ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED NDONGA LINENA TELECOMMUNICATION BASE TRANSCEIVER STATION (BTS) TOWER AT NDONGA LINENA, KAVANGO EAST REGION-NAMIBIA.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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Proposed Construction & Operation of Ndonga Linena Base Transceiver Station Tower in Ndonga Linena - -Kavango east Region: Namibia

Environmental Management Plan (EMP) Prepared for Powercom (Pty) Ltd

P.O. Box 40799 Ausspannplatz Windhoek Namibia

D&P Engineers and Environmental Consultants (Pty) Ltd.

20 Joseph Ithana Mukwayu street Ludwigsdorf Windhoek-Namibia PO Box 8401, Bachbrecht,

Telephone: +264 (61) 302 672/081299 8444

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https://www.facebook.com/DP-Engineers-and-Environmental-

Consultants-193970370936785/

Reference Number: 221126000488

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D&P Engineers and Environmental Consultants (Pty) Ltd

Email: <u>tkasinganeti@dpe.com.na</u>

Authors:

Kristian NN Shiwayu Tendai E. Kasinganeti

Approved: Tendai E. Kasinganeti – Lead EAP

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Contents

1.	CHAPTER ONE: BACKGROUND	1
1.1.		
1.2.	LEGAL OR COMPLIANCE REQUIREMENTS	1
1.3.	OTHER LEGISLATION AND CONVENTIONS	2
2.	CHAPTER TWO: PROJECT DESCRIPTION AND LOCATION	3
2.1.	Project Location	3
2.2.	Brief Description Of The Environment	3
2.3.	DESCRIPTION AND DESIGN OF THE PROJECT	4
3.	CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)	6
3.1.	Purpose Of The Environmental Management Plan (Emp)	6
3.2.	EMP Administration	6
3.3.	Roles and Responsibilities	7
3.4.	Planning and design	8
3.5.	CONSTRUCTION AND OPERATION	9
4.	CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS	16
4.1.	RECOMMENDATION FROM ENVIRONMENTAL ASSESSMENT PRACTITIONER	16

LIST OF FIGURES

Figure 1: Site Locality	3
Figure 2: Typical telecommunication towers structure and form (visual purposes only)	5
LIST OF TABLES	
Table 1: EMP IMplementation-Roles and Responsibilities	7
Table 2: Planning and Design Management Actions	8
Table 3: Construction and Operation EMP (C&O EMP)	9

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 Ndonga Linena 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 Ndonga Linena, 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 Ndonga Linena, Kavango East region at coordinates, 17°58'35.29"S 020°28'15.55"E. The site is located 115 km from Divundu, 75 km from Rundu and 252m from the B8 road. The site is about 315km from the Ndonga Linena green scheme and 3km from the Okavango river.

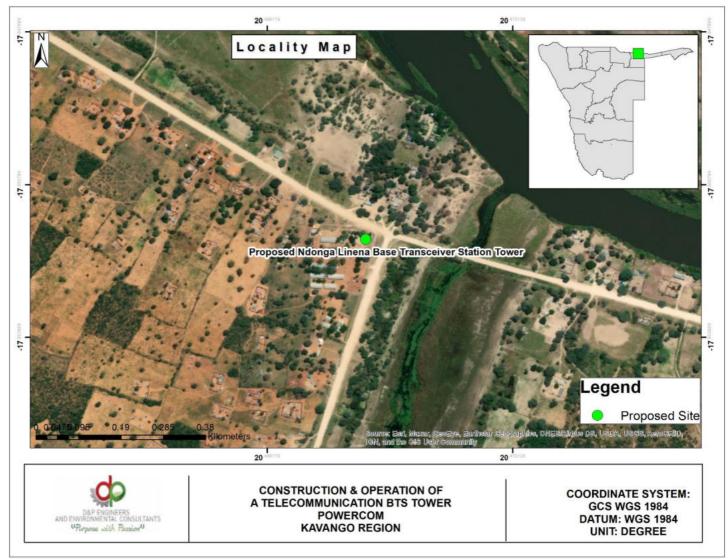


Figure 1: Site Locality

2.2. Brief Description Of The Environment

The Kavango East Region generally receives more rainfall than the rest of the country, except for Zambezi. The highest rainfall usually occurs in the summer months with the periods of highest rainfall normally in January and February (450 to 600 mm). Average maximum temperatures are between 320 C and 340 C, whilst average minimum temperatures are around 80 C to 100 C. Vegetation in the region is fairly homogenous Kalahari Woodland comprises broadleaved deciduous forests that vary

according to topography and soil quality. Soils are generally sandy with low nutrient levels with more fertile soils occurring along a thin strip next to the Kavango River. The economy of the Ndonga Linena Constituency is mostly built on green schemes and subsistence farming consisting of crop production and livestock rearing in the remainder of the constituency.

Deforestation in the woodlands as well as on the banks of the river is a challenge. Terrestrial diversity is high with several core wildlife areas, national parks, and the river accommodating an impressive range of fish and wildlife. The most conspicuous and important feature in the region is the perennial Kavango River which is the main source of life in the region. The area is surrounded by dominant tree species such as Burkea africana, Baikiaea plurijuga, and Pterocarpus angolensis. However, most of these species are not present on the specific site as the surrounding area has been cleared or land degraded.

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 Ndonga Linena being 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.

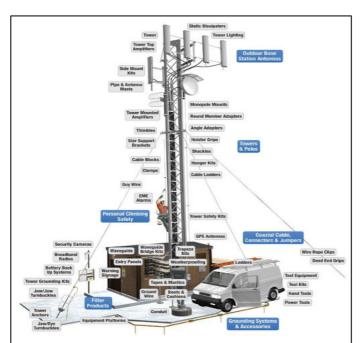




Figure 2: Typical telecommunication towers structure and form (visual purposes only)

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 Ndonga Linena. 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	Responsible to enforce EMP implementation during construction and operation phases.
Manager)	
Environmental Control Officer (ECO)	Implement, review and update the EMP.
	• 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	Approve the EMP and any amendments to the EMP.
Affairs	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.
	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	Follow requirements as directed by the EMP when conducting work.
	• 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	 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	 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 Ndonga Linena. 	Proponent	Ongoing
Surrounding property owners	Consent letters are to be obtained from the surrounding property owners before construction.	Proponent	Pre-construction phase

Construction	•	A convenient construction work/schedule should be	Proponent	Pre-construction
schedule		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.		
Compensation of	•	There needs to be a clear agreement between	Proponent	Pre-construction
land		POWERCOM and the land owners if they will be		
		compensated for the piece of land used before		
		construction starts.		

3.5. Construction and Operation

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

Impact	Description	Effects	Class	Time	Responsibility	Action	Phase
				frame			
Noise	Noise will be	The health of working personnel	Environmental	4-6	Environmental	A construction interval will be established,	Construction &
pollution	generated through:	could be disturbed.		months	Control Officer	used, and adhered to.	Operation
	 Construction 	Ndonga Linena residents could be			Site Manager	Workers will be issued earplugs to protect	
	activities	disturbed by the noise.				them from excessive noise.	
	 Moving vehicles. 						
		General annoyance				The public will be notified through a	
						printed timetable stating planned	
		Driving away local animals				operational activities.	
		species near the project site				Construction activities will be conducted	
						during the daytime.	

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

Impact	Description	Effects	Class	Time	Responsibility	Action	Phase
				frame			
						A local landscaper can be engaged.	
GhG	Green House Gasses	Global climate change	Environmental	Constr	Environmental	Adopt the use of ethanol-blended fuels	Construction &
emissions	(GHGs) emissions will			uction	Control Officer	wherever necessary.	Operation
	be produced from the	Air pollution		phase			
	following activities:				Site Manager	Design an operating system that cuts on	
	Fuels					fuel consumption.	
	combustion for				Department of		
	(construction				Environmental	Use of solar energy systems during	
	vehicles and				Affairs.	construction for lighting and other minor	
	equipment)					energy needs.	
	 Ground 						
	excavation						
	releases						
	phosphorus						
	found						
	underground						
	and releases						
	particulate						
	matter into the						
	atmosphere.						
Waste	Construction and	Pollution from oil spills resulting	Environmental	Constr	Environmental	Ensure that all waste from construction	
Generation	operation are	from the handling of various		uction	Control Officer	activities is stored and contained in	
	associated with a lot	machinery used during the		phase		designated containers and transported to	
	of raw materials and	construction phase			Site Manager	an approved waste disposal site.	
	activities that result in						
	pollution	Construction rubble, empty				Bulky waste such as building rubbles must	
		packaging containers/bags, and				be collected and disposed of for	
	The construction and	materials remnants.				landfilling.	
	maintenance activities					-Visual inspections monitoring	
	may generate e-waste						

Impact	Description	Effects	Class	Time frame	Responsibility	Action	Phase
	and this needs to be disposed of						
Safety and Health risks	sustainably. 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	Constr uction 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	Construction and operation
	Electrical hazards	Fatalities and fires	Health and	Constr	ECO	Provide site signs warning and informing about different hazards on site. Employees should be trained on electrical safety before working on-site.	Construction and Operation
			Salety	and operati on		Safety representatives with training on electrical hazards and emergency management should be a station on-site always during construction	ани Ореганон
						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.	
	Radiation (Non- Ionizing)	Carcinogenic consequences	Health Social	Perman ent	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	Responsibility	Action	Phase
				frame			
						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).	
						The contractors to be installing the	
						transmission are required to put on	
						appropriate PPE to protect them from	
						possible radiation.	
						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.	
	Avifauna	Bird fatalities	Environmental	Perman	Environmental	Towers will be built below 40m in height	Operation
				ent	Control Officer	which will avoid bird fatalities.	
					Site Manager	Construct towers, away from areas of high	
						migratory bird traffic, wetlands, and other	
						known bird areas.	
						Minimize the tower 'footprint' on newly	
						constructed towers.	
						If the tower is decommissioned, it should	

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

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

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.