

**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED
ANAMULENGE TELECOMMUNICATION BASE TRANSCIEVER STATION
(BTS) TOWER AT ANAMULENGE, OMUSATI REGION-NAMIBIA.**

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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**D&P ENGINEERS
AND ENVIRONMENTAL CONSULTANTS**
"Purpose with Passion"



**PowerCom
(PTY) LTD**



Proposed Construction & Operation of Anamulenge Base Transceiver Station Tower in Anamulenge - Omusati Region: Namibia

Environmental Management Plan (EMP)

Prepared for Powercom (Pty) Ltd

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DEFINITIONS

| TERMS | DEFINITION |
|-----------|--|
| | |
| BID | Background Information Document |
| EAP | Environmental Assessment Practitioners |
| ECC | Environmental Clearance Certificate |
| ECO | Environmental Control Officer |
| EIA (R) | Environmental Impact Assessment (Report) |
| ESIA | Environmental and Social Impact Assessment |
| EMP | Environmental Management Plan |
| EMPr | Environmental Management Plan Report |
| GHG | Greenhouse Gasses |
| ISO | International Organization for Standardization |
| I&Aps | Interested and Affected Parties |
| MEFT: DEA | Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs |
| NHC | National Heritage Council |
| NEMA | Namibia Environmental Management Act |
| ToR | Terms of Reference |
| UNFCCC | United Nations Framework Convention on Climate Change |

1. CHAPTER ONE: BACKGROUND

1.1. Introduction

POWERCOM (PTY) LTD herein referred to as the proponent has identified different areas that need improved communication alternatives in Namibia due to the growth in population and economic activities. To achieve the objective of improved telecommunication connectivity, POWERCOM has been appointed by Telecom Namibia, a sister company to establish telecommunication towers across different locations countrywide and Anamulenge is one of the locations identified. The development is earmarked to expand connectivity, decongest connectivity and promote ICT in rural and peri-urban environments.

However, the telecommunication towers cannot be constructed without prior consent from interested and affected parties as well as obtaining an Environmental Clearance Certificate for development. In this respect, D&P Engineers and Environmental Consultants cc has been appointed as an Environmental Assessment consultant to carry out an Environmental and Social Impact Assessment study to obtain an environmental clearance certificate as per the requirements of the Environmental Management Act No. 7 of 2007 and Namibian Environmental Impact Assessment Regulations of 2012 in terms of telecommunication infrastructure.

1.2. Legal or compliance requirements

As per the requirements of the Environmental Management Act No. 7 of 2007 and the Environmental Assessment regulations of 2012, POWERCOM has appointed D&P Engineers and Environmental Consultants (DPEE) to conduct an Environmental Assessment (EA) and develop an Environmental Management Plan (EMP) for the proposed tower establishment. Therefore, this report presents the EMP which has been undertaken in accordance with these requirements. As such, key requirements in accordance with this Act, classifies the proposed project as listed and invoke the need for an environmental management plan to sustainably implement this project. However, legal compliance is not only limited to the EMA, but also applies to all applying legal requirements identified in the ESR. When licenses are required such as for wastewater discharge, the proponent should ensure that all licenses and permits are obtained and fulfilled as per conditions.

In accordance with the two acts stipulated above, the application for the Environmental Clearance Certificate (ECC) will be obtained from the Ministry of Environment, Forestry, and Tourism (MET): Directorate of Environmental Affairs (DEA) before the project can proceed. In this respect, this document forms part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed telecommunication tower at Anamulenge, in accordance with the guidelines and statutes of the Environmental

Management Act No.7 of 2007 and the environmental impacts regulations (GN 30 in GG 4878 of 6 February 2012).

1.3. Other Legislation And Conventions

In addition to the Environmental Assessment Policy and the Environmental Management Act, the following additional pieces of existing or pending legislation and conventions may have some bearing on the proposed project:

The socio-economic environment

- Atomic Energy and Radiation Protection Act (2005)
- Communal Land Act (2002)
- Decentralisation Policy (1998)
- Hazardous Substances Ordinance (1956)
- International Atomic Energy Agency Non-proliferation Treaty (1970)
- Labour Act (1992)
- National Employment Policy (1997)
- National Heritage Act (2004)
- Pending Minerals Safety Bill
- Public Health Act (1919)
- Regional Councils Act (1992) as amended
- Road Traffic and Transport Act (1999)
- Traditional Authorities Act (1995)
- War Graves and National Monuments Amendment Act (1986)

The biophysical environment

- Air Quality Act (2004)
- Atmospheric Pollution Prevention Act (1965)
- Atmospheric Pollution Prevention Ordinance (1976)
- Convention on Biological Diversity (2000)
- Convention to Combat Desertification (1997)
- Forestry Act (2001)
- Minerals Policy of Namibia (2003)
- Namibian Water Corporation Act (1997)
- Nature Conservation Ordinance (1975) and Nature Conservation Amendment Act (1996)
- Pollution and Waste Management Bill (draft)
- Ramsar Convention (1975)
- Soil Conservation Act (1969)
- United Nations Framework Convention on Climate Change (1992)
- Water Resources Management Act (2004)

2. CHAPTER TWO: PROJECT DESCRIPTION AND LOCATION

2.1. Project Location

The proposed tower is to be erected at Anamulenge, Omusati Region at coordinates, 17°29'45.15"S 015°00'48.04"E. The site is located 2.34 km from Outapi (C46 road) and 28 m from the D3608 gravel road.

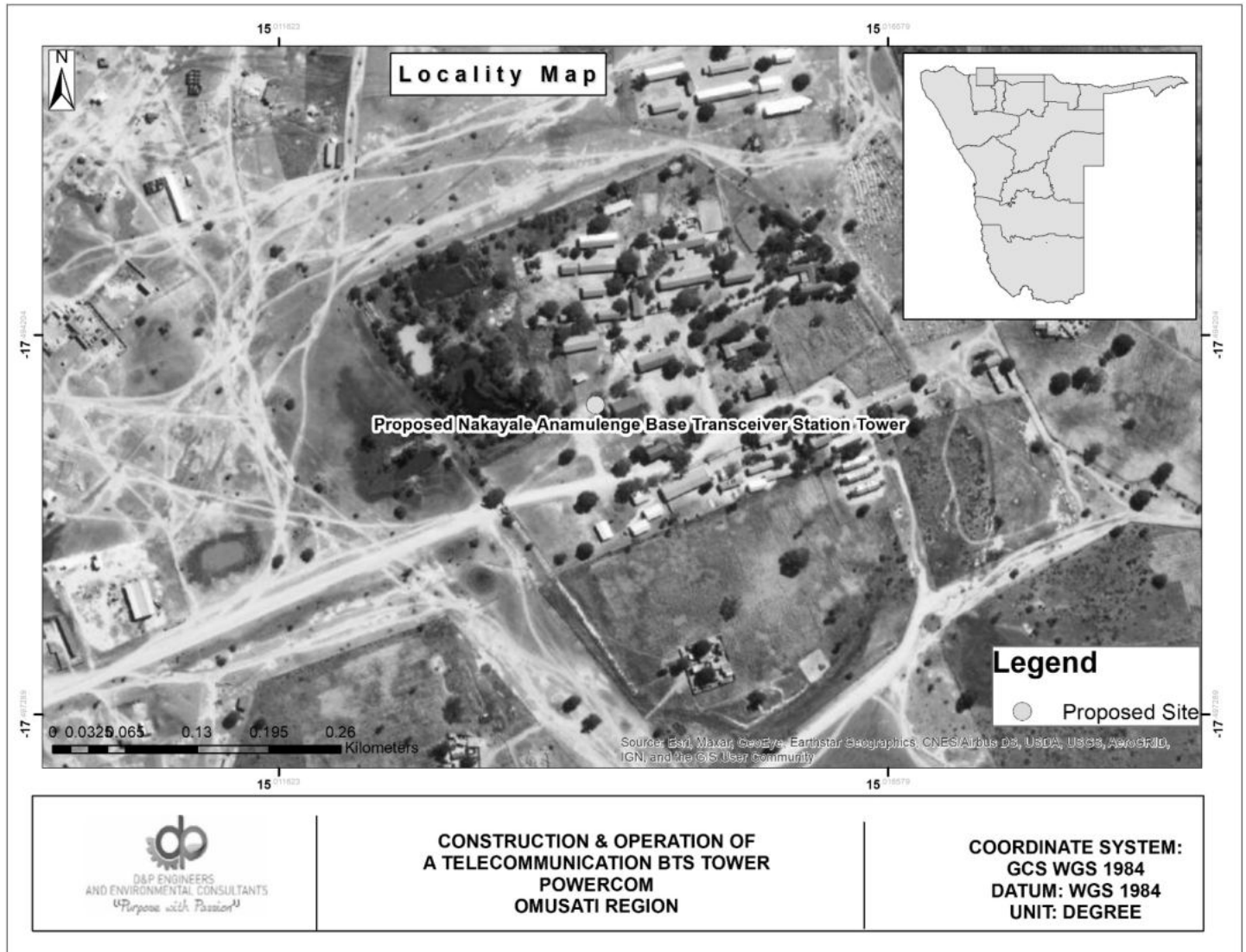


Figure 1: Project Site

2.2. Brief Description Of The Environment

It is semi-arid and characterized by a high temperature ranging between 25-37 degrees Celsius. The average rainfall per year is about 350-500 mm between November to April. The Region falls under the very flat hydrogeological Cuvelai Basin dipping from some 1150 m above sea level (asl) in the northeast to 1080 m asl in Etosha Pan. The groundwater in the west and south of the Region is sweet and shallow i.e. 10-20 meters from the surface. The rest of the water sources in the Region is predominantly saline. The region is a flat, sandy region intersected by a network of broad, shallow

watercourses called Oshanas. The landscape of the Region is made up of *Colophospermum mopane* trees which is a dominant specie and spreads across the Region on shallow sand. The sandy parts of the Region bear abundant *Hyphaene petersiana*, *Ficus carica*, *Adansonia digitata L*, and *Sclerocarya birrea*, especially in the eastern part. However, the project site consists of non of these plants as it is covered by grass species that have been grazed on. The economy of the Anamulenge is built on subsistence farming consisting of crop production and livestock farming or cattle herding. The surrounding area consists of business establishment areas, a school, and homesteads that practice subsistence farming.

2.3. Description And Design of the project

TELECOM Namibia's information and technology infrastructure development subsidiary, POWERCOM (Pty) Ltd is on a drive of construction network towers across the country. POWERCOM targets that, other than improving internet and voice connectivity in the regions, there is also a need to increase the company's footprint and asset base to best service ICT stakeholders and offer better connectivity in all regions of the country. POWERCOM aims at providing different telecommunication service providers in Namibia with ready-to-use infrastructure as well as expanding network coverage into the different areas where there is weak or no network connectivity at all. Behind this backdrop, Telecom identified areas that need improved network connectivity that is currently not serviced with telecom network. The applicant, POWERCOM Pty Ltd intends to develop 22 telecommunication towers countrywide and Anamulengebeing one of the sites.

Each tower development will include the following:

- The project entails the construction of a 30-lattice tower with a footprint size of a 20m x 20m area and a support container;
- The site is to accommodate TN Mobile service and other service providers.
- 20m x 20m electric fence

The Proposed tower position will entail:

- The structure is to be fenced to limit public access to it.
- The base station will be a secured building and sufficient precautions will be made to prevent access to the antenna support structure.
- Access to the area will be strictly controlled through a locked gate.

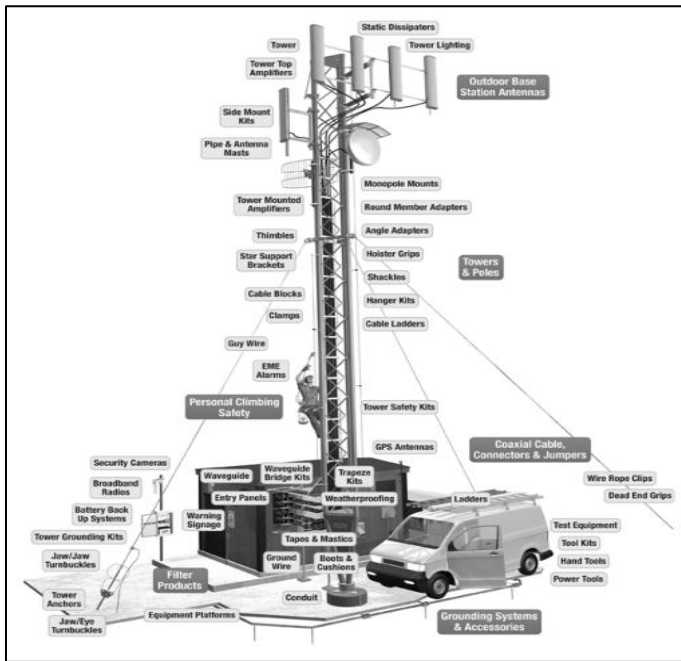


Figure 2: Typical telecommunication towers structure and form (visual purposes only)

3. CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

3.1. Purpose Of The Environmental Management Plan (Emp)

This EMP has been developed for the proposed establishment of a telecommunication base transceiver station at Anamulenge. It forms the operational framework within which the proposed project is to operate within. All anticipated environmental and social impacts identified in the environmental scoping report are addressed, with a mitigation action, monitoring requirements, key indicators, and responsibilities. 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. All this life-cycle has been addressed in this EMP (see table 2&3). This EMP is incessant, and it requires compliance monitoring, updating, and or amendment if the scope of operations changes. All personnel working on the project will be legally required to comply with the standards set out in this EMP.

Furthermore, this section describes the Environmental Management Plan (EMP) for impacts associated with the proposed development. The EMP stipulates the management of environmental programs in a systematic, planned, and documented manner. The EMP below includes the organizational structure, planning, and monitoring for environmental protection at the proposed farm area development and other areas of its influence. The aim is to ensure that the proponent maintains adequate control over the project operations to

- To prevent negative impacts where possible;
- Reduce or minimize the extent of impact during the project life cycle;
- Prevent long-term environmental degradation.
- Ensure public safety and health are protected

3.2. EMP Administration

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented. To ensure that the EMP is effectively implemented, the consultant also recommends that MET: DEA also conduct regular inspection visits on-site to enforce conducting of quarterly and biannual reports. Furthermore, there is also a need for the proponent to appoint an overall responsible person (project manager) to ensure the successful implementation of the EMP.

3.3. Roles and Responsibilities

Table 1: EMP Implementation-Roles and Responsibilities

| ROLE | ENVIRONMENTAL RESPONSIBILITIES |
|---|---|
| Powercom Pty Ltd (Site Acquisition Manager) | Responsible to enforce EMP implementation during construction and operation phases. |
| Environmental Control Officer (ECO) | Implement, review and update the EMP. <ul style="list-style-type: none"> • Ensure all reporting and monitoring required under EMP is undertaken, documented, and distributed as needed • Conduct environmental site training (toolbox talks) and inductions with the support of an environmental consultant. • Conducts environmental audit at the work site with the support of an environmental consultant. • Close out all non-conformances. • Ensure materials being used on site are environmentally friendly and safe. |
| The Directorate of Environmental Affairs | Approve the EMP and any amendments to the EMP. <ul style="list-style-type: none"> • Approve reports of environmental issues and non-conformances as issued. • Review and approve environmental reports submitted as part of EMP implementation • Ensure that the client is compliant with the EMP through biannual reporting on environmental performance. |
| Project Manager (Site Engineer) | Control and monitor actions required by the EMP. <ul style="list-style-type: none"> • Report all environmental issues to HSE Manager. • Ensure documented procedures are followed and records are kept on site. • Ensure any complaints are passed on to the management within 24 hours of receiving the complaint. |

| | |
|------------|--|
| Contractor | <p>Follow requirements as directed by the EMP when conducting work.</p> <ul style="list-style-type: none"> • Report any potential environmental issues to the site engineer/project manager, indicating spilled oil, excess waste, excessive dust generation, dirty water running off the site, and other possible non-conformances |
|------------|--|

3.4. Planning and design

Table 2: Planning and Design Management Actions

| Aspect | Management Requirement | Responsibility | Timeframes |
|------------------------------------|--|----------------|------------------------|
| Tower Design | <ul style="list-style-type: none"> • The design standards to be applied for the Tower should comply with the internationally accepted public exposure guidelines. • The tower design should comply with the aesthetic guidelines for similar structures as prescribed by the City of Windhoek. | Proponent | Pre-construction phase |
| Labour Recruitment | <ul style="list-style-type: none"> • It is anticipated that POWERCOM will utilize its own workforce. However, should there be the need to employ an extra person(s), especially for unskilled labour, it is highly recommended to recruit local people from Anamulenge. | Proponent | Ongoing |
| Surrounding property owners | <ul style="list-style-type: none"> • Consent letters are to be obtained from the surrounding property owners before construction. | Proponent | Pre-construction phase |

| | | | |
|------------------------------|--|-----------|------------------|
| Construction schedule | <ul style="list-style-type: none"> A convenient construction work/schedule should be prepared and shared with the surrounding property owners. This will ensure that the surrounding property owners are aware of when to expect the construction team at the site. | Proponent | Pre-construction |
| Compensation of land | <ul style="list-style-type: none"> There needs to be a clear agreement between POWERCOM and the land owners if they will be compensated for the piece of land used before construction starts. | Proponent | Pre-construction |

3.5. Construction and Operation

Table 3: Construction and Operation EMP (C&O EMP)

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|------------------------|---|---|---------------|------------|--|--|--------------------------|
| Noise pollution | <p>Noise will be generated through:</p> <ul style="list-style-type: none"> Construction activities Moving vehicles. | <p>The health of working personnel could be disturbed.</p> <p>Anamulengeresidents could be disturbed by the noise.</p> <p>General annoyance</p> <p>Driving away local animals species near the project site</p> | Environmental | 4-6 months | <p>Environmental Control Officer</p> <p>Site Manager</p> | <p>A construction interval will be established, used, and adhered to.</p> <p>Workers will be issued earplugs to protect them from excessive noise.</p> <p>The public will be notified through a printed timetable stating planned operational activities.</p> <p>Construction activities will be conducted during the daytime.</p> | Construction & Operation |

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|-----------------------------|--|---|---------------|---------------------|---|---|-------------------------------------|
| | | | | | | <p>Site notices will be erected on, around the site-notifying visitors, and nearby residents of different hazards on site.</p> <p>No areas marked as sensitive environments, especially for birds, need to be avoided during construction and operation.</p> | |
| Dust Generation | Dust will accumulate because of the land preparation, onsite movements of vehicles and machines, wind blowing on loose material during construction, and tipping. | <p>This can lead to respiratory illnesses, especially among those working in the area.</p> <p>General air pollution.</p> <p>Nuisance to nearby residents</p> <p>The process can also drive away wild animals within the project area's surroundings</p> | Environmental | 6-8 months | <p>Environmental Control Officer</p> <p>Site Manager</p> | <p>Dust suppression will be done by watering dust source surfaces.</p> <p>Watering down dusty surfaces,</p> <p>Ensure that protective equipment such as respirators are distributed to employees, and ensure their use.</p> <p>Site notices are to be erected on and around the site to inform visitors and surrounding residents.</p> | Construction & Operation |
| Loss of Biodiversity | <p>Vegetative plants on site will be removed</p> <p>Habitat destruction for both ground-dwelling species and tree-dwelling species.</p> <p>-Soil disturbance on and around the site.</p> | <p>The clearing of vegetation will result in the breaking of the ecosystem processes in the area.</p> <p>Loss of aesthetic value of the proposed project area.</p> <p>The few small animals still habiting the place such as small rodents and birds will be forced away.</p> | Environmental | Constr uction phase | <p>Environmental Control Officer</p> <p>-Site Manager</p> | <p>The proposed project area is already disturbed; hence there is little vegetation to be affected by the development.</p> <p>The ground disturbance will only be limited to the boundary area to avoid affecting a large area.</p> <p>Upon completion of construction activities more greening of the construction footprint affected area is recommended.</p> | Construction |

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|-------------------------|---|---|---------------|--------------------|--|---|--------------------------|
| | | | | | | A local landscaper can be engaged. | |
| GhG emissions | <p>Green House Gasses (GHGs) emissions will be produced from the following activities:</p> <ul style="list-style-type: none"> Fuels combustion for (construction vehicles and equipment) Ground excavation releases phosphorus found underground and releases particulate matter into the atmosphere. | <p>Global climate change</p> <p>Air pollution</p> | Environmental | Construction phase | <p>Environmental Control Officer</p> <p>Site Manager</p> <p>Department of Environmental Affairs.</p> | <p>Adopt the use of ethanol-blended fuels wherever necessary.</p> <p>Design an operating system that cuts on fuel consumption.</p> <p>Use of solar energy systems during construction for lighting and other minor energy needs.</p> | Construction & Operation |
| Waste Generation | <p>Construction and operation are associated with a lot of raw materials and activities that result in pollution</p> <p>The construction and maintenance activities may generate e-waste</p> | <p>Pollution from oil spills resulting from the handling of various machinery used during the construction phase</p> <p>Construction rubble, empty packaging containers/bags, and materials remnants.</p> | Environmental | Construction phase | <p>Environmental Control Officer</p> <p>Site Manager</p> | <p>Ensure that all waste from construction activities is stored and contained in designated containers and transported to an approved waste disposal site.</p> <p>Bulky waste such as building rubbles must be collected and disposed of for landfilling.</p> <p>-Visual inspections monitoring</p> | |

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|--------------------------------|--|---|----------------------|----------------------------|---|---|----------------------------|
| | and this needs to be disposed of sustainably. | | | | | | |
| Safety and Health risks | Construction related Safety and Health hazards | Injuries to workers such as Occupational dermatitis, slips and falls of humans and objects, musculoskeletal disorders, etc. | Health and Safety | Construction phase | ECO | Equip workers with Personal Protective Equipment (PPE), and provide training on how to effectively use the PPE. Provide platforms for briefings and meetings about possible safety and health hazards in the workplace Provide site signs warning and informing about different hazards on site. | Construction and operation |
| | Electrical hazards | Fatalities and fires | Health and Safety | Construction and operation | ECO | Employees should be trained on electrical safety before working on-site. Safety representatives with training on electrical hazards and emergency management should be a station on-site always during construction Safety signs during construction and operation should be put on site. No-go areas should be labeled, and PPE specifications should be clear to maintenance personnel. | Construction and Operation |
| | Radiation (Non-ionizing) | Carcinogenic consequences | Health Social | Permanent | Environmental Control Officer Site Manager | Radiation is the emission of energy as electromagnetic waves or as moving subatomic particles and it is part of our everyday environment (Clegg et al., 2019). Non-ionizing radiation encompasses both | Operation |

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|--------|-------------|-----------------|---------------|------------|---|--|-----------|
| | | | | | | <p>natural and human-made sources of electromagnetic fields, for example, electrical power supplies and appliances are the most common sources of low-frequency electric and magnetic fields in our living environment (ITU-T, 2014).</p> <p>The contractors to be installing the transmission are required to put on appropriate PPE to protect them from possible radiation.</p> <p>Provisions of the Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005) should be effectively implemented, and 20 days before installation of the transmitters, communication should be made to the Radiation Protection Authority for authorization and supervision.</p> | |
| | Avifauna | Bird fatalities | Environmental | Permanent | Environmental Control Officer Site Manager | <p>Towers will be built below 40m in height which will avoid bird fatalities.</p> <p>Construct towers, away from areas of high migratory bird traffic, wetlands, and other known bird areas.</p> <p>Minimize the tower 'footprint' on newly constructed towers.</p> <p>If the tower is decommissioned, it should</p> | Operation |

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|------------------------|--|---|--|------------|--|---|----------------------------|
| | | | | | | <p>be removed as soon as possible.</p> <p>Use visual daytime markers in areas of high diurnal birds.</p> <p>Security lighting for on-ground facilities should be minimized, point downwards, or be down-shielded.</p> <p>Conduct on-site bird fatalities monitoring on the tower at least every month.</p> <p>The use of white strobes results in less circling behavior by nocturnal migrants and thus less mortality than red pulsating lights.</p> | |
| | Aviation Impacts | <p>Bird fatalities</p> <p>Air transports impacts</p> | <p>Socio-economic</p> <p>Environmental</p> | Permanent | <p>Environmental Control Officer</p> <p>Site Manager</p> | <p>The towers should comply with aviation guidelines so that they do not impact air transport systems.</p> <p>Air traffic visibility systems such as lighting at the tip of the tower.</p> <p>The towers should be designed so that they are visible to birds.</p> | Construction and operation |
| Land use change | There will be a change in land use and visual aesthetics | Sudden changes in landscape appearances may be unfavorable for Anamulengeresidents. | <p>Social</p> <p>Terrestrial environment</p> | Permanent | <p>Environmental Control Officer</p> <p>Site Manager</p> | The development should blend into the existing area through designing and color coding. | Construction and operation |
| Positive Impacts | | | | | | | |

| Impact | Description | Effects | Class | Time frame | Responsibility | Action | Phase |
|-----------------------------------|--|--|----------------|--------------------|----------------|--|----------------------------|
| Employment creation | The development provides an opportunity of outsourcing work | Improves disposable income for those employed and their immediate families. | Socio-economic | Project lifetime | Site Manager | Work with local leadership (councilor) on acquiring non-skilled labor from the residents. | Construction and operation |
| Business linkages | Raw materials acquiring and contracting companies provide an opportunity for businesses. | Local suppliers will be presented with an opportunity to empower their businesses. Construction workers can be provided with accommodation, food, and services from the local community increasing business activities. | Socio-economic | Construction phase | Site Manager | The proponent will outsource most of its materials and services | Construction and operation |
| Infrastructure development | The development presents a unique opportunity for infrastructure | Improvement in connectivity. Boost in Local | Socio-economic | Construction phase | Site Manager | The new tower should cover a larger area, and they should also consider the provision of infrastructure platforms to other | Construction and operation |

4. CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS

4.1. Recommendation from Environmental Assessment Practitioner

Based on the information provided it is the opinion of D & P Engineers and Environmental Consultants cc that no fatal flaws have been identified for the proposed development and that the information contained in this report is sufficient enough to allow DEA to make an informed decision.

The Environmental Consultant, therefore, recommends that Environmental Clearance be granted for the proposed development based on the following recommendations:

- The proposed activity is not anticipated to have significant environmental impacts.
- There is however a visual impact.

The following recommendations should be implemented to ensure that potential impacts associated with the establishment and operations of the site are minimised:

- Any areas disturbed during construction and operation must be rehabilitated.
- The structure was to be removed when the structure ceased to be used for telecommunications purposes and the site was rehabilitated.
- Construction is to take place during working hours.
- Trampling and disturbance associated with construction should be limited to within 5m (five meters) of the footprint of the site.
- Provisions of the Atomic Energy and Radiation Protection Act, 2005 (Act No. 5 of 2005) should be strictly abided to.
- On completion of the project, all litter and construction debris shall be immediately removed from the site.
- Mitigation measures to reduce the potential visual impact should be implemented as far as possible.