ENVIRONMENTAL SCOPING REPORT: FOR THE PROPOSED TELECOMMUNICATION BASE TRANSCEIVER STATION (BTS) TOWER IN NCAUTE VILLAGE, KAVANGO EAST REGION, NAMIBIA.

DATE: JULY 2020

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

PowerCom
(PTY) LTD

The Proposed Telecommunication Base Transceiver Station (BTS) Tower in Ncaute Village, Kavango East Region, Namibia: Environmental Scoping Report (ESR)

Environmental Scoping Report Prepared for

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Acronyms

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

i. Purpose of This Environmental Impact Assessment Report

This Environmental Scoping Report (ESR) follows on the Scope of Work delineated by **Powercom Pty Ltd**. Existing information and input from commenting authorities, Interested and Affected Parties (I&APs) was used to identify and evaluate potential environmental impacts (both social and biophysical) associated with the proposed project.

Environmental flaws associated with the proposed project were identified through the Environmental Scoping exercise. A conscious decision was made based on the recommendations and guidelines by the Directorate of Environmental Affairs EIA guidelines in order to assess both significant and less significant environmental impacts proposed by the development. The developed Environmental Management Plan (EMP) for this proposed activity will have to be effectively implemented by the client, to ensure that adverse environmental impacts are not considered.

The detailed assessment of the anticipated impacts was undertaken with the purpose of highlighting any areas of concern regarding to the proposed project during its construction, and operation. In addition, an independent sensitivity mapping analysis was undertaken. This analysis characterised the development site on the significant environmental aspects in order to reflect the sites suitable and unsuitable (no-go) development footprint areas. This action guided the final footprint of the PV Plant and the transmission line.

This ESR will also be used to motivate and define the previously identified, project alternatives (i.e. site, technology and layout) based on the findings of the environmental baseline study and the suitability of the site to the type of development. This ESR has been compiled in accordance with the regulatory requirements stipulated in the EIA Regulations (2012), promulgated in terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007))

The ESR aims to:

- Provide an overall assessment of the social, physical and biophysical environments of the area affected by the proposed project development;
- Undertake a detailed environmental assessment, in terms of environmental criteria and impacts (direct, indirect and cumulative), and recommend a preferred location for the proposed plant (based on environmental sensitivity);
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts; and
- Undertake a fully inclusive Public Participation Process (PPP)
- GIS sensitivity mapping was conducted to identify potential impacts, propose mitigation and inform the sensitivity analysis.

A systematic approach was adopted for the successful completion of the EIA in line with the regulated process. The diagram in Figure 1 below indicates the sequential process that will be followed for this study.

ii. Assumptions And Limitations

The following assumptions and limitations underpin the approach to this EIA study:

- The information received from the stakeholders, desktop surveys and baseline assessments are current and valid at the time of the study;
- A precautionary approach was adopted in instances where baseline information was insufficient or unavailable;
- Mandatory timeframes will apply to the review and adjudication of the reports by the competent authority and other government departments; and
- No land claims have been registered for the proposed site at the onset and registration of the study.

NB: The EAP does not accept any responsibility in the event that additional information comes to light at a later stage of the process. All data from unpublished research utilised for the purposed of this project is valid and accurate. The scope of this investigation is limited to assessing the potential biophysical, social and cultural impacts associated with the proposed project.

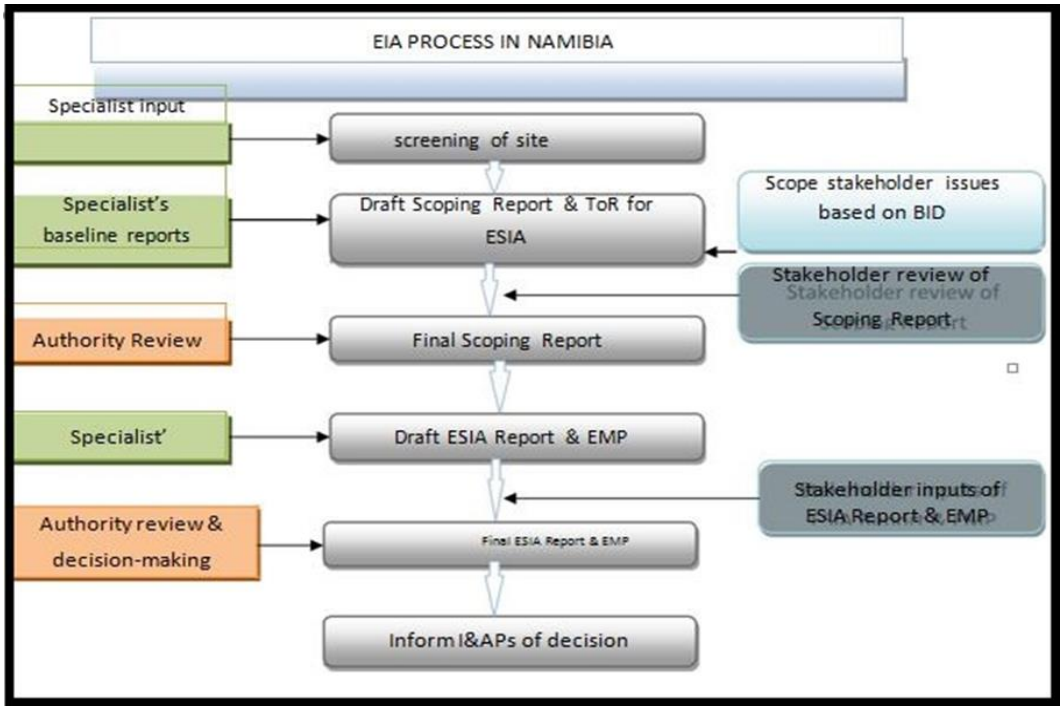

Figure 1: Schematic representation of the EIA Process followed in this study

1. CHAPTER ONE: BACKGROUND

1.1. Introduction

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.

The proponent, **Powercom Pty Ltd** has been requested by Telecom Namibia (TN) mobile to install a telecommunication Base transceiver station tower in Ncaute Village. This development comes after various requests by the Shakambu Farmers Association, Hannes Balzar and Alfons Siyere (Shakambu Chairman), requesting the Telecom Namibia to provide Voice and Data services at Ncaute, Baramasoni , kapupahedi and surrounding villages in Kavango East Region.

In terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007)), an EIA is required to obtain an Environmental Clearance Certificate from the Ministry of Environment and Tourism (MET) before the project can proceed. Furthermore, as per the requirements of the Environmental Management Act No. 7 of 2007, Powercom has appointed **D&P Engineering and Environmental Consultants** to conduct an Environmental Assessment (EA) and develop an Environmental Management Plan (EMP) for the proposed project.

This has been followed by an application for Environmental Clearance Certificate (ECC) to the Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA).

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 construction and operation of a telecommunication tower, in accordance with the guidelines an statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts regulations (GN 30 in GG 4878 of 6 February 2012).

1.2. Project Location

The project site is proposed in Ncaute Village, on the Southern boundary of Ncaute secondary school in Kavango East Region, Namibia. Please refer to the map below (Fig 1) giving a locality layout of the site:

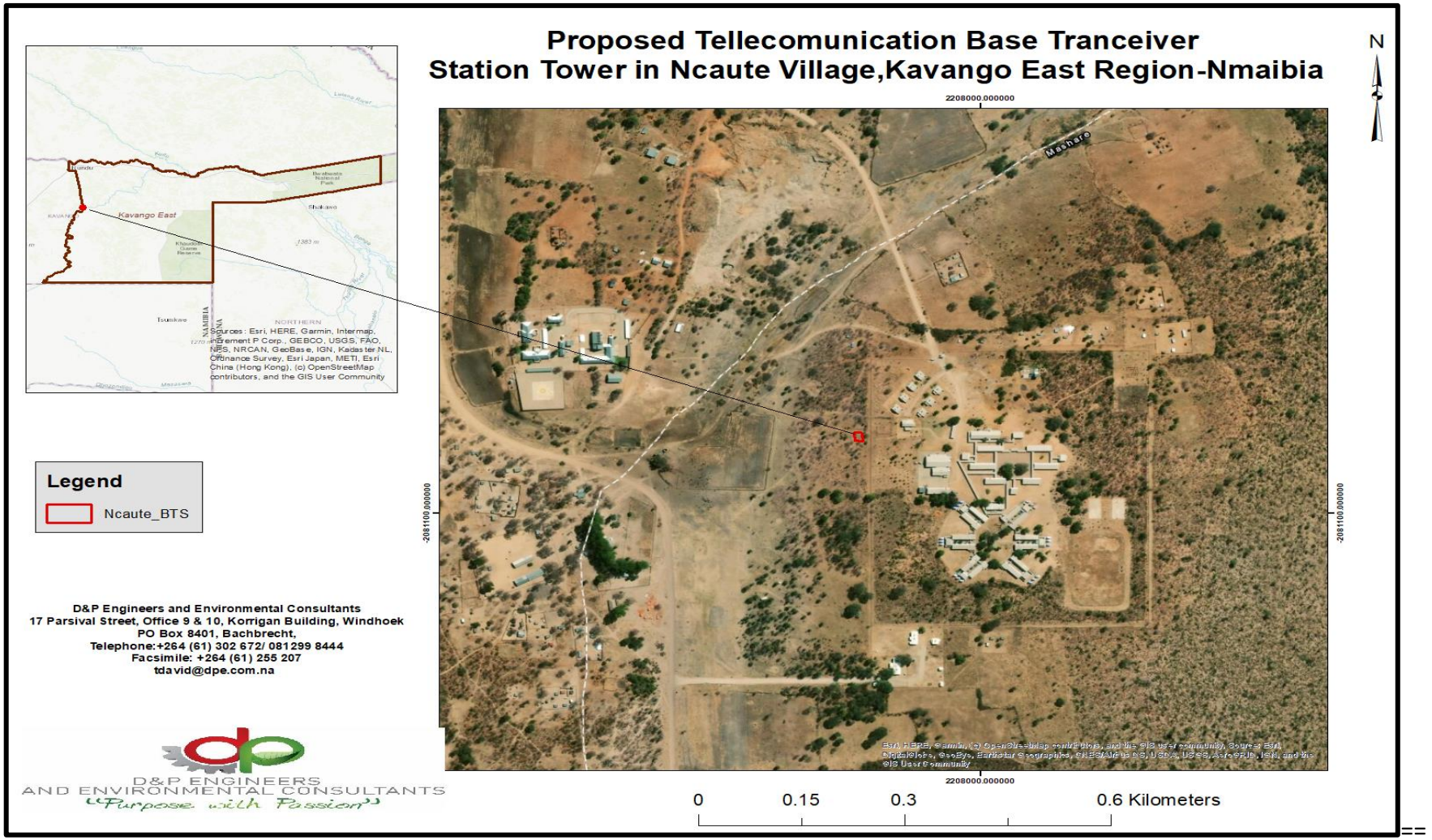

Figure 2: Proposed Project Site.

1.3. Project Overview

The proponents intend to establish a telecommunication base transceiver station tower in Ncaute Village. The proposed development is earmarked to improve network connectivity for the fast growing Ncaute Village as well as its surrounding villages and resettlement farms. The operations of the tower will be conducted with a high degree of safety for employees, equipment and neighbouring land uses. The proposed infrastructure will have minimal impacts on the natural resources, i.e. water, fauna and flora.

1.4. Proposed project infrastructure

The project will involve construction of a base transceiver station tower encompassing the following:

- 80m Guyed mast within the footprint size of a 20m x 20m area
- Container building to house radio and network equipment
- Perimeter fencing
- Site access road

The site will be connected to the nearby electricity transformer at Ncaute Secondary School and the tower site layout will be as illustrated below:

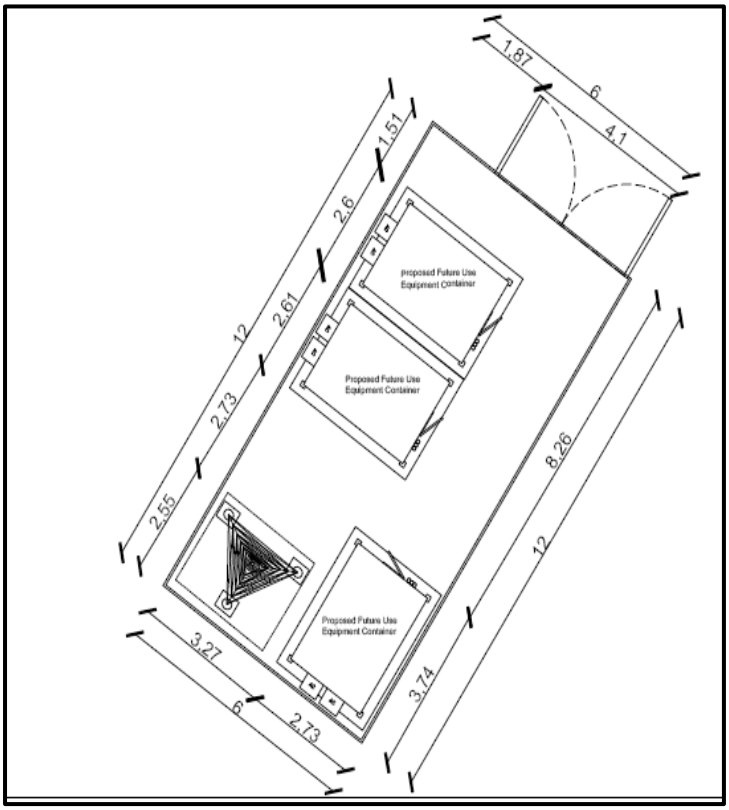

Figure 3: Left-Proposed Tower site layout

Figure 4: Right-Typical Network tower

1.4.1. Accessibility

The site is can be linked to the existing Ncaute Secondary School road; an access road will have to be constructed.

1.4.2. Infrastructure and Services

Water: Water for construction purposes will be obtained from Ncaute Secondary School
Ablution: During construction phase, temporary mobile toilets will be used, but upon completion, there are no permanent toilets needed on site
Electricity: There is an existing electricity connection line within 300m from the site
Communication: The project is being commissioned to improve connectivity in this area.

1.5. Project Environs

The proposed project site is located near the southern boundary of Ncaute secondary school, and to the east of the site, there is Ncaute Clinic. To the south of the proposed site, there is an open area, that is swampy and there are boreholes supplying the Ncaute community on that swampy area. East of the site, there is Ncaute Police station, which is also in dire need of improved network connectivity.

Figure 5: Left-Borehole site with animal drinking point

Figure 6: Centre-Ncaute Secondary School Fence and Electrical line near the site

Figure 7: Site Access road to Ncaute Secondary School and Mahangu fields

2. CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. Introduction

An important part of the EIA is identifying and reviewing the administrative, policy and legislative frameworks concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in undertaking the proposed project. This section looks at the legislative framework within which the proposed development will conform to; the focus is on the compliance with the legislation during the planning, construction and operational phases. All relevant legislations, policies and international statutes applying to the project are highlighted in the table below as specified in the Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012).

Table 1:Policies, legal and Administrative regulations

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
The Constitution of the Republic of Namibia (1990)	The articles 91(c) and 95(i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include: - Guarding against overutilization of biological natural resources, - Limiting over-exploitation of non-renewable resources, - Ensuring ecosystem functionality, - Maintain biological diversity.	-Through implementation of the environmental management plan the proposed development will be in conformant to the constitution in terms of environmental management and sustainability, through bringing development in an environmentally sensitive way.
Vision 2030 and National Development Plans	Namibia's overall Development ambitions are articulated in the Nations Vision 2030. At the operational level, five-yearly national development plans (NDP's) are prepared in extensive consultations led by the National Planning Commission in the Office of the President. Currently the Government has so far launched a 4th NDP which pursues three	The proposed project, is an important element in employment creation, ICT and communication is crucial to rural development as well as a contribution to achieving the Vision 2030 of the country.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	overarching goals for the Namibian nation: high and sustained economic growth; increased income equality; and employment creation.	
Environmental Assessment Policy of Namibia 1994	The Environmental Assessment Policy of Namibia requires that all projects, policies, Programmes, and plans that have detrimental effect on the environment must be accompanied by an EIA. The policy provides a definition to the term "Environment" broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes and plans.	-Telecommunication infrastructure requires environmental clearance because it is a listed activity. -Through abiding to the requirements of the Environmental Assessment Policy of Namibia. The EIA and EMP will cater for the sustainable management of biophysical environment.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
Environmental Management Act No. 07 of 2007	The Act aims at ▪ Promoting the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment; ▪ To provide for a process of assessment and control of projects which may have significant effects on the environment; The Act gives legislative effect to the Environmental Impact Assessment Policy. Moreover, the act also provides procedure for adequate public participation during the environmental assessment process.	This document is compiled in a nature that project implementation is in line with the objectives of the EMA. EIA guiding procedures developed by MET were also used in the course of this project.
Public Health Act (No. 36 of 1919)	Under this act, in section 119: "No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	-The project proponent will ensure that all legal requirements of the project in relation to protection of the health of their employees and surrounding residents is protected as will be alluded in the EMP. -Personal protective equipment shall be provided for employees in construction.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
		-The development shall follow requirements and specification in relation to water supply and sewerage handling and solid waste management so as not to threaten public health of future residents on this piece of land.
Soil Conservation Act 76 of 1969	The objectives of this Act are to: ▪ Make provisions for the combating and prevention of soil erosion, ▪ Promote the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic.	-The project will have a rather localized impact on soils and on the soil through clearance for construction -It is however important to note that project footprint is restricted to 20 sqm x 20sqm
Nature Conservation Ordinance 1996	To consolidate and amend the laws relating to the conservation of nature; the establishment of game parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.	The proposed project implementation is not located in any known or demarcated conservation area, national park or unique environments. The project site was selected with this ordinance in mind to ensure that Namibian nature is conserved.
Protected Areas and Wildlife Management Bill	This bill, when it comes into force, will replace the Nature Conservation Ordinance 4 of 1975. The bill recognizes that biological diversity must	Environmental recommendations and considerations on this project has ensured that the proposed activities will not fall within the

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	be maintained, and where necessary, rehabilitated and that essential ecological processes and life support systems be maintained. It protects all indigenous species and control the exploitation of all plants and wildlife.	boundaries of any protected area and that the project will not affect heavily endangered vegetation and animals on its site, which is however unlikely because the areas forms part of urban locale.
Forest Act, 2001 (Act No. 12 of 2001)	The Act gives provision for the protection of various plant species through the Ministry of Agriculture, Water and Forestry (MAWF), Directorate of Forestry).	-The proponent will have to ensure that there is no indiscriminate removal of vegetation in the area. -The proposed site has been affected by Scheel construction and operation.
National Biodiversity Strategy and Action Plan (NBSAP2)	The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia putting together management of matters to do with ecosystems protection, biosafety, biosystematics protection on both terrestrial and aquatic systems.	-The project proponent has been advised by the D&P Engineers and Environmental Consultants and recognises the need for ecosystems protection to manage the changing climatic environment.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
National Policy on Climate Change for Namibia, 2010	In harmony with the findings of the IPCC over time and the Earth Summits held annually, the policy seeks to outline a coherent, transparent and inclusive framework on climate risk management in accordance with Namibia's national development agenda, legal framework, and in recognition of environmental constraints and vulnerability. Furthermore, the policy pursues the strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks.	-The proponent during construction should ensure that there are limited greenhouse gas emissions from machinery- -No blasting is expected to be conducted on site.
Water Resources Management Act, 2013 (Act No. 11 of 2013)	This Act provides for the management, protection, development, use and conservation of water resources. This also forms the regulation and monitoring of water resources.	The proposed activities are not expected to have any direct impacts on surface and ground water because of its scale.
National Heritage Act 27 of 2004	Heritage resources to be conserved in development. (National Heritage	During the project implementation as soon as objects of cultural and heritage interests are observed such as graves, artefacts and any other object believed to be older than 50 years, all measures will be taken protect these objects until the National Heritage Council of

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
		Namibia have been informed, and approval to proceed with the operations granted accordingly by the Council.
National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979	"No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia: (a) any meteorite or fossil; or (b) any drawing or painting on stone or a petroglyph known or commonly believed to have been executed by any people who inhabited or visited Namibia before the year 1900 AD; or (c) any implement, ornament or structure known or commonly believed to have been used as a mace, used or erected by people referred to in paragraph (b); or (d) the anthropological or archaeological contents of graves, caves, rock shelters, middens, shell mounds or other sites used by such people; or	The proposed site of development is not within any known monument site both movable or immovable as specified in the Act, however in such an instance that any material or sites or archeologic importance are identified, it will be the responsibility of the developer to take the required route and notify the relevant commission.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	(e) any other archaeological or palaeontological finds, material or object; except under the authority of and in accordance with a permit issued under this section.	
Pollution Control and Waste Management Bill	This bill has not come into force. Amongst others, the bill aims to "prevent and regulate the discharge of pollutants to the air, water and land" Of particular reference to the Project is: Section 21 "(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse." Section 55 "(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment."	-To control air, water and land pollution as agitated by the Bill, the project proponent will ensure that proposed project activities will abide by the EMP's specification in terms of pollution prevention to land, water and air during the construction and operation phases.
Atmospheric Pollution Prevention Ordinance 11 of 1976	To provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto.	-Dust emission from construction activities, could be a great risk to the ambient air quality, hence there will be strict abidance to this Act.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
		Employee health and safety will also be prioritised.
Electricity Act 4 of 2007	Requires that any generation and or distribution complies with laws relating to health, safety and environmental standards (s 18(4)(b) In the event that exemption from acquiring a license is granted, the Minister may impose conditions relating to public health safety or the protection of the environment.	-Obliges Powercom to comply with all relevant provisions of the Electricity Act and its regulations when installing electrical connections to the tower.
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LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
The Atomic Energy and Radiation Protection Act, Act 5 of 2005:	Provides for the adequate protection of the environment and of people against the harmful effects of radiation by controlling and regulating the production, processing, handling, use, holding, storage, transport and disposal of radiation sources and radioactive materials, and controlling and regulating prescribed non-ionising radiation sources according to the standards set out by the ICNIRP.	-Justifies the need for assessing the impact of electromagnetic radiation from the mas on the nearby residents. -2G telecommunication masts are not expected to have any negative impacts on nearby residents in terms of radiation propagation.
Hazardous Substances Ordinance 14 of 1974 Regulations Made in Terms Of Hazardous Substances Ordinance 14 of 1974 sections 3 and 27	To provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; to provide for the division of such substances into groups in relation to the degree of danger; to provide for the prohibition	-Powercom will have to conform to this Act and its regulations through application for relevant licences with the relevant bodies highlighted thereto. -However, the proposed technologies do not pose such dangers to the public or the natural environment.

LEGISLATION/POLICY/GUIDING DOCUMENT	PROVISION	PROJECT IMPLICATION
	and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances; and to provide for matters connected therewith.	
Convection on Biological Diversity (CBD)	Namibia is a signatory of the Convention on Biological Diversity and thus is obliged to conserve its biodiversity.	The project will preserve vegetation on site as part of their plans for green and sustainable development.

3. CHAPTER THREE: RECEIVING ENVIRONMENT

3.1. Intorduction

The findings in this chapter are based on baseline surveys, public consultation and desk reviews undertaken by the EIA team. The findings relate mainly to aspects of ecology, ambient air, soil, water and noise levels for the entire operation. Also, the economic and social environment was considered for this study.

3.2. Socio-Economic Status

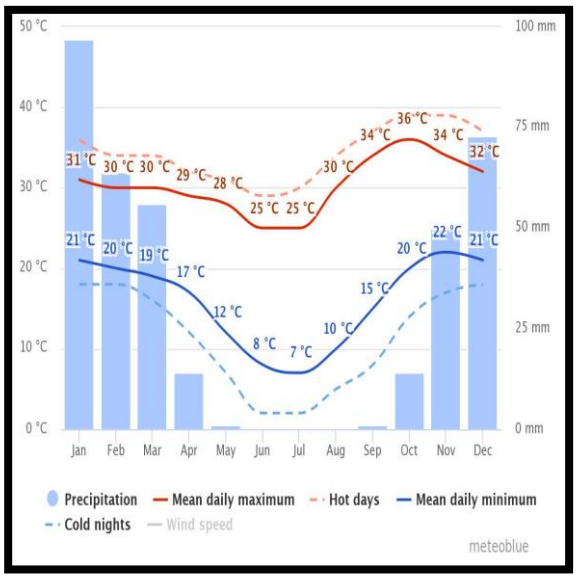
The entire Kavango East region (including Ncaute area) ranks amongst the poorest regions in the country with a prevailing high unemployment rate. Shakambu forms part of Shambyu constituency which is dominated by Gciriku people. The villagers speak Gciriku dialect, of their ruKavango language.

The main sources of income include agriculture, forestry and fishing with agriculture as the dominant income source and livelihood generating sector. Main agriculture activities are small scale crop farming (53%)-growing Mahangu, livestock (23%) –farming goats and cattles, and poultry farming (8%) (Enviro Dynamic 2014). These farming systems provide a degree of food self-sufficiency with a few provisions of economic development. Shakambu area is dominated by small-scale commercial farms of 2 500 hectares which were allocated to individuals under a leasehold system. However, most of the crop-growing activities on these farms generate little income because fields are small, soils have limited fertility, yields are low, surplus harvests are rare and markets are small (Mendelsohn and El Obeid 2003: 92ff Brown 2010: 25). Hence thus the need to find an alternative in income generation through sustainable timber harvesting.

3.3. Climate

Rundu is subjected to a humid subtropical climate, with hot summers and mild winters. During the austral winter, the days are warm and nights cool to cold. The annual rainfall ranges between 500 to550mm with June normally reporting the lowest and January the highest (Mendelsohn et al., 2002).

During the high rainy season, the area regularly becomes flooded which renders the land around the project site inaccessible for a period of two to four months January through March; very limited tourist's movement in the region during this time. Daytime temperatures exceed 30^{o}C throughout the year, except during May, June and July. Average maximum temperatures fluctuate between 32^{o}C and 34^{o}C and average minimum temperatures between 8^{o}C and 10^{o}C. The average level of humidity ranges from 10 to 20% during winter with the highest humidity normally recorded in March (70-80%).



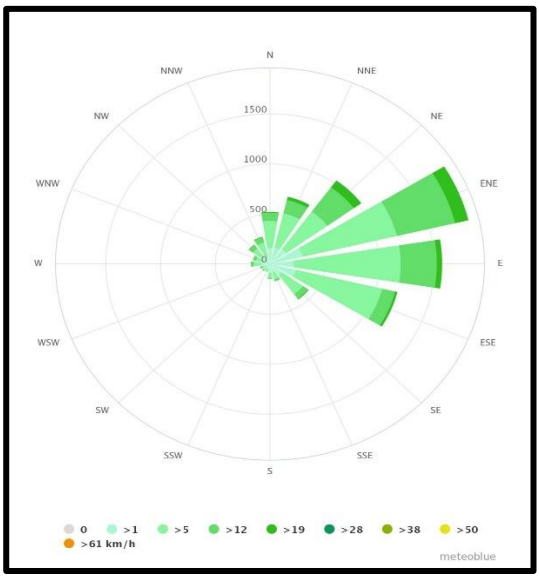


Figure 8: (left) typical yearly average rainfall graph for Ncaute (www.meteo.com)
Figure 9: (Right) Typical Ncaute Wind rose (www.meteo.com)

3.4. Topography, geology and soils

The Kavango East Region within which Ncaute and shambyu faming units area, is composed of a gently undulating plain of unconsolidated sands, sloping gradually down northwards to the Kavango River and eastwards to the lowest areas along the river before it enters Botswana. The generally flat terrain falls from about 1200 m above sea level at Mururani (Kavango West) to just below 1000 m in the east. The plains undulate from sculpting of the sand into long, low east-west oriented dunes that are rarely higher than 10 m above the adjacent valleys, and that are not conspicuous from ground level as they are low and covered in vegetation.

The area is underlain by the Kalahari sands and calcrete. Calcrete, also called Hardpan, calcium-rich duricrust, a hardened layer in or on a soil. It is formed on calcareous materials as a result of climatic fluctuations in arid and semiarid regions, giving rise to sedimentary rock formations such as these. Calcite is dissolved in groundwater and, under drying conditions, is precipitated as the water evaporates at the surface. Rainwater saturated with carbon dioxide acts as an acid and also dissolves calcite and then redeposits it as a precipitate on the surfaces of the soil particles; as the interstitial soil spaces are filled, an impermeable crust is formed. This rock type also explains the deep sandy soils in the project area.

Sands of the Kalahari Basin comprise the substrate of most of Kavango. The predominant soil type are Arenosols: the sandy, porous texture allows quick infiltration of water and quick loss, leaving little moisture in the soil and holding few nutrients. As a result, suitability for crops is generally low. Soils slightly better suited for crops occur mainly along the Kavango River, where fluvisols are derived from sediments deposited during floods. Because of the periodic flooding, these areas are not suitable for large-scale irrigation, but small-scale cultivation, which utilises areas as floodwaters recede, is possible. Arenosols make up the project area in question.

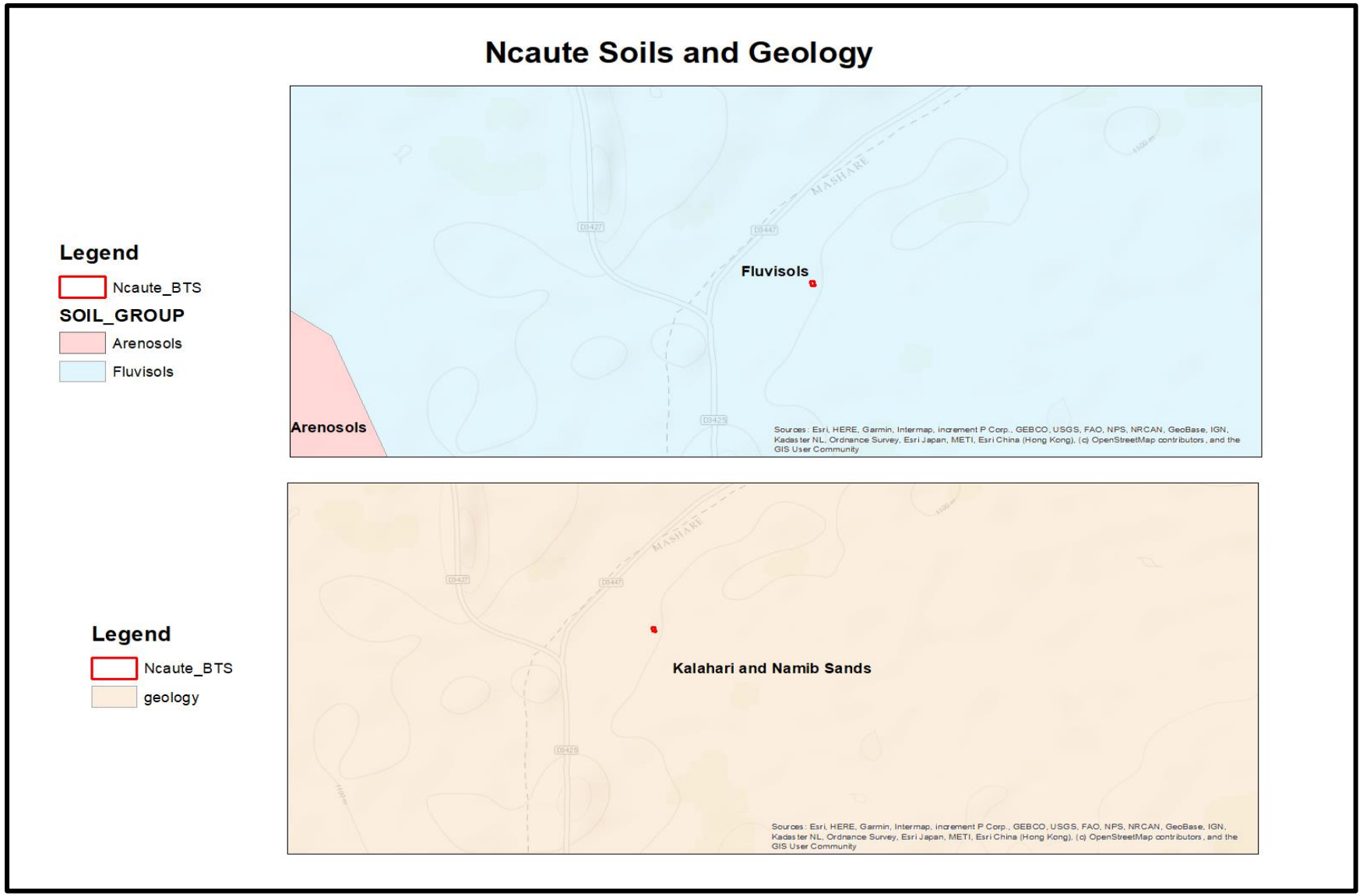


Figure 10: Soil and Geology Thematic Map

3.5. Hydrogeology and Surface Hydrology

The project area is characterised by the Kalahari and namib sands, with sands and calcrete rock types underlying the top soils. The ground around the site carries productive porous ground water aquifers. Secondly, there is access to potable surface water from the ephemeral Omatako River. To the western side about 60km lies the Kavango River, which engulfs an area of rounded 190,000 square kilometres accross Angola, Namibia and Botswana (Mendelsohn and el Obeid 2003). Its water originates from Angola and ends its flow in the Okavango delta in Botswana. Approximately half of its flow comes down the Cuito, with the remaining 50% originating from Cubango as it enters Kavango at Katwitwi. Flows along the Cuito are comparatively stable, whilst those of the Cubango are more susceptible to the varying seasons. The Kavango river is sited, approximately 100km west of the project site.

The groundwater basin of the area is the Omatako- River Basin, the Okavango-Omatako River Basin is located in the north-eastern part of Namibia, stretching across the entire Kavango Region and parts of Otjozondjupa Region.The basin area is 20 500 km2 and borders with Angola and Botswana in the north and east respectively.

The proposed farms are not sited within the banks or in close proximity to a known river course, close to the project area are smaller sandy watercourses (Ephemeral rivers only flows after heavy rain) known as Omatako River. These drains towards the Okavango Delta in Botswana. Of importance, Kaudom River is located about 35km east of the project site. Within 5km radius of the project there are no boreholes or important water features that may be threatened by the project activities.

The proposed project site, as illustrated on **Figure 6**, does not fall within any riverbed. This is an indication that, there is a lower risk of groundwater and surface water contamination. The 500m buffer on site one indicates nonexistence of crucial water features from the development.

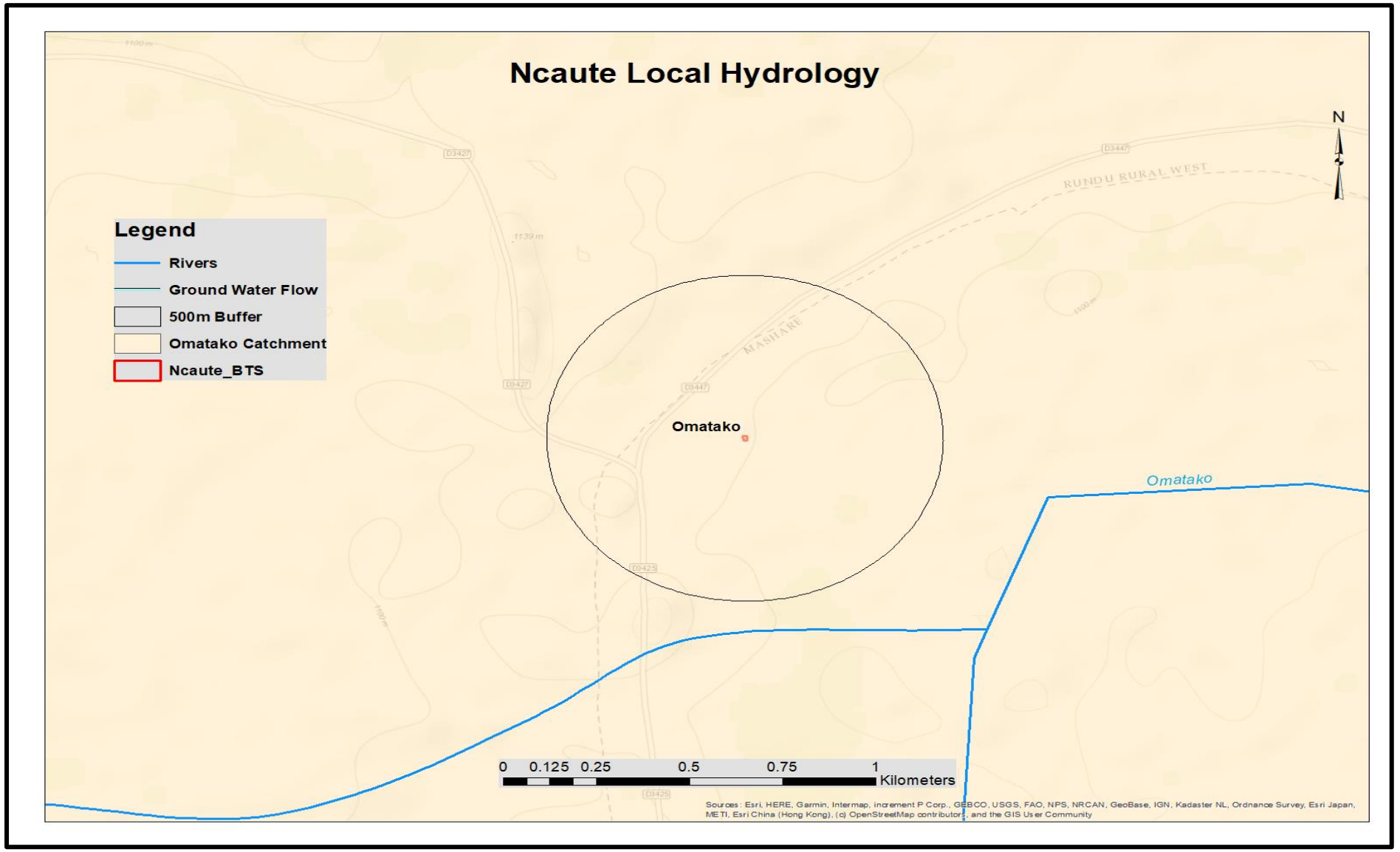


Figure 11: Hydrology Layout Map

3.6. Biophysical Assessment

3.6.1. Fauna

Much of the wildlife that used to occur in the project area has now disappeared because of human encroachment in the area. The Kavango east region has had so much of the natural vegetation being cleared, and it is important to note that the proposed site for development is within an existing settlement. Most remaining wildlife is now concentrated in the Bwabwata and Khaudum National Parks (MET, 2013).

The less inhabited parts of the Kavango East Region (North-East of Ncaute) host a little wildlife – mammal species such as steenbok, kudu and warthog – but has some important conservation areas where key wildlife species occur.The farms also occasionally host some of the species found in the Khaudum National park, because of the farm proximity to the park. Khaudum National Park is one of the few refuges in Namibia where the rare and endangered roan antelope, tsessebe and African wild dog occur. The park is a stronghold for African wild dog, which also tend to move westwards (over farmlands) towards Mangetti National Park in the Kavango West Region. The animals occure in the farmlands because, Khaudum is not fenced on its northern, western and southern borders, but the eastern border, being the international border with Botswana, has a double electrified game fence, although this is also occasionally breached (MET 2012). The park also has about 2,500 elephants (Steyn, 2013), and there is seasonal movement of elephant to and from Nyae-Nyae Conservancy immediately south. Elephants also move northwards into the George Mukoya and Muduva Nyangana Conservancies, and westwards along the omiramba that extend about 20 km beyond the park boundary. These movements emphasise the importance of Khaudum as a core conservation area from where animals may populate the neighbouring conservancies, thereby contributing to their economic success ((MET, 2012).

Other species of conservation priority in the area include pangolin, African clawless otter, sitatunga, reedbuck and bushbuck. Bird Diversity is particularly high in Kavango East Region, with the Kavango River in Bwabwata National Park recording the highest number of birds anywhere in Namibia, with almost 400 species recorded from the Mahango Core Area of Bwabwata National Park. Several wetland birds living and breeding here are of conservation importance e.g. Pel's fishing owl, wattled crane, slaty egret, rock pratincole, all Red Data species listed as Endangered or Critically Endangered in Namibia (Simmons & Brown in prep.).

The Kavango east region hosts a vast diversity of birds, which are a key tourist attraction of the Kavango east region (Mendelsohn 2009). Approximately are 116 mammals, 430 bird, 25 amphibian (15 of which are largely dependent on riverine habitats), 67 reptile and 79 fresh water fish species inhabit the area (MET 2008).

3.6.2. Mammals

The list of mammals in the table below are expected to occur in areas in and surrounding Khaudum National Park (MET, 2008), however on the project site no proof of wild animals existence was observed expect for rodents, birds, some amphibians and repitiles.

Table 3: List of common mammals occurring in the general area

Common Name	Scientific Name
African wild dog	*Lycaon pictus*
Antbear, Aardvark	*Orycteropus afer*
Bat-eared fox	*Otocyon megalotis*
Black-backed jackal	*Canis mesomelas*
Blue wildebeest	*Connochaetes taurinus*
Common duiker	*Sylvicapra grimmia*
Eland	*Taurotragus oryx*
Elephant	*Loxodonta africana*
Gemsbok,	*Gemsbok, Oryx Oryx gazelle*
Giraffe	*Giraffa camelopardalis*
Kudu Tragelaphus	*Tragelaphus*
strepsiceros	*strepsiceros*
Leopard Panthera pardus	*Panthera pardus*
Lion Panthera leo	*Panthera leo*
Red hartebeest	*Alcelaphus buselaphus*
Roan Antelope	*Hippotragus equinus*
Spotted hyena	*Crocuta crocuta*
Steenbok	*Raphicerus campestris*
Tsessebe	*Damaliscus lunatus*
Vervet Monkey	*Ceropithecus aethiops*
Warthog	*Phacochoerus aethopicus*

3.6.3. Birds

The Kavango East region, because of the Okavango River in western Bwabwata, hosts an internationally recognized bird's area hosting bird species that are threatened at global level and range as avian diversity hotspots. The region with 448 bird species, of these species 12 are globally threatened. All of the threatened species are hosted in the Bwabwata national park, despite some occurring in Khaudum National park and surrounding areas. There are no endemic bird species in the project area.

3.6.4. Amphibians, Reptiles and Invertebrates

The area has a high occurrence of reptiles, snakes. This includes cobras, puff adders (inhabit grasslands and bush ecosystems) and the black and green mamba (inhabiting the riverine ecosystems). The area is a habitat of a wide number of lizard species and tortoises. The baseline study further revealed existence of snails, centipedes, spiders and scorpions. However, there is no evidence of existence of endemic species of this kind in the project area.

3.7. Flora

3.7.1. 3.3.4 Kalahari woodlands

Most of the vegetation in the Kavango East, is fairly homogeneous Kalahari woodland, comprised of broad-leafed, deciduous woodlands that vary according to topography and the nature of the soils that support them. Broadly speaking, relatively larger deep-rooted trees such as teak and mangetti dominate on deep sands, while shallower soils in valleys support shrubs and grasses of various species. Today the majority of dune valleys have been cleared for agriculture and multiple sequences of regrowth of shrubs and trees mask the natural vegetation types. Omirambas in particular have been greatly altered by agricultural activities, so that there is a mosaic of recent and old fields, grassland and localised patches of shrubland.

The larger trees such as kiaat (*Pterocarpus angolensis*), teak (*Baikaea plurijuga*), silver terminalia (*Terminalia sericea*) and red seringa (*Burkea Africana*) constitute a valuable resource of timber that is used for furniture, construction, carvings and firewood. A number of species are valued for food, such as false mopane (*Guibourtia coleosperma*), mangetti (*Schinziophyton rautanenii*) and monkey oranges (*Strychnos cocculoides*) – these are important resources for rural livelihoods. Tall grasses in the woodlands are harvested for thatching.

3.7.2. Riverine forest

The banks of the Kavango River and the Khaudum river closer to the project site originally supported forests with distinctive trees such as knobthorn (*Acacia nigrescens*), weeping wattle (*Peltophorum africanum*) and jackalberry (*Diospyros mespiliformis*), and a dense shrubby undergrowth. However, riverine forest has now disappeared almost entirely and only a few, localised patches of this vegetation type remain, almost entirely within the protected area of Bwabwata National Park and Khaudum National Park.

3.7.3. Important Plant Areas

Plant diversity is significantly higher in the Kavango East Region than in most other parts of Namibia and partly as a result of this, and because of restricted ranges of some of the plants, two Important Plant Areas (IPAs) are recognised in Kavango: the Kavango woodlands and the Kavango River valley (Hofmeyer, 2004). IPA status does not confer conservation protection to an area, but it recognises sites with exceptional botanical richness and/or outstanding rare, threatened and/or endemic species, and/or vegetation of high botanic value.

The Kavango woodlands are unique in Namibia, though they do not contain endemics and are not necessarily threatened, apart from by timber collection operations (Hofmeyer 2004). Tree diversity is high, in the project local tree diversity of 76-90 species is expected, and there are several special interest species as shown in Figure **9**. The most significant threats come from fires and indiscriminate logging. Fig 8 also illustrates the current vegetation cover of the project site.

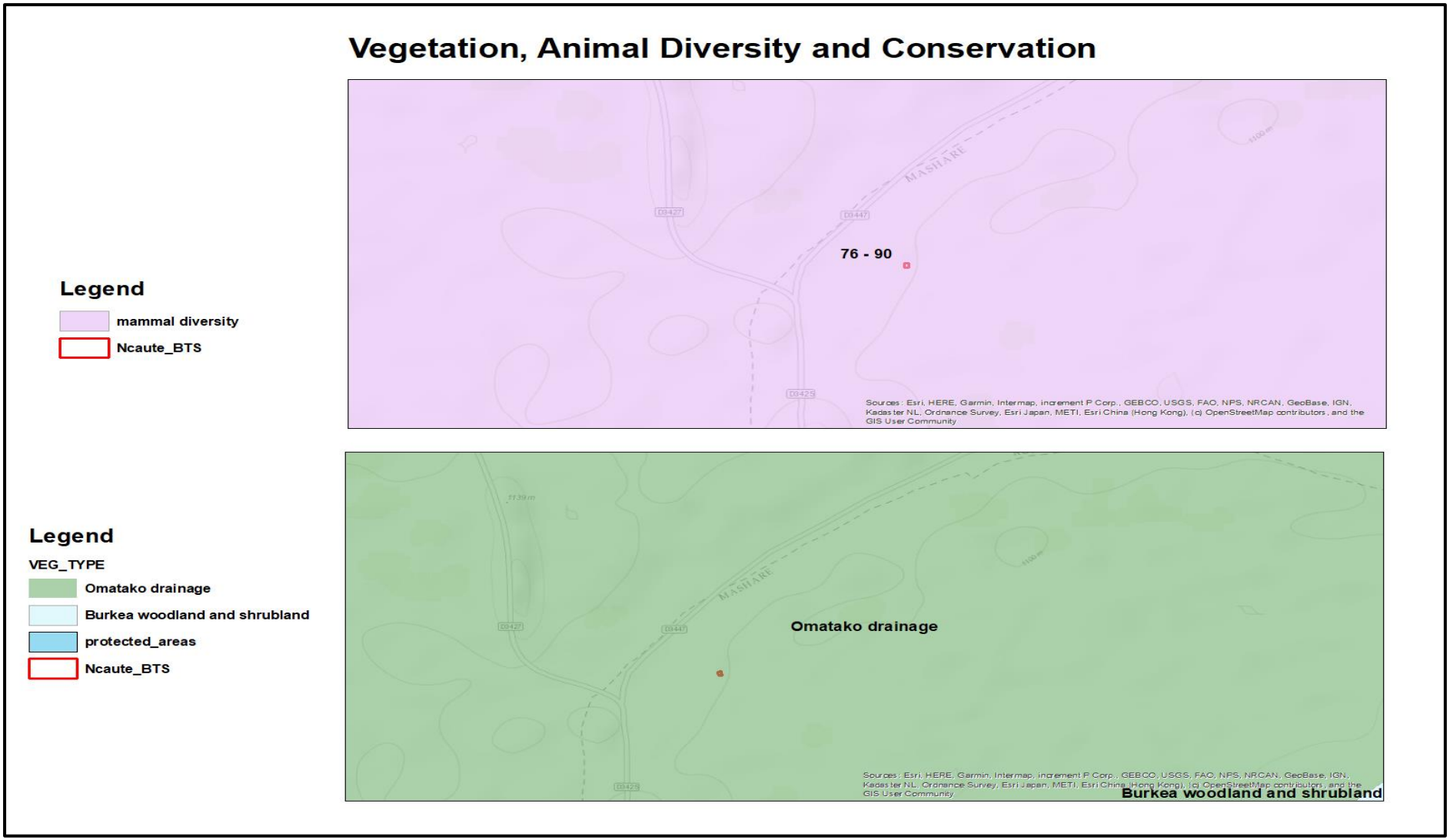


Figure 12: Local Fauna and Flora

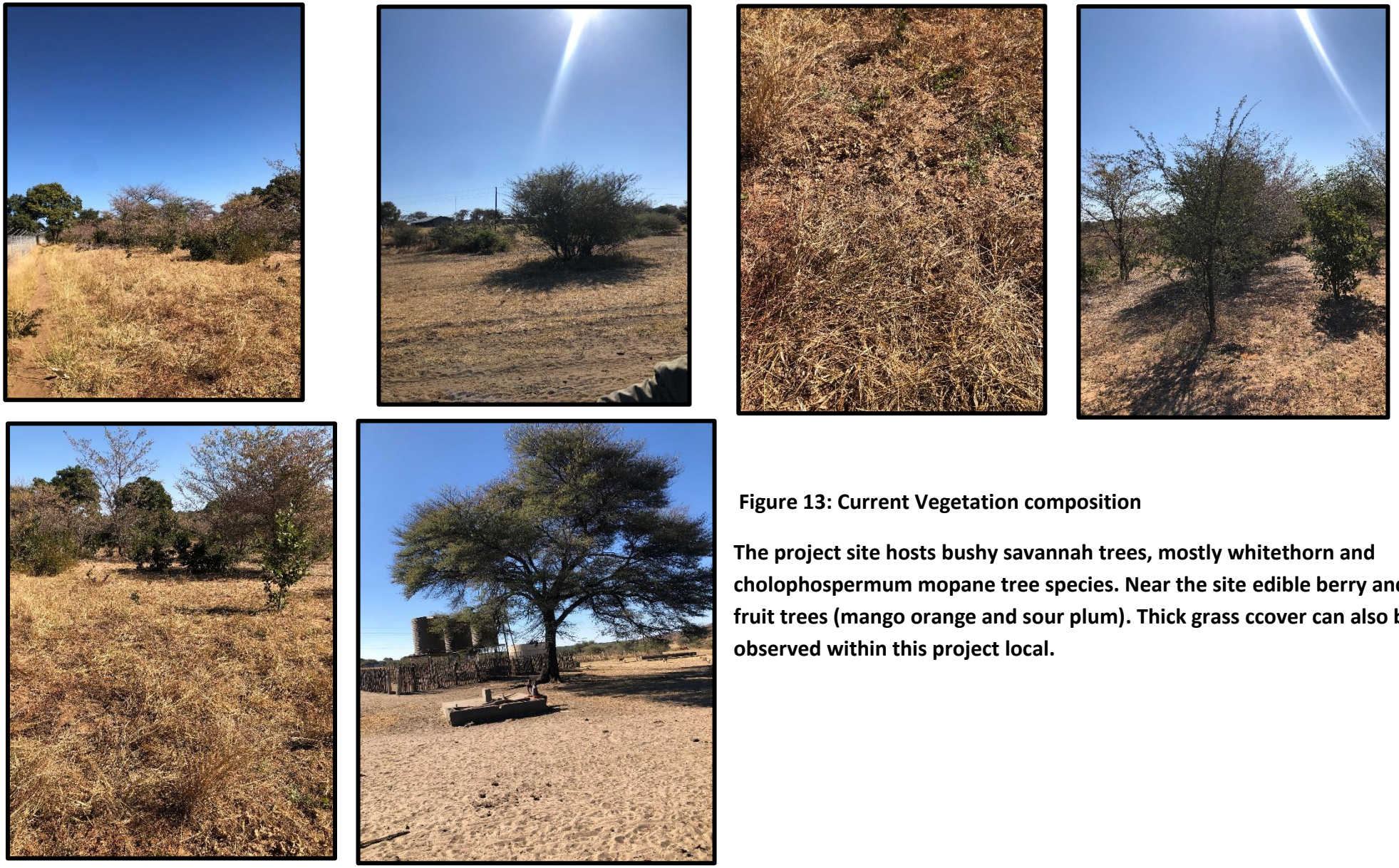


Figure 13: Current Vegetation composition

The project site hosts bushy savannah trees, mostly whitethorn and cholophospermum mopane tree species. Near the site edible berry and fruit trees (mango orange and sour plum). Thick grass ccover can also be observed within this project local.

4. CHAPER FOUR: PUBLIC CONSULTATION

Public and Stakeholder involvement, is a key component of the EA process. The public consultation process, as set out in Section 21 of Regulation No 30 of EMA, has been followed during this assessment and the details thereof documented below.

4.1. Printed Media

4.1.1. Background Information Document

A Background Information Document (BID) was drafted at the onset of the EA process to act as a useful information handout about the proposed construction and operation of the Ncaute BTS tower. In addition, the BID provided details on the public consultation process with contact details for further information. This document was advertised for availability through various means of newspaper articles, Public meeting and electronic mail; see Appendix B of this document.

4.1.2. Newspaper Advertisements & Articles

Newspaper notices about the proposed project and related EA processes was circulated in two newspapers for two weeks. These notices appeared in the “Confidante” and “New Era” newspapers, shown in Appendix B.

4.1.3. Site Notices

A site notice was placed at the project site, Ncaute Secondary School Notice Board and Ncaute Village Meeting place. These provided information about the project and related EA while providing contact details of the project team.

Figure 14(top): Site Notice

Figure 15(bottom): Site notice

4.1.4. Building a Stakeholder Database

A stakeholder database for the project collected through a variety of means. During the advertisement of the project (though public notices in local newspapers and site-notices) the list was augmented as Interested & Affected Parties (I&AP) registered and contact information of stakeholders updated, Please refer to Appendix B.

4.1.5. Stakeholder Meetings & Key Conversations

A public meeting was conducted on 04 July 2020 at Ncaute Secondary School, and the consultant administered facilitated the meeting with all members who attended.

4.1.6. Comments and review period

From the onset of the public consultation process and the initial information sharing through the BID, newspaper and site notices, various stakeholders have registered and provided comments. All of the immediate neighbours are not in support of the initiative due to several reasons. The Scoping Report and Environmental Management Plan was made available to the public and stakeholders for comment and review. Questionnaires and proof of stakeholder's engagement are attached in appendix B of this EAR.

Identified stakeholders for Consultation are as follows:

1) Ncaute Community residents
2) Local Headman in Ncaute
3) Ncaute Secondary School
4) Namibia Civil Aviation Authority


Figure 16: Public consultation proceedings at Ncaute Secondary School

5. CHAPTER FIVE: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

5.1. Overview

Powercom has committed to sustainability and environmental compliance through coming up with a corrective action plan for all anticipated environmental impacts associated with the project. This is also in line with the Namibian Environmental Management legislation and International best practices on infrastructure development. The proponent will implement an Environmental Management Plan (EMP) in order to prevent, minimise and mitigate negative impacts. The environmental management plan is being developed to address all the identified expected impacts, the plan will be monitored and updated on a continuous basis with aim for continuous improvement to addressing impacts.

5.2. Assessment Of Impacts

This section sets out the overall approach that was adopted to assess the potential environmental and social impacts associated with the project. To fully understand the significance of each of the potential impacts each impact must be evaluated and assessed. The definitions and explanations for each criterion are set out below in Table 2: Assessment Criteria and

Table 2: Assessment Criteria

Duration – What is the length of the negative impact?	
None	No Effect
Short	Less than one year
Moderate	One to ten years
Permanent	Irreversible
Magnitude – What is the effect on the resource within the study area?	
None	No Effect
Small	Affecting less than 1% of the resource
Moderate	Affecting 1-10% of the resource
Great	Affecting greater than 10% of the resource
Spatial Extent – what is the scale of the impact in terms of area, considering cumulative impacts and international importance?	
Local	In the immediate area of the impact
Regional / National	Having large scale impacts
International	Having international importance
Type – What is the impact	
Direct	Caused by the project and occur simultaneously with project activities
Indirect	Associated with the project and may occur at a later time or wider area

Cumulative	Combined effects of the project with other existing / planned activities
Probability	
Low	<25%
Medium	25-75%
High	>75%

Table 3: Impact Significance

Class	Significance	Descriptions
1	Major Impact	Impacts are expected to be permanent and non- reversible on a national scale and/or have international significance or result in a legislative non- compliance.
2	Moderate Impact	Impacts are long term, but reversible and/or have regional significance.
3	Minor	Impacts are considered short term, reversible and/or localized in extent.
4	Insignificant	No impact is expected.
5	Unknown	There are insufficient data on which to assess significance.
6	Positive	Impacts are beneficial

Table 4: Environmental Impacts and Aspects Assessment

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance
TOPOGRAPHY	Landscape Scenery	Visual aesthetic impact	Construction and Operation	Moderate	Moderate	Local	Direct	Medium 25 - 75%	Minor
SOIL	Soil	Contamination to soil from waste disposal	Construction and Operations	Moderate	Small	Local	Direct	Low <25%	Minor
	Soil	Spillages of fuel, oil and lubricants.	Construction	Short	Small	Local	Direct	Low <25%	Minor
	Soil	Erosion	Construction	Moderate	Small	Local	Direct	Low <25%	Minor
LAND CAPABILITY	Terrestrial ecology and aquatic ecosystems	Change in land use	Construction and Operations	Permanent	Great	Local	Direct	Low <25%	Moderate
WATER	Surface water quality	Water pollution from oils and lubricants from vehicles and machinery.	Construction and Operations	Moderate	Moderate	Local	Direct	Medium 25 - 75%	Moderate
	Surface water quality	Turbidity and high sediment load	Construction	Moderate	Small	Local	Direct	Low <25%	Moderate
AIR QUALITY	Noise Pollution	-Noise During Construction	Construction	Moderate	Moderate	Local	Direct	Medium 25 - 75%	Moderate
	Dust Pollution	-Dust release during construction	Construction	Moderate	Moderate	Local	Direct	High >75%	High
WASTE	Groundwater quality	Hazardous waste such as waste oil and lubricants.	Construction and Maintenance	Short	Small	Local	Direct	Low <25%	Minor
	Topography and Landscape	Visual impacts due to infrastructure and unsustainable handling and disposal of waste.	Construction and Operations	Short	Small	Local	Direct	Low <25%	Minor

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance
FAUNA	Aquatic life	Antifouling paints, eutrophication and sedimentation of streams.	Construction	Moderate	Small	local	Direct	Low <25%	Minor
	Terrestrial ecology and biodiversity	Destruction of vertebrate fauna (e.g. road kills; fence and construction /land clearing mortalities)	Construction and Operations	Long	Moderate	Local	Direct	Low <25%	Minor
FLORA	Terrestrial ecology and biodiversity	Proliferation of invasive species inland	Construction and Operations	Long	Moderate	Local	Direct	High >75%	Moderate
	Terrestrial ecology and biodiversity	Loss of unique flora and special habitats in the local environment because of general nuisance and animal migrate.	Construction and operations	None	Moderate	Regional	Direct	Low <25%	Moderate
SOCIAL	Noise Pollution	Increased noise levels	Construction	Moderate	Small	Local	Direct	Low <25%	Minor
	Socio Economic Activities	Temporary and permanent employment prospects.	Construction and operations	Long	Moderate	Regional	Direct	Medium 25 – 75%	Positive
	Contribution to National Economy	Employment, local procurement, duties and taxes.	Construction and Operations	Short	None	Regional / National	Direct	Low <25%	Positive

Environmental Impact	Valued Ecosystem Component	Impact	Project Phase	Duration	Magnitude	Extent	Type	Probability	Significance
HERITAGE/ARCHAEOLOGY	Artefacts, archaeological high value components	Destruction or affecting paleontological and archaeological artefacts	Construction	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate
HEALTH AND SAFETY	Health Sanitation	Poor ablution and waste management facilities may be detrimental to human health.	Construction	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate
	Property and human life	Electrical hazards and fires may result in fatalities, damage to properties and power surges.	Construction and Operation	Moderate	Great	Local	Direct	Medium 25 – 75%	Major
TRAFFIC	Air traffic	Air Traffic disturbances	Construction and Operation	Moderate	Small	Local	Direct	Low <25%	Minor
	Access road	Vehicular accidents	Construction and Operation	Moderate	Moderate	Local	Direct	Medium 25 – 75%	Moderate