



ENVIRONMENTAL SCOPING REPORT - PROPOSED CONSTRUCTION OF ACCESS ROAD: UPGRADING TO GRAVEL STANDARDS OF ACCESS ROAD TO OIKOKOLA CLINIC AND SCHOOL IN THE OMUSATI REGION (8KM)



**PROPOSED CONSTRUCTION OF ACCESS ROAD - UPGRADING TO GRAVEL STANDARDS OF ACCESS ROAD TO OIKOKOLA CLINIC AND SCHOOL IN THE OMUSATI REGION (8KM)**

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### LIST OF ACRONYMS

AIDS	Acquired immune deficiency syndrome
CRR	Comments and response report
dB	Decibels
DESR	Draft Environmental Scoping Report
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
EAR	Environmental Assessment Report
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
FESR	Final Environmental Scoping Report
ESR	Environmental Scoping Report
HIV	Human immunodeficiency virus
I&AP	Interested and Affected Party
IUCN	International Union for Conservation of Nature
MEFT	Ministry of Environment, Forestry and Tourism
MEFT: DEA	Ministry of Environment, Forestry and Tourism: Department of Environmental Affairs
MURD	Ministry of Urban and Rural Development
PPP	Public Participation Process

## 1. INTRODUCTION

### 1.1 Project Background

The Ministry of Works and Transport proposes to undertake the design, supervision, and administration of the construction of an access road to Oikokola Clinic. Oikokola village is situated in Namibia's Omusati Region, approximately 90 kilometers northeast of the regional capital, Outapi and approximately 22 kilometers northeast of Okalongo settlement. The community primarily sustains itself through subsistence crop farming and livestock rearing.

This road infrastructure project is designed to bolster the socio-economic development of both the local community and the nation at large. By expanding road capacity and upgrading of pavements, the project will facilitate improved access to markets, employment opportunities, educational institutions, and healthcare services. Additionally, it is expected to reduce transportation costs for both passengers and freight.

The proposed intervention involves upgrading the existing earth road to a gravel standard. The design will incorporate minor drainage structures to mitigate runoff during periods of heavy rainfall, where necessary. Furthermore, sections of the current road with sharp curves will be realigned to optimize horizontal curve radii, enhancing safety and traffic flow.

Environam Consultants Trading (ECT), acting as the independent Environmental Assessment Practitioner (EAP) was appointed to undertake the EIA study, in order to obtain an environmental clearance certificate (ECC) for the proposed development. The EIA and ECC application were conducted as per the requirements of the Environmental Management Act of 2007, and its regulations of 2012.

### 1.2 Project Location

The access road starts from the D3608 at coordinates -17.4734, 15.5234, and moving in the northern direction past Oshivanda Primary School ending at Oikokola Combined School and Oikokola Clinic at coordinates -17.4194, 15.5492. The centre coordinates for the road are -17.4480, 15.5278. See Figure 1 below for the locality map of the development site.

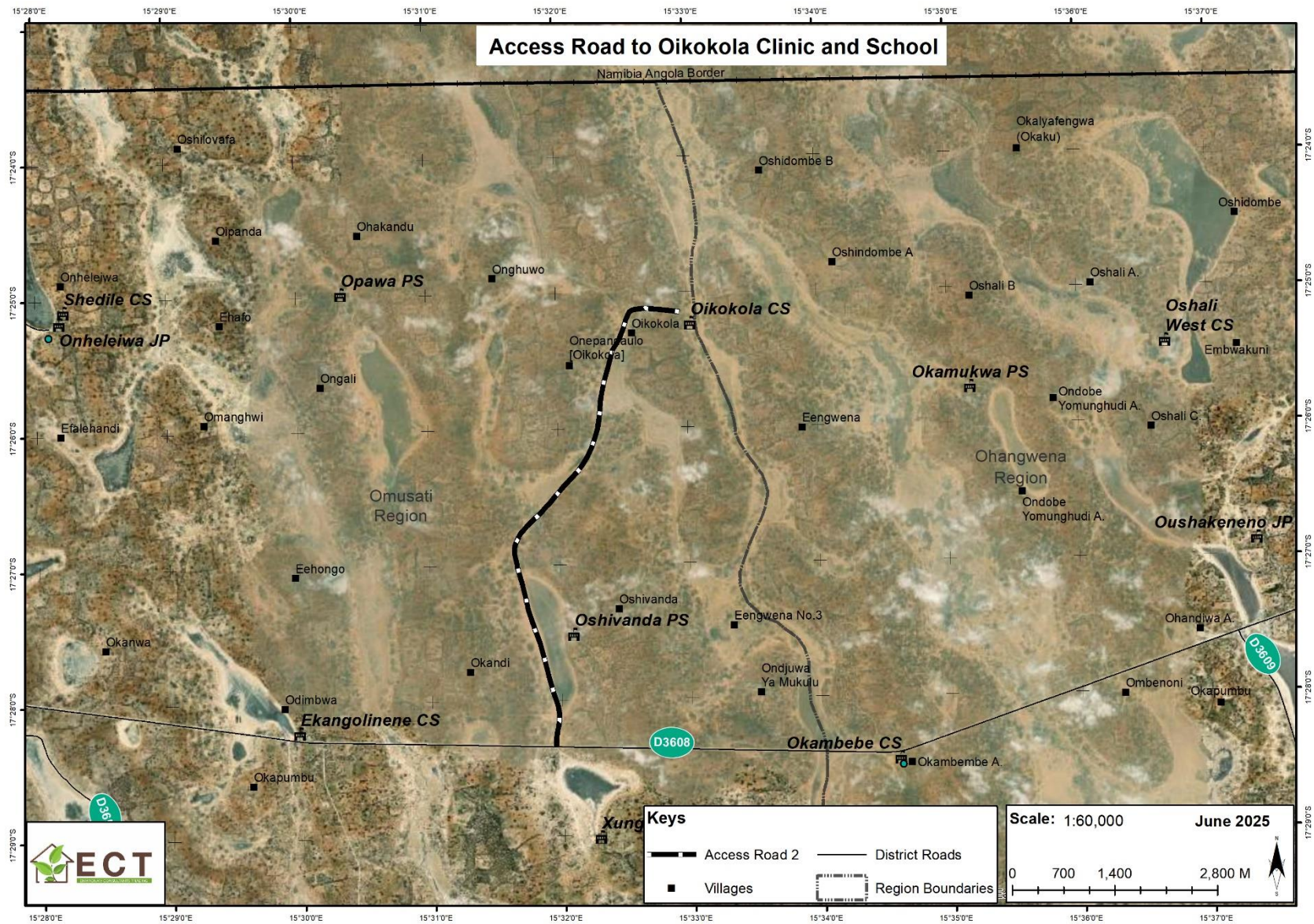


Figure 1: Locality map of the proposed development

### 1.3 Terms of Reference and Scope of Project

The Ministry of Works has commissioned an Environmental Impact Assessment (EIA) for the proposed construction of access road to Oikokola clinic and school.

Ekwatho Consulting Engineers were appointed by the Ministry of Works and Transport as Principal Agents. Ekwatho Consulting Engineers in turn appointed Environam Consultants Trading to undertake the Environmental Impact Assessment of the proposed project. This study will enable decision makers to make an informed decision regarding the development and make sure it does not have significant negative environmental impacts and where they are, that they are mitigated. The scope is limited to conducting an environmental impact assessment and applying for an Environmental Clearance Certificate for the proposed Construction and upgrading to Gravel Standards of the 8km Access Road to Oikokola Clinic and School in the Omusati Region. This Includes Consultations with client; site investigations and analysis; stakeholder consultations; impact analysis; mitigation formulation; report writing; and draft Environmental Management Plan.

The scope of the EIA is aimed at identifying and evaluating potential environmental impacts emanating from the construction, operations and possible decommissioning of the proposed access road. Relevant data have been compiled by making use of secondary sources and from project site visits. Potential environmental impacts and associated social impacts will be identified and addressed in this report.

The environmental impact assessment (EIA) report seeks to address the following:

- Identification of potential positive and negative environmental impacts.
- Provide sufficient information to determine if the proposed project will result in significant adverse impacts.
- Identification of “hotspots” which should be avoided where possible due to the significance of impacts.
- Evaluation of the nature and extent of potential environmental impacts
- Identify a range of management actions which could mitigate the potential adverse impacts to required levels.
- Provide sufficient information to the Ministry of Environment, Forestry and Tourism (MEFT) to make an informed decision regarding the proposed project.
- Conduct a public participation exercise.
- Present and incorporate comments made by stakeholders.

### 1.4 Assumptions and Limitations

In undertaking this investigation and compiling the Environmental Assessment, the following assumptions and limitations apply:

- Assumes the information provided by the proponent is accurate and discloses all information available.

## 1.5 Content of Environmental Scoping Report

Section 8 of the gazetted EA Regulations makes provision for the contents of a Scoping Report. Table 1 below delineate for ease reference, where this content is found in the Environmental Scoping Report.

**Table 1: Contents of the Scoping / Environmental Assessment Report**

Section	Description	Section of ESR/ Annexure
8 (a)	The curriculum vitae of the EAPs who prepared the report;	Refer to Annexure D
8 (b)	A description of the proposed activity;	Refer to Chapter 4
8 (c)	A description of the site on which the activity is to be undertaken and the location of the activity on the site;	Refer to Chapter 3
8 (d)	A description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed listed activity;	Refer to Chapter 3
8 (e)	An identification of laws and guidelines that have been considered in the preparation of the scoping report;	Refer to Chapter 2
8 (f)	Details of the public consultation process conducted in terms of regulation 7(1) in connection with the application, including	Refer to Chapter 5
	(i) the steps that were taken to notify potentially interested and affected parties of the proposed application	Refer to Chapter 5
	(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given;	Refer to Annexure G
	(iii) a list of all persons, organisations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application;	Refer to Annexure F
	(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	Refer to Chapter 5
8 (g)	A description of the need and desirability of the proposed listed activity and any identified alternatives to the proposed activity that are	Refer to Chapter 4

Section	Description	Section of ESR/ Annexure
	feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives have on the environment and on the community that may be affected by the activity;	
8 (h)	A description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed listed activity;	Refer to Chapter 7
8 (i)	terms of reference for the detailed assessment;	Refer to Chapter 1
8 (j)	An environmental management plan	Refer to <b>Annexure A</b>

## 2. LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

The principle environmental regulatory agency in Namibia is the Office of the Environmental Commissioner within the Directorate of Environmental Affairs of the Ministry of Environment, Forestry and Tourism. Most of the policies and legislative instruments have their basis in two clauses of the Namibian Constitution, i.e. Article 91 (c) and Article 95 (l); however, good environmental management finds recourse in multiple legal instruments. Table 2 below provides a summary of the legal framework considered to be relevant to this development and the environmental assessment process.

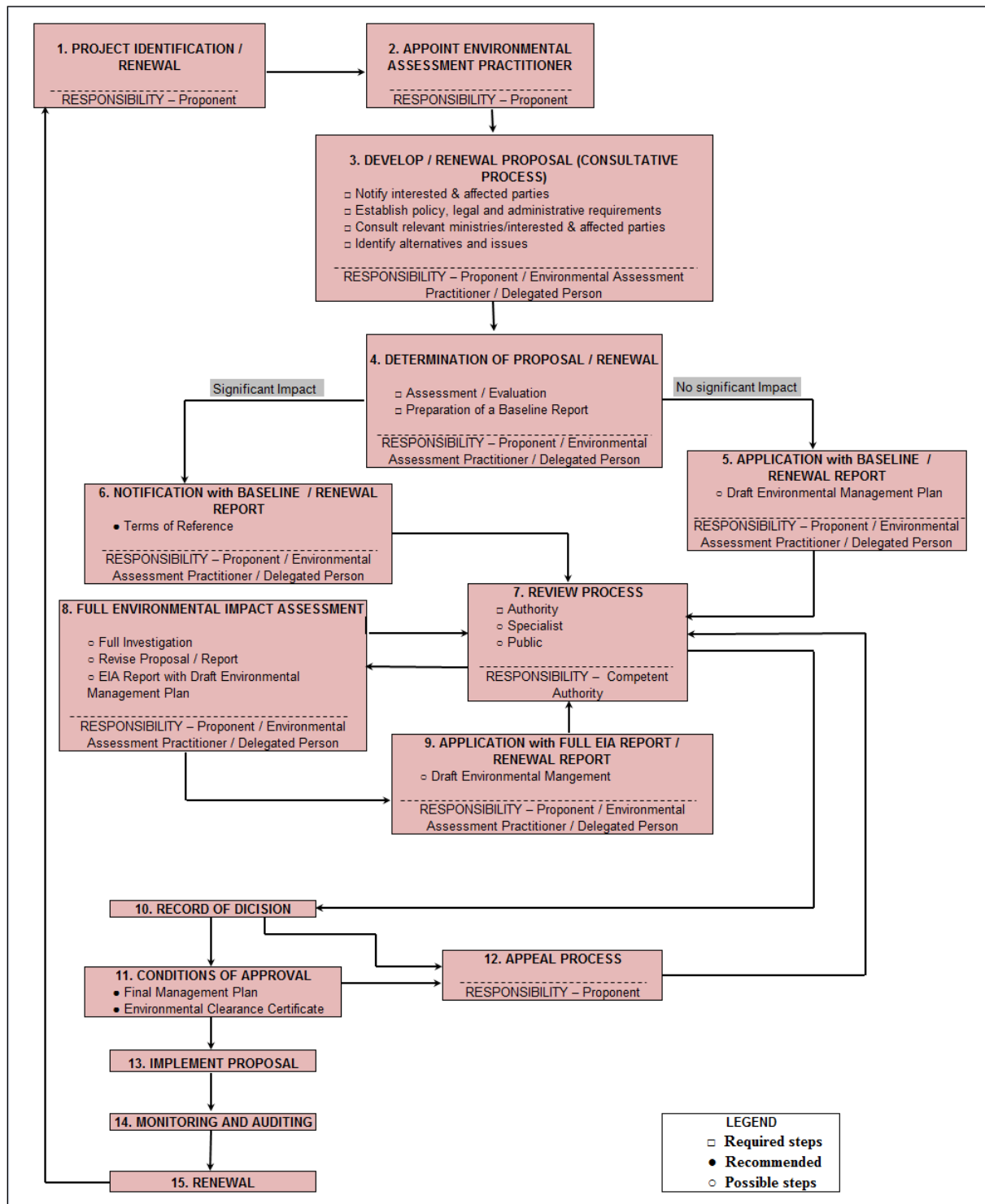
**Table 2:** Legislation applicable to the proposed development

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
The Constitution of the Republic of Namibia as Amended	<p>Article 91 (c) provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia.”</p> <p>Article 95(l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</p>	Sustainable development should be at the forefront of this development.
Environmental Management Act No. 7 of 2007 (EMA)	<p>Section 2 outlines the objective of the Act and the means to achieve that.</p> <p>Section 3 details the principle of Environmental Management</p>	The development should be informed by the EMA.
EA Regulations GN 28, 29, and 30 of EMA (2012)	<p>GN 29 Identifies and lists certain activities that cannot be undertaken without an environmental clearance certificate.</p> <p>GN 30 provides the regulations governing the environmental assessment (EA) process.</p>	<p><b>Activity 3.2</b> Other forms of mining or extraction of any natural resources whether regulated by law or not.</p> <p><b>Activity 8.8</b> Construction and other activities in water courses within flood lines.</p> <p><b>Activity 8.9</b> Construction and other activities within a catchment area.</p> <p><b>Activity 10.1 (b)</b> The construction of- public roads.</p> <p><b>Activity 10.2</b> The route determination of roads and design of associated physical infrastructure where -</p> <p>(a) it is a public road;                      (b) the road reserve is wider than 30 meters; or                      (c) the road caters for more than one lane of traffic in both directions.</p>
Convention on Biological Diversity (1992)	Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	The project should consider the impact it will have on the biodiversity of the area.
Draft Procedures and Guidelines for conducting EAs and compiling EMPs (2008)	Part 1, Stage 8 of the guidelines states that if a proposal is likely to affect people, certain guidelines should be considered by the proponent in the scoping process.	The EA process should incorporate the aspects outlined in the guidelines.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Namibia Vision 2030	Vision 2030 states that the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets.	Care should be taken that the development does not lead to the degradation of the natural beauty of the area.
Water Resources Management Act 11 of 2013.	<p>Section 44 states that no person may abstract or use water, except following a license issued under this Act. Abstraction of water including open waters, aquifer, brackish or marine water.</p> <p>Section 566 states that any drilling to be conducted or enlargement of an existing borehole can only be conducted under a permit issued under the Act.</p> <p>Section 66 states that a person may not discharge any effluent directly or indirectly to any water resource on or under the ground or construct any effluent treatment facility or disposal site unless in compliance with a permit issued under Section 70 of the Act. Where “effluent” means any liquid discharge as a result of domestic, commercial, industrial, or agricultural activities.</p>	<p>Obligation not to pollute surface water bodies. The following permits are required in terms of the Water Act:</p> <ol style="list-style-type: none"> <li>1. water abstraction license that will form part of the contract obligations.</li> </ol>
The Ministry of Environment, Forestry and Tourism (MEFT) Policy on HIV & AIDS	MEFT has developed a policy on HIV and AIDS. In addition, it has also initiated a programme aimed at mainstreaming HIV and gender issues into environmental impact assessments.	The proponent and its contractor(s) have to adhere to the guidelines provided to manage the aspects of HIV/AIDS. Experience with construction projects has shown that a significant risk is created when construction workers interact with local communities.
Labour Act no 11 of 2007	<p>Chapter 2 details the fundamental rights and protections.</p> <p>Chapter 3 deals with the basic conditions of employment.</p>	Given the employment opportunities presented by the development, compliance with the labour law is essential.
Public and Environmental Health Act of 2015	The Act serves to protect the public from nuisance and states that person may not cause a health nuisance or may not permit to exist on a land or premises owned or occupied by him or her, or of which he or she is in charge, a health nuisance or other condition liable to be injurious or dangerous to health.	The construction of the road will take place across publicly accessible spaces. The proponent should ensure that the site is off limits from public during construction to avoid incidences.

LEGISLATION/POLICIES	RELEVANT PROVISIONS	RELEVANCE TO PROJECT
Nature Conservation Ordinance no 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	Indigenous and protected plants have to be managed within the legal confines.
Soil Conservation Act 76 of 1969	Prevention and combating of soil erosion; conservation, improvement, and manner of use of soil and vegetation, and protection of water sources. The Minister may direct owners or land occupiers in respect of inter alia water courses.	Removals of vegetation cover are to be avoided and minimized at all costs. Soil pollution is to be avoided.
Atmospheric Pollution Prevention Ordinance (No. 11 of 1976).	The Ordinance objective is to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto.	All activities on the site will have to take due consideration of the provisions of this legislation.
Roads Ordinance 17 of 1972	This Ordinance consolidates the laws relating to roads.	The provisions of this legislation have to be taken into consideration in as far as access to the development site is concerned.
Roads Authority Act, 1999	Section 16(5) of this Act places a duty on the Roads Authority to ensure a safe road system.	Some functions of the Roads Ordinance 17 of 1972 have been assigned to the Roads Authority.

This EA process will be undertaken in accordance with the EA Regulations. A Flow Diagram (refer to **Figure 3** below) provides an outline of the EA process to be followed.



**Figure 1: EA Flowchart for Namibia (Environmental Assessment Policy of 1995)**

### 3. ENVIRONMENTAL BASELINE DESCRIPTION

#### 3.1. Social Environment

##### 3.1.1. Socio-Economic Context

Omusati Region is situated in the northern part of the Republic of Namibia. The word ‘omusati’ is an Oshiwambo word which means a mopani tree. It shares borders with the Republic of Angola in the north, Ohangwena Region in the north-east, Oshana Region in the east and Kunene Region in the south-west. There are many unspoiled beautiful sceneries, while different species of trees and animals continue to attract tourists and visitors to the Region.

The Region consists of twelve (12) Constituencies, namely Anamulenge, Elim, Etayi, Ogongo, Okahao, Okalongo, Onesi, Oshikuku, Outapi, Ruacana, Tsandi and Otamanzi, three (3) Settlements i.e. Okalongo, Onesi and Ogongo and five (5) Local Authorities namely Outapi, Ruacana, Okahao, Oshikuku and Tsandi Village Council. Outapi Town is the Administrative Seat and Capital of the Region (ORC, 2025). The area of interest is located within the Etayi Constituency.

Etayi Constituency has a population of 33,088 and the size area of 544.35 km<sup>2</sup> and its population density stands at 60.80. It is situated 70 km from Outapi. It shares borders with Engela Constituency in the east, Okatana Constituency in the south east, Elim Constituency in the south, Oshikuku Constituency in the south west, Okalongo Constituency in the west, the Republic of Angola in the north and Ongenga Constituency in the north east. It has a diversity of cultures i.e. its inhabitants consist of Oshikwanyama, Oshikwambi and Oshimbandja speaking people (NSA,2025). Its inhabitants produce and depend more on mahangu as their staple food and rearing cattle, goats and sheep to a lesser extent. There are several community projects, mostly run by women. Potteries, traditional baskets and traditional cups ‘omaholo’ and grenaries ‘omashisha’ are among popular local products. There are also some SMEs that are producing bricks, making beds, security doors etc. within and around the Constituency.

Omusati Region is predominantly an agricultural Region, focusing on both crop and livestock farming. This is due to its fertile soil and the availability of water from the water canal. Among other crops, omahangu is successfully cultivated and consumed as a staple food. A canal which carries water from Ruacana River to Oshakati passes through Outapi Town.

The water from the canal is used for irrigation at the Government-owned Farm at Etunda in Ruacana Constituency where crops such as maize, watermelons, tomatoes, potatoes and bananas, amongst other fruits and vegetables are grown. Apart from the said activities, local people also engage in livestock farming, conservancies and retailing. In this context, the said sectors become the main economic nerves of the Region as far as the promotion and support of the development is concern.

In addition, the construction of roads continues to connect the Region to the outside world. For example, the construction of Omafo-Okalongo-Outapi Road connects the Region to Ohangwena,

Rundu and Zambezi Regions. The access road proposed for construction starts from this main road. Likewise, the construction of Iitananga-Omakange Road connects the Region to Kunene Region and thereby shortens the distance to Outapi (ORC, 2025).

### **3.1.2. Archaeological and Heritage Context**

Omusati Region, like the rest of Namibia, is a home to many cultural groups from various parts of Africa, Asia and Europe. The rich diverse and distinct cultural values and traditions render a unique character to the Namibian society. The culture shapes the destiny of the people while it stabilizes the lives of groups at local level. However, in the country like Namibia, with its different ethnics and cultural groups coined with the history characterized by the racial discrimination still fresh in the national psyche, the promotion of accommodative cultures continues to promote nation building. Hence, the Government since the attainment of the independence in 1990 adopted the Policy of National Reconciliation in order to foster tolerance and respect of different cultural groups (ORC, 2025).

#### **3.1.2.1. Olutanda**

There is one well-known heritage place known as Olutanda. This place is known for its mysterious existence of ancestral spirits and hence there are no houses in this area. It is narrated that this place has protected the People Liberation Army of Namibia (PLAN) Cadres against the South African troops who could not trace them whenever they entered Olutanda. There is also Omwandigwaasimbakadhona where unmarried pregnant girls were thatched and burned to death as in accordance with local traditions and culture (ORC, 2025).

#### **3.1.2.2. Outapi War Museum**

Outapi War Museum is located in the then South African Military Base which accommodated the South African troops during the colonial time. There is also a well-documented history of the heroes and heroines of the Namibian liberation struggle. It is now turned into the Museum with good accommodation facilities.

#### **3.1.2.3. Ombalantu Baobab Tree**

It is the biggest tree of its kind and it is located in the centre of Outapi Town behind the Open Market. It has been previously used as the post office by the colonial administrators as well as a church by the South African troops. Another historical baobab tree is located in Okahao Town. According to historians, it has been used as the shade where ancestors had performed certain rituals.

#### **3.1.2.4. Olufuko Festival**

This is a female initiation where girls of about twelve years are being prepared before marriage in accordance with local beliefs and culture. It is performed by an elderly man, known as 'namunganga' and celebrated through performing and dancing local music. Its Patron is the

Founding President and the Father of the Namibian Nation, Dr Sam Nujoma and it takes place in August annually. It seeks to promote culture and traditional norms, while appreciating the diverse traditions and cultures. This is one of the biggest events that continues to attract both tourists and locals to Outapi Town. In addition to tourism attraction, it also aims at strengthening local and regional economy, through attracting visitors with buying capacity.

## 3.2. Bio-Physical Environment

### 3.2.1. Climate

Site specific weather data for Oikokola area is not readily available and this section has been derived from the weather data for Okalongo settlement, located approximately 20 kilometers away from the project site and the regional climate. The regional climate can be described as semi-arid, with the rains falling mostly in the summer months of January, February and March when the temperatures are highest. Water from rainfall or that flowing as surface water tend to evaporate rather quickly or seeps into the sandy ground. While there have been wetter and drier periods the climate has been constant for millions of years (Mendelsohn et al., 2000). The average rainfall ranges between 350-400 mm.

The average daily temperatures rise from about 17° Celsius in June and July to about 25° Celsius in October, November and December. These three months and September also experience the highest maximum temperatures for the year of between 30° and 35° Celsius. The summer months that follow are generally cooler due to the cooling effects of the rain and the greater cloud cover. The average minimum temperatures for the winter period are about 7° and 8° Celsius with very few days that experience near zero temperatures, occurrences of frost are not many (Mendelsohn et al., 2000).

The region has a humid subtropical climate with hot summers and relatively mild winters (with warm days and chilly to cool nights). See Figure 2 for average temperatures and precipitation data for Okalongo. See Figure 3 for the wind rose of Okalongo.

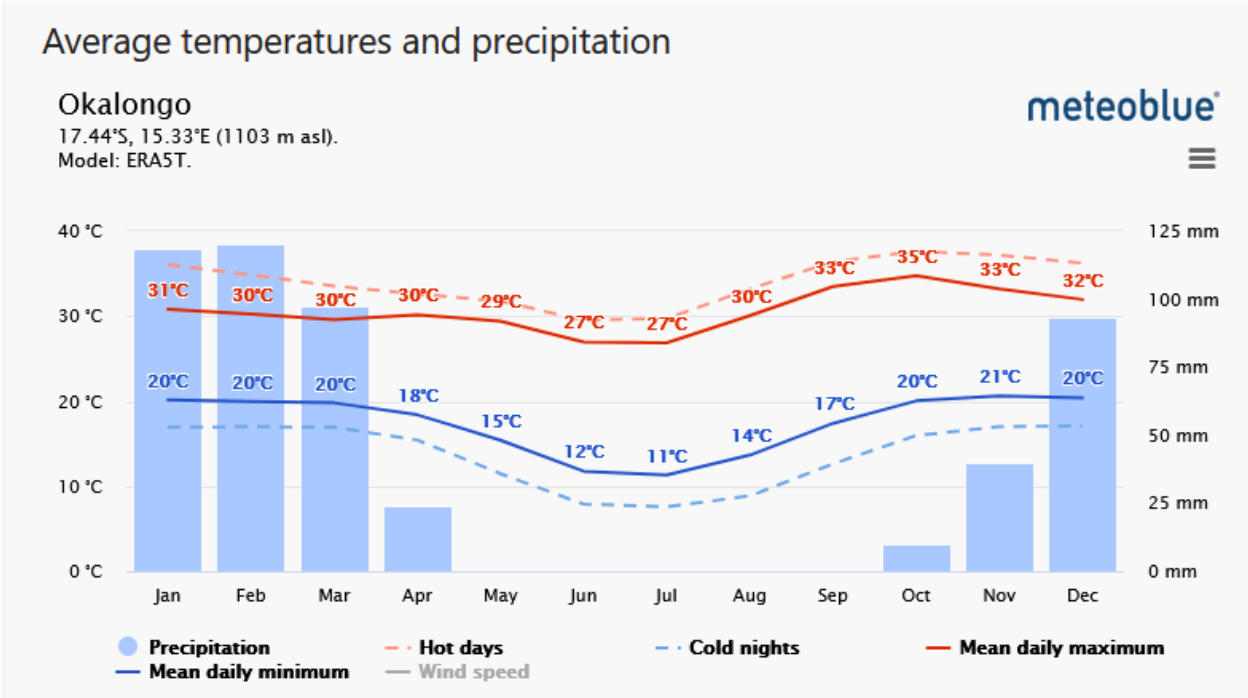


Figure 2: Average temperature and precipitation graph for Okalongo (Meteoblue, 2025)

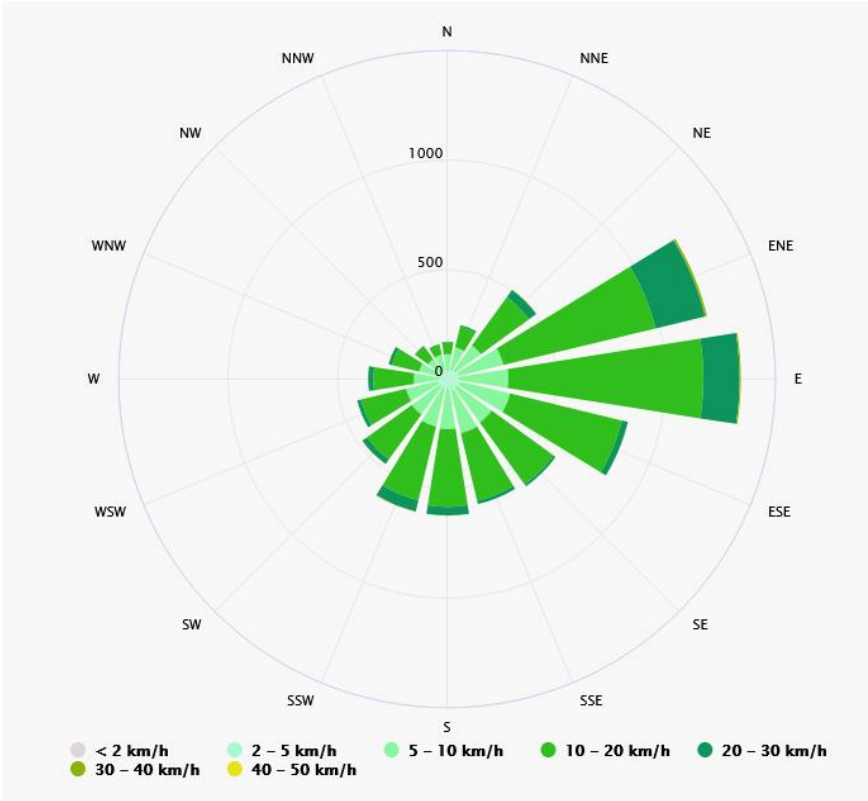


Figure 3: Windrose for Okalongo (Meteoblue, 2025)

### 3.2.2. Topography, Geology and Hydrogeology

#### *I. Topography*

In general, the topography in the Cuvelai-Etосha Basin (CEB) declines from all directions towards the lowest point of north-central Namibia, the Etosha Pan, with a minimum elevation of about 1,080 mamsl. Compared to the relief of the eastern areas the terrain to the west and south is dipping with a relatively steep gradient of up to 2.8% towards the basin centre.

The topography has a major influence on the entire drainage system with the numerous interconnected channels of the oshana system, which are cut into the underlying plane Kalahari sands forming raised, vegetated areas in between.

#### *II. Soil and Geology*

For the past 70 Ma years the Owambo basin has been filling up with sand, silt and clay that was eroded from higher grounds surrounding the area. Cycles of climate change with wet and dry periods followed each other (Mendelsohn et al., 2000). Rivers drained into the basin bringing sediments with them known by deposits called Ombalantu, Beisep, Olukonda and Andoni formation. Ombalantu represents the base and Andoni the top of the named formations.

These four formations form the youngest unit of the basin - the Kalahari Sequence. The following lithological and stratigraphical descriptions of the Kalahari formations are based on the work of Miller (1997, 2008c) and mainly consider the sediments and distribution within the CEB as part of the larger Owambo basin.

Surface geology at the project location consists of Quaternary and Tertiary age, of the Kalahari Group (Tk). The Kalahari group in the project location consists mainly of unconsolidated formations, but some degree of consolidation may be present. The soils are classified as Eutric Cambisols, which are relatively fertile, well-draining with a cambic horizon, indicating early stages of soil formation. Their high base saturation makes them suitable for a variety of agricultural uses. The subsurface geology consists of red mudstones, siltstones, sandstones, grit and conglomerate of the Karoo Sequence - Omingonde formation.

#### *III. Hydrogeology*

The Omingonde Formation generally has low groundwater potential owing to the argillaceous character of the rocks. Locally though, especially at contact zones towards intrusive dolerites, this can improve to moderate potential. Groundwater flow would be mostly through primary porosity in the Kalahari cover but flow along fractures, faults (secondary porosity) and other geological structures present within the underlying Omingonde formations might take place where consolidated layers are present.

According to Plothner & Bittner (2001), all groundwater within the CEB flows towards the Etosha Pan which is the base level of the groundwater flow system due to the structure of the basin

and the pan is the deepest point. Flow direction from the project location is expected in a southerly direction; however local drainage patterns may vary due to groundwater abstraction.

According to the Department of Water Affairs database (DWA), 2 known boreholes and/or wells exist within a 3km radius from the site. The local water table depth in the area is expected to be less than 20mbgl and water quality is considered good. The shallow rest water levels and good quality water observed in the area is usually due to the presence of shallow perched aquifers.

This area does not fall within a Water Control Area; however, groundwater belongs to the government of the Republic of Namibia. This means that the government of Namibia controls the exploration and usage of groundwater in this area. See Figure 4 below, for the hydrogeological.

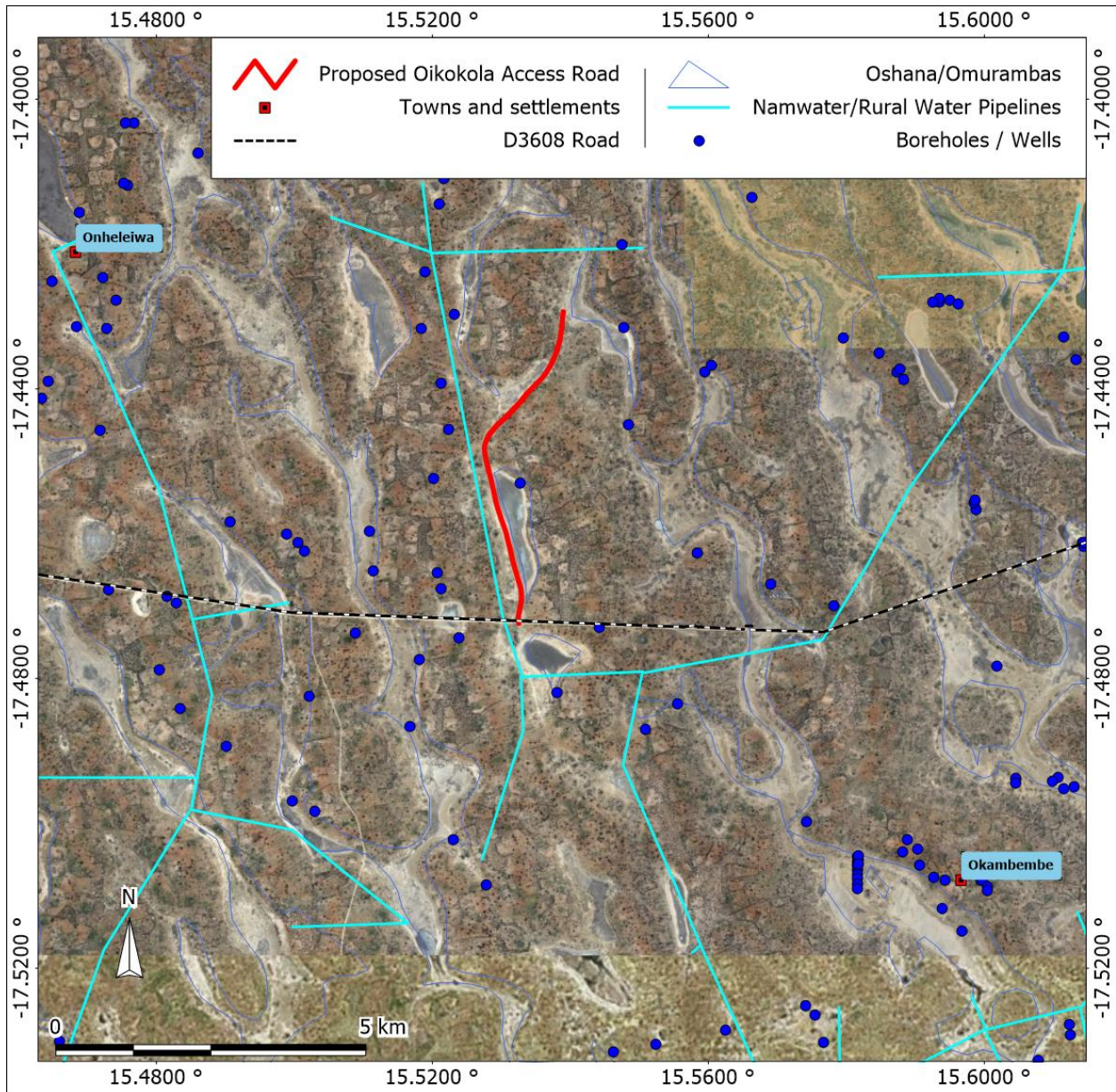


Figure 4: Hydrogeological map

### 3.2.3. Terrestrial Ecology

The proposed 8 km access road to Oikokola Clinic and School is located within the Omusati Region in north-central Namibia. This area forms part of the Cuvelai drainage system and falls within a semi-arid ecological zone dominated by Tree and Shrub Savanna (Figure 5), and mopane woodland vegetation.

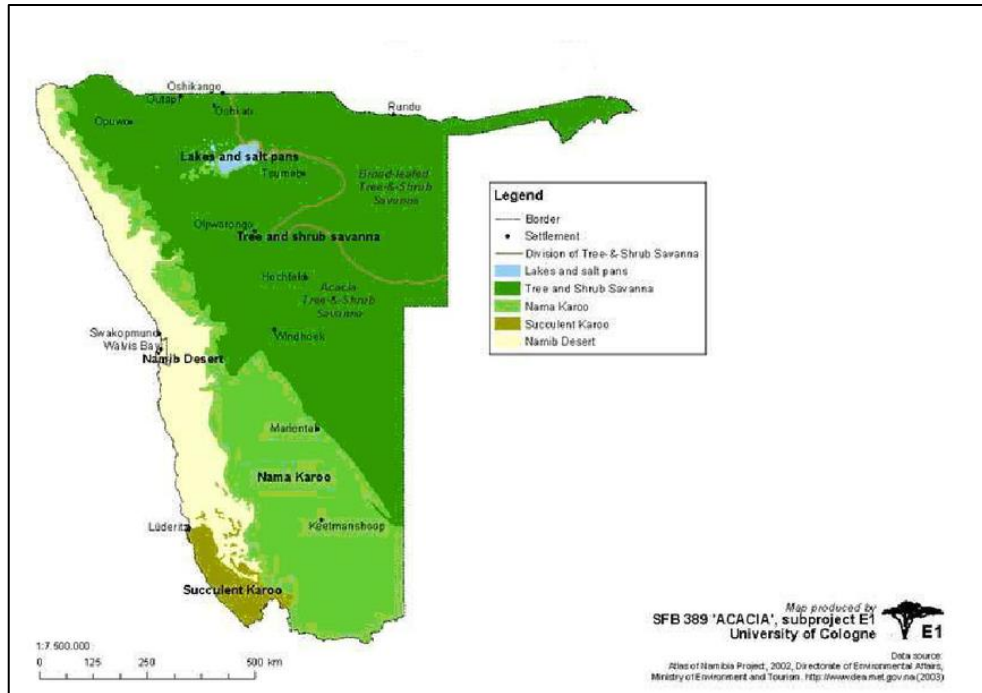


Figure 5: Biomes of Namibia Kamuhelo (2015)

### 3.2.2.1 Flora

Vegetation along the proposed road corridor primarily consists of typical dry mopane woodlands interspersed with patches of mixed acacia savanna. The dominant tree species is *Colophospermum mopane* (Mopane), which often forms low-canopy woodlands and is well-adapted to dry conditions. Other key woody species include *Acacia erioloba* (Camelthorn), *Acacia tortilis*, and *Terminalia sericea*, with Combretum species present in some less-disturbed areas. The grass layer is comprised mostly of *Panicum maximum*, *Stipagrostis* spp., and *Eragrostis* spp., which thrive in open areas and under tree canopies. Near homesteads and footpaths, and along the route of the proposed road, evidence of clearing and bush encroachment was noted, largely due to human activity and grazing pressure (Figure 7).

In addition to naturally occurring species, several trees and shrubs of cultural and economic value are also found in the area. These include *Sclerocarya birrea* (Marula), which is valued for its edible fruits and traditional alcoholic brews; *Ziziphus mucronata* (Buffalo Thorn), commonly used for fencing and medicinal purposes; and *Adansonia digitata* (Baobab), which is culturally significant and occasionally observed in surrounding areas. Local vegetation is also under pressure from unsustainable harvesting practices, overgrazing by livestock, and general land degradation associated with settlement expansion and wood collection for fuel and construction.



Figure 6: Vegetation in Oikokola area



Figure 7: Illustrates sparsely distributed vegetation alongside the route

### 3.2.2.2 Fauna

The fauna within the immediate project area is relatively limited in diversity and abundance, mainly due to long-standing human settlement, habitat modification, and fencing. Nonetheless, small to medium-sized mammals such as *Papio ursinus* (Chacma Baboon), *Procavia capensis* (Rock Hyrax), *Canis mesomelas* (Black-backed Jackal), and *Lepus capensis* (Cape Hare) are commonly found. In more vegetated patches, occasional sightings of antelope species such as *Sylvicapra grimmia* (Common Duiker) and *Tragelaphus scriptus* (Bushbuck) are possible. Large mammals are mostly absent due to habitat fragmentation and human presence.

Birdlife in the area is more diverse, benefiting from the seasonal presence of surface water in nearby oshanas (Figure 8) and open savanna habitats. Commonly observed species include wetland-associated birds such as *Ciconia episcopus* (Woolly-necked Stork), *Anastomus lamelligerus* (African Openbill), and *Ardea goliath* (Goliath Heron). Upland and savanna birds such as *Euplectes orix* (Southern Red Bishop), *Ploceus* species (weavers), and raptors like *Aquila rapax* (Tawny Eagle) and *Milvus migrans* (Black Kite) are also present. Amphibians such as *Xenopus laevis* (African Clawed Frog) emerge during the rainy season, particularly in stagnant or shallow waters. Reptiles like *Varanus albigularis* (Rock Monitor), *Python natalensis* (African Rock Python), and *Agama* lizards are found in more undisturbed and rocky patches.



Figure 8: Site picture illustrating the Oshanas in the project area

### 3.3. Surrounding Land Use

The land use along the road alignment consist of a mixed use of predominantly homesteads and crop fields, as well as commercial and recreational amenities, iishanas, schools, clinic, and church amongst others. The upgrading to gravel standards of this section of road is important to interconnect the above sectors and features.

## 4. PROJECT DESCRIPTION

### 4.1. Project Activities

An application is made to the Directorate of Environmental Affairs and Forestry (DEAF) for an Environmental Clearance Certificate (ECC) for the proposed upgrading of the 8 km of road from D3608 to Oikokola Combined School and Clinic to gravel standard.

#### Scope of Construction Works

The project entails the following key activities:

- Layer works along the entire 8 km stretch.
- Widening of the existing earth track to meet gravel road specifications.
- Prospecting and utilization of road materials from four (4) designated borrow pits.

#### Borrow Pits Assessment

Potential borrow pits were investigated in the immediate surrounds of the proposed route. They were excluded due to insufficient quantities and substandard material quality. Four (4) borrow pits (see Figure 9) located on average 6km from the project site were found to contain materials suitable for the project (selected subgrade and wearing course applications (classified as G10).

The approved borrow pits are located at the following coordinates:

- Borrow Pit 1 (BP1) = -17.416547°, 15.498047°
- Borrow Pit 2 (BP2) = -17.416683°, 15.483669°
- Borrow Pit 3 (BP3) = -17.408589°, 15.481497°
- Borrow Pit 4 (BP4) = -17.404631°, 15.476286°

#### Construction Equipment and Duration

The project will utilize heavy machinery, including graders, roller compactors, front loaders, excavators, survey equipment, water dozers, tipper trucks, and fog spray trucks. The construction is scheduled to commence soon after the approval of the ECC, with an estimated duration of 15 months.

#### Alignment and Access Provisions

The existing tracks will be retained as far as possible, with minor adjustments to comply with Roads Authority standards. Properly constructed access points will be established for adjacent settlements, villages, schools, and other locations with evident traffic movement. The final positioning of intersections and access points has been determined through stakeholder consultations.



**Figure 9:** Location of borrow pits

## 4.2. Decision Factors

The design and construction will be performed in accordance with various RA's Manuals such as Section 4 (Detailed Design Stage) of the RA Procedures Manual. Any proposed deviation from the requirements of the RA Manuals must be brought to the attention of the Roads Authority. The appropriate manuals are to be consulted, i.e.:

- RA Materials Manual (1st Edition, October 2014).
- Technical Recommendations for Highways (TRH20).
- Code of Practice for Pavement Design (Southern Africa Transport and Communications Commission (SATCC), 1998).

The road will have a 30m wide reserve, see Figure 10, that will include the following:

- Road reserve 30m total. Vegetation clearing required for at least 15m total area and fences will be moved. No buildings and homesteads will be affected, especially since most of them are at least 50m away from the edge of the proposed road.
- Road way, about 7.5m wide. Area to be used as carriage way for goods and public. Vegetation clearance will be minimal since this will follow mostly already existing tracks and most vegetation already cleared.
- Road Shoulders and Side Slope, 6m wide. Vegetation clearing will be required to improve visibility of road users and pedestrians.

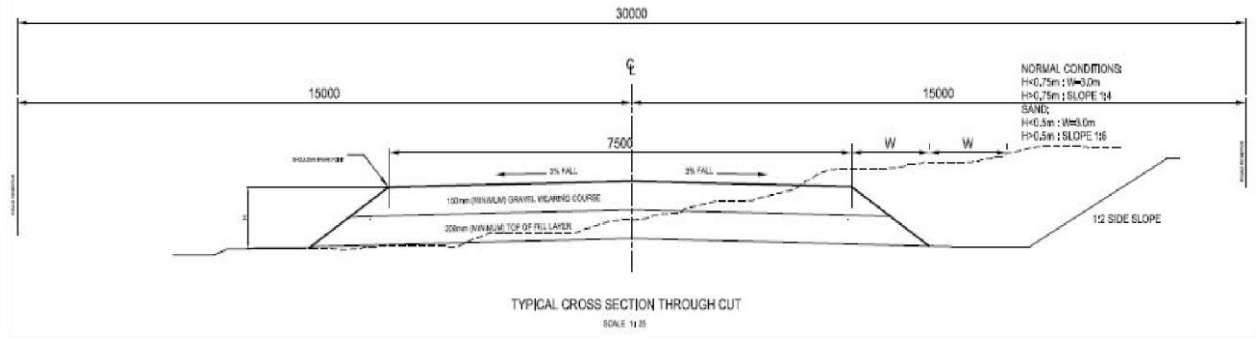


Figure 10: Typical cross section of a gravel road

### 4.3. Description of Alternatives

#### 4.3.1 No-Go Alternative

The no-development alternative is the option of not upgrading the road to Oikokola Combined School and Clinic. Should the proposed development not take place, the socio-economic development of both the local community and the region will continue to be constraint and limited in terms of access to markets, employment opportunities, educational institutions, and healthcare services. The no-development option is thus not considered to be a feasible alternative at this stage.

#### 4.3.2 Site Alternative

An optimal route selection should minimize the total costs of the transport system, including both construction and operational expenses. While the most direct path is often preferred, it may not always be the most cost-effective—especially in rugged terrain. Additionally, environmental impact must be a key consideration, ensuring the chosen route causes the least possible ecological damage.

The project site is generally suitable for this type of operation. The environmental footprint is expected to be minimal as the project site is partially disturbed. The potential impacts at the project location, both environmental and socio-economic, are of such a nature that they can be mitigated through good practice and compliance to the EMP.

This project will largely follow the existing road tracks, thereby avoiding large-scale vegetation clearance or habitat fragmentation. A few road alignments options were considered initially in consultation with local communities. The final alignment was deemed more feasible taking into consideration some of the following factors:

- Access to Oikokola Clinic
- Access to Oikokola Combined School
- Access to Oikokola Police Station
- Access to Oikokola Church
- Access to Oshivanda Combined

- Topography & Terrain
- Geotechnical conditions
- Drainage
- Ecological sensitivities
- Displacement of communities

## 5. PUBLIC PARTICIPATION PROCESS

### 5.1. Public Consultation Process Phase 1

In terms of Section 21 of the EA Regulations a call for public consultation with all I&APs during the EA process is required. This entails consultation with members of the public and providing them an opportunity to comment on the proposed project. The Public Consultation Process does not only incorporate the requirements of Namibia’s legislation, but also takes account of national and international best practises. Please see Table 3 below for the activities undertaken as part of the statutory public participation process.

**Table 3:** Table of Public Consultation Activities

ACTIVITY	REMARKS
Roads Authority Community Liaison	21 June 2024
Placement of site notices/posters in the project area	See Annexure H
Placing advertisements in two newspapers for two consecutive weeks, namely The Namibian and Confidante	See Annexure G
Written notice to Interested and Affected Parties via Email	See Annexure H
Public meeting in Oikokola	11 April 2025
Focal Consultative meeting with: - Traditional Authority Headmen and Community Leaders	11 April 2025
Feedback meeting with Constituency Councillor, Traditional Authority Headmen and Community Leaders	07 July 2025

#### 5.1.1 Roads Authority Community Liaison

The Roads Authority (RA) personnel held one a consultative meeting with the Local Councilor, and representatives of communities along the route on 21st of June 2024 at 14h00, Oikokola village meeting area. The community informed the RA team that, given the location of the road, there will be properties that will be encroached upon because of the proposed alignment. The community was assured that the affected landowners whose land and properties are affected by the proposed road reserve will be compensated. To facilitate the owners interview process, the RA personnel will seek the assistance of the local village headmen to assist with interviewing of the affected landowners whose land will be affected by the construction of the road.

### 5.1.2 Focal meeting in Oikokola

A further consultative focal meeting with key stakeholders and environmental consultants was held on 11 April 2025 at 10:30 at Oshivanda Village. This meeting was attended by the following stakeholders, amongst other leaders:

- Village Headman - Oshivanda Village
- Village Headman - Oikokola Village
- Village Headman - Onghuwo Village
- Village Headman - Okandi Village
- School Principal - Oikokola Combined School



Figure 11: Focal meeting at Oshivanda Village

A summary of the issues and comments raised during this consultation is found below:

- Borrow pits should be rehabilitated and turned into waterpoints for the community.
- Ensure safety around borrow pits.
- The need to employ local people for especially unskilled jobs.

- Requested that engineers should study the flooding and topography of the area carefully so that correct culverts are put up and the correct locations and for engineers to head the advised of the local community about flooding regimes.
- Recommended that access roads to be constructed must also include Oshivanda Combined School.
- Consider extending the road up to the border with Angola.
- Consider rather upgrading the existing track in the direction of Oshivanda Combined School.

### 5.1.3 Public meeting

A public meeting with the community was held immediately after the focal meeting with the key stakeholders on 11 April 2025 at 11:30. The venue was the Mkotola Pay Point, Oikokola Village, Omusati Region. The public meeting was attended by 50 local residents and traditional and community leaders, who provided input to the proposed development. A background information document was availed to interested and affected parties, and those that requested the information. The comment period of the initial public participation process commenced on 28 March 2025 and ended on 18 April 2025.



Figure 12: Public meeting at Mkotola Pay Point, Oikokola Village

A summary of the issues and comments raised during the initial consultation phase is found below.

- Express support for the road upgrade.
- Borrow pits should be rehabilitated and turned into waterpoints for the community.
- Ensure safety around borrow pits.
- The need to employ local people for especially unskilled jobs.
- Recommended that access roads to be constructed must also include Oshivanda Combined School.
- Consider extending the road up to the border with Angola, to accommodate future police station and possible immigration office.
- Consider upgrading the existing track in the direction of Oshivanda Combined School at the same time.

#### **5.1.4 Feedback meeting with Constituency Councillor, Traditional Authority Headmen and Community Leaders**

A feedback consultative focal meeting with the community leaders was held on 07 July 2025 at 09:00 at Oshivanda Village (See Figure 13). This meeting was necessitated to update the community on the final design alignment of the proposed road. The meeting was attended by the following stakeholders, amongst other leaders:

- Constituency Councillor - Etayi Constituency
- Village Headman - Oikokola Village
- Oikokola and Oshivanda Community Leaders

A summary of the issues and comments raised during this engagement is found below:

- Express support for the road upgrade.
- Recommended that access roads to be constructed must also include Oshivanda Combined School.
- Consider upgrading the existing 1.7km track in the direction of Oshivanda Combined School at the same time (see Figure 14 below). The community felt strongly that the proposed road upgrade must not commence before the confirmation of inclusion of the Oshivanda Combined School track.



Figure 13: Feedback consultative focal meeting

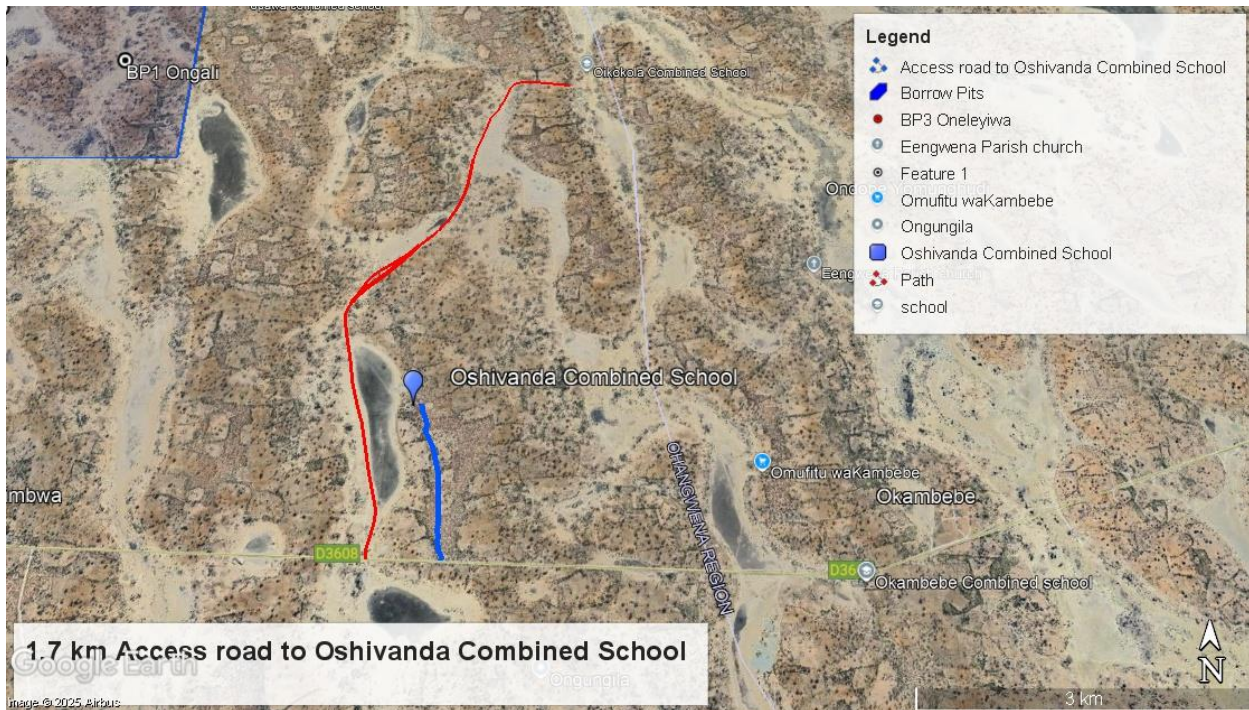


Figure 14: Track (blue path) to Oshivanda Combined School

## 5.2. Public Consultation Process Phase 2

The second phase of the Public Consultation Process involved the lodging of the Draft Environmental Scoping Report (DESR) to all registered I&AP for comment. Registered and potential I&APs are informed of the availability of the DESR for public comment. I&APs were given time until **18 July 2025** to submit comments or raise any issues or concerns they may have with regard to the proposed project. No further comments or input were received during this period.

## 6. ASSESSMENT METHODOLOGY

Impact assessments depend on the nature and magnitude of the proposed activity, as well as the type of environmental control envisaged for the particular project. Given the nature of the proposed activity, i.e. a construction project, the identification and assessment of the potential impacts will be based on the type and scale of the various activities associated with the project.

Assessment of the predicted significance of impacts for a proposed development is by its nature, inherently uncertain. To deal with such uncertainty in a uniform manner, standardised and internationally recognised methodologies have been developed. One such accepted methodology is applied in this study to assess the significance of the potential environmental impacts of the proposed development, outlined as follows in Table 4.

**Table 4:** Impact Assessment Criteria

CRITERIA	CATEGORY
<b>Impact</b>	Description of the expected impact
<b>Nature</b> Describe type of effect	<b>Positive:</b> The activity will have a social / economical / environmental benefit. <b>Neutral:</b> The activity will have no effect <b>Negative:</b> The activity will have a social / economical / environmental harmful effect
<b>Extent</b> Describe the scale of the impact	<b>Site Specific:</b> Expanding only as far as the activity itself (onsite) <b>Small:</b> restricted to the site's immediate environment within 1 km of the site (limited) <b>Medium:</b> Within 5 km of the site (local) <b>Large:</b> Beyond 5 km of the site (regional)
<b>Duration</b> Predicts the lifetime of the impact.	<b>Temporary:</b> < 1 year (not including construction) <b>Short-term:</b> 1 - 5 years <b>Medium term:</b> 5 - 15 years <b>Long-term:</b> >15 years (Impact will stop after the operational or running life of the activity, either due to natural course or by human interference) <b>Permanent:</b> Impact will be where mitigation or moderation by natural course or by human interference will not occur in a particular means or in a particular time period that the impact can be considered temporary

CRITERIA	CATEGORY
<p><b>Intensity</b> Describe the magnitude (scale/size) of the Impact</p>	<p><b>Zero:</b> Social and/or natural functions and/ or processes remain unaltered  <b>Very low:</b> Affects the environment in such a way that natural and/or social functions/processes are not affected  <b>Low:</b> Natural and/or social functions/processes are slightly altered  <b>Medium:</b> Natural and/or social functions/processes are notably altered in a modified way  <b>High:</b> Natural and/or social functions/processes are severely altered and may temporarily or permanently cease</p>
<p><b>Probability of occurrence</b> Describe the probability of the Impact <u>actually</u> occurring</p>	<p><b>Improbable:</b> Not at all likely  <b>Probable:</b> Distinctive possibility  <b>Highly probable:</b> Most likely to happen  <b>Definite:</b> Impact will occur regardless of any prevention measures</p>
<p><b>Degree of Confidence in predictions</b> State the degree of confidence in predictions based on availability of information and specialist knowledge</p>	<p><b>Unsure/Low:</b> Little confidence regarding information available (&lt;40%)  <b>Probable/Med:</b> Moderate confidence regarding information available (40-80%)  <b>Definite/High:</b> Great confidence regarding information available (&gt;80%)</p>
<p><b>Significance Rating</b> The impact on each component is determined by a combination of the above criteria.</p>	<p><b>Neutral:</b> A potential concern which was found to have no impact when evaluated  <b>Very low:</b> Impacts will be site specific and temporary with no mitigation necessary.  <b>Low:</b> The impacts will have a minor influence on the proposed development and/or environment. These impacts require some thought to adjustment of the project design where achievable, or alternative mitigation measures  <b>Medium:</b> Impacts will be experienced in the local and surrounding areas for the life span of the development and may result in long term changes. The impact can be lessened or improved by an amendment in the project design or implementation of effective mitigation measures.  <b>High:</b> Impacts have a high magnitude and will be experienced regionally for at least the life span of the development, or will be irreversible. The impacts could have the no-go proposition on portions of the development in spite of any mitigation measures that could be implemented.</p>

\*NOTE: Where applicable, the magnitude of the impact has to be related to the relevant standard (threshold value specified and source referenced). The magnitude of impact is based on specialist knowledge of that particular field.

For each impact, the EXTENT (spatial scale), MAGNITUDE (size or degree scale) and DURATION (time scale) are described. These criteria are used to ascertain the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The decision as to which combination of alternatives and mitigation measures to apply

lies with the proponent, and their acceptance and approval ultimately with the relevant environmental authority.

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. Such significance is also informed by the context of the impact, i.e. the character and identity of the receptor of the impact.

## 7. MITIGATION HIERACHY

The mitigation hierarchy (Figure 15) is a widely used tool that guides users towards limiting as far as possible the negative impacts on biodiversity from development projects. It emphasises best-practice of avoiding and minimising any negative impacts, and then restoring sites no longer used by a project, before finally considering offsetting residual impacts.

Following the hierarchy is crucial for all development projects aiming to achieve no overall negative impact on biodiversity or on balance, a net gain - also referred to as no net loss and the net positive approach, respectively. It is based on a series of essential, sequential - but iterative - steps taken throughout the project's life cycle in order to limit any negative impacts on biodiversity.

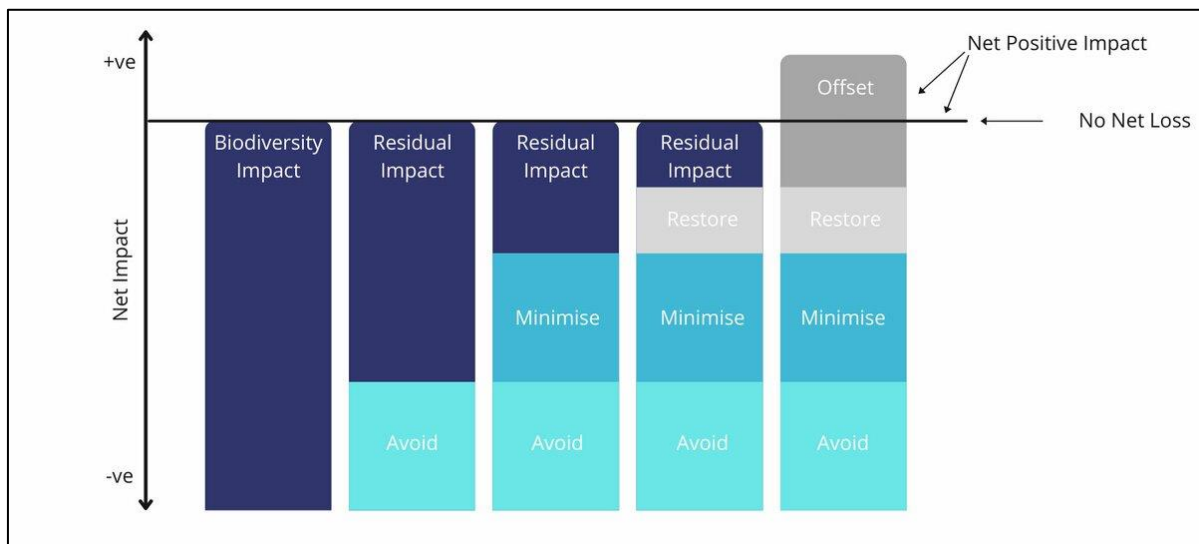


Figure 15: Mitigation Hierarchy

### Sequential steps of the mitigation hierarchy

- 1. Avoidance:** the first step of the mitigation hierarchy comprises measures taken to avoid creating impacts from the outset, such as careful spatial placement of infrastructure, or timing construction sensitively to avoid or disturbance. Examples include the placement of roads outside of rare habitats or key species' breeding grounds, or

switching from fossil fuels to solar, wind, or hydro power to avoid the harmful emissions associated with traditional energy sources. Avoidance is often the easiest, cheapest and most effective way of reducing potential negative impacts, but it requires biodiversity to be considered in the early stages of a project.

2. **Minimisation:** these are measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided. Effective minimisation can eliminate some negative impacts, such as measures to reduce noise and pollution, designing powerlines to reduce the likelihood of bird electrocutions, or building wildlife crossings on roads.
3. **Rehabilitation/restoration:** The aim of this step is to improve degraded or removed ecosystems following exposure to impacts that cannot be completely avoided or minimised. Restoration tries to return an area to the original ecosystem that was present before impacts, whereas rehabilitation only aims to restore basic ecological functions and/or ecosystem services - such as through planting trees to stabilise bare soil. Rehabilitation and restoration are frequently needed towards the end of a project's life cycle but may be possible in some areas during operation.

Collectively, avoidance, minimisation and rehabilitation/restoration serve to reduce, as far as possible, the residual impacts that a project has on biodiversity. Typically, however, even after their effective application, additional steps will be required to achieve no overall negative impact or a net gain for biodiversity.

4. **Offset:** offsetting aims to compensate for any residual, adverse impacts after full implementation of the previous three steps of the mitigation hierarchy. Biodiversity offsets are of two main types: 'restoration offsets' which aim to rehabilitate or restore degraded habitat, and 'averted loss offsets' which aim to reduce or stop biodiversity loss in areas where this is predicted. Offsets are often complex and expensive, so attention to earlier steps in the mitigation hierarchy is usually preferable.

Supporting Conservation Actions: measures taken which have positive - but difficult to quantify - effects on biodiversity. These qualitative outcomes do not fit easily into the mitigation hierarchy, but may provide crucial support to mitigation actions. For example, awareness activities may encourage changes in government policy that are necessary for implementation of novel mitigation, research on threatened species may be essential to designing effective minimisation measures, or capacity building might be necessary for local stakeholders to engage with biodiversity offset implementation.

## 8. POTENTIAL IMPACTS

This Chapter describes the potential impacts on the biophysical and socio-economic environments, which may occur due to the proposed activities. These include potential impacts, which may arise during the planning and design phase, potential construction related

impacts (i.e. short to medium term) as well as the operational impacts of the proposed development (i.e. long-term impacts).

The assessment of potential impacts will help to inform and confirm the selection of the preferred project plan and design to be submitted to MEFT: DEA for consideration. In turn, MEFT: DEA's decision on the environmental acceptability of the proposed project and the setting of conditions of authorisation (should the project be authorised) will be informed by this chapter, amongst other information contained in this Report.

The baseline and potential impacts that could result from the proposed development are described and assessed with mitigation measures recommended. Finally, comment is provided on the potential cumulative impacts which could result should this development, and others like it in the area, be approved.

## **8.1 Planning and Design Phase**

During the planning and design phase, consideration is given to aspects such as compliance; possible community relocation; public engagement, environmental awareness, health and safety aspects.

### **8.1.1. Compliance Requirements**

The proposed development is listed as a project requiring an environmental assessment as per the listed activities in Environmental Management Act (2007) and its regulations of 2012. The Environmental Commissioner requires regular environmental monitoring and evaluation on environmental performance to be conducted on approved developments, as well as the setting and monitoring of targets for improvement. As part of this exercise bi-annual reports have to be submitted to the Office of the Environmental Commissioner for the duration of the environmental clearance certificate.

### **8.1.2. Community Relocation**

Should resettlement of people or communities be required for the proposed development. Compensation and resettlement efforts should aim to restore or improve the living conditions and livelihoods of displaced people, regardless of their land ownership status. Resettlement plans should protect people from exposure to natural hazards or climate change risks. Approximately 19 properties have been identified as being affected by the proposed road alignment, this is however limited to fields as opposed to homesteads. The route is designed to minimize the amount of land taken from the sides, aiming to avoid dividing large parcels of fields. This approach helps reduce safety risks for households who need to cross the road to tend to their fields on both sides.

### 8.1.3. Public Consultation

Consultation with the public forms an integral component of an environmental impact assessment. Initiate participation of Interested and affected parties (I&APs). Inform I&APs and key stakeholders about the proposed development. Identify issues and concerns of key stakeholders and I&APs with regards to the proposed development. Develop a communication structure with stakeholder and I&APs.

### 8.1.4. Environmental Awareness

Ensure that all persons involved in the project are aware of, and are familiar with the environmental requirements for the project. Develop and implement environmental emergency preparedness procedures.

### 8.1.5. Health and Safety Aspects

The potential health and safety impacts of the proposed project include the occupational health and safety risks related to the project activities. A number of activities undertaken during development of the proposed project have potential risks to the health and safety of the workers. During the construction phase, the potential health and safety risks the workers are likely to be exposed to include: Injuries resulting from operation of machinery, equipment, tools and construction vehicle, and road accidents.

During construction of the proposed project, it is expected that construction workers are at risk of injuries and hazards as a result of accidents, handling hazardous waste, lack or neglect of the use of protective wear etc. All necessary health and safety guidelines should be adhered to so as to avoid such occurrences. It is recommended that before construction activities commence, the materials and equipment are well inspected and that they conform to the relevant occupational health and safety standards.

The northern areas of Namibia have been active battle zones during the war for liberation. Demining operations are underway in northern Namibia to remove remnants of war, including unexploded landmines and explosive remnants of war (ERW). These efforts are critical for ensuring civilian safety, enabling agricultural and infrastructural development, and restoring usable land to communities. It is therefore important to assess the risk and ensure safety prior to the commencement of construction activities.

Construction workers will produce human waste during daily operations, which must be properly managed to prevent the spread of diseases such as cholera, typhoid, and diarrhoea. Without adequate sanitation measures, this could lead to serious environmental and public health risks. To mitigate these hazards, mobile toilets should be installed on-site to ensure safe and hygienic waste disposal.

Establish personnel protection standards and mandatory safety practices and procedures for the field activities related to Corrective Actions at the site. Establish the lines of

communication among contractors and subcontractors involved in work operations for safety and health matters.

Conduct HIV /Aids Awareness Programme on Site for not less than 90% of workers inclusive of all direct and indirect costs. Provide and maintain condom dispenser. Provide and maintain HIV/AIDS awareness posters. Provide information regarding the voluntary testing of construction workers and counselling, support and care.

## 8.2 Construction Phase Impacts

During the construction phase the following potential impacts have been identified: fauna and flora; pressure on the existing infrastructure; surface and ground water; air quality; noise, traffic; solid waste management; hazardous substances; social impact, impacts to local businesses.

### 8.2.1 Fauna and Flora

Since the proposed project entails using existing tracks, the expected impacts on flora and fauna are generally minimal. This intervention will therefore avoid large-scale vegetation clearance or habitat fragmentation. However, minor and localized impacts may still occur during the project phases. These may include temporary disturbance to roadside vegetation due to machinery movement, dust emissions, and limited bush clearing along the shoulders for road widening or drainage improvements. Such disturbance could affect common grasses, shrubs, and a few scattered trees along the route. Small terrestrial fauna such as reptiles, amphibians, and ground-nesting birds may also be temporarily displaced or disturbed by construction noise and vibrations.

Although no critically endangered species were recorded during desktop or field assessment, the mopane woodland ecosystem is ecologically significant due to its importance for biodiversity and its slow regeneration rate. Hence, vegetation clearing should be kept strictly within the existing road footprint, with no off-road deviation unless necessary. Mature trees and ecologically important shrubs should be marked and protected where feasible. Construction activities should be scheduled to avoid peak rainfall periods to limit disturbance to seasonal wetland fauna. Finally, environmental awareness among workers should be promoted, particularly regarding the handling of small animals encountered during roadworks.

### 8.2.2 Pressure on Existing Infrastructure

The proposed access road is currently not proclaimed, hence there are no existing linear infrastructure expected along the route.

### 8.2.3 Surface and Ground Water Impacts

Surface and ground water impacts may be encountered during the construction phase. The risk of contaminating such water sources can be increased by accidental spillage of oils and fuels and any other equipment used during construction; chemical contamination from construction materials such as cement, paint and mechanical fluids. This risk is minimised by the fact that the construction period will be a short-term activity.

### 8.2.3 Air Quality

During the construction phase fugitive dust and exhaust gases generated have a potential impact on the air quality of the area and its surroundings. Dust is a major component of air pollution and could negatively affect the health of nearby communities, if not mitigated.

Dust is generated mainly from the following activities:

- Excavations and stockpiles during site clearance;
- Use of heavy vehicles, machinery and equipment during construction;
- Procurement and transport of construction materials to the site.

Dust abatement techniques should be implemented e.g. spraying of water on site to reduce dust levels to an acceptable standard. The local community and surrounding businesses should be continuously consulted to ensure that the dust levels are acceptable.

### 8.2.4 Noise Impacts

Noise is perceived as one of the most undesirable consequences of a construction activity. The most common reported impacts are interference in oral communication and sleep disturbance. The construction of the road will result in associated noise impacts. These noise impacts will mainly be associated with construction machinery and vehicles, concrete and mixing; and excavation for foundations. It is important that noise is managed well to avoid a negative impact to the surrounding communities and other developments in the vicinity during the short-term construction phase.

### 8.2.5 Traffic Impacts

Traffic is expected to slightly increase in the area during the construction phase of the project. Trucks and other heavy machinery will be required to deliver, handle and position construction materials as well as to remove spoil material. Not only will the increase in traffic result in associated noise impacts, it will also impact on the vehicular traffic in the area. The use of slow-moving heavy construction trucks has the potential to cause traffic jams. This will add additional pressure on the existing D3608 road, if not well managed.

### 8.2.6 Solid Waste Management

The construction activities will lead to the generation of significant amounts of solid waste mainly in the form of rock cuttings and building rubble. This could have a negative environmental impact if not managed well. Therefore, enough waste bins and skip containers

should be avoided to manage the solid waste. This may result in blocked waterways should waste be blown into water pipelines; animals may choke on waste when ingested and additionally it may pose a negative visual impact on the surrounding environment. All solid waste should be disposed of at the designated landfill sites in the project area.

### **8.2.7 Storage and Utilisation of Hazardous Substances**

Hazardous substances are regarded by the Hazardous Substance Ordinance (No. 14 of 1974) as those 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 in certain circumstances. During the construction period, the use and storage of these types of hazardous substances, such as shutter oil, curing compounds, types of solvents, primers and adhesives and diesel, on-site, could have negative impact on the surrounding environment, if these substances spill and enter the environment.

### **8.2.8 Social Impacts**

The project will result in long-term positive impacts as far as the social welfare of the affected community is concerned. There is potential of an influx of migrant workers to the area. This can boost the local economic development of the settlement as a result of an increase in consumers of goods, and spending power. However, this can also boost the social evils, such as theft, alcohol abuse, unemployment, etc. Hence, it is important that employment opportunities for locals be prioritised.

### **8.2.9 Impacts to Local Businesses**

The proposed construction activities could potentially impact those who have settled or set up businesses close to the road or within the road reserve. Additionally, some community members sell fruits and crafts along the side of the road and this business activities could be disturbed during upgrade activities. Should these community members or businesses be impacted upon during upgrade activities, mitigation measures need to be in place to ensure that the impacts are minimised.

Community members and business owners should be informed of construction and materials abstraction activities prior to construction commencing. Should community members have to relocate their business activities e.g. selling of fruit, the contractor should communicate with the community members prior to commencing work to ensure a suitable alternative location to which to relocate the activities is agreed upon.

The development will have a positive impact on the socio-economic status of the area and its residents. This is due to the job opportunities that will be created both directly related to the construction and indirectly from supporting services.

## **8.3 Operational and Maintenance Phase Impacts**

The operational phase impacts that have been identified are: environmental monitoring and evaluation; noise; health, safety and security; and visual impact.

### 8.3.1 Environmental Monitoring and Evaluation

The Environmental Commissioner requires regular environmental monitoring and evaluation on environmental performance to be conducted on approved developments, as well as the setting and monitoring of targets for improvement. As part of this exercise bi-annual reports have to be submitted to the Office of the Environmental Commissioner for the duration of the environmental clearance certificate.

### 8.3.2 Noise Impacts

The operational phase could typically generate noise through the amount and frequency of use of the various types of vehicles that will make use of the road as well as those used during maintenance of the road.

Namibia has no environmental noise and impact guidelines, reference is made to guidelines published by the International Finance Corporation (IFC, 2007) (See Table 5 below) and the South African Bureau of Standards (SABS) (SANS 10103, 2008). Both these guidelines are in line with the World Health Organisation (WHO) Guidelines for Community Noise (WHO, 1999).

**Table 5:** Environmental Noise standard

Noise Level Guidelines (IFC, 2007)		
Area	One Hour LAeq (dBA) 07:00 to 22:00	One Hour LAeq (dBA) 22:00 to 07:00
Industrial receptors	70	70
Residential, institutional and educational receptors	55	45

By applying a series of the mitigation measures as proposed for general developments of this nature it is believed that any potential nuisance can be significantly reduced.

### 8.3.3 Health, Safety and Security Impacts

Gravel roads often have uneven surfaces, loose gravel, and dust, which can increase the risk of vehicle accidents, skidding, and loss of control. Pedestrians and cyclists may also face hazards due to poor road conditions.

Dust generated from gravel roads can contribute to respiratory issues for nearby residents and travellers. Additionally, dust may affect air quality and cause discomfort or health problems, particularly for vulnerable groups. Gravel roads may be more susceptible to erosion and washouts during heavy rains, potentially cutting off communities or delaying emergency response.

Proper maintenance and planning are essential to mitigate these impacts and improve safety and security along gravel roads.

#### 8.3.4 Visual and Sense of Place Impacts

Individuals who frequent the area on a regular basis will experience a change in their sense of place of the area. The extent of this disturbance will depend on how high they valued the initial aesthetic quality of the site. Therefore, the aesthetics quality of the new infrastructure has to be pleasing and designed to blend in and have minimal negative impact to the natural surrounds.

### 9 SUMMARY OF POTENTIAL IMPACTS

A summary of the significance of the potential impacts from the proposed project assessed above is included in **Table 6**. The **Tables 7 - 10** provide a summary of the mitigation measures proposed for the impacts.

**Table 6: Summary of potential impacts**

Impacts	Negative		Positive		No Impact
	Short Term	Long Term	Short Term	Long Term	
<b>Planning and Design Phase</b>					
1. Compliance Requirements		X			
2. Community Relocation		X			
3. Public Engagement		X			
4. Environmental Awareness		X			
5. Health and Safety Aspects		X			
<b>Construction Phase</b>					
6. Fauna and Flora		X			
7. Pressure on Existing Infrastructure					X
8. Surface and Ground Water Impacts	X				
9. Air Quality	X				
10. Noise Impacts	X				
11. Traffic Impacts	X				
12. Solid Waste Management	X				
13. Storage and Utilisation of Hazardous Substances	X				
14. Social Impacts	X				
15. Impacts to Local Businesses		X			
<b>Operational Phase</b>					

16. Environmental Monitoring and Evaluation	X				
17. Noise Impacts	X				
18. Health, Safety and Security Impacts		X			
19. Visual and Sense of Place Impacts	X				

**Table 7: Proposed mitigation measures for the planning and design phase**

PLANNING AND DESIGN PHASE IMPACTS	
Impact	Mitigation Measures
Compliance Requirements	<ul style="list-style-type: none"> <li>• An Environmental Control Officer/ Environmental Practitioner should monitor the implementation of the EMP, and recommend any changes to this document when necessary.</li> <li>• The Environmental Control Officer/ Environmental Practitioner should inspect the site on a regular basis (preferably monthly or bi-monthly).</li> <li>• Biannual reports are to be submitted to the Environmental Commissioner.</li> </ul>
Community Relocation	<ul style="list-style-type: none"> <li>• Identify properties along the road that could possibly be affected by the proposed road upgrade.</li> <li>• Involve the local Traditional Authority in the consultation process with the affected land / property owners.</li> <li>• Negotiate and agree compensation in line with the applicable legislation and guidelines.</li> <li>• The Proponent shall negotiate and finalize an agreement for the repair or replacement of any infrastructure impacted by the proposed road upgrade.</li> <li>• Prior to the commencement of construction, the Contractor shall be provided with written details of all agreements reached between the Proponent and affected property owners.</li> <li>• Any agreements established between the Proponent and local residents shall be binding, and all parties must comply with their stipulated terms.</li> </ul>
Public Consultation	<ul style="list-style-type: none"> <li>• Arrange a meeting with the local community after the contractor appointment.</li> <li>• The contractor must assign an ECO from the construction team to oversee full compliance with the EMP.</li> <li>• Ensure clear communication between the contractor and community regarding Construction schedule &amp; duration. This should be in the form of a Public Consultation Plan (PCP). The PCP must include, as a minimum, the following: <ul style="list-style-type: none"> <li>○ A complaint mechanism for construction-related concerns.</li> <li>○ Contractor feedback to complainants on issue resolution.</li> <li>○ Regular reports to the community and proponent on raised issues and corrective actions.</li> </ul> </li> <li>• The Responsible Entity (RE) and contractor must present a detailed construction program in a meeting with the local community and landowners.</li> <li>• Maintain continuous communication with all relevant stakeholders.</li> <li>• Ensure transparent feedback to the RE and client throughout construction.</li> <li>• The contractor shall designate a team member to ensure full adherence to the EMP.</li> </ul>
Health, Safety and Security	<ul style="list-style-type: none"> <li>• It is important to assess the risk of unexploded landmines and explosive remnants of war and ensure safety prior to the commencement of construction activities.</li> </ul>

PLANNING AND DESIGN PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>• Provide suitable emergency and safety signage on site (manufactured of durable, weatherproof material). The signage signs should be placed at strategic locations to ensure awareness.</li> <li>• Demarcate and barricade any areas which may pose a safety risk (including hazardous substances, deep excavations etc.). These notices must be worded in English, and local languages (Oshiwambo).</li> <li>• Enforce the use of appropriate Personal Protective Equipment (PPE) for the right task or duties at all times.</li> <li>• Prevent illegal access to the construction site by implementing appropriate security measures. These security measures must not pose a threat to surrounding communities.</li> <li>• Should a construction camp be necessary, it should be located in such a way that it does not pose a risk to the public.</li> <li>• Equipment housed on site must be placed in a way that does not encourage criminal activities.</li> <li>• For safety and security reasons it is recommended that the entire site (construction site and camp) be fenced-off and security personnel be employed to safeguard the premises and to avert criminal activities.</li> <li>• Sensitize operators of earthmoving equipment and tools to switch off engines of vehicles or machinery not being used.</li> <li>• The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times.</li> <li>• Proper barricading and/or fencing around the work sites should be erected to avoid entrance of animals and/or unauthorized persons.</li> <li>• Adequate lighting within and around the construction location should be erected, to ensure visibility.</li> <li>• Angle the security lights downwards to prevent light pollution.</li> <li>• Portable toilets should be available at the construction site in the following ratio: 1 toilet for every 20 females and 1 toilet for every 20 males.</li> </ul>

**Table 8:** Proposed mitigation measures for the construction phase

CONSTRUCTION PHASE IMPACTS	
Impact	Mitigation Measures
Fauna and flora	<ul style="list-style-type: none"> <li>• The camel thorn tree (<i>Acacia Erioloba</i>) is protected under Namibia's Forest Act and is listed as a Protected Plant Species. The tree may not be harvested, damaged, or removed without consent and permitting from the relevant authorities.</li> </ul>

CONSTRUCTION PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>• Prevent contractors from collecting wood, veld food, etc. during the construction phase.</li> <li>• Limit clearing of vegetation to those areas within the footprint of construction site. Do not clear the entire development site, but rather keep the large individual trees and shrubs not directly affecting the development.</li> <li>• Disturbance of areas outside the designated working zone is not allowed.</li> <li>• No vegetation should be removed outside the designated project area.</li> <li>• Transplant removed vegetation where possible, or plant new trees in lieu of those that have been removed.</li> <li>• The trees that are to be kept should be clearly marked with “danger tape” to prevent accidental removal.</li> <li>• Regular inspection of the marking tool should be carried out.</li> <li>• The very important trees should be “camped off” to prevent the unintended removal or damage to these trees.</li> </ul>
Surface and Ground Water	<ul style="list-style-type: none"> <li>• Use drip trays or linings when evidence of leaks is observed on construction vehicles or equipment.</li> <li>• Remove leaking vehicles from project location immediately.</li> <li>• No servicing and maintenance of vehicles and/or equipment should be conducted on site.</li> <li>• Any spillage of hazardous substances including fuel, oil, paint or cleaning solvent must be cleaned up immediately and disposed of at a designated disposal facility.</li> <li>• Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and hydrocarbons into water sources.</li> <li>• Prevent illegal washing out of containers in nearby water courses.</li> <li>• Properly secure all temporary / portable toilets to the ground to prevent them toppling due to wind or any other cause.</li> <li>• Maintain toilets in a hygienic state and remove waste to a licensed disposal facility.</li> <li>• Ensure that no spillages occur when the toilets are cleaned or emptied.</li> <li>• Prohibit open urination or open defecation, use designated facilities.</li> <li>• Stabilize cleared areas as soon as possible to prevent and control surface erosion.</li> <li>• Proper environmental awareness and remedial response training of operators must be conducted on a regular basis.</li> <li>• An emergency plan should be in place on how to deal with spillages and leakages during this phase.</li> </ul>
Air quality	<ul style="list-style-type: none"> <li>• All loose material should be kept on site for the shortest possible time.</li> <li>• Ensure measures are in place to minimise dust generated during the construction phase.</li> </ul>

CONSTRUCTION PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>• Use appropriate dust suppression measures when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather.</li> <li>• Avoid excavation, handling and transport of materials which may generate dust under high wind conditions.</li> <li>• Locate stockpiles of construction materials in sheltered areas where they are not exposed to erosive effects of the wind.</li> <li>• Ensure all vehicle, plant and equipment are in good condition.</li> <li>• Encourage reduction of engine idling.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• Inform neighbouring communities of construction activities to commence and provide for continuous communication between them and contractor.</li> <li>• Limit construction times to acceptable daylight hours.</li> <li>• Install technology such as silencers on construction machinery.</li> <li>• Do not allow the use of horns/hooters as a general communication tool, but use it only where necessary as a safety measure.</li> <li>• Provide protective equipment such as ear muffs, masks and ear plugs to workers.</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>• Limit and control the number of access points to the site.</li> <li>• Ensure that road junctions have good sightlines.</li> <li>• Construction vehicles need to be in a road worthy condition and maintained throughout the construction phase.</li> <li>• Transport the materials in the least number of trips as possible.</li> <li>• Construction vehicles and machinery must be tagged with reflective signs or tapes to maximise visibility and avoid accidents.</li> <li>• Adhere to the speed limit.</li> <li>• Implement traffic control measures where necessary.</li> <li>• Minimise the movement of heavy vehicles during peak time.</li> </ul>
Waste Management	<ul style="list-style-type: none"> <li>• It is recommended that waste from the portable toilets be disposed of at a suitable waste disposal site, on a regular basis. Consultation with the local authority should be sought in this regard.</li> <li>• A sufficient number of waste bins should be placed around the site for the soft refuse.</li> <li>• A sufficient number of skip containers for the heavy waste and rubble should be provided for around the site.</li> <li>• The waste containers should be able to be closed to prevent birds and other animals from scavenging.</li> </ul>

CONSTRUCTION PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>• Solid waste will be collected and disposed of at an appropriate local landfill, in consultation with the local authority.</li> </ul>
Hazardous Substances	<ul style="list-style-type: none"> <li>• All chemicals and other hazardous substances (if any), must be stored and maintained in accordance with the Hazardous Substances Ordinance (No. 14 of 1974), with all relevant licences and permits to be obtained where applicable.</li> <li>• Given the potential harm to human health during handling and use of any of hazardous substances it is essential that all staff be trained with regards to the proper handling of these substances, as well as First Aid, in the case of spillage or intoxication.</li> <li>• Storage areas for all substances should be bunded and capable to hold 120% of the total volume of a given substance stored on site.</li> </ul>
Heritage	<ul style="list-style-type: none"> <li>• There are no known heritage areas envisaged in the area; however, the contractor might come across archaeological features or objects that possess cultural values during construction activities.</li> <li>• If such remains or objects with cultural values (e.g. bones, weapons, ancient cutlery, graves etc) are uncovered at the project location or surrounding, it should be barricaded off, and</li> <li>• The relevant authorities (i.e. the local police and National Heritage Council of Namibia) should be contacted immediately.</li> </ul>
Social	<ul style="list-style-type: none"> <li>• Ensure locals enjoy priority in terms of job opportunities, to the extent possible, for skills that are available locally.</li> <li>• Ensure local procurement where commodities are available locally.</li> </ul>
Impacts to Local Businesses	<ul style="list-style-type: none"> <li>• Community members and business owners should be informed of construction and materials abstraction activities prior to construction commencing.</li> <li>• Should community members have to relocate their business activities e.g. selling of fruit, the contractor should communicate with the community members prior to commencing work to ensure a suitable alternative location to which to relocate the activities is agreed upon.</li> </ul>

**Table 9:** Proposed mitigation measures for the operational phase

OPERATIONAL PHASE IMPACTS	
Impact	Mitigation Measures
Environmental monitoring and Evaluation	<ul style="list-style-type: none"> <li>• An Environmental Control Officer / Environmental Practitioner should monitor the implementation of the EMP, and recommend any changes to the document when necessary.</li> <li>• The Environmental Control Officer / Environmental Practitioner should inspect the site on a regular basis (preferably monthly or bi-monthly).</li> <li>• Biannual reports are to be submitted to the Environmental Commissioner.</li> </ul>
Health, Safety and Security	<p>Maintaining gravel roads is essential to ensure safety, durability, and smooth travel for vehicles. Maintenance actions should include:</p> <ul style="list-style-type: none"> <li>• <b>Regular Grading (Blading)</b> <ul style="list-style-type: none"> <li>○ Use a motor grader or drag to reshape the road surface, maintaining proper crown (slope) for drainage.</li> <li>○ Remove potholes, ruts, and washboarding (corrugations).</li> <li>○ Shoulder maintenance to prevent edge drop-offs.</li> </ul> </li> <li>• <b>Dust Control</b> <ul style="list-style-type: none"> <li>○ Apply dust suppressants (calcium chloride, magnesium chloride, lignin sulfonate, or water).</li> <li>○ Consider organic options for eco-friendly solutions.</li> <li>○ Reduce speed limits to minimize dust.</li> </ul> </li> <li>• <b>Pothole &amp; Rut Repair</b> <ul style="list-style-type: none"> <li>○ Fill potholes with fresh gravel and compact properly.</li> <li>○ Address underlying drainage issues causing rutting.</li> <li>○ Use a grader or hand tools for spot repairs.</li> </ul> </li> <li>• <b>Proper Drainage Maintenance</b> <ul style="list-style-type: none"> <li>○ Clean ditches and culverts to prevent water pooling.</li> <li>○ Ensure cross-slope (crown) of 3-5% for runoff.</li> </ul> </li> </ul>

OPERATIONAL PHASE IMPACTS	
Impact	Mitigation Measures
	<ul style="list-style-type: none"> <li>○ Install pipe underdrains if needed.</li> <li>● <b>Gravel Resurfacing (Regraveling)</b> <ul style="list-style-type: none"> <li>○ Add fresh gravel when the road surface becomes too thin.</li> <li>○ Use the right mix of crushed stone, sand, and fines for better compaction.</li> </ul> </li> <li>● <b>Vegetation Control</b> <ul style="list-style-type: none"> <li>○ Mow or trim grass/weeds along shoulders to improve visibility and drainage.</li> <li>○ Use herbicides (if necessary) to prevent overgrowth.</li> </ul> </li> <li>● <b>Traffic Management</b> <ul style="list-style-type: none"> <li>○ Enforce speed limits to reduce washboarding and dust.</li> <li>○ Restrict heavy loads during wet conditions to prevent rutting.</li> </ul> </li> <li>● <b>Monitoring &amp; Preventive Care</b> <ul style="list-style-type: none"> <li>○ Inspect roads regularly for early signs of wear.</li> <li>○ Address minor issues before they worsen.</li> </ul> </li> </ul>
Visual and Sense of Place	<ul style="list-style-type: none"> <li>● the aesthetics quality of the infrastructure has to be pleasing and designed to blend in and have minimal negative impact to the natural surrounds.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>● All maintenance vehicles, machinery and equipment must be regularly serviced to ensure minimal noise production.</li> <li>● The use of low frequency white noise or flashing lights should be considered instead of audible high frequency warning signals for moving maintenance vehicles.</li> <li>● Where possible, use infrastructure to act as noise barriers to sensitive environments.</li> <li>● Provide hearing protectors as standard PPE for workers in situations with elevated noise levels.</li> </ul>

## 10 CONCLUSION

This road infrastructure project is designed to bolster the socio-economic development of both the local community and the nation at large. By expanding road capacity and upgrading of pavements, the project will facilitate improved access to markets, employment opportunities, educational institutions, and healthcare services. Additionally, it is expected to reduce transportation costs for both passengers and freight.

The current access tracks are in poor condition, characterized by uneven surfaces, erosion, and muddiness during wet seasons, making it difficult for vehicles and pedestrians to use safely and efficiently. Upgrading the track to a gravel standard will significantly improve accessibility, safety, and convenience for users while supporting local economic and social activities.

The proposed intervention involves upgrading the existing earth road to a gravel standard. The design will incorporate minor drainage structures to mitigate runoff during periods of heavy rainfall, where necessary. Furthermore, sections of the current road with sharp curves will be realigned to optimize horizontal curve radii, enhancing safety and traffic flow.

The gravel road will provide a stable, all-weather road, reducing accidents, vehicle damage, and delays caused by muddy or slippery conditions. It will ensure better access for emergency services, delivery vehicles, and equipment, ensuring timely response and operations. Proper drainage and gravel surfacing will minimize erosion and sediment runoff, protecting surrounding land and water sources.

## 11 RECOMMENDATIONS

With reference to the information available at this stage, the confidence in the environmental assessment undertaken is regarded as being acceptable for decision-making, in terms of the environmental impacts and risks. The Environmental Assessment Practitioner believes that the information contained within this ESR is adequate to allow MEFT: DEA to determine the environmental viability of the proposed project.

It is acknowledged that the project details may evolve during the detailed design and construction phases. However, these are unlikely to change the overall environmental acceptability of the proposed project and any significant deviation from what was assessed in this ESR should be subject to further assessment. If this was to occur, an amendment to the Environmental Authorisation may be required in which case the prescribed process would be followed.

Based on the evidence produced during the assessment process, it is very unlikely that this project will have any significant negative impacts on the environment. It is therefore recommended that a clearance certificate be issued for the project.

## 12 REFERENCES

1. Bender, F. (2002). Geology of Namibia: Sedimentary Basins and Oceanic Crust. In: The Geology of Namibia. Volume 1.
2. Dimo Mada. (2020). *Wildlife Conservation in Namibia: The Role of Local Communities*. Journal of Conservation Biology, 35(4), 1223-1230.
3. Geological Society of Namibia. (2009). A Geological Framework for Namibia. Geological Survey of Namibia.
4. Gorham, E., & Smit, I. (2022). *Ecological Functions of Biodiversity in Dryland Ecosystems*. Journal of Arid Environments, 187, 64-72.
5. IFC, 2007. General Environmental, Health and Safety Guidelines.
6. Mendelsohn, J., Jarvis, A., Roberts, A. and T. Robertson Atlas of Namibia. A Portrait of the Land and its People. David Philip Publishers, Cape Town, RSA
7. Mendelsohn, J., Jarvis, A., Roberts, C., & Roberts, D. (2002). Atlas of Namibia: A Portrait of the Land and Its People.
8. Meteoblue, 2025. Okalongo Climate. Simulated historical climate & weather data for Okalongo.  
[https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/Okalongo\\_namibia\\_3353172](https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/Okalongo_namibia_3353172)
9. Ministry of Environment and Tourism. (2017). *Conservancy Management in Namibia: Achievements and Prospects*. Windhoek: Government of Namibia.
10. Namibia Nature Foundation. (2021). *The Importance of Birds in Biodiversity Conservation*. Namibia: Namibia Nature Foundation.
11. Namibia Statistics Agency (NSA), 2023. Namibia 2023 Population and Housing Census Main Report.
12. Namibia Water Resources Management Act. Government of Namibia.
13. Namibian Association of Community Based Natural Resource Management (CBNRM) Support Organisations (NACSO), 2010. Namibia's Communal Conservancies: A Review of Progress and Challenges in 2009. NACSO, Windhoek
14. Oleson, K. L., Weller, B., & Behnke, R. H. (2019). *Integrating Economic Development with Conservation in Namibia*. Environmental Management, 63(5), 914-925.
15. Raison, 2016. People of the coast. Available at:  
<http://www.raison.com.na/Pages%20110%20to%20133.pdf>.
16. SADC Environmental Legislation Handbook (SELH), 2012. Environmental Legislation. EA process flowchart for Namibia. Available at:  
[www.saiea.com/dbsa\\_handbook\\_update2012/pdf/chapter11.pdf](http://www.saiea.com/dbsa_handbook_update2012/pdf/chapter11.pdf).
17. SANS 10103, 2008. The measurement and rating of environmental noise with respect to annoyance and to speech communication. Pretoria: Standards South Africa.
18. Schubert, G. (2007). Groundwater Resources of Namibia. Water Research Commission Report.
19. World Health Organisation (WHO), 1999. Guidelines to Community Noise.
20. World Wildlife Fund (WWF). (2010). Desertification in Namibia: Strategies for Sustainable Land Management.

21. Omusati Regional Council (ORC), 2025.

Profile [https://omusatirc.gov.na/documents/370745/515860/Omusati\\_Regional\\_Profile.pdf/c1c714df-d734-7ccd-4d52-b9ddeeff9d40?t=1629871594128](https://omusatirc.gov.na/documents/370745/515860/Omusati_Regional_Profile.pdf/c1c714df-d734-7ccd-4d52-b9ddeeff9d40?t=1629871594128).