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# Environmental Management Plan (EMP) for the Proposed Construction of a Telecommunication Tower in the Omusati Region (Mahenene South site), Namibia

## Report

**Final**

27 April 2021



**Mobile Telecommunication Namibia**

**GCS Project Number: 19-0983**

**Client Reference: MTC Phase 2**



**Environmental Assessment for the for the Proposed Construction of a  
Telecommunication Tower in the Omusati Region (Mahenene South site), Namibia**

**Environmental Management Plan**



**Version - Final**



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## 1 OVERVIEW

### 1.1 Project Background

Due to the increasing demand for mobile voice and data services in Namibia, the pressure to continuously expand the national mobile communications footprint is increasing. It is for this reason that Mobile Telecommunications Ltd (MTC) intends to expand their network coverage countrywide with the objective of providing 100% population coverage to all Namibians. This initiative will result in the construction of 554 new Base Transceiver Stations (BTS) across all 14 regions of Namibia until completion at the end of 2023.

Under the Environmental Management Act (Act 7 of 2007) the proposed construction of telecommunication networks is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC).

As such MTC undertook an Environmental Assessment process in 2017 for the construction of the proposed BTS. Environmental Clearance for the sites were obtained in 2018.

As part of Phase 2 of the development, MTC has identified 9 additional sites which were not identified at the time of the EIA which was conducted in 2017. MTC proposed to erect 9 telecommunication towers within the Erongo (1 site), Kunene (5 sites), Otjozondjupa (1 site), Omusati (1 site) and Kavango West (1 site) Regions respectively as depicted in **Figure 1-1** below. As such MTC has appointed GCS Water Environmental Engineering Namibia (Pty) Ltd (“GCS Namibia” hereafter) to undertake an EA Process for the additional sites.

In line with the Environmental Management Act (Act 7 of 2007) an Environmental Assessment (EA) has been conducted for the proposed development per region. This Environmental Management Plan (EMP) is based on the EA conducted for the proposed sites in the Omusati Region (**Figure 1-2**).

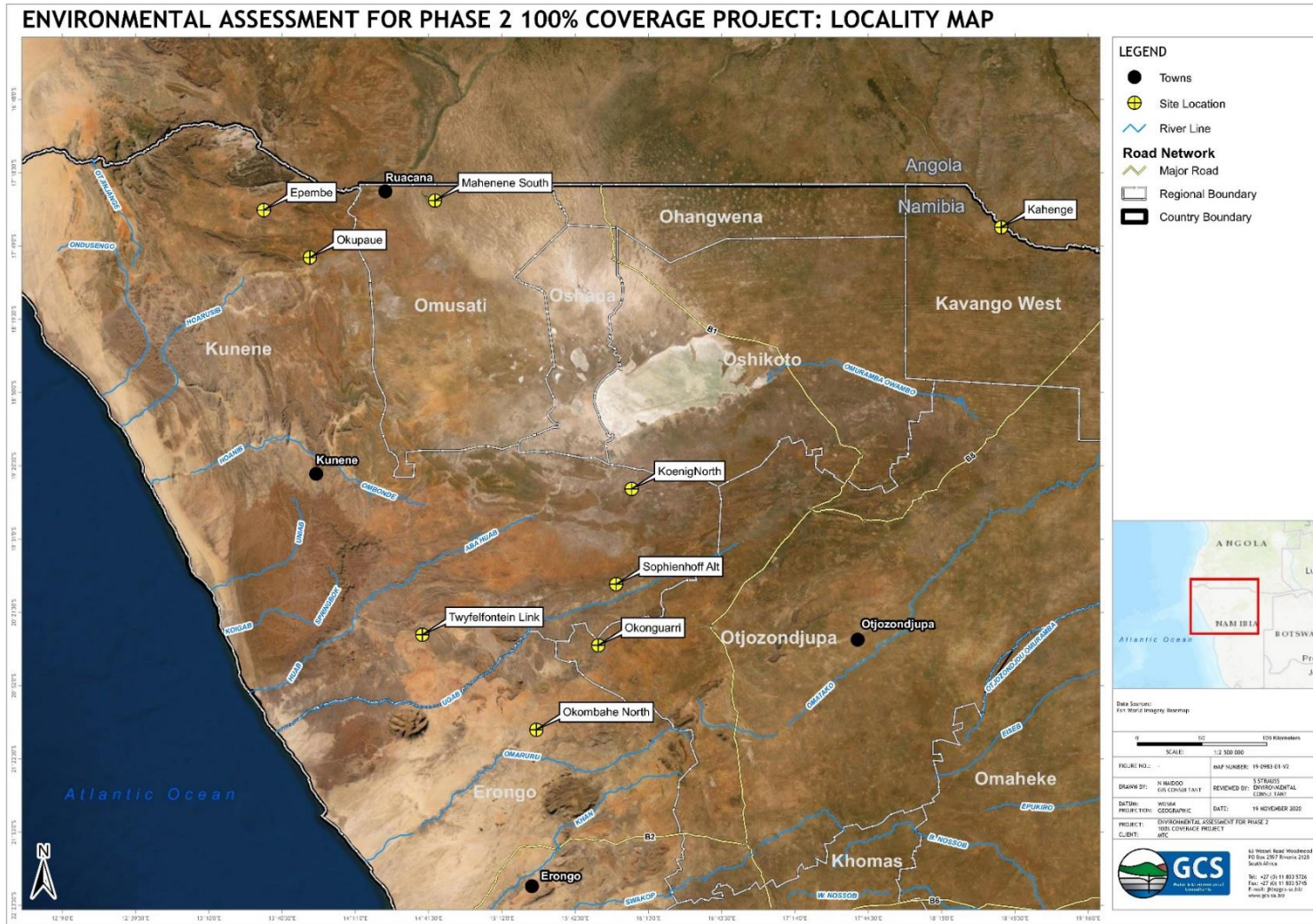


Figure 1-1: Location of proposed sites



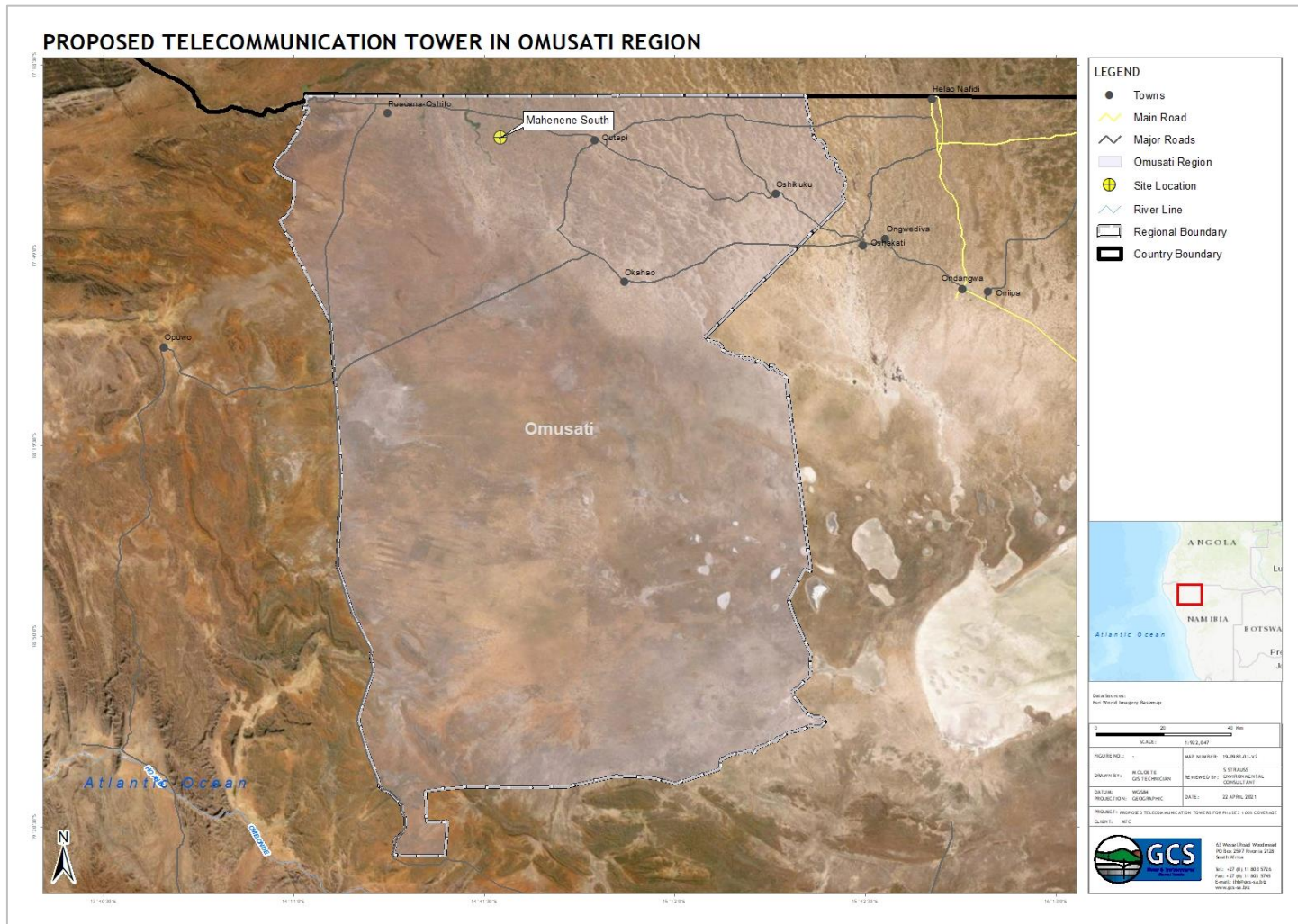


Figure 1-2: Location of proposed site in the Omusati Region

## 1.2 Purpose of the EMP

Regulation 8 of the Environmental Management Act's (EMA) (7 of 2007) Environmental Impact Assessment Regulations (2012) requires that a draft Environmental Management Plan (EMP) be included as part of the scoping Environmental Assessment (EA) process. A 'management plan' is defined as:

*"...a plan that describes how activities that may have significant effects on the environment are to be mitigated, controlled and monitored."*

An EMP is one of the most important outputs of the EA process as it synthesises all the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts identified in the EIA Process and the required environmental management on the ground during project implementation and operation. It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a living document and should be amended to address project changes and/or environmental conditions and feedback from compliance monitoring.

The purpose of this document is therefore to guide environmental management throughout the following life-cycle stages of the proposed development, namely planning and design, construction, operation and maintenance and if considered, decommissioning.

The following phases are addressed in this EMP:

- **Planning and design** - the period, prior to the construction phase, during which preliminary legislative and administrative arrangements are carried out in preparation of construction activities;
- **Construction phase** - during this phase, the tower and its related infrastructure will be constructed;
- **Operation and maintenance** - the period during which the tower and its related infrastructure will be operational and maintained as necessary.
- **Decommissioning** - Should the tower be decommissioned; this phase will be implemented.

### 1.3 Environmental Assessment Practitioner (EAP)

GCS Water Environmental Engineering Namibia (Pty) Ltd (“GCS” hereafter) have been appointed by Mobile Telecommunications Ltd (“MTC or Proponent” hereafter) as independent environmental consultants to conduct the required Environmental Assessment (EA). This includes the compilation of an EMP for the proposed development. The EMP is to be submitted with the Scoping EA Report to apply for an Environmental Clearance Certificate (ECC). The application will be submitted to the Environmental Commissioner at the Department of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT). The EMP will also be used by Contractors and Engineers, as well as the Proponent, in guiding them during the construction and operation of the tower to ensure that impacts on the environment are limited or avoided altogether.

### 1.4 Legal Requirements

The contents of the EMP must meet the requirements Section 8 (j) of the EIA Regulations. The EMP must address the potential environmental impacts of the proposed activity on the environment throughout the project life cycle. It must also include a system for assessment of the effectiveness of monitoring and management arrangements after implementation. MTC therefore has the responsibility to ensure that the proposed activity, as well as the EIA process, conforms to the principles of EMA. Any contractors appointed by MTC must also comply with such principles.

Under the 2012 Environmental Impact Assessment (EIA) Regulations of the Environmental Management Act (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 section:

*“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.”*

In addition to this, the project also involves activities related to the construction of associated infrastructure for the Project:

*“Construction of facilities for the transmission and supply of electricity”*

*“Construction of public roads”*

**Table 1-1** below lists the applicable and relevant Namibian legislations and other international guidelines for this specific EA process



**Table 1-1: Applicable and relevant Namibian legislations and other international guidelines for this specific EA process**

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Constitution of the Republic of Namibia (1990)	The articles 91(c) and 95(i)	MTC should ensure that their proposed structural developments coexist with the natural environment and most importantly, the well-being of the Namibian citizens in terms of facilities and services.
Environmental Management Act EMA (No 7 of 2007)	Section 27	The EMA and its regulations should inform and guide this EA process.
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	GN 30 S21 Scoping Report (GN 30 S8) Assessment Report (GN 30 S15).	
Communications Act, 2009	Section 50 (1)	MTC should consider sharing existing sites with other service providers to avoid cumulative impact.
Namibian Communications Commission Act, Act 4 of 1992	Entire Act	Standards for setting up cellular, wireless and satellite services outlined by this Act should be followed.
The Atomic Energy and Radiation Protection Act, Act 5 of 2005:	Section 2: a-c	Used to determine the “safe distance” around the site.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Guidelines for Limiting Exposure to Time Varying Electric, Magnetic, and Electromagnetic Fields (100kHz to 300GHz)” (2020) developed by the International Commission on Non Ionizing Radiation Protection (ICNIRP)	Entire document	MTC should adhere to the limitations put by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).
Public Health Act 36 of 1919	Section 119	MTC should ensure that all workers involved in the construction and maintenance of the towers comply with this Act.
Health and Safety Regulations GN 156/1997 (GG 1617)	All regulations	MTC should ensure that all workers involved in the construction and maintenance of the towers comply with this Act.
World Health Organisation: Base stations and wireless networks exposure and health consequences (2005)	Entire document	MTC should adhere and understand the exposure standards of wireless networks and potential health effects on the residents of the receiving environment.
The Aviation Act, Act 74 of 1962	Section 139.02.8	MTC Namibia to adhere to regulations for setting up a cellular structure in Namibia.
Convention on International Civil Aviation	Annex 14: to the Convention on International Civil Aviation. Chapter 4 & 6	MTC should adhere to the guidelines outlined in this Convention so as to avoid obstruction to aerodromes.
National Heritage Act (Act 27 of 2004):	Section 48	MTC should immediately inform the National Heritage Council of Namibia should any archaeological material, e.g. graves be found during the construction phase.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Forestry Act 12 of 2001	Section 22 Section 23	MTC should notify the relevant authorities in order to be allowed to construct in their jurisdictions. If there are any protected species, a permit to remove them is required.
Nature Conservation Ordinance (No. 4 of 1975)	Section 18 Section 19	The Proponent should acquire the right permits before entering national parks.
International Convention for the Protection of Birds (1950)	Article 1 Article 2	This convention should guide the site selection process, so as to reduce the potential interruption of avifauna, paying particular attention to their breeding sites and migration routes.
Water Resources Management Act (No. 11 of 2013)	Section 38 Section 68 Section 92	MTC Namibia should ensure that they comply with this Act's regulations as deemed necessary for the project.
The Pollution Control and Waste Management Bill (in preparation)	The entire Bill	The proponent should apply emissions and management measures and acquire the necessary permits.
Regional, Town or City Structure plan (1996)	Entire Plan	The proposed sites must be constructed to fit into the town's vision or plans with the proposed land.
If available, Town Planning Schemes	Entire Plan	MTC may need to apply to the different town councils for consent to use the sites for the construction of BTS stations.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Labour Act (No. 6 of 1992)	Section 39	MTC Namibia and its project contractors should ensure that the safety and welfare of workers are not compromised during the construction, operation and maintenance of the new network structures.
The Electricity Act (No. 4 of 2009)	Exercises control over the provision, use and consumption of electricity in Namibia.	Terms should be agreed between MTC Namibia and the electricity supplier (NamPower, NORED, CENORED, etc.) in the respective regions.
The Road Traffic and Transport Act (No. 22 of 1999)	Advertising on Roads and Ribbon Development Ordinance 30 of 1960.	MTC Namibia should obtain the relevant permits for road transportation or access to sites that are off the national proclaimed public road networks, if required.

## 1.5 Assumptions and Limitations

This EMP has been drafted with the acknowledgment of the following assumptions and limitations:

- This EMP has been drafted based on the scoping-level Environmental Assessment (EA) conducted for the proposed construction of the telecommunication tower in the Omusati Region. No specialist studies were included as part of the assessment; and
- The mitigation measures recommended in this EMP document are based on the risks/impacts in the Scoping Report. These impacts were identified based on the provided project description and anticipated project impacts. Should the scope of the project change, the risks will have to be reassessed and mitigation measures provided accordingly.

## 1.6 Report Structure

This EMP lays out the management actions for the proposed site in the Omusati Region. The EMP addresses the following phases:

- **Planning and design** - the period, prior to construction, operation and maintenance, during which preliminary legislative and administrative arrangements are carried out in preparation for the construction of the infrastructure (towers);
- **Construction phase** - during this phase the services infrastructure (electricity cables), the tower and its related infrastructure will be constructed;
- **Operation and maintenance phase** - the period during which the tower and its related infrastructure will be operational, and maintenance is conducted by the proponent as deemed necessary; and
- **Decommissioning phase:** the period during which the proponent may decide to discontinue the operations of the towers and the associated infrastructure. The modern world is advancing on a daily basis, and there will always be a need for improved mobile services, hence the decommissioning of the infrastructure is not anticipated at this stage. Regardless, mitigation measures will be provided.



## 2 ROLES AND RESPONSIBILITIES

MTC is ultimately responsible for the implementation of the EMP. The Proponent may delegate this responsibility at any time, as they deem necessary, from operation and maintenance phase and decommissioning phase (if considered). The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals which may be fulfilled by the same person:

- Proponent's Representative; and/or
- Environmental Control Officer.

### 2.1 Proponent's Representative

If the Proponent does not personally manage all aspects of the planning and design, construction and operation and maintenance phase activities and decommissioning, referred to in this EMP, they should assign this responsibility to a suitably qualified individual referred to in this plan as the Proponent's Representative (PR). The Proponent may decide to assign the role of a PR to one person for both phases. Alternatively, the Proponent may decide to assign a separate PR for each component i.e. planning and design, construction, operation and maintenance and decommissioning phase. The PR's responsibilities, included in Table 2-1, are as follows:

**Table 2-1: Responsibilities assigned to the Proponent's Representative for planning and design, construction, operation and maintenance and decommissioning phases**

Responsibility	Project Phase
Managing the implementation of this EMP and updating and maintaining it when necessary.	Throughout the lifetime of the project.
Management and monitoring of individuals and/or equipment on-site in terms of compliance with this EMP.	Throughout the lifetime of the project.
Issuing fines for contravening EMP provisions.	Throughout the lifetime of the project.

### 2.2 Environmental Control Officer

The Proponent should assign the responsibility of overseeing the implementation of the whole EMP on the ground from the planning and design phase to operation and maintenance and decommissioning phase to an independent consultant, referred to in this EMP as the Environmental Control Officer (ECO). The Proponent may decide to assign this role to one person for both phases or may assign separate individual ECOs to oversee EMP implementation during each phase. The ECOs will have the following responsibilities:

- Management and facilitation of communication between the Proponent, PR and Interested and Affected Parties (I&APs) with regard to this EMP;
- Conducting site inspections (recommended minimum frequency is weekly during construction period and bi-annually during the operation and maintenance and decommissioning) of all areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Advising the PR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the PR with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

### 3 ENVIRONMENTAL MANAGEMENT PLAN ACTIONS

#### 3.1 Key Potential environmental impacts to be managed

From the EA, the following key potential negative impacts have been identified per project phase and are summarised in Table 3-1 below.

**Table 3-1: Summary of key potential environmental impacts per project phase**

No	Project Phase	Potential negative impacts identified in the EA
1	Planning and Design	Design and planning failures.
2	Construction	Disturbance to surrounding communities, impacts on avifauna, biodiversity loss, landscape, health and safety, waste generation, archaeology, dust and noise impacts.
3	Operation and maintenance	Health and safety (radiation emission), visual impacts and civil aviation impacts.
4	Decommissioning	Loss of better cellular network coverage, removal of infrastructure, health and safety and waste handling and disposal from site.

The aim of the management actions of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

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Management actions recommended to manage the potential impacts rated in the EA carried out for the proposed tower construction are presented in the following tables. The management actions were compiled based on the four project phases:

- Planning and design phase (**Table 3-2**);
- Construction phase (**Table 3-3**);
- Operation and maintenance phase management actions (**Table 3-4**); and
- Decommissioning phase (**Table 3-5**).

The responsible persons at MTC should assess these commitments in detail and should acknowledge their responsibility to the specific management actions detailed in the table of the next subchapters.

### **3.2 Phase 1: Planning and Design Management Actions**

Since the proponent is responsible for the construction of the site, the management requirements detailed in **Table 3-2** need to be carried out before any construction works. Necessary preliminary legislative and administrative arrangements should be made in preparation for the operation of the proposed development. These management requirements are also applicable for the period during which engineering designs/drawings are carried out.

**Table 3-2: Planning and design management actions**

Aspect	Management Requirement	Responsibility	Timeframes
Tower Design	<ul style="list-style-type: none"> <li>The design standards to be applied for the tower should comply with the internationally accepted public exposure guidelines.</li> </ul>	Proponent	Pre-construction phase
Labour Recruitment	<ul style="list-style-type: none"> <li>It is anticipated that MTC will utilize its own workforce.</li> <li>However, should there be a need to employ additional labourers it is recommended that local labour be recruited for unskilled or semi-skilled labour;</li> <li>Recruitment should not be done at the project site.</li> </ul>	Proponent	Pre-construction, construction, operation and decommissioning
Construction schedule	<ul style="list-style-type: none"> <li>A convenient construction work/schedule should be prepared and be shared with the surrounding communities. This will ensure that the surrounding communities are aware of when to expect the construction team at the site.</li> </ul>	Proponent	Pre-construction

Aspect	Management Requirement	Responsibility	Timeframes
EMP Implementation	<ul style="list-style-type: none"><li>MTC needs to appoint a Proponent's Representative (PR) that will act as their on-site implementing agent. This person should be responsible to ensure that the Proponent and Contractor's responsibilities are executed in compliance with relevant legislation and this EMP.</li></ul>	Proponent	Pre-construction
Agreement with affected landowners	<ul style="list-style-type: none"><li>MTC to ensure that permission is granted in writing by the landowners to erect the structures on the site prior to commencing construction.</li></ul>	Proponent	Pre-construction



### 3.3 Phase 2: Construction Phase Management Actions

The management actions for the construction phase are listed in **Table 3-3**.

**Table 3-3: Construction phase management actions**

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
EMP training	Lack of EMP awareness and the implications thereof	<ul style="list-style-type: none"> <li>• Employees appointed for construction work on respective infrastructure must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective work.</li> <li>• Comprehensive induction forms a critical component during the construction and operational period. This includes the following:               <ul style="list-style-type: none"> <li>○ Ensuring that all employees are aware of their individual impact on the environment.</li> <li>○ Ensuring that preventative measures and procedures are undertaken in order to reduce the risk of a potential impact.</li> </ul> </li> </ul>	Environmental Control Officer and Contractor	During construction

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Monitoring	EMP non-compliance	<ul style="list-style-type: none"> <li>The PR should monitor the implementation of this EMP.</li> <li>The ECO should inspect the site throughout the construction period and after completion.</li> </ul>	Proponents Representative and Environmental Control Officer	During construction
Health and Safety	Health and Safety	<ul style="list-style-type: none"> <li>Construction workers should be trained on how to handle materials and equipment on site (if they do not already know how to) in order to avoid injuries.</li> <li>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 at all times during construction hours on site.</li> <li>No workers should be allowed to drink alcohol during working hours.</li> <li>No workers should be allowed on site if under the influence of alcohol.</li> </ul>	Proponents Representative and Contractor	During construction
Waste Management		<ul style="list-style-type: none"> <li>The construction site should be kept tidy at all times.</li> </ul>	Proponents Representative and Contractor	During construction

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• All domestic and general construction waste produced on a daily basis should be cleaned and contained daily.</li> <li>• No waste may be buried or burned on site or anywhere else.</li> <li>• Waste containers (bins) should be emptied after the construction and removed from site to the municipal waste disposal site.</li> <li>• Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.</li> <li>• Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>• No waste may remain on site after the completion of the project.</li> <li>• The proponent should investigate and utilise possible methods for recycling waste generated on site.</li> </ul>		

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Construction labourers		<ul style="list-style-type: none"> <li>Construction workers will be transported, in a bus (or similar suitable passenger vehicle) to and from site.</li> <li>If the construction team is not allowed to use the toilets available on site, portable toilets (i.e. easily transportable) should be available at a ratio of at least 1 toilet per 10 workers.</li> <li>No workers may reside on-site for the entire duration of the construction period.</li> <li>No cooking on site to prevent the risk of fires.</li> </ul>	Proponents representative and Contractor	During construction
Flora	Biodiversity Loss	<ul style="list-style-type: none"> <li>No vegetation should be removed from site unnecessarily or disturbed in any way.</li> <li>No equipment or waste material of any kind shall be left on any vegetation after construction works.</li> <li>No off-road driving shall be allowed, except on the agreed upon access roads into the area.</li> <li>No collection of site plants for own use or commercial purpose is allowed.</li> </ul>	Contractor	During construction

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• When constructing roads and powerlines, vegetation may only be cleared within the corridor. The reserves on either sides of this corridor may not be cleared of vegetation. Detours must be made around mature trees if necessary and where tracks already exist.</li> <li>• No trees may be felled or live wood in the project area removed by any member of the construction team.</li> <li>• A survey and inventory shall be made of large trees (i.e. trees of <math>\geq 150</math> cm diameter) in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided.</li> <li>• No natural habitats, wetlands and protected areas in the immediate vicinity of the activity will be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities.</li> </ul>		



Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.</li> </ul>		
Fauna	Biodiversity Loss	<ul style="list-style-type: none"> <li>The construction team shall not snare, poach, kill, taunt, collect, smuggle or abuse wild or domestic animals at the sites</li> <li>The breeding sites (nests) of wild birds shall not be disturbed.</li> <li>Underground burrows shall not be flushed, closed up, or destroyed, on purpose, even within the site areas.</li> </ul>	Contractor	During construction
Avifauna	Injury/death of avifaunal species	<ul style="list-style-type: none"> <li>Where possible, avoid the unnecessary destruction of habitat (e.g. large trees or bushes) and/or degradation of the environment, including the sensitive drainage lines and other vegetated areas.</li> </ul>	Contractor	During construction

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• Before construction starts, the proposed site and power line route should be inspected by a suitably qualified person for any signs of bird nesting activity; if possible, the timing of construction should avoid bird breeding seasons (usually summer).</li> <li>• Anti-poaching measures should be strictly enforced, and this should be emphasised during induction to contractors; accommodation quarters of construction workers should be inspected regularly for signs of poaching (e.g. feathers, bones, and flesh); offenders should be prosecuted.</li> <li>• Traffic rules, especially speed limits, should be enforced strictly and offenders fined.</li> <li>• Ongoing awareness should be promoted about the value of biodiversity and the negative impacts of disturbance, reckless driving and poaching, especially to breeding birds.</li> <li>• Stay wires of communication structures should be marked with standard "vibration dampers" in alternating black and white, to increase visibility</li> </ul>		

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• The stay wires on powerline poles should be "gapped" similarly, by means of an insulator.</li> <li>• Transformer/switchgear structures should be designed in such a way that they are not attractive as bird perches/nesting sites. Selected live components should be insulated (e.g. using PVC piping or low density polyethylene pipe (LDPE)). On strain structures where jumper wires are used in a horizontal configuration, the two outer jumpers should be suspended below the cross arm and the third/center jumper should be insulated, or all jumpers insulated.</li> <li>• The primary mitigation for a power line is the choice of route options and alternatives. Where possible, the power line route should avoid any areas that are sensitive to birds, such as hill crests, or water courses/ephemeral drainage lines.</li> </ul>		

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• Wherever possible, solar power should be investigated as the optimum source of power, in order to reduce the impacts of power lines on avifauna. Where necessary, security precautions should be improved or developed that discourage the theft of solar equipment, e.g. mounting the solar panels at a higher level, installing electric fencing, camera traps etc.</li> <li>• Burying the power line could be considered as an option in some cases, should this be technically, economically and ecologically feasible.</li> <li>• If sensitive areas cannot be avoided, it may be necessary to mark identified "hotspots" on the power line with an appropriate design of bird flight diverter (BFD), in order to increase the visibility of the line and thereby avoid collisions.</li> <li>• Regular monitoring is considered essential (see below) and, should the results indicate that collisions are still taking place, further mitigation should be investigated and applied.</li> </ul>		

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• While subscribing to mandatory aviation requirements, attempts should be made to reduce the impact of necessary light as far as possible through:               <ul style="list-style-type: none"> <li>○ reducing numbers and intensity of lights at night, as far as possible</li> <li>○ using intermittent light (i.e. avoid steady light in favour of flashing/blinking lights)</li> </ul> </li> <li>• Regular monitoring is considered essential and, should the results indicate that collisions are still taking place, further mitigation should be investigated and applied.</li> </ul>		
Archaeology	Loss/damage of archaeological resources	<ul style="list-style-type: none"> <li>• 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 in the order they appear below:               <ul style="list-style-type: none"> <li>○ If operating machinery or equipment stop work;</li> <li>○ Demarcate the site with danger tape;</li> <li>○ Determine GPS position if possible;</li> </ul> </li> </ul>	Contractor	During construction

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>○ Report findings to the construction foreman;</li> <li>○ Report findings, site location and actions taken to superintendent;</li> <li>○ Cease any works in immediate vicinity;</li> <li>○ Visit site and determine whether work can proceed without damage to findings;</li> <li>○ Determine and demarcate exclusion boundary;</li> <li>○ Site location and details to be added to the project’s Geographic Information System (GIS) for field confirmation by archaeologist;</li> <li>○ Inspect site and confirm addition to project GIS;</li> <li>○ Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and</li> <li>○ Recovery, packaging and labelling of findings for transfer to National Museum.</li> </ul>		

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"> <li>• Should human remains be found, the following actions will be required:                             <ul style="list-style-type: none"> <li>○ Apply the chance find procedure as described above;</li> <li>○ Schedule a field inspection with an archaeologist to confirm that remains are human;</li> <li>○ Advise and liaise with the NHC and Police; and</li> <li>○ Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory.</li> </ul> </li> <li>• The Contractors should ensure that no artefacts are removed or damaged under any circumstances.</li> <li>• All archaeological or cultural sites should be clearly marked and left undisturbed during removal of vegetation for construction and maintenance work.</li> <li>• Cemeteries/graveyards should not be intruded nor disturbed during construction, operation and maintenance works.</li> <li>• No graves shall be moved or tampered with.</li> </ul>		

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
		<ul style="list-style-type: none"><li data-bbox="712 343 1384 651">• If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notification shall be made and approvals/permits be obtained from local authorities and all construction activities planned and carried out in line with local and national legislation.</li></ul>		



### 3.4 Phase 3: Operation and Maintenance Management Actions

The table below (Table 3-4) presents the management action for the operation and maintenance phase.

**Table 3-4: Operation and maintenance phase management actions**

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
EMP training	Lack of EMP awareness and the implications thereof	<ul style="list-style-type: none"> <li>Employees appointed for operation and maintenance on respective site infrastructure and services must ensure that all personnel are aware of necessary health, safety and environmental considerations applicable to their respective work.</li> </ul>	Environmental Control Officer and Contractor	Ongoing
Monitoring	EMP non-compliance	<ul style="list-style-type: none"> <li>The PR or the Proponent should monitor the implementation of this EMP.</li> <li>The ECO(s) should inspect the site operation throughout the operation on a biannual basis.</li> </ul>	Proponents Representative, Proponent and Environmental Control Officer	Ongoing

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Health and Safety	Electromagnetic Radiation (EMR) emission	<ul style="list-style-type: none"> <li>MTC should ensure that tower construction and its EMR are within the international standards of The Atomic Energy and Radiation Protection Act, Act 5 of 2005 and Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (March 2020) developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)).</li> <li>The design standards to be applied for the antennae should comply with the internationally accepted public exposure guidelines.</li> </ul>	Proponent	Ongoing
		<ul style="list-style-type: none"> <li>The National Radiation Protection Authority should be involved during this phase (operational) to assess the possible emissions from antennae but not only limited to, when a concern is raised by a stakeholder.</li> <li>In densely populated areas, output levels should be measured more frequently.</li> <li>Any contravention should immediately be rectified.</li> </ul>	National Radiation Authority of Namibia and Proponent	Ongoing

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Civil aviation	Civil aviation impact	<ul style="list-style-type: none"> <li>• MTC should ensure that the structures adhere to the Namibia Civil Aviation Regulations (NAMCARs) Part 139 Aerodomes and Heliports: licencing and Operation.</li> <li>• In the case that MTC will need to increase the height of the tower or add additional infrastructure on top of the tower, prior consultations should be made with Civil Aviation Department to ensure that the new infrastructure does not interfere with civil aviation operations.</li> </ul>	Proponent	Ongoing
Visual	Visual impacts	<ul style="list-style-type: none"> <li>• At sites with a high visual prominence (e.g. located close to a road or on slightly elevated ground) the following should be investigated (subject to approval from the Director of Civil Aviation): <ul style="list-style-type: none"> <li>○ The equipment container and palisade fence should be painted brown or green (depending on the vegetation cover of the surrounding area) or covered with wooden poles to blend in with the surrounding area.</li> <li>○ With the approval of the Directorate of Civil Aviation, masts should be left galvanized to minimize the visual impact.</li> </ul> </li> </ul>	Proponent	Ongoing

### 3.5 Phase 4: Decommissioning Management Actions

The table below (Table 3-5) presents the management action for decommissioning phase.

**Table 3-5: Decommissioning phase management actions**

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Tower Decommissioning	Loss of better mobile network coverage	<ul style="list-style-type: none"> <li>The proponent should ensure that the mobile coverage is not compromised, by putting up an alternative cellular infrastructure.</li> </ul>	Proponent	Pre-decommissioning
Health and Safety	Health and Safety during removal of infrastructure	<ul style="list-style-type: none"> <li>Construction workers should be trained on how to handle materials and equipment on site (if they do not already know how to) in order to avoid injuries.</li> <li>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 at all times during construction hours on site.</li> <li>No workers should be allowed to drink alcohol during working hours.</li> <li>No workers should be allowed on site if under the influence of alcohol.</li> </ul>	Proponents Representative and Contractor	Ongoing

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Waste Management	Waste handling and removal during removal of infrastructure	<ul style="list-style-type: none"> <li>• The construction site should be kept tidy at all times.</li> <li>• All domestic and general construction waste produced on a daily basis should be cleaned and contained daily.</li> <li>• No waste may be buried or burned on site or anywhere else.</li> <li>• Waste containers (bins) should be emptied after the construction and removed from site to the municipal waste disposal site.</li> <li>• Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.</li> <li>• Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>• No waste may remain on site after the completion of the project.</li> <li>• It is recommended that the recycling and re-use of removed infrastructure should be explored and implemented.</li> </ul>	Environmental Officer and Contractor	Ongoing

Environmental Feature	Impact	Management Actions	Responsibility	Timeframes
Construction labourers	Labour aspects	<ul style="list-style-type: none"> <li>• Construction workers will be transported, in a bus (or similar suitable passenger vehicle) to and from site.</li> <li>• If the construction team is not allowed to use the toilets available on site, portable toilets (i.e. easily transportable) should be available at a ratio of at least 1 toilet per 10 workers.</li> <li>• No workers may reside on-site for the entire duration of the construction period.</li> <li>• No cooking on site to prevent the risk of fires.</li> </ul>	Proponents Representative and Contractor	Ongoing

#### **4 CONCLUSIONS**

GCS has provided practical mitigation measures and monitoring regimes for all phases of the proposed towers development. Should the mitigation measures provided within this EMP be implemented effectively, GCS is of the opinion that no significant environmental or social impacts will be generated.