2	2	6	3	**M - 30**
Post-mitigation	1	1	2	1	L - 4

7.4.4.1 Mitigations and recommendation to waste generation

- The site should be kept tidy at all times.
- All domestic and general waste produced on a daily basis should be cleaned and contained daily.
- No waste may be buried or burned on site or anywhere else.
- Waste containers (bins) should be emptied after the construction and removed from site to the municipal waste disposal site.
- Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.
- Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.
- No waste may remain on site after the completion of the project.

8 RECOMMENDATIONS AND CONCLUSION

8.1 Conclusion

The key potential biophysical and social impacts related to the planning and design, construction, operation/maintenance and decommissioning phases of the proposed project were identified and assessed. Suitable mitigation measures (where required and possible) were recommended. The impacts can be summarised as follows:

- **Impacts on Surrounding Property Owners** (during construction): There is a possibility of disturbance to surrounding property owners due to the presence of the construction team and construction site activities. The construction work will last for a period of two (2) months and is not expected to continue for an extended period. The significance of this impact is rated as *low*. However, the impact can be adequately addressed by the recommendations given under subchapter 7.2.1, 7.4.2 and management actions given in the EMP (Chapter 3).

- **Impacts on Health and Safety** (during construction and decommissioning) Workers may be subject to issues of health and safety during construction on site. Improper handling of construction materials and equipment may cause injuries. With no mitigation measures in place, this impact would receive a *medium-to-high* significance rating. However, with the implementation of applicable safety measures, the impact would be reduced to a *low* rating. The impact can be adequately addressed by the recommendations given under subchapter 7.2.2, 7.4.3 and management actions given in the EMP (Chapter 3).

- **Impacts of Waste** (during construction and decommissioning): Construction activities generate waste – food waste and ablutions from site personnel, bulk construction wastes (scrap metal and packaging) - which leads to environmental pollution if not properly handled, and a negative visual impact to observers in the surroundings. Without mitigation measures implemented, the impact is rated as *medium* significance. After the implementation of mitigation, the impact will be reduced to a *low* significance rating. The impact can be adequately addressed by the recommendations given under subchapters 7.2.3, 7.4.4 and also management actions given in the EMP (Chapter 3).

- **Impacts of dust and noise** (during construction): Dust and noise generation may occur during construction. Without mitigation measures implemented, the impact is rated as *medium* significance. After the implementation of mitigation, the impact will be significantly reduced to a *low* rating. The impact can be adequately addressed by the recommendations given under subchapter 7.2.4 and 7.2.5 and also management actions given in the EMP (Chapter 3).
- **Impacts on Health and Safety** (Potential radiation during operational phase): Health concerns, as they relate to potential radiation from telecommunication sites, are a national and international topic that require investigation. The significance of this impact can be reduced to *low* significance by ensuring that sufficient mitigation measures governed by national and international standards, such as those of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for infrastructure electromagnetic radiation (EMR) emissions are implemented. The impact can be adequately addressed by the recommendations given under subchapters 7.3.1,7.4.3 and also management actions given in the EMP (Chapter 3).
- **Impact on mobile users** (of decommissioning): The affected residents and businesses will lose network coverage if the tower is decommissioned and no alternative cellular service infrastructure is put in place. In the unlikely event that the tower was to be removed in the future, it would most probably be replaced with improved infrastructure of the same purpose. The impact can be adequately addressed by the recommendations given under subchapter 7.4.1 and also management actions given in the EMP (Chapter 3).

8.2 Recommendation

Based on the information provided in this report, should the measures recommended in the EMP be implemented and monitored, GCS is confident the identified risks associated with the proposed development can be reduced to acceptable levels.

It is therefore recommended that the project receive Environmental Clearance, provided that the EMP is implemented.

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APPENDIX A - CV'S –NDESHIHAFELA NELIWA AND PAULA TOLKSDORFF

APPENDIX B - ENVIRONMENTAL MANAGEMENT PLAN (EMP)

APPENDIX C – LIST OF INTERESTED AND AFFECTED PARTIES

APPENDIX D - BACKGROUND INFORMATION DOCUMENT

APPENDIX E - NEWSPAPER ADVERTS

APPENDIX F - NOTIFICATION EMAILS AND LETTERS

APPENDIX G - PROOF OF SITE NOTICES

APPENDIX H - PUBLIC MEETING PRESENTATION

APPENDIX I - COMMENTS RECEIVED