

# Environmental & Social Impact Assessment for the Upgrade Low Volume Seal (LVS) Standard of DR3425 (87km: Ncaute – Karukuvisa) in the Kavango East and Kavango West Regions

## Environmental Scoping Report (ESR)

Project Ref: SC/RFP/RA - 07/2022

ECC Application No.: APP-230927002163

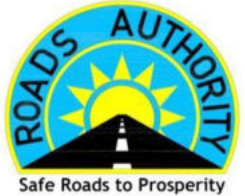




10 November 2023

**Proponent: Roads Authority**



**Prepared for DAT JV**



© EnviroPlan Consulting cc   2023   All rights reserved			
Project Name	Environmental & Social Impact Assessment for the Upgrade to Low Volume Seal (LVS) Standard of DR3425 (87km: Ncaute – Karukuvisa) in the Kavango East and Kavango West Regions		
Document Type	Environmental and Social Impact Assessment (ESIA): Environmental Scoping Report (ESR)		
Client	Roads Authority of Namibia Enquiries: Mr. Tuli Nashidengo Tel: +264 811 29 5501 E-Mail: <a href="mailto:tuli@archetype.com">tuli@archetype.com</a>		
Lead Consultant	EnviroPlan Consulting CC Enquiries: Mr. Tendai E. Kasinganeti Tel: +264 81 363 4904 E-Mail: <a href="mailto:tendai@enviroplanconsult.com">tendai@enviroplanconsult.com</a>		
Date of Release	November 2023		
	Name	Signature	Date
Author/s	Tendai E. Kasinganeti		10/11/2023
	Fredrika N. Shagama		10/11/2023
Contributing Author	Adiel T. Mudzanapabwe		10/11/2023

## DOCUMENT DATA SHEET

## **EXECUTIVE SUMMARY**

The Roads Authority of Namibia (the Proponent) appointed D&P Engineers, Archetype and Tweya Consulting Engineers - Joint Venture (DAT JV) to undertake the preliminary and detailed design, tender documentation, contract administration and full-time site supervision for the upgrading to Low Volume Seal (LVS) Standard of DR3425 (87km: Ncaute – Karukuvisa) in the Kavango East and Kavango West Regions.

The need for the upgrade of the LVS road has been determined by the deteriorating condition of the road and the current increase in economic activities being serviced by this road. As such, the Proponent identified the need to upgrade the road to fulfil its mission of achieving a safe and efficient national road network in Namibia. The design further aims to determine possible sources for material (borrow pits) that will be needed for the road upgrade activities.

EnviroPlan consulting CC was appointed by DAT JV to conduct a detailed assessment in terms of environmental and social implications associated with the proposed road upgrade project. A holistic approach was adopted to assess biophysical, water resources, culture & heritage, socio-economic and ecological impacts of the road upgrade project and its associated activities such as materials abstraction. This report documents the assessment of potential environmental and social impacts of the proposed activity. The preliminary findings within this Scoping Report indicate that potential impacts will be of low significance. These potential impacts can be further mitigated by the implementation of an effective Environmental Management Plan.

Based on the information provided in this report, EnviroPlan is confident the identified risks associated with the proposed development can be reduced to acceptable levels, should the measures recommended in the EMP be implemented and monitored effectively. Should the recommendations included in this report and the EMP be implemented, the significance of the impacts can be reduced to reasonably acceptable standards and durations. All developments could proceed provided that general mitigation measures as set out are implemented as a minimum.

It is therefore recommended that the proposed upgrade to LVS of the DR3425 and its associated activities receive Environmental Clearance, provided that the recommendations described above and the developed ESMP are implemented.

## Contents

EXECUTIVE SUMMARY .....	0
ENVIRONMENTAL IMPACT ASSESSMENT .....	x
1. CHAPTER ONE: BACKGROUND .....	1
1.1. OVERVIEW .....	1
1.2. PROJECT LOCATION .....	2
1.3. THE ENVIRONMENTAL CONSULTANT .....	3
1.4. NEED AND DESIRABILITY OF THE PROJECT .....	3
1.5. SCOPE OF WORK .....	4
2. CHAPTER TWO: PROJECT DESCRIPTION .....	4
2.1. ROAD CHARACTERISTICS .....	5
2.2. DESCRIPTION OF ACTIVITY .....	5
2.2.1. ROAD DESIGN .....	5
2.2.2. ROAD FURNITURE .....	6
2.2.3. SERVICES AND FACILITIES .....	6
2.3. PAVEMENT AND MATERIALS: AGGREGATES FOR CONCRETE AND SURFACING .....	7
2.4. PAVEMENT AND MATERIALS: BORROW PITS .....	7
2.4.1. ENVIRONMENTALLY SENSITIVE AREAS IDENTIFIED .....	13
2.4.2. RESOURCES AND WORKING TEAM .....	13
2.4.3. INFRASTRUCTURE AND SERVICES .....	13
3. CHAPTER THREE: PROJECT ALTERNATIVES CONSIDERED .....	14
3.1. NO-GO ALTERNATIVE .....	14
3.2. DESIGN ALTERNATIVES .....	14
3.3. RESOURCES ALTERNATIVES .....	14
3.4. CONCLUSIONS ON THE CONSIDERED ALTERNATIVES .....	15
4. CHAPTER FOUR: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK .....	16
4.1. INTRODUCTION .....	16
5. CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL BASELINE .....	28
5.1. INTRODUCTION .....	28
5.2. SOCIO-ECONOMIC PROFILE .....	28
5.2.1. POPULATION .....	28
5.2.2. EDUCATION .....	28
5.2.3. LAND USE .....	28
5.2.4. AGRICULTURAL SECTOR .....	29
5.2.5. MINING .....	29
5.3. INFRASTRUCTURE DEVELOPMENT .....	29
5.3.1. AIR TRANSPORT .....	29
5.3.2. RAIL TRANSPORT .....	29

5.3.3.	WATER SUPPLY .....	30
5.3.4.	POWER SUPPLY .....	31
5.3.5.	TELECOMMUNICATIONS.....	31
5.3.6.	EDUCATION, HEALTH AND SAFETY & SECURITY SERVICES.....	31
5.3.7.	ROAD CONSTRUCTION AND MAINTENANCE .....	31
5.3.8.	FUTURE DEVELOPMENTS ALONG THE ROAD.....	32
5.4.	CLIMATE & TOPOGRAPHY.....	32
5.4.1.	CLIMATIC CONDITIONS .....	32
5.4.2.	LANDSCAPE AND TOPOGRAPHY .....	33
5.5.	THE SOILS, GEOLOGY AND WATER RESOURCES .....	34
5.5.1.	SOILS .....	34
5.5.2.	GEOLOGY .....	35
5.5.3.	HYDROLOGY (SURFACE WATER) .....	36
5.6.	ECOLOGICAL ENVIRONMENT .....	37
5.6.1.	FAUNA.....	37
5.6.2.	FLORA.....	38
6.	CHAPTER SIX: PUBLIC CONSULTATION .....	41
6.1.	OVERVIEW .....	41
6.2.	APPROACH .....	41
6.2.1.	INTERESTED AND AFFECTED PARTIES (I&APs) .....	41
6.2.2.	COMMUNICATION WITH I&APs.....	42
6.3.	PRINTED MEDIA .....	43
6.3.1.	BACKGROUND INFORMATION DOCUMENT .....	43
6.3.2.	NEWSPAPER ADVERTISEMENTS & ARTICLES.....	43
6.3.3.	BUILDING A STAKEHOLDER DATABASE .....	44
6.3.4.	STAKEHOLDER MEETINGS & KEY CONVERSATIONS .....	44
6.3.5.	COMMENTS AND REVIEW PERIOD .....	45
7.	CHAPTER SEVEN: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS .....	47
7.1.	OVERVIEW .....	47
7.1.1.	EXTENT (SPATIAL SCALE).....	48
7.1.2.	DURATION.....	48
7.1.3.	INTENSITY, MAGNITUDE / SEVERITY .....	48
7.1.4.	PROBABILITY OF OCCURRENCE.....	49
7.1.5.	SIGNIFICANCE .....	50
7.2.	PLANNING AND DESIGN PHASE IMPACT ASSESSMENT.....	51
7.3.	CONSTRUCTION PHASE IMPACT ASSESSMENT .....	51
7.3.1.	IMPACT ASSESSMENT OF PHYSICAL LAND (SOIL) DISTURBANCE.....	51
7.3.2.	IMPACT ASSESSMENT OF BIODIVERSITY LOSS .....	52
7.3.3.	IMPACT ASSESSMENT OF ENVIRONMENTAL DEGRADATION .....	52

7.3.4.	IMPACT ASSESSMENT OF WASTE GENERATION.....	53
7.3.5.	IMPACT ASSESSMENT OF SOILS AND WATER RESOURCES - POLLUTION.....	53
7.3.6.	IMPACT ASSESSMENT OF WATER RESOURCES USAGE (ABSTRACTION) .....	53
7.3.7.	IMPACT ASSESSMENT OF NOISE GENERATION .....	54
7.3.8.	IMPACT ASSESSMENT OF ARCHAEOLOGICAL AND HERITAGE RESOURCES.....	54
7.3.9.	IMPACT ASSESSMENT OF DISTURBANCE TO LOCAL COMMUNITY MEMBERS AND BUSINESSES.....	55
7.3.10.	IMPACT ASSESSMENT OF TEMPORARY EMPLOYMENT CREATION .....	55
7.3.11.	IMPACT ASSESSMENT OF OCCUPATIONAL AND COMMUNITY HEALTH, SAFETY AND WELFARE	56
7.3.12.	AIR QUALITY (DUST) IMPACT ASSESSMENT .....	56
7.3.13.	IMPACT ASSESSMENT OF VEHICULAR TRAFFIC SAFETY .....	57
8.	CHAPTER EIGHT: RECOMMENDATIONS AND CONCLUSION .....	57
8.1.	CONCLUSION .....	57
8.1.1.	IMPACT ON BIODIVERSITY .....	58
8.1.2.	IMPACTS ON ENVIRONMENTAL DEGRADATION .....	58
8.1.3.	IMPACTS ON WASTE GENERATION .....	58
8.1.4.	IMPACTS ON SOIL AND WATER RESOURCES (SURFACE AND GROUNDWATER) CONTAMINATION .....	58
8.1.5.	IMPACT ON WATER RESOURCES USAGE (ABSTRACTION) .....	59
8.1.6.	IMPACTS ON DUST GENERATION (COMPRISED AIR QUALITY).....	59
8.1.7.	IMPACT ON NOISE GENERATION.....	59
8.1.8.	IMPACT ON ARCHAEOLOGICAL AND HERITAGE RESOURCES.....	59
8.1.9.	IMPACT ON DISTURBANCE TO LOCAL COMMUNITY MEMBERS AND BUSINESSES .....	60
8.1.10.	IMPACT ON TEMPORARY EMPLOYMENT CREATION .....	60
8.1.11.	IMPACT ON OCCUPATION AND COMMUNITY HEALTH AND SAFETY AS WELL AS WELFARE .....	60
8.1.12.	IMPACT ON VEHICULAR TRAFFIC SAFETY .....	60
8.1.13.	IMPACT ASSESSMENT OF PHYSICAL LAND (SOIL) DISTURBANCE .....	61
8.2.	RECOMMENDATION.....	61
9.	REFERENCES .....	62
	APPENDICES.....	63

### LIST OF APPENDICES

APPENDIX A: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

APPENDIX B: CV'S OF ENVIRONMENTAL ASSESSMENT PRACTITIONERS (EAPS)

APPENDIX C: HYDROGEOLOGICAL ASSESSMENT REPORT

APPENDIX D: PUBLIC CONSULTATION PROOFS (PUBLIC NOTIFICATIONS & ENGAGEMENT)

- D1: BACKGROUND INFORMATION DOCUMENT
- D2: NEWSPAPER ADVERTS
- D3: COPY OF SITE NOTICES (IN ENGLISH, RUKWANGALI AND RUGIRIKU)
- D4: MINUTES FROM THE STAKEHOLDERS & PUBLIC CONSULTATION MEETINGS

### LIST OF FIGURES

Figure 1: DR3425 route Locality	1
Figure 2: Localities of preliminary borrow pits for the upgrading of DR3425 (Ncaute-Karukuvisa)	8
Figure 3: Borrow Pit (BP) 1 Locality (at Masivi Village: 18°37'03.1"S 19°41'38.7"E)	8
Figure 4: Borrow Pit (BP) 2 test pit photos (at Ncushe Village: 18°41'45.9"S 19°41'50.0"E)	9
Figure 5: Borrow Pit (BP) 3 test pit photos (at Kondja Village: 18°43'40.1"S 19°41'14.2"E)	9
Figure 6: Borrow Pit (BP) 4 Test pit photos (at Tam-Tam Village: 18°47'06.8"S 19°40'37.8"E)	10
Figure 7: Borrow Pit (BP) 5 test pit photos (at "Small" Karukuvisa Village: 18°50'51.5"S 19°42'44.3"E)	10
Figure 8: Borrow Pit (BP) 6 test pit photos (at Vamukora Farm: 18°53'57.0"S 19°39'48.5"E)	11
Figure 9: Borrow Pit (BP) 7 test pit photos (at "Big" Karukuvisa Village: 18°55'36.8"S 19°41'16.6"E)	11
Figure 10: Borrow Pit (BP) 8 test pit photos (at Zadang Village: 18°59'59.2"S 19°42'28.3"E)	12
Figure 11: Active borrow pits for the maintenance of DR3425 sections	12
Figure 12: Environmentally sensitive areas encroached by the DR3425 route	13
Figure 13: The landscape and topography of the project area	34
Figure 14: The soil type along the project route and immediate surroundings	35
Figure 15: The geology of the project route and immediate surroundings	36
Figure 16: Geohydrological Map of the project area	37

Figure 17: Some goats, donkeys, horses and cattle observed along the project route	38
Figure 18: The vegetation structure map along the project route	39
Figure 19: Some of the vegetation observed along the DR3425 route	40
Figure 20: Public Meeting Proceedings at; A - Karukuvisa Gathering Tree, Karukuvisa Settlement, B - Ncushe Meeting Tree, C - Ncushe Settlement Area/Tree, C - Gcwatjinga Headman’s Premises Gathering Tree and D - Old Community Forest Office, Ncaute Settlement	45

### LIST OF TABLES

Table 1: Listed Activities -Environmental Management Act No. of 2007	2
Table 2: Sections within Scoping Report	4
Table 3: Project Area Details	5
Table 4: Alternatives considered in terms of services infrastructure	14
Table 5: Policies, legal and administrative regulations governing the proposed road upgrading works	18
Table 6: Climatic conditions around the entire project site area	32
Table 7: The list of common plant (and protected) species occurring along the DR3425 route	39
Table 8: Summary of Identified Key I&APs	42
Table 9: Consultative engagement conducted	42
Table 10: Modes of Public notification and engagement	43
Table 11: Commenting themes raised during the consultative meetings	45
Table 12: Extent or spatial impact rating	48
Table 13: Duration of Impact	48
Table 14: Intensity, magnitude and severity of impact	49
Table 15: Probability of occurrence impact rating	50



Table 16: Significance rating scale	50
Table 17: Assessment of impacts on soils (physical disturbance)	52
Table 18: Assessment of the impacts on biodiversity loss	52
Table 19: Assessment of impacts on environmental degradation	53
Table 20: Assessment of Impacts on Waste generation	53
Table 21: Assessment of the impacts on soil, surface and groundwater - pollution	53
Table 22: Assessment of water abstraction for the project activities	54
Table 23: Assessment of the impacts of noise generation	54
Table 24: Assessment of the impacts on archaeological and heritage resources	55
Table 25: Assessment of the impacts on disturbance to local community members and businesses	55
Table 26: Assessment of impacts on temporary employment creation	55
Table 27: Assessment of impacts on health, safety and welfare	56
Table 28: Assessment of Dust impact (Air quality)	57
Table 29: Assessment of Vehicular traffic safety impact	57

## ACRONYMS

TERMS	DEFINITION
BID	Background Information Document
BP	Borrow Pit
DAT	D&P Engineers, Archetype Project Consultants and Tweya Consulting Engineers
DEAF	Department of Environmental Affairs and Forestry
DR	District Road
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment

TERMS	DEFINITION
ESR	Environmental Scoping Report
ESMP	Environmental and Social Management Plan
GHGs	Greenhouse Gasses
ISO	International Organization for Standardization
I&APs	Interested and Affected Parties
KAZA	Kavango-Zambezi Trans frontier Conservation Area
LVS	Low Volume Seal
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT: DEA	Ministry of Environment, Forestry and Tourism’s Directorate of Environmental Affairs
NCEL	Namibia Civil Engineering Laboratory
NGOs	Non-governmental Organisations
NHC	National Heritage Council of Namibia
NEMA	Namibia Environmental Management Act
NSA	Namibia Statistics Agency
RA	Roads Authority of Namibia
ToR	Terms of Reference
TPs	Test Pits
UNFCCC	United Nations Framework Convention on Climate Change

## DEFINITION OF TERMS

**Alternative** - A possible course of action, in place of another that would meet the same purpose and need of the proposal.

**Baseline** - Work done to collect and interpret information on the condition/trends of the existing environment.

**Biophysical** - The part of the environment that does not originate with human activities (e.g., biological, physical and chemical processes).

**Consultant (Environmental Assessment Practitioner)** – this refers to the team that is conducting the ESIA and the preparation of the EMP for the development, i.e., EnviroPlan Consulting.

**Cumulative Impacts / Effects Assessment** - In relation to an activity, means the impact of an activity that in it may not be significant but may become significant when added to the existing

and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Decision-maker** - The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal

**Ecological Processes** - Processes which play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy and biological diversity (as an expression of evolution).

**Environment** - As defined in Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.

**Environmental Management Plan (Draft EMP) / Environmental & Social Management Plan (ESMP)** - As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.

**Interested and Affected Party (I&AP)** - In relation to the assessment of a listed activity includes - (a) any person, group of persons or organization interested in or affected by an activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity.

**Fauna and Flora** - The animals and plants/vegetation found in an area.

**Mitigation** - The purposeful and practical implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.

**Monitoring** - Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).

**Proponent** – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. In other words, this refers to the institutions/departments that are directly involved in the implementation of the project or it can be defined as the organization (private or public sector) or individual intending to implement a development proposal, i.e., the Roads Authority of Namibia.

**Public Consultation/Involvement** - A range of techniques that can be used to inform, consult or interact with stakeholders affected by the proposed activities.

**Protected Area** - Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended.

**Scoping** - An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA/ESIA.

**Significant impact** - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment

**Stakeholders** – this refers to the people, organisations, NGOs that are directly or indirectly affected and interested by the project.

## **ENVIRONMENTAL IMPACT ASSESSMENT**

This Environmental Scoping Report (ESR) follows the Scope of Work delineated by the Roads Authority (RA) and DAT JV for the proposed upgrade to Low Volume Seal (LVS) standard of the District Road (DR) 3425. The road upgrade project will also include other activities such as the abstraction of water and construction materials for construction activities. Existing information and input from commenting authorities, Interested and Affected Parties (I&APs) were used to identify and evaluate potential environmental impacts (both social and biophysical) associated with the proposed project.

Environmental flaws associated with the proposed project were identified through an Environmental Scoping Assessment. A conscious decision was made based on the recommendations and guidelines by the Directorate of Environmental Affairs (DEA) Environmental Impact Assessment (EIA) guidelines in order to assess both significant and less significant environmental impacts proposed by the development. The developed Environmental and Social Management Plan (ESMP) for the proposed listed activities will have to be effectively implemented by the client, to ensure that adverse environmental impacts are considered.

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

This ESR has been compiled in accordance with the regulatory requirements stipulated in the Environmental Assessment Regulations (2012), promulgated in terms of the Namibian environmental legislation Environmental Management Act (No. 7 of 2007).

The ESIA aims to:

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

A systematic approach was adopted to successfully complete the ESIA in line with the regulated process.

## ASSUMPTIONS AND LIMITATIONS

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

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

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

# 1. CHAPTER ONE: BACKGROUND

## 1.1. Overview

Roads Authority (RA) of Namibia (the Proponent) intends to upgrade the District Road (DR) 3425 road to Low Volume Seal Standard (LVS). As such RA appointed DAT JV (D&P Engineers, Archetype and Tweya Consulting Engineers Joint Venture) to undertake the preliminary and detailed design, tender documentation, contract administration and full-time site supervision for the upgrading to Low Volume Seal (LVS) standards of DR3425 (87km: Ncaute – Karukuvisa) in the Kavango East and Kavango West Regions.

The DR3425 originates in the Sikanduko Settlement east of Rundu and starts at a T-junction intersection with the B8 route (Trunk Road 8/3) (stake value (sv) 0+000) which links Rundu with central Namibia. According to the Road Management System (RMS) of the RA, the entire DR3425 measures 179.65km and terminates in Karukuvisa Village.

The section of DR3425 under review and the focus of this project is the portion between the settlements of Ncaute and Karukuvisa which measures approximately 87km.

The initial portion of the road from Sikanduko to Ncaute is a gravel surfaced road in a poor condition. The portion from Ncaute to Karukuvisa is presently an earth track that meanders and largely follows the Omatako River pattern. The road has been selected by the RA for upgrade from track to an all-weather two-lane single carriageway to low volume seal standard which will serve the purpose to:

- Improve local rural and regional accessibility,
- Reduction of road user costs, and
- Reduction of travel times.

The road connects multiple notable localities such as Ncaute, Ncushe, Gcwatjjinga, Naingopo, and Karukuvisa. Other smaller villages are scattered in-between those mentioned above.

It is anticipated that a new alignment close to the existing one will be established to have the upgraded road out of potential flood waters. The extent of the associated disturbance of properties due to the development such as fences, fields etc. will be determined and compensation will be made accordingly.

The project will involve inter alia the following:

- Upgrading to bitumen standards of the roadway,

- Provision of and Improvement of drainage facilities and features,
- Upgrading of intersections,
- Installation of road furniture, and
- Establishment of the 30m road reserve.

## **1.2. Project Location**

The DR3425 originates in the Sikanduko Settlement east of Rundu and starts at a T-junction intersection with the B8 route (Trunk Road 8/3) (stake value (sv) 0+000) which links Rundu with central Namibia. According to the Road Management System (RMS) of the RA, the entire DR3425 measures 179.65km and terminates in Karukuvisa Village. However, as mentioned above, the focus of this project is the section between the settlements of Ncaute and Karukuvisa which measures approximately 87km.



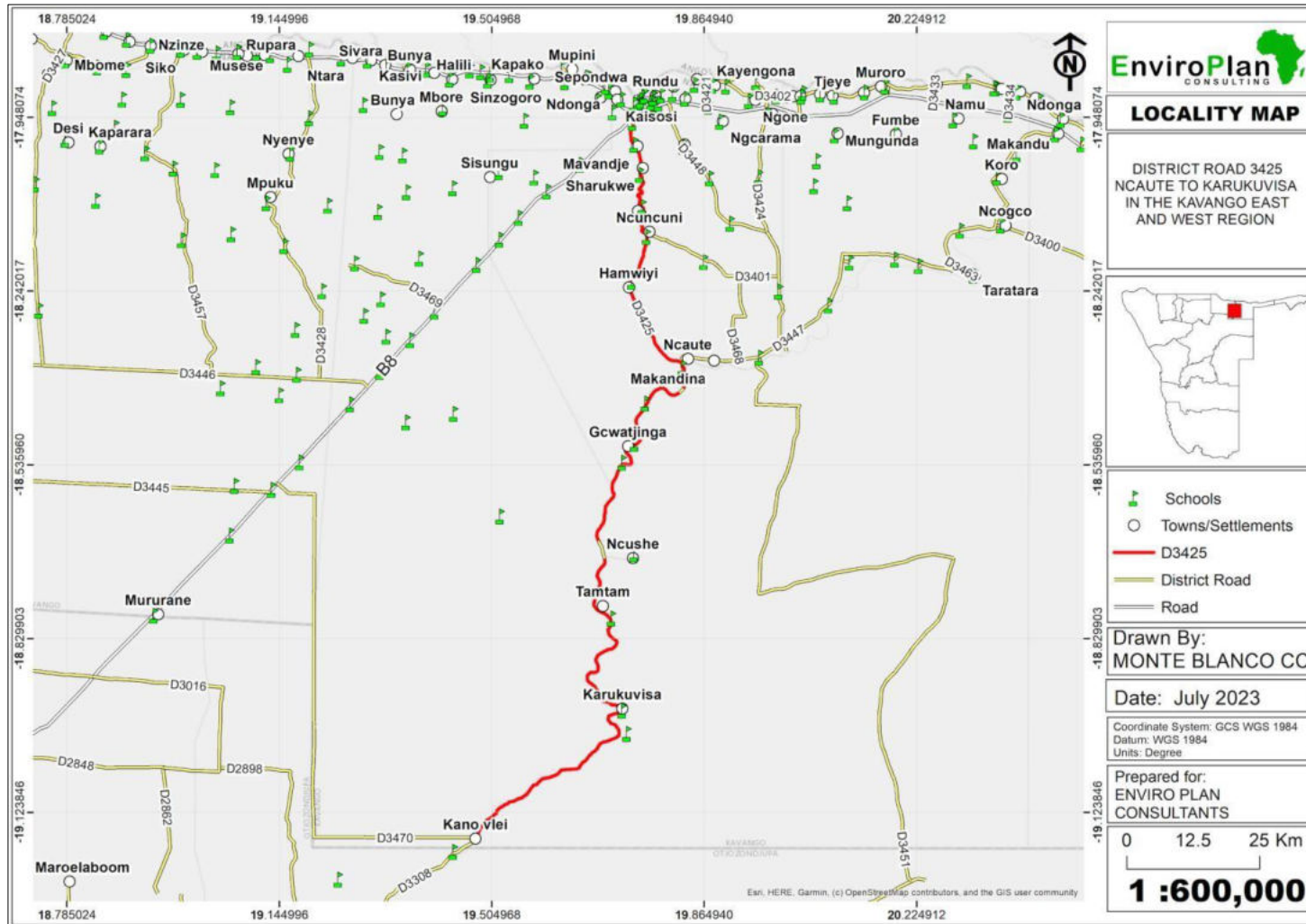


Figure 1: DR3425 route Locality

For the road upgrade and its associated activities to commence, in terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007 and the Environmental Impact Assessment Regulations of 2012), an EIA is required to obtain an Environmental Clearance Certificate from the Ministry of Environment, Forestry and Tourism (MEFT) before the project can proceed. This is because under the 2012 Environmental Impact Assessment (EIA) Regulations of the Environmental Management Act (EMA) No. 7 of 2007, the proposed development is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC). The main activity and associated activities are listed under the following relevant sections as provided in Table 1:

**Table 1: Listed Activities -Environmental Management Act No. of 2007**

<p><b>3: Mining and Quarrying Activities</b> 3.3 Resource extraction, manipulation, conservation and related activities</p>	<p><b>10: Infrastructure</b> 10.1 The construction of- (b) public roads</p>
---	---

Furthermore, as per the requirements of the Environmental Management Act No. 7 of 2007, Roads Authority has appointed EnviroPlan Consulting cc to conduct an Environmental and Social Impact Assessment (ESIA) and develop an Environmental & Social Management Plan (ESMP) for the proposed project – Appendix A.

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

In this respect, this document forms part of the application to be made to the DEA’s office for an Environmental Clearance Certificate (ECC) for the proposed upgrade to LVS Standard of the DR3425 road and abstraction of construction materials. The document is compiled in accordance with the guidelines and statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts assessment regulations (GN 30 in GG 4878 of 6 February 2012).

### **1.3. The Environmental Consultant**

The Roads Authority has appointed DAT JV as the engineer to design and supervise the proposed road upgrade project. DAT JV subsequently appointed EnviroPlan Consulting CC (EnviroPlan hereafter), on behalf of the Roads Authority, as the independent environmental consultant conducting the EA for the proposed activity.

Tendai E. Kasinganeti, a qualified Environmental Assessment Practitioner (EAP) conducted this EA process assisted by Fredrika Shagama. The CVs of the EAPs are attached hereto as Appendix B.

### **1.4. Need and Desirability of the Project**

The Roads Authority has identified the need for this road upgrade project as the project road has surpassed its intended design life. The road has been identified for upgrading from gravel to LVS standard to improve traffic conditions and provide safe and convenient access to economic and service centres. RA, therefore, aims to extend the life of the road by significantly improving the road pavement type and riding quality to ensure that the road is safer and more comfortable for the road users.

During the initial site visit (meetings with regional stakeholders), issues were brought to the attention of the project team which require further investigation during the design stage. These issues will be developed and investigated as the design and planning progress. Should possible solutions be found these will be required to be executed during the upgrading activities and works.

By investigating the issues on the subject road, the proposed project aims to benefit Namibian road users and assist the Roads Authority in meeting its objective of ensuring safe roads to prosperity. The need for the project is further motivated by:

- The need for road safety and traffic management improvements;
- The need to identify and address drainage problems;
- The need to investigate the condition of existing structures and identify associated upgrade requirements.

The project road is of local and regional importance within the two Region. The road further provides agriculture, social services, and tourism access. It is for these reasons that the upgrade of the road to LVS standard is needed.

## 1.5. Scope of Work

This scoping study was carried out in accordance with the Environmental Management Act (EMA) (7 of 2007) and its 2012 EIA Regulations (GG No. 4878 GN No. 30).

After submitting an application for ECC to the DEA, the first stage in the EA process is to submit a scoping report. This report provides the following sections/chapters (Table 2 below):

**Table 2: Sections within Scoping Report**

Description	Section of the Report
The need and desirability of the proposed project	Sub-Chapter 1.4
Project description and the need for it	Chapter 2
Alternatives considered for the proposed project in terms of no- go option, design, and natural resources	Chapter 3
The relevant laws and guidelines pertaining to the proposed project	Chapter 4
Baseline environment in which the proposed activity will be undertaken	Chapter 5
The public consultation process followed (as described in Regulation 7 of the EMA Act) whereby interested and affected parties (I&APs) and relevant authorities are identified, informed of the proposed activity and provided with a reasonable opportunity to give their concerns and opinions on the project	Chapter 6
The identification of potential impacts, impacts description, assessment, mitigation measures and recommendations	Chapter 7
Recommendations and conclusions to the report	Chapter 8

## 2. CHAPTER TWO: PROJECT DESCRIPTION

A Joint Venture formed between D&P Engineers and Environmental Consultants, Archetype Project Consultants and Tweya Consulting Engineers was appointed by the Roads Authority to perform consulting services for the detailed design, tender documentation, contract administration and site supervision for the upgrading to LVS standards of DR3425.

**The objective of this project is to:**

- Improve local rural and regional accessibility;
- Reduction of road user costs;
- Reduction of travel times;

- Reduction of maintenance costs and frequency.

**The upgrading to entail the following:**

- Upgrading to LVS standards of the roadway;
- Horizontal and geometric alignment improvements;
- Improvement of drainage facilities and features;
- Upgrading of intersections;
- Installation of road furniture;
- Establishment of road reserve.

**2.1. Road characteristics**

The subject road is a gravel road and it will be upgraded to LVS standard road. The project road is approximately 87km in length. The road is generally flat, with occasional dips where the roads largely follows the Omatako River pattern. The subject road details are stipulated in Table 3 below:

**Table 3: Project Area Details**

<b>Length of Road</b>	87km
<b>Road reserve</b>	15m from the Centre Line
<b>Regional Administration</b>	Kavango East and West
<b>Towns and settlements serviced by the road</b>	Rundu, Ncaute, Gcwatjinga, Ncushe, Naingopo, and Karukuvisa

**2.2. Description of Activity**

**2.2.1. Road design**

The components of the project to be carried out by DAT Joint Venture as predetermined in the Terms of Reference may be summarised as follows:

- The detailed engineering design, including consultation, data collection, survey, geotechnical and materials investigation and testing, pavement design, geometric design, structural and drainage design, tender documentation;
- Administration of the tender process;
- Contract administration and site supervision of the construction phase.

The existing DR3425 has been constructed according to geometric standards for its present status (i.e. 100km/h gravel road). The upgrade from gravel to LVS standard however warrants a reconsideration of the geometric standards to accommodate and comply with the upgraded operating speeds of up to 100km/h and all associated implications.

The study aims to also assess the existing condition of the road in order to determine which areas are a matter of concern and to generate alternative solutions accordingly. As such the engineering, social, economic and environmental aspects that relate to the proposed upgrade will be investigated in order to provide sufficient and accurate information regarding the proposed upgrade.

### ***2.2.2. Road furniture***

**Fencing:** New fences will be installed where impacted due to construction and relocated to establish the boundaries of the road reserve. Borrow areas will also need to be fenced for the protection of the public and livestock as a once-off and provision for this will be made in the bill of quantities.

**Road signs:** New road signs will be installed where necessary and existing road signs will be replaced with new ones. The bulk of these signs will be required at major community centres and at intersections. The positioning and the design of all road signs specified will comply with the stipulations contained in the Roads Authority Road Traffic Signs Policy.

**Rest areas and Pedestrian Facilities:** Rest areas will be constructed at intervals of at least 10km along the road. It is generally not required in rural areas it is not a requirement that provision be made for pedestrians. In areas where heavy pedestrian traffic is experienced however, such as Rundu, painted pedestrian crossings will be installed. Bus stops will also be provided.

**Intersections and Accesses:** Standard Roads Authority access types are anticipated on this project.

### ***2.2.3. Services and facilities***

**Electricity:** Several overhead electricity lines cross the road and pass within the project and road reserve areas. The positions of the visible power lines have been surveyed and indicated on the Route Layout Drawing to be included in the Detail Design submissions. The lines will be verified by NORED in terms of the minimum permissible clearance required. Interested and Affected parties have not indicated concerns regarding potential disturbances to electrical lines.

Water Pipelines, Canals and Water Points: A number of Rural Water Supply pipeline markers and points have been noted during the assessment process. The individual pipelines supplying households will be noted with the aid of the residents at the construction stage. These will need to be protected and rerouted/ relocated where required. Additionally, sleeves will be provided along the route for existing and future communal pipelines to provide points to cross the road without cutting into the pavement.

### **2.3. Pavement and Materials: Aggregates for Concrete and Surfacing**

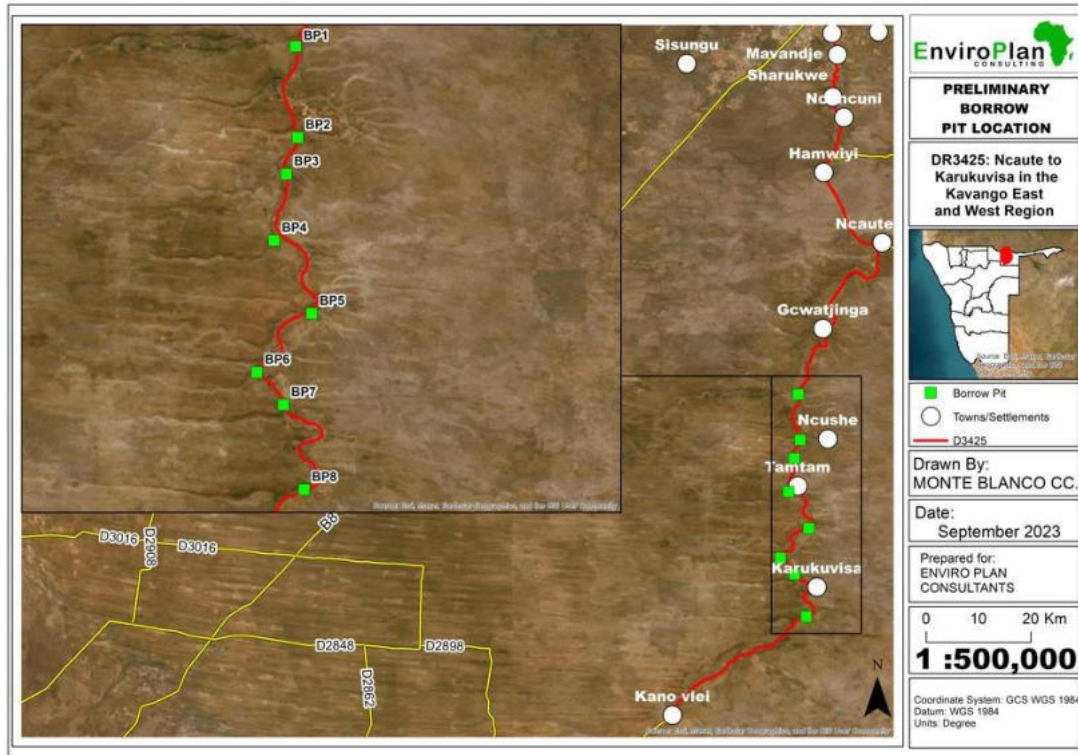
As part of the design study, the consulting engineering team undertook soil investigations and tests along the road route to identify type and sources of construction materials necessary for the subsequent design and construction phases of the project. The materials investigations undertaken on this project involved centreline soil investigations on the existing pavement, borrow pits for fills / selected layers, borrow pits wearing course material, as well as the availability of sand for concrete works. The scope of this task involved the search and quantification of materials appropriate for the strategic assessment of the quantity of the availability of materials to undertake the project successfully.

### **2.4. Pavement and Materials: Borrow Pits**

The exploration of borrow pits to provide materials for the road construction was carried out at the positions determined during the desktop study phase. To minimize haul costs, borrow pits should ideally be spaced approximately 5km apart for selected sub-grade materials and 10km apart for sub-base and base materials as far as practicable. The materials investigation was conducted in accordance with the Roads Authority's Materials Manual.

The borrow pit field material investigations for the proposed road DR3425 were undertaken between the 8<sup>th</sup> and 13<sup>th</sup> of September 2023 as per the preliminary Materials Draft Report by Namibia Civil Engineering Laboratory (NCEL). This included test pit excavation, sampling and profiling of encountered material at pre-identified borrow pit (BP) sites. In total, eight (8) potential (preliminary) borrow pit sites were investigated at Chainage of km33, km43, km47, km54, km61.5, km68.5, km73 and km84. For the purpose of this Report, these borrow pits localities are also marked as BP1 (km33), BP2 (km43), BP3 (km47), BP4 (km54), BP5 (km61.5), BP6 (km68.5), BP7 (km73) and BP8 (km84) on the map in Figure 2 below.





**Figure 2: Localities of preliminary borrow pits for the upgrading of DR3425 (Ncaute-Karukuvisa)**

Some photos of the BPs' test pits (TPs) are provided under the following Figures (Figure 3 to Figure 10) as provided by NCEL (2023).



Photo 1: km33 – TP1



Photo 2: km33 – TP1 Material

**Figure 3: Borrow Pit (BP) 1 Locality (at Masivi Village: 18°37'03.1"S 19°41'38.7"E)**





Photo 9: km43 – TP1



Photo 10: km43 – TP2

**Figure 4: Borrow Pit (BP) 2 test pit photos (at Ncushe Village: 18°41'45.9"S 19°41'50.0"E)**



Photo 17: km47 – TP1



Photo 18: km47 – TP2

**Figure 5: Borrow Pit (BP) 3 test pit photos (at Kondja Village: 18°43'40.1"S 19°41'14.2"E)**



Photo 25: km54 – TP2



Photo 26: km54 – TP3

Figure 6: Borrow Pit (BP) 4 Test pit photos (at Tam-Tam Village: 18°47'06.8"S 19°40'37.8"E)



Photo 31: km61.5 – TP1



Photo 32: km61.5 – TP1 Material

Figure 7: Borrow Pit (BP) 5 test pit photos (at "Small" Karukuvisa Village: 18°50'51.5"S 19°42'44.3"E)



Photo 37: km68.5 – TP1



Photo 38: km68.5 – TP2

Figure 8: Borrow Pit (BP) 6 test pit photos (at Vamukora Farm: 18°53'57.0"S 19°39'48.5"E)



Photo 43: km73 – TP1 Material



Photo 44: km73 – TP2

Figure 9: Borrow Pit (BP) 7 test pit photos (at "Big" Karukuvisa Village: 18°55'36.8"S 19°41'16.6"E)





Photo 49: km84 – TP1



Photo 50: km84 – TP1 Material

**Figure 10: Borrow Pit (BP) 8 test pit photos (at Zadang Village: 18°59'59.2"S 19°42'28.3"E)**

Only BP sites with valid approved Environmental Clearance Certificates will be used for materials supply by the contractor.

The consent letters for the establishment and utilization of the borrow pits have will be obtained from the local leadership of the respective villages when the final BPs are determined by NCEL.

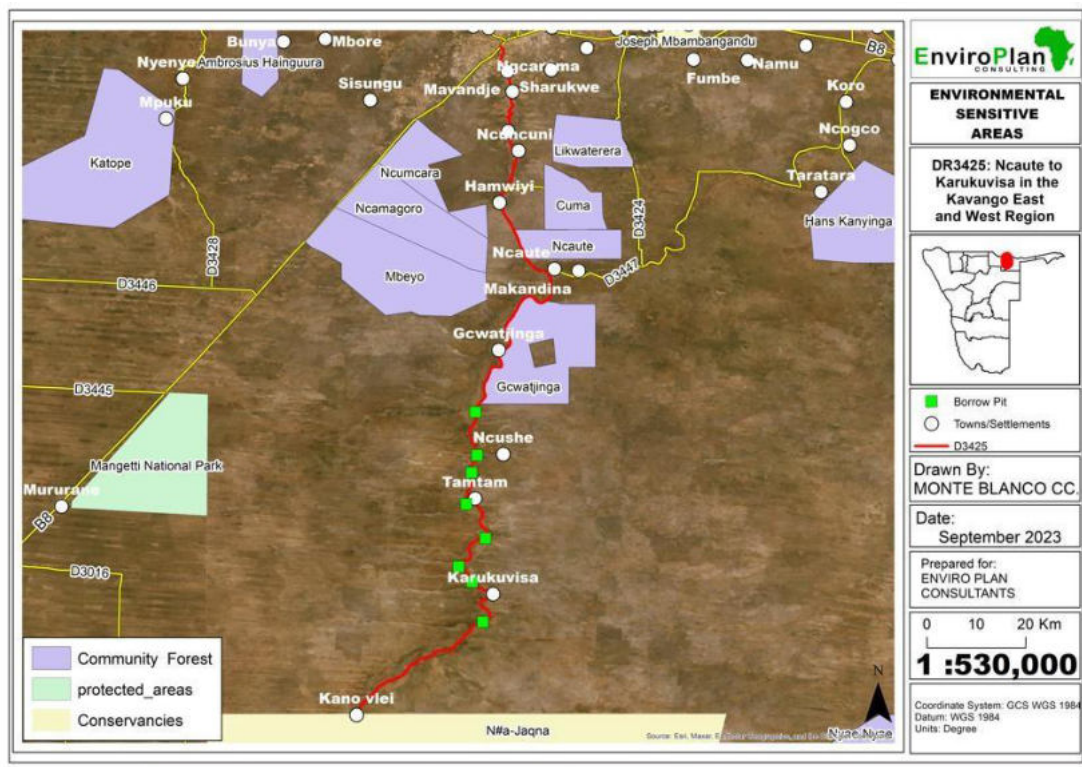
During the field visit on 25 May 2023, there were two active adjacent borrow pits observed along the DR3425 - Figure 11. These borrow pits are said to be associated with the existing road maintenance works for the DR3425 road where some sections are being maintained by adding a gravel layer.



**Figure 11: Active borrow pits for the maintenance of DR3425 sections**

**2.4.1. Environmentally sensitive areas identified**

The proposed road passes through areas that hosts sensitive area such as community forests or along these forests as shown on the map in Figure 12 below. The road does not cross any of the forests, therefore environmental sensitivity owing to road activities (borrow pits siting) in such areas is low.



**Figure 12: Environmentally sensitive areas encroached by the DR3425 route**

**2.4.2. Resources and Working Team**

Upgrade activities will be undertaken by a contractor appointed by the Roads Authority. It is anticipated that the workforce will be housed in temporary site camps throughout the road upgrade period.

**2.4.3. Infrastructure and Services**

Water will be required for the proposed development. The water sources to be utilized are provided in the hydrogeological report appended with this document. The water source chosen would depend on the amount of water required during construction. The alternatives considered in terms of infrastructure and services during the assessment are discussed further in Section 3.

### 3. CHAPTER THREE: PROJECT ALTERNATIVES CONSIDERED

Alternatives are defined as: “different means of meeting the general purpose and requirements of the activity” (Environmental Management Act (2007) of Namibia and its regulations (2012)). This chapter will highlight the different ways in which the project can be undertaken and identify the alternative that will be the most practical but least damaging to the environment.

#### 3.1. No-Go Alternative

The “No-Go” alternative is the option of not proceeding with the activity, which typically implies a continuation of the status quo. This would mean that the proposed road upgrade will not commence. Should the proposed project be discontinued, none of the potential impacts (positive and negative) identified would occur. Therefore, the road condition will remain unchanged and would not be improved.

In considering the proposed project, the ‘no-go’ option cannot be the preferred alternative.

#### 3.2. Design alternatives

The detailed design for the proposed road upgrade to LVS standard will take into consideration all raised environmental, social and technical options in designing the proposed road. However, due to this project being upgrading an existing road, with activities taking place within an existing road reserve, it is unlikely that design alternatives will significantly change potential impact significance.

#### 3.3. Resources alternatives

In terms of the resources that may be required for the proposed upgrade works, their alternatives are presented in Table 4 below.

**Table 4: Alternatives considered in terms of services infrastructure**

Services	Proposed source	Alternative source
<b>Water</b>	-Water from existing community boreholes -Water to be sourced from boreholes to be drilled for the project activities.	Borehole water from project drilled boreholes is the best option. This is to avoid interrupting community water supplies.
<b>Power supply for construction</b>	Electric drives and generators -Power grid and solar	-Electric drives and generators

Services	Proposed source	Alternative source
<b>Power for cooking</b>	Gas stoves	Firewood
<b>Worker's accommodation</b>	-Campsite at the project site -commuting from the nearest town or settlement	Accommodation will be in the nearest town or settlement (Rundu/Ncaute) (depending on where along the road the upgrade is taking place) and campsite will be established when the travelling distance is over 10km to the working road site.
<b>Materials</b>	-Borrow pits along the road -Hauling from outside the project area	Borrow pits along the road to save time and cost on hauling from outside the project site/area
<b>Waste Management</b>		
<b>Sewage</b>	-Portable toilets with septic tanks -Ventilated improved pit (VIP) latrine.	Portable toilets – these are easily transportable and have no direct impact on the environment or ecology (if waste is properly disposed of).
<b>Domestic waste</b>	-Onsite waste bins, regularly emptied at the nearest solid waste management facility -Creating a solid waste site along the road	Transporting the waste to the nearest town solid waste management site, once onsite containers reach capacity.
<b>Hazardous waste (chemicals)</b>	Waste generated is to be transported to and disposed of at an appropriate facility in the nearest town equipped for the disposal of hazardous waste.	None

### 3.4. Conclusions on the Considered Alternatives

The alternatives considered for the project are summarized as follow:

- No-go vs. continuation of the proposed project: The no-go alternative is not considered to be the preferred option. Should the proposed project be discontinued, none of the potential

impacts (positive and negative) identified would occur. Therefore, the road condition will remain unchanged and would not be improved.

- **Project design:** The detailed design for the proposed road upgrade is currently being undertaken. This ESIA study will inform the design report as far as environmental and social compliance is concerned. It is unlikely that design alternatives will significantly change potential impact significance.
- **Resources:**
  - **Water-**Water for the proposed activity is to be sourced from new boreholes to be drilled for the project along the road (at determined intervals of drilling).
  - **Energy-** Increased use of solar technologies is promoted within the project (especially to power water boreholes pumping equipment). Where it cannot be successfully employed the use of generators would be required.
  - **Materials-** It is proposed that approved borrow pits be utilized to source material for the proposed upgrade of the road. The borrow pits which are located in close proximity to the subject road are preferred to reduce hauling costs. Tests are ongoing to determine what material will be needed and is available. The materials to be used and where they will be sourced from will only be defined during the detailed design phase.
  - **Waste -** Domestic and hazardous waste is to be disposed of appropriately at the nearest approved solid waste management facility. Portable toilets are to be made available at the construction site and the contractor's camp and these are easily transportable and have no direct impact on the environment or area ecology (if waste is properly disposed of).

## **4. CHAPTER FOUR: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **4.1. Introduction**

A review of Namibian legislation, policies and guidelines applicable and relevant to the proposed development is given in this chapter. This review serves to inform the Proponent (Roads Authority), Interested and Affected Parties (I&APs) and the decision-makers at the DEA of the requirements and



expectations, as laid out in terms of these instruments, to be fulfilled in order to undertake the road upgrade activities.

- The Constitution of the Republic of Namibia (1990)
- Environmental Assessment Policy of Namibia 1994
- Environmental Management Act No. 7 of 2007, and EIA Regulations GN 57/2007 (GG 3812)
- Communal Land Reform Act 5 of 2002
- Traditional Authority Act No. 25 of 2000
- Roads Authority Environmental Manual (October 2014)
- The Regional Councils Act No. 22 of 1992
- Local Authorities Act No. 23 of 1992,
- Road Traffic Ordinance 30 of 1967, and Roads Ordinance No 17 of 1972
- Roads Authority Act No 17 of 1999
- National Road Safety Act No 9 of 1972
- The Water Act 54 of 1956, and Water Resources Management Act No. 11 of 2013
- Atmospheric Pollution Prevention Ordinance 11 of 1976
- National Solid Waste Management Strategy
- Soil Conservation Act 76 of 1969, and Forest Act 12 of 2001
- Nature Conservation Ordinance (1996)
- Labour Act 11 of 2007.
- Health and Safety Regulations GN 156/1997 (GG 1617)
- Public Health Act 36 of 1919, and Public and Environmental Health Act 1 of 2015.
- National Heritage Act 27 of 2004

These above-listed legislations and policies and their inclusion in the proposed project assessment are further presented in Table 5 below.

**Table 5: Policies, legal and administrative regulations governing the proposed road upgrading works**

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
The Constitution of the Republic of Namibia (1990)	<p>The articles 91(c) and 95 (i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalising policies to accomplish the Sustainable objectives which include:</p> <ul style="list-style-type: none"> <li>• Guarding against overutilization of biological natural resources,</li> <li>• Limiting over-exploitation of non-renewable resources,</li> <li>• Ensuring ecosystem functionality,</li> <li>• Maintain biological diversity.</li> </ul>	The Proponent should ensure compliance with the conditions set in the Act.
Environmental Assessment Policy of Namibia 1994	<p>The Environmental Assessment Policy of Namibia states Schedule 1: Screening list of policies/ plans/ programmes/ projects subject to environment must be accompanied by environmental assessments. "The Proposed development activities" are on that list.</p>	This EIA outlines the environmental consequences of this project and considers this definition of Environment.
	<p>The policy provides a definition to the term "Environment" broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the</p>	This EIA outlines the environmental consequences of this project and considers this definition of Environment.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
	<p>inclusion of alternatives in all projects, policies, programmes and plans.</p>	
<p>Environmental Management Act No. 07 of 2007</p>	<p>Requires that activities with significant environmental impact are subject to an environmental assessment process (Section 27).</p> <p>Requires for adequate public participation during the environmental assessment process stakeholders to give their opinions about a project (Section 2(b-c)).</p> <p>According to Section 5(4) a person may not discard waste as defined in Section 5(1)(b) in any way other than at a disposal site declared by the</p> <p>Section 3 (2) (b) states that “community involvement in natural resources management and the sharing of benefits arising from the use of the resources, must be promoted and facilitated” is key.</p> <p>Section 3 (2) (e) states that “assessments must be undertaken for activities which may have a significant effect on the environment or the use of natural resources”.</p>	<p>The EMA and its regulations should inform and guide this EA process.</p>

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
<p>EIA Regulations GN 57/2007 (GG 3812)</p>	<p>Details requirements for public consultation within a given environmental assessment process (GN No 30 S21).</p> <p>Details the requirements for what should be included in an Environmental Scoping Report (GN No 30 S8) and an EIA report (GN No 30 S15).</p>	
<p>Traditional Authority Act (Act No. 25 of 2000):</p>	<p>The Act also stipulates that Traditional Authorities (TAs) should ensure that natural resources are used on a sustainable basis that conserves the ecosystem. The implications of this Act are that TAs must be fully involved in the planning of land use and development for their area. It is the responsibility of the TA's customary leadership, the Chiefs, to exercise control on behalf of the state and the residents in their designated area.</p>	<p>The project route is within the communal land under the local Traditional Authority. Therefore, they should be consulted for the land use consent and engagement should continue throughout the project cycle.</p>
<p>Communal Land Reform Act 5 of 2002</p>	<p>To provide for the allocation of rights in respect of communal land; to establish Communal Land Boards; to provide for the powers of Chiefs and Traditional Authorities and boards in relation to communal land; and to make provision for incidental matters</p>	<p>The Proponent should ensure that the proposed development complies with the regulations provided in the for-road reserve, furniture and borrow pits.</p>

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
Roads Authority Environmental Manual (October 2014)	The manual seeks to inform practitioners regarding the legal and contractual framework within which roads must be designed and built. It also seeks to provide guidance regarding the requirements of the Roads Authority in respect of environmental issues.	The EIA and resultant road upgrade design and activities should be conducted in line with the guidelines within the document.
The Regional Councils Act No. 22 of 1992	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 “to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.”	Kavango East and West Regional Councils were considered to be I&APs and were consulted during the Environmental Assessment (EA) process.
Local Authorities Act No. 23 of 1992		Rundu Town Council and Ncaute are affected and it was consulted.
Roads Ordinance No 17 of 1972	<p>The Ordinance consolidates the laws relating to roads.</p> <ul style="list-style-type: none"> <li>▪ Section 3.1 deals with width of proclaimed roads and road reserve boundaries.</li> <li>▪ Section 27.1 is concerned with the control of traffic on urban trunk and main roads.</li> </ul>	The proposed road upgrade must adhere to all applicable provisions in the Roads Ordinance.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
	<ul style="list-style-type: none"> <li>▪ Section 36.1 regulates rails, tracks, bridges, wires, cables, subways or culverts across or under proclaimed roads.</li> <li>▪ Section 37.1 deals with infringements and obstructions on and interference with proclaimed roads.</li> </ul>	
Road Traffic Ordinance 30 of 1967	The Ordinance governs road traffic comprehensively.	The project should consider the impact it will have on road traffic in the subject area.
Roads Authority Act No 17 of 1999	The Act establishes a Roads Authority to manage the national road network of Namibia.	The Roads Authority is the proponent for the development.
National Road Safety Act No 9 of 1972	The Act establishes the National Road Safety Council and includes provisions intended to promote road safety.	The project should consider the impact it will have on road safety in the subject area.
The Water Act 54 of 1956	The Act was formulated to consolidate and amend the laws relating to the control, conservation and use of water for domestic, agricultural, urban and industrial purposes; to make provision for the control, in certain respects, of the use of sea water for certain purposes; for the control of certain activities on or in water in certain areas.	The pollution of water resources must be avoided during construction and operation of the development.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
<p>The Water Resources Management Act No. 11 of 2013</p>	<p>Equitable improvement of water and sanitation services should be achieved by the combined efforts of the government and the beneficiaries, based on community involvement and participation, the acceptance of a mutual responsibility and by outsourcing services where necessary and appropriate, under the control and supervision of government.</p>	<p>Should water need to be abstracted, a water abstraction permit will be required from the Ministry of Water, Agriculture and Land Reform (MAWLR).</p>
<p>Atmospheric Pollution Prevention Ordinance 11 of 1976</p>	<p>The law act to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto. The law regulates and prohibit pollution from industries particularly smoke and dust from various activities.</p>	<p>The development should consider the provisions outlined in the act. The Proponent should apply for an Air Emissions permit from the Ministry of Health and Social Services (if needed).</p>
<p>National Solid Waste Management Strategy</p>	<p>The Strategy ensures that the future directions, regulations, funding and action plans to improve solid waste management are properly co-ordinated and consistent with national policy, and to facilitate co-operation between stakeholders</p> <p>The Strategy listed priorities for the strategy to address for effective solid waste management, the priorities given below are the most relevant to the WSSP:</p>	<p>The road upgrade can potentially generate significant amount of solid waste (stockpiles, soil remains, cattle manure) that might need proper management by contractors to avoid pollution. Waste management plans should be generated and implemented prior the commencement of civil works and during road operations.</p>

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
	<ul style="list-style-type: none"> <li>Waste disposal is the main problem with the current solid waste management in Namibia. The top priority is to reduce risks to the environment and public health from current waste disposal sites and illegal dumping in many areas of Namibia.</li> </ul>	<p>Contractors for the construction of the road should reduce the risk of solid waste to the environment and surroundings of the project area.</p>
<p>Soil Conservation Act 76 of 1969</p>	<p>The Act established to consolidate and amend the law relating to the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources in the Republic of Namibia.</p>	<p>The proposed activity should ensure that soil erosion and soil pollution is avoided during construction and operation.</p>
<p>Forest Act 12 of 2001</p>	<p>Section 10 (1) set out the aim of the forest management as to:</p> <p>The purpose for which forest resources are managed and developed, including the planting of trees where necessary in Namibia is to conserve soil and water resources, maintain biological diversity and to use forest produce in a way which is compatible with the forest's primary role as the protector and enhancer of the natural environment.</p>	<p>Protected tree and plant species as per the Forest Act No 12 of 2001 and Forest Regulations of 2015 may not be removed without a permit from the Directorate of Forestry at MEFT.</p>



LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
	<p>(a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or</p> <p>(b) any living tree, bush or shrub growing within 100 metres of a river, stream or watercourse.</p>	<p>The construction will not result in the removal of living trees, bushes and shrubs growing within 100m of a river, stream or watercourse. If need arise, necessary measures should be implemented.</p>
	<p>(2) A person who wishes to obtain a licence to cut and remove the vegetation referred to in subsection (1) shall, in the prescribed form and manner, apply for the licence to a licensing officer who has been designated or appointed for the area where the protected area is situated.</p>	<p>The removal of trees in the above instances would require the contractors or sub-contractors to acquire necessary permits first.</p>
	<p>The Strategy proposed strategies that aim to:</p> <ul style="list-style-type: none"> <li>- Strategic Aim 1: Further improve the overall climate change understanding and related policy responses in water resources sector.</li> <li>- Strategic Aim 2: Monitoring and data collecting technologies of surface and underground water are developed and implemented at basin/watershed level.</li> </ul>	<p>RA should invest capital on strengthening the understanding of climate change and its related policies through various training of the officers responsible for the project.</p>

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
Nature Conservation Ordinance (1996)	This ordinance relates to the conservation of nature; the establishment of game, parks and nature reserves; the control of problem animals; and highlights matters incidental thereto.	The activities of the project are highly localized therefore, there is no potential to interfere with parks, games, and nature reserves. However, there is need for proper designing and planning of the drainage and water network of the project to make sure that the infrastructure will not interfere with facilities listed in the Nature Conservation Ordinance.
Labour Act 11 of 2007.	Empowers the minister responsible for labour to publish regulations pertaining to health and safety of labourers (S135). Details requirements regarding minimum wage and working conditions (S39-47).	The construction and operation activities will invite significant amount of laborious work. Therefore, there is need to make sure that the workers participate are protected and that they are from the local's especially unskilled labour.
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers to be involved in the construction and operation of the road.	Contractors involved in the construction of the road and its associated infrastructures should complying with this Act and its regulations

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
Public Health Act 36 of 1919	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The Proponent should ensure that relevant regulations set out under this Act are adhered to.
Public and Environmental Health Act 1 of 2015.	To provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters.	
National Heritage Act 27 of 2004	Section 48(1) states that “A person may apply to the (Heritage) Council for a permit to carry out works or activities in relation to a protected place or protected object”  Protects and conserves cultural heritage and cultural resources with special emphasis on places and sources of National heritage including graves, artefacts and any objects older than 50 years.	The project constructions are localized, however, if heritage resources (e.g. human remains, artefacts, etc.) discovered during constructions, it would require RA to have a permit from the National Heritage Council of Namibia for removal and relocation.

## 5. CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL BASELINE

### 5.1. Introduction

The proposed project will be undertaken in a specific biophysical and social environment. The baseline conditions of these environmental features are described in the following subchapters. The baseline conditions are described for the subject area, which is the area/regions through which the project road traverses. The subject road is located within the Kavango East and West Regions.

### 5.2. Socio-economic profile

#### 5.2.1. Population

According to Namibia Statistics Agency (NSA) (2014), the Kavango Regions (as one Region at the time) had a population of 223,352. The population for Mashare Constituency through which the DR3425 mainly runs through had a population of 3,187 (1,730 females and 1,457 males).

The labour force was 61% (employed) and unemployed accounted for 39%. The main source of income in the Constituency by 2011 was farming (4%), wages & salaries (18%), cash remittance (22%), non-farming business (9%) and pension (36%).

#### 5.2.2. Education

The literacy rate (15+ years) in the Mashare Constituency is 95%. In terms of education (15%+ years), 8% of the population never attended school, 20% were at school and 71% had left school (NSA, 2014).

#### 5.2.3. Land Use

The project area where the DR3425 route crosses is dominated by agricultural activities. The observed economic activities as summarized below:

- Mini and medium-size markets and small businesses in Ncaute,
- Subsistence farming (livestock comprising cattle, horse, donkeys, and goats),
- Private or commercial farms and ranches as observed from the road or through signage along the road are; Dimi Ranch Farm Patience, Farm Uguva Cattle Ranch, Farm Mpezo No. 1385, Wanehepo Paradise (with a cattle marking),
- Agricultural centre points such as an animal vaccination and livestock loading point near Karukuvisa,
- Small businesses such as cuca shops, wood/fire wood selling along the road in some areas between Ncaute and Karukuvisa, and

- Maria Kambindo Community Business centre.

#### **5.2.4. Agricultural Sector**

Agriculture is the most important sector of the economy in the two Kavango Regions, as it provides for the livelihood of more than 80% of the population. Nationally, the agriculture sector contributes about 8% of the overall economic activity.

The DR3425 road is bordered by numerous agricultural fields and homesteads. The project area is used for small-scale farming on a communal (subsistence) and commercial basis. The land is essentially owned by the government, controlled by traditional authorities and regional government, and used by individual farmers. The two Regions' agricultural sector is traditionally based on two main activities: agriculture and livestock farming.

The development of an extensive rural road network is a prerequisite for growth in the agricultural sector. Roads reduce input costs, enhance productivity and promote commercialization by providing access to commercial markets.

#### **5.2.5. Mining**

There are no known commercial mining activities in the project area, however there are active mineral prospecting licenses in the area.

### **5.3. Infrastructure Development**

#### **5.3.1. Air Transport**

There is an airport in Rundu connecting between Windhoek and the town. The road access to the airport is in an acceptable condition from major urban centres such as Rundu, Divundu and Nkurenkuru as the main urban areas in the Regions. The improved road will provide improved accessibility to the residents in the project area to these infrastructure for general air travel and possible emergencies.

#### **5.3.2. Rail Transport**

Rail transport is a general indicator of national economic development and has some relevant reference even on this project. A substantial amount of bulk goods and products (such as cement, road building materials (crushed base course)) are transported this way between regions that are indirect and direct inputs into initiatives that further drive national, regional and local development. Goods such as construction materials are transported via rail.

Around 2019, there has been discussions and plans to construct the Grootfontein-Rundu-Katima Mulilo railway. However, the railway line remains in limbo, despite a feasibility study conducted several years ago. The study concluded that the construction of the railway line would be economically feasible. The railway would connect three countries from the ore-rich province of Katanga in the DRC, down to Lumwana mines in Zambia, with links to Solwezi, Kasempa, Kataba and Kaoma mines, down to Mulobezi sawmills and Sesheke, into Namibia via Katima Mulilo to Grootfontein and to the Port of Walvis Bay<sup>1</sup>.

The Trans-Kalahari Corridor which stretches from the Port of Walvis Bay to Lubumbashi in the Democratic Republic of Congo through Zambia, is considered very important by the three countries, and it is argued that the construction of the railway line would be economically feasible as it could attract one million tons of cargo per annum - mostly composed of copper, agricultural products, timber, mining equipment and other equipment by various industries along the route.

It is also believed that it would lift a heavy load off Namibia's road networks as currently most of the consignments are transported with trucks, which many believe are highly contributing to road damages and accidents in the country.

The goods to be used in the project would have been delivered directly or indirectly via rail to the closest appropriate offload points and thereafter via road to the project. However, this development will serve other developments in the regions in the near future.

### **5.3.3. Water Supply**

The project area is supplied with water from boreholes drilled and developed by the Rural Water Supply Division under the Ministry of Agriculture, Water and Land Reform.

Most of the rural population within the project area have access to reliable safe and clean water supply. The supply of water is generally related to the development of other infrastructure and services such as schools and clinics and areas supplied with water are potential growth centres. Areas supplied with water should therefore be considered as areas where access by road should be considered, if not available. Future road development should therefore follow future extensions to the water supply network.

---

<sup>1</sup> Mushaukwa, A. (2019). Grootfontein-Rundu-Katima railway in limbo. <https://neweralive.na/posts/grootfontein-rundu-katima-railway-in-limbo>

According to the preliminary consultations with communities and water committees along the project route, the borehole supply good quality water and the supply is reliable (not interruptions experienced yet). Therefore, the supply will be sufficient (quantity and pressure) and suitable (quality) water available for the construction of the road within proximity of the alignment by drilling new boreholes for the construction activities to avoid water supply interruptions to the communities.

#### **5.3.4. Power Supply**

The supply of electricity is generally related to the development of other infrastructure and areas supplied with electricity are potential growth centres. The electrical infrastructure follows along the road with power lines crossing the alignment at multiple locations along its length.

The development and extension of power lines and networks are ongoing in the two Regions. The existing powerlines are directly applicable in that the provision of power and electricity along the road will be for the provision to the construction and engineer's camps.

#### **5.3.5. Telecommunications**

There are postal services in the Kavango Regions that necessitate the delivery of mail between Windhoek and the Regions which takes one to two days for courier services and approximately one week for standard postal services. Landlines and mobile telephone facilities, are available in these areas and these services are constantly being improved and extended. 4G LTE connectivity is available throughout most of the road route. Improved telecommunication services stimulate growth, which in return necessitates the upgrading and extension of the road network.

Good telecommunication services will facilitate communication during the construction and supervision phase.

#### **5.3.6. Education, Health and Safety & Security Services**

Based on the field assessment and data collection, the project route area has one secondary school (Ribebe Angelina Matumbo Secondary School in Ncaute), Ncaute Primary School, and Gcigco Junior Primary School, Frans Joseph Munango Primary School, and Karukuvisa Junior Primary School.

In terms of health centres, there is Ncaute Primary Health Centre (PHC) / Clinic, and Gcwatjingwa PHC. In terms of safety and security services, there is a Police Station in Ncaute.

#### **5.3.7. Road Construction and Maintenance**

The road is currently a sandy single-track and this affect the traffic movement between Rundu/Ncaute to Karukuvisa due to the thick sand. The motorists hardly use this road and it is mainly used by four wheel (4x4) vehicles compared to smaller vehicles such as sedans or non 4x4 drives.

This is hindering service delivery in the far areas in the Regions. Road construction and maintenance is ongoing in the region. The maintenance of DR3425 is managed under the Rundu District/ Area of the Rundu Maintenance Region.

#### **5.3.8. Future developments along the road**

There are no major future developments envisaged along the project corridor that would adversely affect the current proposed development according to consultation with the Regional Councils and by extension the constituencies and traditional authorities.

### **5.4. Climate & Topography**

#### **5.4.1. Climatic Conditions**

The climatic conditions of the project area (Ncaute) and Kavango Regions that houses the proposed road route (centre point of the project). Therefore, these conditions would apply to the entire area through which the DR3425 passes through.

The proposed project area falls under some parts of Kavango West and in Kavango East Regions that are characterized by a semi-arid to sub-humid climate. The Regions lie in the transition zone between the arid Namib Desert to the west and the more humid regions of northern Namibia. The climate is influenced by its proximity to the Okavango River and the presence of the Kalahari Desert to the east. The annual rainfall ranges from approximately 500mm to 600mm, with most of the precipitation occurring during the summer months (November to March). The Regions experiences distinct wet and dry seasons, with high temperatures during the summer and cooler temperatures in the winter.

The climatic condition for the project area, mainly based on the climatic information for Ncaute is presented in Table 6 below:

**Table 6: Climatic conditions around the entire project site area**

<b>Climatic feature</b>	<b>Description</b>
Climate classification	Semi-arid area
Average rainfall	Rains fall almost entirely in summer, with the months from May to September usually being dry, and the first early rains coming to the region in October and November. Highest rainfalls usually occur in January and

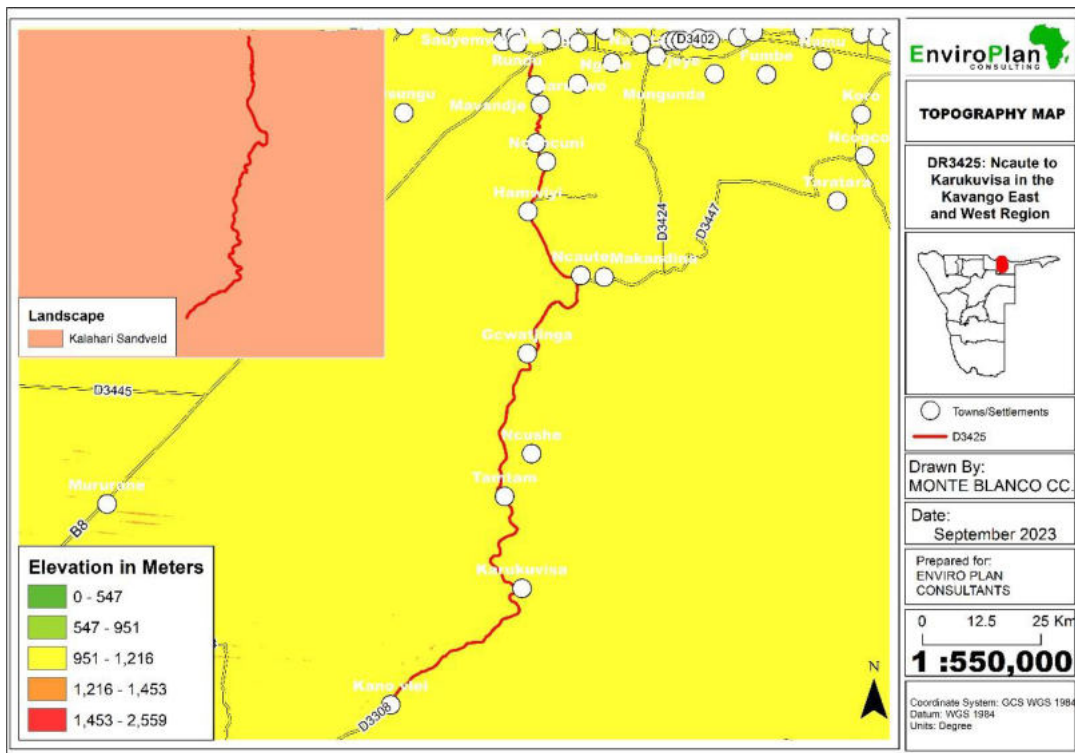


Climatic feature	Description
	February.
Average evaporation	Average between 2,800 and 3,000mm annually
Temperatures	The Kavango Regions is usually warm to hot with average maximum temperatures above 30°C for nine months of the year, and average minimums are below 10 °C during the coolest months June, July and August. Temperatures below freezing are occasionally recorded but are rare and are usually only experienced in low-lying valleys such as found along the Kavango River and drainage lines. The Ncaute areas has maximum and low temperatures of 38°C (around October) and 10°C (in July) (World Weather Online, 2023)
Wind direction	The wind direction in the project area is predominantly blowing from Southwest (SW) to Northeast (NE).

#### 5.4.2. *Landscape and Topography*

The project route runs along the Omuramba-Omatako River and is characterized by a mix of flat plains, gently undulating hills, and river valleys. The project area is situated within the Kavango-Zambezi Trans frontier Conservation Area (KAZA) which is an area that has been demarcated for the free movement of migratory wildlife.

The landscape of the project area is characterized by the Kalahari sediments, hence Kalahari Sandveld - Figure 13. This landscape is found in much of the northern and eastern Namibia dominated by Savanna woodlands growing on sands deposited by wind over the last 70-63 million years ago. The landscape is particularly flat, although the sands have been molded into dunes in some areas. Altitudes are highest in the central and western areas, from where the whole landscape slopes gently down to lower ground in the east and south (Mendelsohn et al, 2002). The elevation of the project route ranges between 951 and 1,216 meters above sea level as shown on the map under Figure 13.



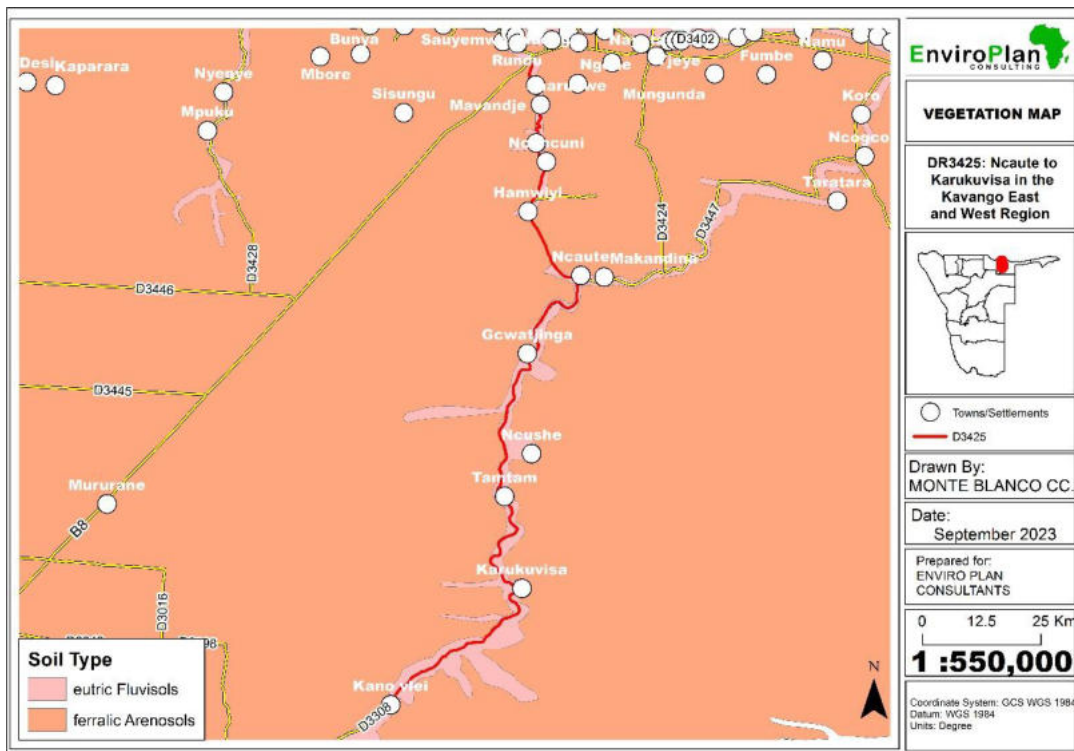
**Figure 13: The landscape and topography of the project area**

## 5.5. The Soils, Geology and Water Resources

### 5.5.1. Soils

The site route area and surroundings are covered by the Kalahari sands comprising sand, clayey and loamy soils. At some sections in proximity of the road, the soils are highly influenced by the land use including the secondary sediments such as gravel that were brought to the area for the construction of the gravel road (DR3425).

The dominant soils along the road route are eutric fluvisols as indicated on the soil map in Figure 14. Eutric soils are fertile with high base saturation, and the second name component (fluvisols) means that these soils are found along the margins and valleys of larger river courses in eastern Namibia. Some are flooded regularly, especially these in and around the Zambezi Rivers and eastern Caprivi Floodplain, while others along the dry omurambas probably last saw flood water hundreds of years ago. Furthermore, some fluvisols provide nutrient rich soils for crop cultivation, a quality exploited by many farmers in Zambezi and Kavango areas (Mendelsohn et al., 2002). The soils on and around the project site area are ferralic arenosols, and according to Mendelsohn et al (2002), ferralic are defined as soils with high contents of combined oxides of iron and aluminium. Arenosols are formed from wind-blown sand and usually extend to a depth of at least one meter, with sand generally making up more than 70% of the soil.

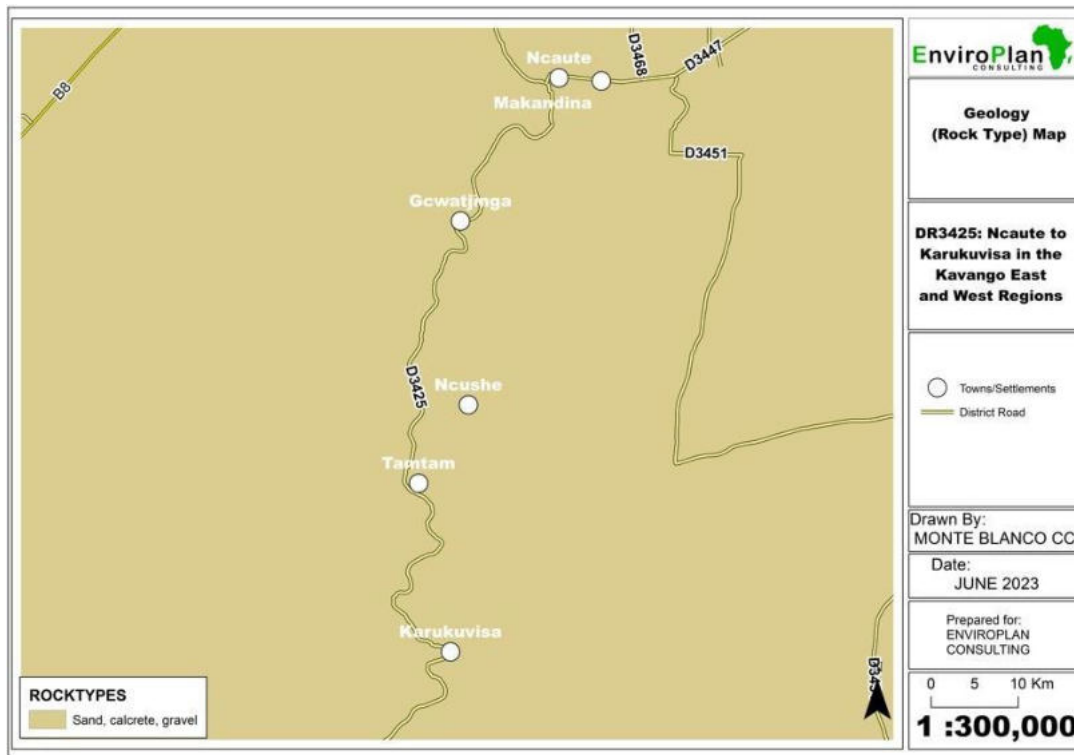


**Figure 14: The soil type along the project route and immediate surroundings**

**5.5.2. Geology**

The Okavango Basin is part of the greater Kalahari Basin, which covers most of the northern and eastern parts of Namibia and extends across the Namibian border into Botswana and Angola. The bedrock underlying the basin filled with Kalahari Sequence deposits consisting of basal rocks of the Damara Sequence, followed by the Karoo Sequence sediments, overlain and intruded by volcanics of Karoo age. The unconsolidated to semi- consolidated clay, sand and gravel of the Kalahari Sequence fill the Okavango Sub-basin, which thickens from the northeast towards the northwest, from 0 to >400 m along the north-west trending basin axis (Bittner, 2002).

The geology of the project area is characterized by the Kalahari sands (Mendelsohn et al., 2002). Based on the site specific geology map in Figure 15 below, the project site is underlain by the sand, calcrete and gravel of the Kalahari Group.



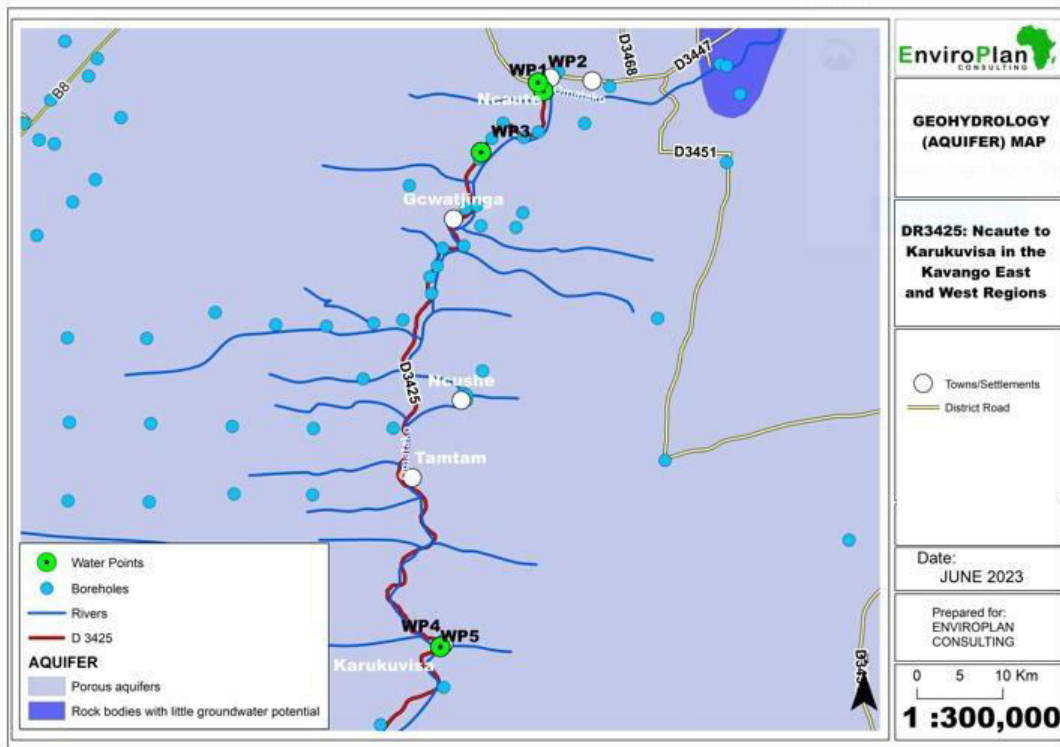
**Figure 15: The geology of the project route and immediate surroundings**

**5.5.3. Hydrology (Surface Water)**

The aquifers in the Kavango Regions area can be sub-divided into two main groups, namely the primary (porous) aquifers and secondary (fractured) aquifers. The primary aquifers consist mainly of argillaceous and arenitic unconsolidated to semi-consolidated sediments of the Kalahari Sequence, that occur throughout the two Kavango Regions. The secondary aquifers comprise fractured and weathered pre-Kalahari bedrock. The secondary aquifers are only important in areas where the Kalahari sediments are absent or thinly developed such as in the north-eastern and south-eastern parts of the Kavango Regions.

The Kalahari Sequence sediments constitute the most important aquifers in the region and the vast majority of boreholes drilled for rural and bulk water supply intersect the Kalahari aquifers. Boreholes drilled in close proximity to the Kavango River, intersecting paleo-channels, are often high yielding and most of the bulk water schemes are developed along the River.

Groundwater in the project site area is hosted in the porous Kalahari sediments (primary aquifers) as shown on the site-specific geohydrology map is shown in Figure 16. The hydrogeological Report of the DR3425 is appended hereto as Appendix C.



**Figure 16: Geohydrological Map of the project area**

The road has a number of boreholes water points due to the fact that most of the road runs along the Omuramba-Omatoko which serves as source of water for the local communities (and acting as a recharge source for aquifers/groundwater sources), livestock, and as a linear oasis for the flora along the river. The proposed project area boasts a rich and diverse array of flora and fauna, owing to its unique combination of habitats, including floodplains, woodlands, grasslands, and riverine ecosystems.

## 5.6. Ecological Environment

According to Mendelsohn et al (2002, the area forms part of the North-eastern Kalahari Woodland biome dominated by broadleaved woodlands, which if further characterized by woodlands and shrubland-woodland mosaic vegetation structure.

The proposed project area boasts a rich and diverse array of flora and fauna, thanks to its unique combination of habitats, including floodplains, woodlands, grasslands, and riverine ecosystems.

### 5.6.1. Fauna

The proposed project area is renowned for its rich wildlife and is home to a wide range of mammal, bird, reptile, and amphibian species. Large herbivores such as elephants, buffalos, giraffes, and various antelope species, including impalas, kudus, and red lechwes, can be found roaming the

grasslands and woodlands. Predators such as lions, leopards, cheetahs, and hyenas also inhabit the Regions. However during the assessment, no wildlife was observed except the black backed jackal. In terms of domestic animals, the communities farm with small (goats and sheep) and large livestock (cattle, horses and donkeys). Some of these animals such as goats, cattle, and donkeys were seen on the project route during the site visit mostly along the Omaruru River side of the road and near the road, and water supply (watering) points on the 25<sup>th</sup> of May 2023 - Figure 17.

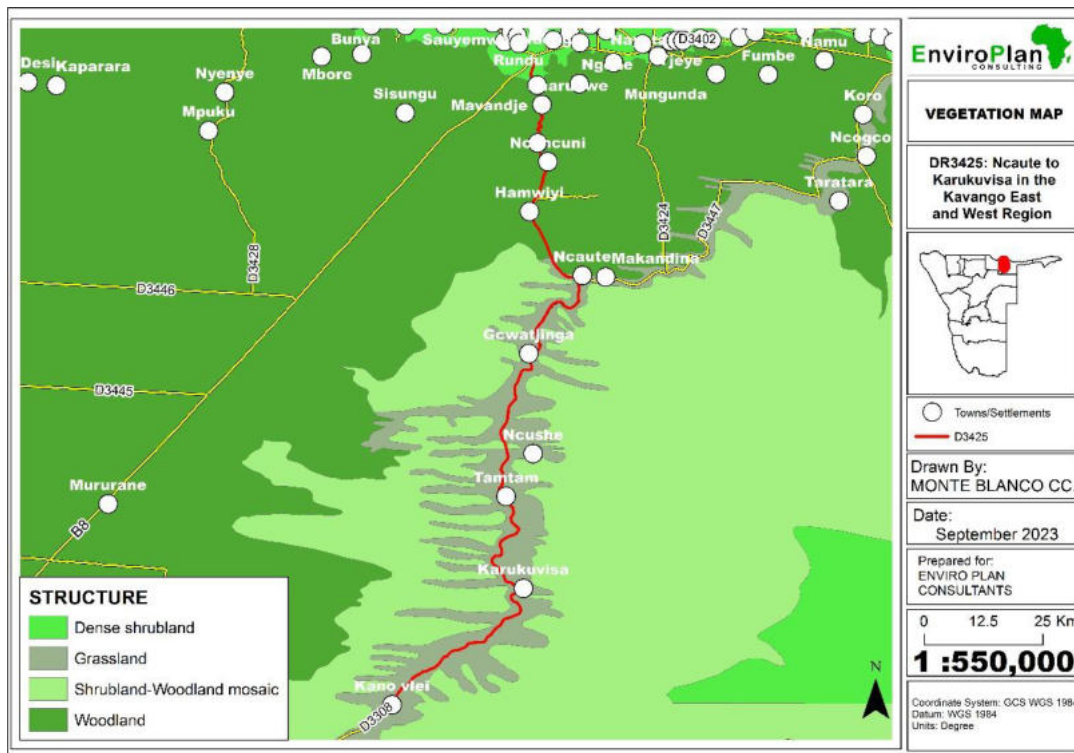


**Figure 17: Some goats, donkeys, horses and cattle observed along the project route**

### 5.6.2. *Flora*

The project route are is characterized by grassland shrubland-woodland mosaic vegetation structure as shown on the vegetation structure map in Figure 18.





**Figure 18: The vegetation structure map along the project route**

The vegetation along the proposed road path supports the communities by providing them with food and harvesting of wood as a fuel and for wood carving as some parts of the road runs along and through some community forests.

Along the route/existing path for the road construction, most of the area is dominated by *Vachellia* species, such as the Camelthorn (*Vachellia erioloba*), candle pod (*Vachellia hebeclada*) and buffalo thorn (*Ziziphus mucronata*) etc. The path also hosts timber tree species such as Kalahari apple-leaf (*Philenoptera nelsii*), Zambezi teak (*Baikiaea plurijuga*) and False mopane (*Guibortia coloesperma*) which are protected species which are used for construction of fencing poles, huts, and woodcarving etc. Furthermore the area has various shrubs and herbaceous species which provide fruits that are consumed by the community as well as livestock and any present wildlife. These trees provide shade, food, and nesting sites for a variety of bird species. In the grassland areas, a variety of grass species were identified, including red grass (*Themeda triandra*), finger grass (*Digitaria spp.*), and love grass (*Eragrostis spp.*). These grasses provide grazing resources for herbivores more specifically livestock.

The common plan (vegetation) species observed and noted along the DR3425 route and protected by the Forest Act 12 of 2001 are provided in Table 7.

**Table 7: The list of common plant (and protected) species occurring along the DR3425 route**

Scientific Name	Common Name
<i>Baikiaea plurijuga</i>	Zambezi Teak
<i>Burkea africana</i>	Burkea
<i>Combretum Imberbe</i>	Leadwood
<i>Guibourtia Coloesperma</i>	False Mopane
<i>Peltophorum africanum</i>	African Wattle
<i>Philenoptera nelsii</i>	Kalahari Apple-leaf
<i>Pterocarpus angolensis</i>	Kiaat
<i>Schinziophyton rautanenii</i>	Manketti
<i>Ziziphus mucronata</i>	Buffalo thorn

Photos of some of these vegetation and other observed along the project route are shown in Figure 19 below.



**Figure 19: Some of the vegetation observed along the DR3425 route**

Some of the vegetation in the project area is of high value to the population and as part of the ecology and must be conserved at all costs. Therefore, sustainable and fair compensation as well as replacement options for lost fruit trees and other vegetation must be considered.



## 6. CHAPTER SIX: PUBLIC CONSULTATION

### 6.1. Overview

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

Public consultation forms an important component of an Environmental Assessment (EA) process. Public consultation provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process. Public consultation has been done in accordance with both the EMA and its EIA Regulations.

The public consultation process assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and the extent to which further investigations are required. Public consultation can also aid in the process of identifying possible mitigation measures.

### 6.2. Approach

#### 6.2.1. *Interested and Affected Parties (I&APs)*

An I&P is defined under the Environmental Management Act (2007) as:

- “Any person, group of persons or organization interested in or affected by an activity; and
- (b) Any organ of state that may have jurisdiction over any aspect of the activity”.

EnviroPlan identified specific I&APs, whom were considered interested in and/or affected by the proposed activities through the following means:

- Information for the applicable local authorities was obtained from the existing GCS stakeholder database;
- Notification letters and/or emails were sent to those possibly interested and affected by the proposed project; and
- Notices were placed in the local newspapers requesting any potentially affected or interested members of the public to register as I&APs.

A summary of the I&APs identified is presented in Table 9.

**Table 8: Summary of Identified Key I&APs**

List of I&APs	Description
	Roads Authority of Namibia
	Ministry of Agriculture, Water and Land Reform (MAWLR): Directorate of Water Supply and Sanitation Coordination
	Ministry of Environment, Forestry and Tourism
	Kavango East and West Regional Councils
	Ncuncuni and Mashare Constituencies
	Rundu Town Council
	Ncaute Settlement
	Local community members and Traditional Authorities

### 6.2.2. Communication with I&APs

Regulation 21 of the EIA Regulations details steps to be taken during a given public consultation process and these have been used in guiding this process. Communication with I&APs regarding the proposed development was facilitated through the following means and in this order:

Meetings were held with the relevant authorities as presented in Table 9 below (also refer to Appendix D):

**Table 9: Consultative engagement conducted**

Date and Time	Activity	Venue/Place
24.05.2023, 09h30	Inception Consultative Meeting	Nkurenkuru Plaza, Kavango West, Nkurenkuru
24.05.2023, 14h30	Inception Consultative Meeting	Kavango East Regional Council Chamber, Kavango East, Rundu
04.07.2023, 10h30	Consultative Meeting	Karukuvisa Gathering Tree, Karukuvisa Settlement
04.07.2023, 14h00	Consultative Meeting	Ncushe Meeting Tree, Ncushe Settlement
05.07.2023, 10h30	Consultative Meeting	Gcwatjinga Headman's Premises Gathering Tree , Gcwatjinga
05.07.2023, 14h00	Consultative Meeting	Old Community Forest Office, Ncaute Settlement

- A Background Information Document (BID) containing descriptive information about the proposed activities was compiled and sent out to all identified and registered I&APs;

- Site notices were fixed at conspicuous locations in Rundu, Ncaute and Karukuvisa; and
- Radio announcements were also made in English, Rukwangali and Rugciriku languages for easy information dissemination. The information regarding the project and consultation meetings were shared with the respective constituency councilors (Mashare and Ncuncuni constituencies) for announcement on the Rukwangali radio. The radio announcements were made on Thursday, 29 June 2023 by Hon. Philipus Mavara of Mshare Constituency and Monday, 03 July 2023 by Hon. Leopoldine Nseu of Ncuncuni Constituency.

Public consultation was carried out according to the Environmental Management Act's EIA Regulations. After the initial notification, the I&APs were given three weeks to submit their comments on the project until January 28 2022. The comment period will remain open until the final scoping report is submitted to MEFT.

### 6.3. Printed Media

#### 6.3.1. Background Information Document

A Background Information Document (BID) - Appendix D1 was drafted at the onset of the EA process to act as a useful information handout about the proposed road upgrade project. In addition, the BID provided details on the public consultation process with contact details for further information. This document was advertised for availability through various means of newspaper articles, electronic mail; as well as distributed as hard copies in the consultation meetings.

#### 6.3.2. Newspaper Advertisements & Articles

Newspaper notices about the proposed project and related EA processes was circulated in two newspapers for two weeks. Notices were placed in the *Windhoek Observer* and *New Era* newspapers (Appendix D2), briefly explaining the activity and its locality, and inviting members of the public to register as I&APs. The modes of notification and consultation are presented in Table 10 below.

**Table 10: Modes of Public notification and engagement**

Newspaper	Area of Distribution	Language	Date placed
<i>New Era</i> (Appendix D2)	Country Wide	English	14 June & 21 June 2023
The Villager (Appendix D2)	Country Wide	English	14 June & 21 June 2023
Site notice (Appendix D3)	Rundu, Ncaute and Karukuvisa	English, Gciriku and Rukwangali	Between 21 June 2023 and 04 July 2023

Newspaper	Area of Distribution	Language	Date placed
Public Meeting Meeting minutes attached in Appendix D4	Local along the road	English and translations in Rukwangali	-25 May 203 (stakeholders) -04 July to 05 July 2023 (community/public)

**6.3.3. Building a Stakeholder Database**

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

**6.3.4. Stakeholder Meetings & Key Conversations**

Public consultation meetings were conducted with representations from the traditional authority, council representatives, regional council, residents, government and quasi-government departments and ministries. Meeting minutes were taken attached in Appendix D4 and pertinent issues relating to the projects were discussed and recorded. Some photos from the meeting proceedings are shown in Figure 20.







**Figure 20: Public Meeting Proceedings at; A - Karukuvisa Gathering Tree, Karukuvisa Settlement, B - Ncushe Meeting Tree, C - Ncushe Settlement Area/Tree, C - Gcwatjinga Headman’s Premises Gathering Tree and D - Old Community Forest Office, Ncaute Settlement**

**6.3.5. Comments and review period**

Various stakeholders have registered and provided comments from the onset of the public consultation process and the initial information sharing through the BID, newspaper and site notices.

The public commenting period from the First Newspaper advert spanned for 30 Man days and the Scoping Report and Environmental Management Plan was made available to the public and stakeholders for comment and review.

Attendance registers, comments and proof of stakeholder’s engagement are attached in Appendix D of this ESR. Key Issues raised during the consultative meeting are presented in Table 11 below:

**Table 11: Commenting themes raised during the consultative meetings**

Theme	Comment
Land Use	<ul style="list-style-type: none"> <li>▪ Fair compensation of properties affected by the road reserve and borrow pits.</li> <li>▪ The rehabilitation of borrow puts for both health and safety of the communities. Borrow pits that cannot be rehabilitate for post-use, should be fenced off.</li> </ul>

Theme	Comment
<b>Economic</b>	<ul style="list-style-type: none"> <li>▪ The need to improve the road for easy access to growth centres such as agricultural facilities (an abattoir in the area along the DR3425), schools and health centres (within the RA' 5km radius – for far centres, a request would be submitted by councillors).</li> <li>▪ Prioritizing rural roads of the Kavango Regions because of the Agricultural/farming activities and produce needs to be delivered to markets.</li> <li>▪ Empowerment of locals through fair compensations: there is an issue of most construction companies unfairly negotiate with local communities by paying less for construction materials sourced from community members' properties/land.</li> <li>▪ Empowerment of locals through job opportunities and local businesses small-medium enterprises (SMEs) to be considered for work and goods/services procuring, respectively.</li> <li>▪ The need to consider safely rehabilitating some borrow pits to be used as a rainwater harvesting infrastructure.</li> <li>▪ Construction contractors to site construction boreholes next to communities so that they can be used by the communities later.</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>▪ The need to identify protected and valuable tree species were mention to be important and compensation should be ensured.</li> <li>▪ Implementation of the ESMP was emphasized by the stakeholders.</li> </ul>
<b>Social (communication)</b>	<ul style="list-style-type: none"> <li>▪ The Project team/consultants to liaise with the Planning Department in the Regional Council as well as regional/constituency councillors. Make use of existing channels of communications in the Regions.</li> <li>▪ There should be someone to mediate between the communities (who speaks both English and local languages) to receive and understand grievances in the area.</li> <li>▪ Traditional Authority (TA) / Headmen/women to work together with the local development committee (LDC) to facilitate recruitment on the project.</li> <li>▪ All government projects such as roads should go through the Chief Regional Officers' (CRO) offices and not directly to traditional authorities/leaders.</li> <li>▪ Roads Authority (RA) needs to introduce the contractors to the communities through the regional councillors/constituency' offices.</li> <li>▪ Communication for siting borrow pits should be communicated through constituency councillors to inform communities of the arrival of materials engineer and contractors into the area.</li> <li>▪ Transparency in budgets and updates if there are unexpected financial challenges</li> <li>▪ Borrow pits should not be sited over known graves or cemeteries.</li> </ul>
<b>Health and safety</b>	<ul style="list-style-type: none"> <li>▪ The health and safety of workers is compromised. Workers on the current maintenance works are working without dust masks, gloves, and overalls (PPE).</li> </ul>

Theme	Comment
<b>Others from road project experience</b>	<ul style="list-style-type: none"> <li>▪ Access roads to schools and clinics were requested for upgrade.</li> <li>▪ Existing private water supply pipelines crossing the road will be identified and sleeves will be provided for.</li> </ul>
<b>Traffic-Safety and Existing Infrastructure</b>	<ul style="list-style-type: none"> <li>▪ Road signage will be installed as per road safety requirements.</li> <li>▪ Important crossings along the road are required and should be co-identified in consultation with local residents, i.e., rest places, schools, clinics, and churches.</li> </ul>

EnviroPlan concludes that the public participation was extensive and transparent enough to ensure any comments or issues regarding the proposed development were addressed and to suggest possible mitigation measures.

## 7. CHAPTER SEVEN: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

### 7.1. Overview

The proposed activities have impacts on certain biophysical and social features. The identified impacts were assessed in terms of probability (likelihood of occurring), scale/extent (spatial scale), magnitude (severity) and duration (temporal scale) as presented in Table 13, 14, 15 and 15. To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable.

It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact;
- Assessment of the pre- and post-mitigation significance of the impact; and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for

various features of the biophysical and social environment. The following criteria were applied in this impact assessment:

**7.1.1. Extent (spatial scale)**

Extent is an indication of the physical and spatial scale of the impact. Table 12 shows rating of impact in terms of the extent of spatial scale.

**Table 12: Extent or spatial impact rating**

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Impact is localised within the site boundary: Site only	Impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	Impact extend National or over international boundaries

**7.1.2. Duration**

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. Table 13 shows the rating of impact in terms of duration.

**Table 13: Duration of Impact**

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long- term	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

**7.1.3. Intensity, magnitude / severity**

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These were also



taken into consideration during the assessment of severity. Table 14 shows the rating of impact in terms of intensity, magnitude or severity.

**Table 14: Intensity, magnitude and severity of impact**

Type of Criteria	Negative				
	H-(10)	M/H (8)	M-(6)	M/L (4)	L-(2)
<b>Qualitative</b>	Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.

**7.1.4. Probability of occurrence**

Probability describes the likelihood of the impacts actually occurring. This determination is based on previous experience with similar projects and/or professional judgment. See Table 15 for impact rating in terms of probability of occurrence.

**Table 15: Probability of occurrence impact rating**

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
<p>Improbable; low likelihood; seldom.</p> <p>No known risk or vulnerability to natural or induced hazards.</p>	<p>Likely to occur from time to time.</p> <p>Low risk or vulnerability to natural or induced hazards</p>	<p>Possible, distinct possibility, frequent.</p> <p>Low to medium risk or vulnerability to natural or induced hazards.</p>	<p>Probable if mitigating measures are not implemented.</p> <p>Medium risk of vulnerability to natural or induced hazards.</p>	<p>Definite (regardless of preventative measures), highly likely, continuous.</p> <p>High risk or vulnerability to natural or induced hazards.</p>

**7.1.5. Significance**

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this chapter, for this assessment, the significance of the impact pre-and post-mitigation actions was measured.

Once the above factors (Table 13, Table 14, Table 15 and Table 16) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

$$SP = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$$

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate or low significance, based on the following significance rating scale (Table 16).

**Table 16: Significance rating scale**

SIGNIFICANCE	ENVIRONMENTAL SIGNIFICANCE POINTS	COLOUR CODE
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N

<b>SIGNIFICANCE</b>	<b>ENVIRONMENTAL SIGNIFICANCE POINTS</b>	<b>COLOUR CODE</b>
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	>-60	H

For an impact with a significance rating of high (negative), mitigation measures are recommended to reduce the impact to a low or medium significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation measures. To maintain a low or medium significance rating, monitoring is recommended for a period of time to enable the confirmation of the significance of the impact as low or medium and under control.

The impact assessment for the proposed activities is given below.

## **7.2. Planning and Design Phase Impact Assessment**

The planning and design phase is mostly concerned with the preparation of the site for the road upgrade activities, pertaining to administrative and legal aspects, i.e., construction tender documentation, recruitment of construction labour, consents and land use agreements, where necessary. Therefore, the main or key impacts for the proposed project are expected to occur during the construction phase. These key impacts are described and assessed below, while the management and mitigation measures are provided in the EMP/ESMP.

## **7.3. Construction Phase Impact Assessment**

The potential impacts associated with the construction phase of the upgrade of the subject road have been identified and assessed in this subchapter. The main potential impacts identified are: environmental degradation, soil disturbance, waste generation, soil and water resources contamination, dust and noise generation, archaeological and heritage resources impacts, disturbance to local community members and businesses, temporary employment creation, vehicular traffic as well as health and safety impacts.

### **7.3.1. Impact Assessment of Physical Land (Soil) Disturbance**

The earthworks (excavations), land clearing to enable siting of project structures and equipment as well as road works will potentially result in soil disturbance leaving the soils prone to erosion. The movement and parking of heavy vehicles and equipment onsite may lead to compaction of the soils. This will, however, be a short-term and localized impact.

Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 17.

**Table 17: Assessment of impacts on soils (physical disturbance)**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 1	L/M - 3	M - 4	M – 4	M - 32
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

### 7.3.2. Impact Assessment of Biodiversity Loss

A number of large indigenous trees are located along the side of the road, with some within the road reserve of the proposed road upgrade. Where necessary, some vegetation may need to be removed to allow for the road construction works. This may also lead to habitat destruction for some fauna. As such, care should be taken during the removal of vegetation for site preparation to ensure minimal disturbance in the area. The envisaged impact at the project site is thus not of such magnitude and/ or significance that it will have irreversible impacts on the biodiversity and endemism of the area and Namibia at large. The pre- mitigation impact is assessed to be “medium” in significance and after mitigation the impact is assessed to have a “low” significance. The assessment of this impact is presented in Table 18.

**Table 18: Assessment of the impacts on biodiversity loss**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

### 7.3.3. Impact Assessment of Environmental Degradation

During construction different types of waste may be generated on-site. This may include general waste as well as hazardous bitumen and hydrocarbons which may cause degradation of the subject environment if not correctly managed and contained. Furthermore, the presence of the workforce and machinery may enhance environmental destruction along the project route. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the

implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 19.

**Table 19: Assessment of impacts on environmental degradation**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 1	L/M - 3	M - 4	M – 4	M - 32
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

#### 7.3.4. Impact Assessment of Waste Generation

Construction activities usually generate waste which may lead to environmental pollution, if not properly handled. This may result in blocked waterways should waste be blown into water pathways; animals may choke on waste such as plastic bags or paper when ingested. Additionally, the windblown waste may pose a negative visual impact on the surrounding environment. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to a “low” rating. The assessment of this impact is presented in Table 20.

**Table 20: Assessment of Impacts on Waste generation**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 1	L/M - 3	M - 4	M – 4	M - 32
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

#### 7.3.5. Impact Assessment of Soils and Water Resources - Pollution

Improper handling, storage and disposal of wastewater (effluent), hydrocarbon products and hazardous materials at the site may lead to soil, surface and groundwater contamination, in case of spills and leakages, particularly during rainy months of the year when surface run off is inevitable to transport contaminants into surface water systems such as rivers. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 21.

**Table 21: Assessment of the impacts on soil, surface and groundwater - pollution**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 4	M - 6	M – 4	M - 52
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

#### 7.3.6. Impact Assessment of Water Resources Usage (Abstraction)

The abstraction of more water than it can be replenished from low groundwater potential areas would negatively affect people and animals in the area who rely on the same groundwater resource (aquifer). The impact of the project activities on the resources would be dependent on the water volumes required by each project activity. Commonly construction activities requires a lot of water. However, given the fact that the project area is underlain by good aquifers, the Proponent will drill new boreholes at strategic points along the road and store the water in standard water reservoirs/tanks onsite and refilled as required. The abstraction of water will also just only last for the duration of the construction activities and ceases upon completion.

Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 22.

**Table 22: Assessment of water abstraction for the project activities**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

### 7.3.7. Impact Assessment of Noise Generation

If not properly managed, construction activities and the presence of construction vehicles may lead to the generation of noise which could negatively impact local communities residing close to the road works, resulting in disturbing the surrounding communities. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 23.

**Table 23: Assessment of the impacts of noise generation**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 2	L/M - 2	M - 6	M – 3	M - 27
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

### 7.3.8. Impact Assessment of Archaeological and Heritage Resources

The proposed construction activities is not taking place in an area that has significant archaeological or heritage resources. However, there is a potential of inadvertently destruction of archaeological resources (graves, artefacts, etc.) in the subsurface during earthworks and site clearing for the road upgrading activities. To mitigate this impact, mitigation measures will be implemented to ensure

that these resources are not significantly disturbed or destroyed. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 24.

**Table 24: Assessment of the impacts on archaeological and heritage resources**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

**7.3.9. Impact Assessment of disturbance to local community members and 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 activity could be disturbed during upgrade activities. Should these community members or businesses be impacted upon during upgrade activities, mitigation measures will need to be in place for implementation to ensure that the impacts are minimised. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 25.

**Table 25: Assessment of the impacts on disturbance to local community members and businesses**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 1	L/M - 3	M - 4	M – 4	M - 32
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

**7.3.10. Impact Assessment of Temporary Employment Creation**

The proposed road activities will provide temporary employment opportunities for the local people to generate income for themselves and their families. The job opportunities and fair compensations will be given to the locals within the communities along the road. Additional benefits may arise depending on the agreements reached between the community and the Proponent’s contractor. The impact can be rated as of a “low-positive” significance. The assessment of this impact is presented in Table 26.

**Table 26: Assessment of impacts on temporary employment creation**

	Extent	Duration	Intensity	Probability	Significance
--	--------	----------	-----------	-------------	--------------



Pre- mitigation	L/M + 2	L/M + 2	M + 2	M +3	L+ 18
Post- mitigation	L + 4	L+ 3	L+ 2	L+ 3	L + 27

**7.3.11. Impact Assessment of Occupational and Community Health, Safety and Welfare**

Construction activities may cause health and safety risks to people operating on the site. This includes lack of personal protective equipment (PPE) or improper usage of PPE by the project personnel as well as lack of “know-how” to use project machinery or equipment resulting in minor to major injuries.

If the heavy vehicles, equipment and fuel storage areas are not properly secured, these may lead to harm or injury to the project personnel, locals and animals. Another potential risks to both people and animals are, unfenced active borrow pits or trenches or open areas that are not backfilled during or after the road works are completed. Unsecured pits or trenches and even uncapped holes could pose a risk of people, and animals falling into these leading to injuries.

The unsecured and used containers for hazardous materials such as oil and grease may be accessed by local children and animals who may attempt to drink or touch such containers, resulting in health issues.

The presence of hydrocarbons onsite may result in accidental fire outbreaks, posing a safety risk to people and animals onsite and in the immediate surroundings of the working sites.

Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 27.

**Table 27: Assessment of impacts on health, safety and welfare**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

**7.3.12. Air Quality (Dust) Impact Assessment**

There is a potential impact of dust emanating from site access roads when transporting project equipment and supply to and from site as well as dust from the site excavation works. Another potential source of air quality issue is the gas and fumes emissions from vehicles and machinery onsite. This may pose a negative health impact on the surrounding communities. This may contribute to the dust levels in the air, thus, compromising the air quality in the area. Dust may also lead to poor visibility for vehicle drivers, animals and locals resulting in road accidents or animal-

vehicle collisions along the road. The impact is considered short-term and localized as construction activities are carried over a specified durations, thus, the impact will only last during the construction period. Therefore, manageable with mitigation measures.

Pre-implementation of mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 28.

**Table 28: Assessment of Dust impact (Air quality)**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

### 7.3.13. Impact Assessment of Vehicular Traffic Safety

The existing local access single-track roads and new tracks will be used for all vehicular movement in the area associated with the project activities. There would be a potential increase in traffic flow with slow moving heavy vehicles (trucks) and light vehicles (4x4 bakkies) delivering of supplies, goods and services to site. The slow moving trucks with the dust generated onsite may lead to poor visibility resulting in road accidents or animal-vehicle collisions along the road. Depending on the project needs, trucks, medium and small vehicles will be frequenting the area to and from road working sites along the road.

Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 29.

**Table 29: Assessment of Vehicular traffic safety impact**

	Extent	Duration	Intensity	Probability	Significance
Pre- mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post- mitigation	L - 1	L- 1	L- 2	L - 1	L-4

## 8. CHAPTER EIGHT: RECOMMENDATIONS AND CONCLUSION

### 8.1. Conclusion

The key potential biophysical impacts related to the construction, operational and maintenance and decommissioning phases of the proposed project were identified and assessed. Suitable mitigation

measures (where required and possible) were recommended, and the impacts can be summarised as follows:

#### **8.1.1. Impact on biodiversity**

There are some large indigenous trees located along the side of the road. Some are located within the road reserve in which the proposed road upgrade activities will take place. Some vegetation may need to be removed should the upgraded road deviate from its current alignment. This may also lead to habitat destruction for some fauna. As such, care should be taken during the removal of vegetation for site preparation to ensure minimal disturbance in the area. The likelihood of this impact is low. However, the impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### **8.1.2. Impacts on environmental degradation**

During construction different types of waste may be generated on site. This may include general waste as well as hazardous bitumen and hydrocarbons which may cause degradation of the subject environment. Furthermore, the presence of the workforce and machinery may aid in environmental destruction within the subject site. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The impact can be adequately addressed by the recommendations management actions given in the EMP.

#### **8.1.3. Impacts on waste generation**

A number of large indigenous trees are located along the side of the road, with some within the road reserve of the proposed road upgrade. Where necessary, some vegetation may need to be removed to allow for the road construction works. This may also lead to habitat destruction for some fauna. As such, care should be taken during the removal of vegetation for site preparation to ensure minimal disturbance in the area. The envisaged impact at the project site is thus not of such magnitude and/ or significance that it will have irreversible impacts on the biodiversity and endemism of the area and Namibia at large. The pre- mitigation impact is assessed to be “medium” in significance and after mitigation. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### **8.1.4. Impacts on soil and water resources (surface and groundwater) contamination**

Improper handling, storage and disposal of wastewater, hydrocarbon products and hazardous materials at the site may lead to spills and leakages which could cause soil, surface and groundwater

contamination. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### **8.1.5. Impact on water resources usage (abstraction)**

The abstraction of more water than it can be replenished from low groundwater potential areas would negatively affect people and animals in the area who rely on the same groundwater resource (aquifer). The impact of the project activities on the resources would be dependent on the water volumes required by each project activity. Construction activities requires a lot of water. However, given the fact that the project area is underlain by good aquifers, the Proponent will drill new boreholes at strategic points along the road and store the water in standard water reservoirs/tanks onsite and refilled as required. The abstraction of water will also just only last for the duration of the construction activities and ceases upon completion. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### **8.1.6. Impacts on dust generation (comprised air quality)**

There is a potential impact of dust emanating from site access roads when transporting project equipment and supply to and from site as well as dust from the site excavation works. Another potential source of air quality issue is the gas and fumes emissions from vehicles and machinery onsite. This may pose a negative health impact on the surrounding communities. This may contribute to the dust levels in the air, thus, compromising the air quality in the area. Dust may also lead to poor visibility for vehicle drivers, animals and locals resulting in road accidents or animal-vehicle collisions along the road. The impact is considered short-term and localized as construction activities are carried over a specified durations, thus, the impact will only last during the construction period. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### **8.1.7. Impact on noise generation**

Site clearing, construction activities and the presence of construction vehicles may lead to the generation of noise which could impact the local communities negatively, if not properly handled. This may pose a disturbance on the surrounding communities. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### **8.1.8. Impact on archaeological and heritage resources**

The proposed construction activities is not taking place in an area that has significant archaeological or heritage resources. However, there is a potential of inadvertently destruction of archaeological resources in the subsurface during earthworks and site clearing for the road upgrading activities. To mitigate this impact, mitigation measures will be implemented to ensure that these resources are not significantly disturbed or destroyed. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### ***8.1.9. Impact on disturbance to local community members and businesses***

The proposed upgrade could potentially impact those who have settled 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 activity could be disturbed during upgrade. However, should community members or businesses be encountered during the upgrade activities, mitigation measures need to be in place to ensure that these impacts to the community members are minimised. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### ***8.1.10. Impact on temporary employment creation***

The proposed activity may provide employment opportunities for the local people. Additional benefits may arise depending on the agreements reached between the community and the Proponent. The impact can be suitably enhanced by the recommendations and management actions given in the EMP.

#### ***8.1.11. Impact on occupaiton and community health and safety as well as welfare***

Construction activities may cause health and safety risks to people operating on the site. This includes lack of personal protective equipment (PPE) or improper usage of PPE by the project personnel as well as lack of “know-how” to use project machinery or equipment, improper storage of heavy vehicles, equipment and fuel storage. Further risks include unfenced active borrow pits or trenches or open areas that are not backfilled or uncapped holes as well as accidental fire outbreaks from the presence of hydrocarbons onsite. The impact can be adequately addressed by the management actions given in the EMP.

#### ***8.1.12. Impact on vehicular traffic safety***

The existing local access single-track roads and new tracks will be used for all vehicular movement in the area associated with the project activities. There would be a potential increase in traffic flow with slow moving heavy vehicles (trucks) and light vehicles (4x4 bakkies) delivering of supplies, goods and services to site. The slow moving trucks with the dust generated onsite may lead to poor visibility resulting in road accidents or animal-vehicle collisions along the road. Depending on the

project needs, trucks, medium and small vehicles will be frequenting the area to and from road working sites along the road. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

#### ***8.1.13. Impact Assessment of Physical Land (Soil) Disturbance***

The earthworks (excavations), land clearing to enable siting of project structures and equipment as well as road works will potentially result in soil disturbance leaving the soils prone to erosion. The movement and parking of heavy vehicles and equipment onsite may lead to compaction of the soils. This will, however, be a short-term and localized impact. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

## **8.2. Recommendation**

Based on the information provided in this report, EnviroPlan is confident the identified risks associated with the proposed road upgrade project can be reduced to acceptable levels, should the measures recommended in the EMP be implemented and monitored. It is therefore recommended that the project receive Environmental Clearance, provided that the EMP be implemented.

## 9. REFERENCES

Google Maps, Accessed: January 2023

Government of Namibia. 2008, Government Gazette of the Republic of Namibia. Government notice No.1: Regulations for Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA)-Windhoek

Government of Namibia.2008, Government Gazette of the Republic of Namibia. Government notice No.1: Regulations for Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA)-Windhoek

IFC.2007. Stakeholder Engagement: A good practice handbook for companies doing business in emerging markets. IFC. Washington D.C

Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. (2002). Atlas of Namibia: A Portrait of the Land and its People. Cape Town: David Philip Publishers.

MEFT. (2012). Environmental Management Act no. 7 of 2007. Windhoek: Directorate of Environmental Affairs, Ministry of Environment and Tourism

Ministry of Agriculture Water and Rural Development. 2011. *Groundwater in Namibia an explanation to the Hydrogeological Map*.

Namibia Civil Engineering Laboratory, 2023. Borrow-Pit Materials Investigation for the new proposed DR3425 road in Kavango East, Namibia – Materials Draft Report. Unpublished. Ongwediva.

Namibia Statistics Agency, 2019, *Namibia Labour Force Survey 2018 Report*, Namibia Statistics Agency, Windhoek

Namibia Statistics Agency. 2014. Namibia Population and Housing Census: Kavango Regional Profile. NSA. Windhoek.

World Weather Online. (2023). Average Weather Data for Ncaute. Available from <https://www.worldweatheronline.com/ncaute-weather-averages/okavango/na.aspx>

# APPENDICES