



The Republic of Namibia
Ministry of Health and Social Services
&
Ministry of Works and Transport

APP: 003952

**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED
CONSTRUCTION AND OPERATION OF THE NEW WINDHOEK DISTRICT
HOSPITAL**



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Table of Contents

ACRONYMS	I
EXECUTIVE SUMMARY	III
1 INTRODUCTION	1
1.1 BACKGROUND	1
1.2 THE NAMIBIAN HEALTH SECTOR	2
1.2.1 <i>District and referral hospital in Khomas Region</i>	3
1.3 THE NEEDS AND DESIRABILITY	4
1.4 TERMS OF REFERENCE	5
2 PROJECT DESCRIPTION	7
2.1 LOCATION	7
2.2 DESCRIPTION OF THE HOSPITAL	7
2.3 SUPPORTING INFRASTRUCTURES	10
2.3.1 <i>Rooftop Photovoltaic Solar system</i>	10
2.3.2 <i>Waste Water Treatment Plant</i>	10
2.3.3 <i>Access Roads</i>	11
2.4 CONSTRUCTION PHASE	12
2.4.1 <i>Bulk Earthworks</i>	12
2.4.2 <i>Construction Activities</i>	12
2.4.3 <i>Construction Materials</i>	12
3 GENERATION AND MANAGEMENT OF HEALTH CARE WASTE	13
3.1 HOSPITAL WASTE GENERATION	13
3.2 HOSPITAL WASTE MANAGEMENT	14
3.2.1 <i>Waste segregation and packaging</i>	14
3.2.2 <i>On-site storage, collection, and transport of waste</i>	18
3.3 HOSPITAL WASTE TREATMENT	19
3.3.1 <i>Incineration</i>	19
3.3.2 <i>Sterilization</i>	19
4 DESCRIPTION OF THE AFFECTED ENVIRONMENT	21
4.1 BIO-PHYSICAL ENVIRONMENT	21
4.1.1 <i>Flora</i>	21
4.1.2 <i>Fauna</i>	23
4.1.3 <i>Reptiles</i>	23
4.1.4 <i>Amphibians</i>	24
4.1.5 <i>Mammals</i>	24

4.1.6	<i>Avian Diversity</i>	24
4.2	SOCIO-ECONOMIC ENVIRONMENT	25
4.2.1	<i>National Economic Overview</i>	25
4.2.2	<i>Baseline Socio-Economic Conditions</i>	26
4.2.3	<i>National Population Demography</i>	26
4.2.4	<i>Khomas Population Demography</i>	28
4.2.5	<i>Havana Informal Settlement Population Demography</i>	29
4.3	HERITAGE AND ARCHAEOLOGY.....	30
4.3.1	<i>Chance find.</i>	30
4.4	PHYSICAL ENVIRONMENT	31
4.4.1	<i>Climate</i>	31
4.4.2	<i>Geology and Topography</i>	33
4.4.3	<i>Hydrology and Drainage</i>	36
4.4.4	<i>Site drainage</i>	39
5	PROJECT ALTERNATIVE	42
5.1	SITE ALTERNATIVE	42
5.2	DESIGNS AND LAYOUT.....	42
6	LEGAL AND POLICY FRAMEWORK	45
6.1	NATIONAL REGULATORY FRAMEWORK.....	45
7	STAKEHOLDER CONSULTATION	50
7.1	SITE NOTICES AND INVITATION TO REGISTER AS I&AP	50
7.2	WRITTEN NOTICE	50
7.3	NEWSPAPER ADVERTISEMENT	51
7.4	PUBLIC MEETING.....	51
8	ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT	53
8.1	INTRODUCTION	53
8.2	IMPACT IDENTIFICATION	53
8.3	CUMULATIVE IMPACTS	58
9	IMPACT ASSESSMENT AND MITIGATION	59
9.1	CRITERIA OF IMPACT ASSESSMENT.....	59
9.2	IMPACT ASSESSMENT.....	61
9.3	IMPACT MITIGATION AND SIGNIFICANCE.....	61
9.4	IMPACT DURING CONSTRUCTION PHASE	62
9.4.1	<i>Positive Impact</i>	62
9.4.2	<i>Negative Impact</i>	63

9.4.3	Traffic congestion and road safety	64
9.4.4	Noise and Vibration.....	65
9.4.5	Dust emission	66
9.4.6	Land degradation / Soil erosion	67
9.4.7	Exhaust emission.....	68
9.4.8	Occupational health and Safety Risk.....	69
9.4.9	General Waste and Pollution.....	70
9.4.10	Hazardous waste.....	72
9.4.11	Visual Impact.....	73
9.4.12	Increase demand for water	73
9.4.13	Heritage and Archaeological Resource.....	75
9.5	IMPACT DURING OPERATIONAL PHASE	76
9.5.1	Positive Impact.....	76
9.5.2	Negative Impacts	77
10	DECOMMISSIONING AND REHABILITATION.....	83
11	CONCLUSIONS AND RECOMMENDATIONS	83
11.1	CONCLUSIONS	83
11.2	RECOMMENDATIONS	83
12	REFERENCES:	85
13	ANNEXURES	87
13.1	ANNEX 1: WRITTEN NOTICES	87
13.2	ANNEX 2: NEWSPAPER ADVERTS	89
13.3	ANNEX 3 ATTENDANCE REGISTER	93
13.4	ANNEX 4: TRAFFIC IMPACT STUDY.....	95

List of Figures

Figure 1.	The ESIA process in Namibia.....	6
Figure 2.	Locality Map of Windhoek District Hospital	7
Figure 3.	Artistic impression of rooftop photovoltaic solar panels.....	10
Figure 4.	Baseline vegetation cover (Source: Red-Dune Consulting CC, May 2024)	21
Figure 5.	Cleared shrubs collected as firewood by Havana community members	23

Figure 6. Trend of the Namibia Population (Source: NSA PHC 2023)	27
Figure 7. Namibian Regional Population Density	28
Figure 8: Average annual Temperatures in Namibia (Atlas of Namibia Team, 2022).....	32
Figure 9: Annual average rainfall in Namibia (Atlas of Namibia Team, 2022).....	33
Figure 10: Simplified geological map of the study area, indicating the major lithological substrates (Strohbach, B., 2021)	34
Figure 11: Topography of the study area, indicating several landmarks and major rivers draining the Khomas Hochland ((Strohbach, B., 2021) ¹	34
Figure 12: Map of Windhoek city and aquifer	35
Figure 13: Groundwater basins and hydrogeological regions in Namibia (Christelis and Struckmeier, 2011)	36
Figure 14: Hydrogeological map of Namibia. (Christelis & Struckmeier 2011))	38
Figure 15: Catchments of Namibia	39
Figure 16. Area topography on the north east of the study site	40
Figure 17. Site topography and drainage	40
Figure 18: Aerial topography and drainage system	41
Figure 19: Drainage stream with tall grass and drainage sieving point.....	41
Figure 20. Site notices at project site	50
Figure 21. Public meeting at Havana High School.....	52
Figure 22. Mitigation Hierarchy Source	62

List of Tables

Table 1: Triggered Listed Activities.....	1
Table 2: Public health facilities in Namibia (Source: MoHSS, 2022)	4
Table 3. Capacity of WDH.....	8
Table 4. Colour Coding for segregation of healthcare waste (Source)	14

Table 5. Management of biomedical waste (Source: WHO).....	15
Table 6. Policy and Legal framework governing the project	45
Table 7. Newspaper Adverts.....	51
Table 8. Impact identification.....	53
Table 9. Criteria for Impact Assessment	59
Table 10. Risk assessment matrix.....	61

ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
BID	Background Information Document
CoW	City of Windhoek
CSSD	Central Sterile Services Department
DCW	Dual Carriage Way
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EMA	Environmental Management Act 2007 (Act No. 7 of 2007)
ESMP	Environmental Social Management Plan
GDP	Gross Domestic Product
GRN	Government Republic of Namibia
HA	Hectares
HHS	Havana High School
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Parties
KIH	Katutura Intermediate Hospital
KMC	Kangaroo Mother Care
M²	Square Meter
MEFT	Ministry of Environment, Forestry and Tourism
MoHSS	Ministry of Health and Social Services
MTEF	Medium Term Expenditure Framework
MWT	Ministry of Works and Transport
NSA	Namibia Statistic Agency
PHC	Population Housing Census
PHC	Primary Health Care
PPC	Puncture Proof Container
SDGs	Sustainable Development Goals
TB	Tuberculosis
UPS	Uninterrupted Power Supply

WCH	Windhoek Central Hospital
WDH	Windhoek District Hospital
WHO	World Health Organization
WWTP	Waste Water Treatment Plant

EXECUTIVE SUMMARY

(i) Introduction

The Ministry of Health and Social Services together with the Ministry of Works are constructing a new Windhoek Class C District Hospital (WDH). The WDH will be a 500-bed hospital that will provide the package of service for a class C hospital with some specialized services to support Windhoek Central Hospital.

(ii) Statutory Requirement

The proposed construction of the hospital is a listed activity under the Environmental Management Act 2007, (Act No 7 of 2007) that may not be undertaken without an Environmental Clearance Certificate (ECC) (See Table below).

Environmental Management Act, 2007 (Act No 7 of 2007) and ESIA Regulation Government Gazette 6 February 2012 No. 4878	
List of Activities	Applicability to the project
ENERGY GENERATION, TRANSMISSION AND STORAGE ACTIVITIES 1. The construction of facilities for - (a) the generation of electricity	The project aims to use photovoltaic panels to provide grid tied electricity as well as to charge the UPS batteries during daytime
WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES 2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste	The hospital will involve the construction of Bio-Medical Incinerator and Autoclave for sterilization
2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.	Atmospheric emissions from the hospital Incinerator
HAZARDOUS SUBSTANCE TREATMENT, HANDLING AND STORAGE 9.1 The manufacturing, storage, handling, or	Handling of Chemical, Medicines, Human Anatomical Parts, Linen contaminated with human blood etc.

processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974	
INFRASTRUCTURE 10.1 The construction of- (a) oil, water, gas, and petrochemical and other road bulk supply pipelines; (b) public roads;	The project will involve the construction of bulk water supply pipeline and public access road

(iii) Project Description

The hospital will comprise of the following;

Clinical Capacity	Clinical Profile	Clinical Support Services	Hospital Support Services
1. 500 District bed hospital Spaces that do not count as beds 1. 20 bed Day Surgery facility 2. 40 bed Mother Lodge (for neonates and pediatrics) 3. 16 bed Pregnant mothers waiting lodge 4. 6 Birthing rooms 5. 6 Resuscitation 6. Emergency Centre: <ul style="list-style-type: none"> ○ Resuscitation bays x 5 adults ○ Resuscitation bays x 4 Pediatrics 	1. Medicine 2. General Surgery 3. Day Procedures - Surgical and Internal Medicine 4. Maternity and Neonatal (incl. Kangaroo Mother Care (KMC)) 5. Paediatrics incl. Critical Care (High Care) 6. Adult Inpatient services: Surgical, Medical (incl. Tuberculosis (TB)), 7. Acute Psychiatry 8. Emergency Medicine and Observation 9. Clinical Forensics	1. Allied (Rehabilitation Services: Dietetics, Social Services, Speech and Hearing, Physiotherapy, Occupational Therapy, Dentistry). 2. CSSD 3. Diagnostic Radiology Department (Digital X-Rays) 4. Emergency Centre (Emergency medicine) 5. Operating theatres x 5 (1 x emergency theatre, 3 x general theatres, 1 x septic theatre) 6. Obstetric operating theatre unit – 2 x theatres, 1 x minor theatre 7. Day unit – minor theatres x 2, 1 x endoscopy theatre	1. Cafeteria 2. Engineering and Maintenance (Workshops) 3. Food Services 4. Main Kitchen 5. Student dining room 6. Ground Cleaning Services 7. Housekeeping & cleaning 8. Linen Bank 9. Lodging facilities 10. On Call Facilities 11. Plant Rooms 12. Portering 13. Registry and Reprographics 14. Security 15. Staff Facilities

Clinical Capacity	Clinical Profile	Clinical Support Services	Hospital Support Services
7. Staff accommodation for both staff and students	10. Outpatient Services (OPD) 11. Ambulatory Rehabilitation Services 12. Diagnostic Radiology	8. Laboratory and Blood bank services to support the hospital and the clinics in the area 9. Mortuary 10. Incinerator 11. Outpatients 12. Dental OPD with training facilities 13. Pharmacy 14. Clinical Training Centre	16. Staff Accommodation 17. Supply Chain Management 18. Bulk Stores 19. Condemned equipment 20. Transport – Patient and Government 21. Parking 22. Waste Management

The 500-hospital bed plan is provided in the table below.

Discipline	Distribution	Bed number	Total Beds	%
MEDICAL	Male Medical	30	60	12,4
	Female Medical	30		
FRAIL CARE	Male Frail	12	24	4,8
	Female Frail	12		
INFECTIOUS DISEASES	Infectious Diseases	20	20	4,0
TUBERCULOSIS (TB)	General TB	16	28	5,6
	TB Highcare with ICU capacity	4		
	MDR-TB	4		
	XDR-TB	4		
SURGERY	Male Surgical	32	64	12,8
	Female Surgical	32		
ADULT CRITICAL CARE	Adult High Care	8	8	1,6
	Adult ICU	6	6	1,2
PAEDIATRICS	General Paediatrics	24	84	16,8
	Gastro Paediatrics	24		
	Malnutrition Paediatrics	24		
	Paediatric High care	8		
	Paediatric ICU	4		
NEONATES	Neonatal ICU	20	28	5,6
	Neonatal High Care	6		
	Neonatal Isolation	2		
OBSTETRICS	Antenatal & High Risk	32	108	21,6
	Post natal (2 x32 bed)	64		
	Kangaroo Mother Care	6		
	Obstetric High Care	4		
	Obstetric ICU	2		
GYNAECOLOGY		24	24	4,7

MENTAL HEALTH ACUTE	Observation	6	46	8,9
	Low secure	10		
	Medium secure	24		
	High Secure	6		
		500	500	100

(iv) Description of the affected environment

The hospital will be constructed within Windhoek Townlands, on an approximately 15ha of virgin land on the outskirts of Havana Informal Settlement.

(v) Methodology of Environmental Impact Assessment

Potential impacts were identified following extensive literature review, site assessment and public participation process and assessed using the criteria in the table below.

Risk Event	Rating	Description of the risk that may lead to an Impact
Probability	The probability that an impact may occur under the following analysis	
	1	Improbable (Low likelihood)
	2	Low probability
	3	Probable (Likely to occur)
	4	Highly Probable (Most likely)
	5	Definite (Impact will occur irrespective of the applied mitigation measure)
Confidence level	The confidence level of occurrence in the prediction, based on available knowledge	
	L	Low = limited information
	M	Medium = moderate information
	H	High = sufficient information
Significance (Without Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require

Risk Event	Rating	Description of the risk that may lead to an Impact
		that the projects is altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Mitigation	The applied measure / alternative to reduce / avoid an impact	
Significance (With Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localised, that may not require alteration to the operation of the project
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects is altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Duration	Time duration of the impacts	
	1	Immediate
	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent
Scale	The geographical scale of the impact	
	1	Site specific
	2	Local
	3	Regional
	4	National
	5	International

Furthermore, the significance of an impact was determined using a five-by-five risk matrix as indicated in the table below, where the impact severity was categorised and assigned scores from 1 to 5 as follows Improbable=1, Low=2, Medium=3, High=4 and Severe=5. Similarly, the likelihood was assigned scores as follows; improbable=1, Low Likely=2, Probable=3, High

Probability=4, Definite=5. The impact rating was determined by multiplying the impact severity and likelihood.

LIKELIHOOD	5 Definite	5 Low	10 Medium	15 High	20 Severe	25 Severe
	4 High Probability	4 Low	8 Medium	12 High	16 High	20 Severe
	3 Probable	3 Low	6 Medium	9 Medium	12 High	15 High
	2 Low	2 Low	4 Low	6 Medium	8 Medium	10 Medium
	1 Improbable	1 Negligible	2 Low	3 Low	4 Low	5 Low
	1 Negligible	2 Minor	3 Medium	4 High	5 Severe	
	IMPACT SEVERITY / CONSEQUENCE					
	Negligible	Low	Medium	High	Severe	

The summary of the impacts and their significance rating is presented in the table below

Impact	Summary of impact	Impact Type	Probability	Impact Significance		Duration	Scale	Confidence level
				Without mitigation	With mitigation			
CONSTRUCTION PHASE								
Employment creation and skill transfer	Employment opportunity during construction of the hospital	P	5	M	L	2	2	H
Increase in local economy	Procurement of goods and services will stimulate local economy	P	5	M	L	2	2	H
Loss of biodiversity	Destruction of flora and loss of habitat for fauna from clearing of area	N	5	M	L	2	2	H
Traffic congestion and road safety	Reduced Level of Service by slow flow of traffic and potential increase of road accidents.	N	5	H	L	2	2	H
Noise and vibration	Noise by construction vehicles and other activities	N	5	H	M	2	2	H
Dust emission	Dust from movement of heavy vehicles, excavation, crushing and transportation of sand and concrete	N	5	H	L	2	1	H
Land Degradation	Movement of vehicles and machine on and around the site	N	4	M	L	2	1	H
Exhaust emission	Greenhous gas emission from construction vehicles	N	4	M	L	2	2	H
Occupational health and Safety Risk	Injuries and health risks to employees during working hours as well as to public such as accidents from falling objects,	N	5	H	L	2	2	H

Impact	Summary of impact	Impact Type	Probability	Impact Significance		Duration	Scale	Confidence level
				Without mitigation	With mitigation			
	collision of construction vehicles, falling from heights, deaf risks from excessive noise, respiratory risks from dust inhalation							
General waste and pollution	Building rubbles and offcuts from building materials	N	5	M	L	2	1	H
Hazardous waste	Oil, fuel, and Lubricant leaks from machinery and constructing vehicles and cements from mixers	N	4	M	L	2	1	H
Visual impact	Poor housekeeping on site and uncoordinated painting for the buildings	N	3	M	L	2	1	H
Unsustainable use of water	Increased water demand	N	4	M	L	2	1	H
Heritage and Archaeological Resource	Potential destruction of Heritage and Archaeological Materials during digging and excavation	N	2	M	L	2	1	M
OPERATIONAL PHASE								
Employment creation	Employment of health practitioners and support staff such as drivers, cleaners and maintenance workers etc.	P	5	L	L	5	4	H
Improved land value	Establishment of infrastructure on the virgin land increases land value.	P	5	L	L	5	1	H
Health care provision	Increase provision of adequate public health care	P	5	M	L	5	3	H

Impact	Summary of impact	Impact Type	Probability	Impact Significance		Duration	Scale	Confidence level
				Without mitigation	With mitigation			
Inadequate handling and disposing of health care waste	Risk of environment pollution and sewer contamination	N	3	H	L	5	2	H
Potential water and soil contamination	Risk of soil and water pollution from uncontrolled disposal of healthcare.	N	4	H	L	5	1	H
Air pollution from incinerators	Risk of air pollution from waste incineration	N	3	H	L	5	2	H
Risks of occupational health and Safety	Risk of health workers exposure to dangers such contagious diseases and injury at work place.	N	4	H	L	5	1	H
Fire Risk	Fire accident in laboratories and electrical shock.	N	3	M	L	5	1	H

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1 INTRODUCTION

1.1 Background

The Ministry of Health and Social Services (MoHSS) together with the Ministry of Works and Transport (MWT) are planning to construct a new Windhoek Class C¹ District Hospital (WDH). Section 27 (2) (b) of the Environmental Management Act 2007, (Act No 7 of 2007) (EMA) and annexures of its Environmental Impact Assessment (ESIA) Regulation has listed activities that may not be undertaken without an Environmental Clearance Certificate (ECC). In this regard, the proposed construction and operation of the WDH includes various listed activities that may not be undertaken without an ECC (**Table 1**).

Table 1: Triggered Listed Activities

Environmental Management Act, 2007 (Act No 7 of 2007) and ESIA Regulation Government Gazette 6 February 2012 No. 4878	
List of Activities	Applicability to the project
ENERGY GENERATION, TRANSMISSION AND STORAGE ACTIVITIES 2. The construction of facilities for - (a) the generation of electricity	The project aims to use photovoltaic panels to provide grid tied electricity as well as to charge the UPS batteries during daytime
WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES 2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste	The hospital will involve the construction of Bio-Medical Incinerator and Autoclave for sterilization
2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.	Atmospheric emissions from the hospital Incinerator
HAZARDOUS SUBSTANCE TREATMENT, HANDLING AND STORAGE 9.1 The manufacturing, storage, handling, or	Handling of Chemical, Medicines, Human Anatomical Parts, Linen contaminated with human blood etc.

¹ Type C Hospitals are basic district hospitals. In-patient and out-patient services are provided in general medicine, surgery, and child and maternity care. Basic X-ray and laboratory services are usually available.

processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974	
INFRASTRUCTURE 10.1 The construction of- (a) oil, water, gas, and petrochemical and other road bulk supply pipelines; (b) public roads;	The project will involve the construction of bulk water supply pipeline and public access

Consequently, to ensure full compliance with the EMA, Red-Dune Consulting CC (RDC) has been appointed to undertake an Environmental Social Impact Assessment (ESIA) and develop an Environmental Social Management Plan (ESMP) for the proposed construction and operation of the WDH including its associated infrastructures to support the application of ECC.

1.2 The Namibian health Sector

Namibia has a two-tier health system: public health under the MoHSS and the private health service. MoHSS ‘vision is to be the leading provider of quality health care and social services according to international set standards’². Since Namibia’s independence, the government adopted Primary Health Care (PHC) as the approach to providing health service and as a key strategy in attaining the goal of national health. Good health is also strengthened by the United Nation Sustainable Development Goals (SDGs). The SDGs provide a road map for human development and, among others, systematically address the social determinants of health. Notable is SDG 3, which focuses on good health and well-being³.

Namibia’s health services under the MoHSS are structured along a three-tier hierarchy levels; national, regional, and at district levels. These services are accessed by 85% of the Namibian population, often the lower income population.

The private health sector consists of profit and non-profit entities. The ownership and licensing of a private health facility is guided by the Hospital and Health Facilities Act of 1994 and

² <https://mhss.gov.na/about-mohss>

³ <https://sdgs.un.org/goals/goal3>

provides eligibility criteria for operating private health facility. There are 844 private health facilities, 557 medical practitioners, 75 pharmacies, as well as specialty and general private hospitals, and private clinics⁴.

1.2.1 District and referral hospital in Khomas Region

Khomas region has two main hospitals; Katutura Intermediate Hospital (KIH) and Windhoek Central Hospital (WCH) serving as district and referral hospitals respectively.

1.2.1.1 Katutura Intermediate Hospital

The KIH was commissioned in 1973 and has since played an integral role in the delivery of essential health care in Namibia, particularly in Khomas Region. The hospital serves as a district hospital and provides extensive services as an intermediate referral hospital. As a result, KIH is one of the busiest hospital in Namibia⁵. The hospital has nine (9) medical departments that are operating 24 hours per day with a capacity of 882 patient beds. It admits both private and public patients and serves as a teaching hospital for medical students⁶.

1.2.1.2 Windhoek Central Hospital

The Windhoek Central Hospital (WCH) became operational in 1984 and transitioned into a National Referral Centre for specialized health care services after independence. The hospital provides specialized health care services and is also the highest-level tertiary hospital in Namibia. With a patient bed of 855, the hospital accommodates both private and public patient referrals from across the country⁷.

Overall, the Namibian public health system consists of one (1) national referral hospital (WCH); five (5) intermediate hospitals, 31 district hospitals, 378 clinics and health centres⁸. Windhoek has a total of twenty-one (21) public health facilities (**Table 2**).

⁴ 2023. United Nations Population Fund. Annual Report

⁵ Ministry of Health and Social Services. 2022. Health Care Workforce Status Report

⁶ Ministry of Health and Social Services. 2022. Health Care Workforce Status Report

⁷ <https://wch.gov.na/about-wch>

⁸ Deutsche Gesellschaft Fur Internationale Zusammenarbeit. 2023. Namibia Sector Brief: Health

Table 2: Public health facilities in Namibia (*Source: MoHSS, 2022*)

No.	Region	Deferral Hospital	District Hospital	Health Center	Clinic	DOT Point	Rehabilitation Center	Total
1	Erongo		4	2	18		1	25
2	Hardap		3	3	13			19
3	Karas		3	5	17		1	26
4	Kavango East	1	2	2	16			21
5	Kavango West		1	6	20			27
6	Khomas	2		4	15			21
7	Kunene		3	2	26			31
8	Ohangwena		3	1	40			44
9	Omaheke		1	1	15			17
10	Omusati		4	6	44	3		57
11	Oshana	1		7	21			29
12	Oshikoto	1	2	8	23			34
13	Otjozondjupa		4	4	20	5		33
14	Zambezi		1	5	34			40
	Total	5	31	56	322	8	2	424

1.3 The needs and desirability

Health care is an integral part of human life. To date, there are various deadly diseases such as Tuberculosis (TB), Human Immune Virus / Acquired Immuno Disease Syndrome (HIV/AIDS), Malaria, Cancer, Ebola, Hepatitis, and other health challenges such as maternal deaths and many other life-threatening conditions that continues to threaten human existence. The answer to these health challenges is the development of adequate health care facilities in every community.

On 13th March 2024 the Namibian Statistic Agency (NSA) released a preliminary report that gives the provisional results of the 2023 Population and Housing Census (PHC) of Namibia. The census indicates that the Namibia population grew from 2.1 million in 2011 to 3.02 million in 2023. At this rate, by the year 2050 the population of Namibia would be over 6 million. Khomas Region remains the most populous region in Namibia with a population of 494,729 people. Between 2011 and 2023, urban population increased from 903 434 to 1,494,992 respectively, representing a rate of 65.5%.

The Namibian public health sector serves 85% of the population, the private sector serves the remaining 15% middle- and high-income groups. The WDH is proposed to be part of the of the Service profile of Khomas Region which will have an estimated population of 721 949⁹ people by 2053. The WDH is in line with the country’s Vision 2030 through which it aims to “transform into a Healthy and Food secure nation” which integrated the Mission of the Ministry of Health and Social Services (MoHSS) which is focused to deliver an integrated, quality healthcare that is responsive to the needs of the population.

1.4 Terms of Reference

The scope of this ESIA is guided by the Terms of References as provided for by the ESIA Regulation 2012, Section 9 (a-b) but, not limited to the following;

- Provide a comprehensive description of the proposed Project.
- Identify relevant legislation and guidelines for the project.
- Identify potential environmental (physical, biological, and social) conditions of the project location and conduct risk assessment.
- Inform Interested and Affected Parties (I&APs) and relevant authorities about the proposed project to enable their participation and contribution.
- Develop an Environmental and Social Management Plan (ESMP) that would be a legal guideline for the environmental protection by the project.

⁹ 2024-4-12 Windhoek District Hospital Population Technical Support

The Namibia ESIA process is explained in the ESIA regulation 2012, GRN Gazette No. 4878. The process is summarised in **Figure 1** below.

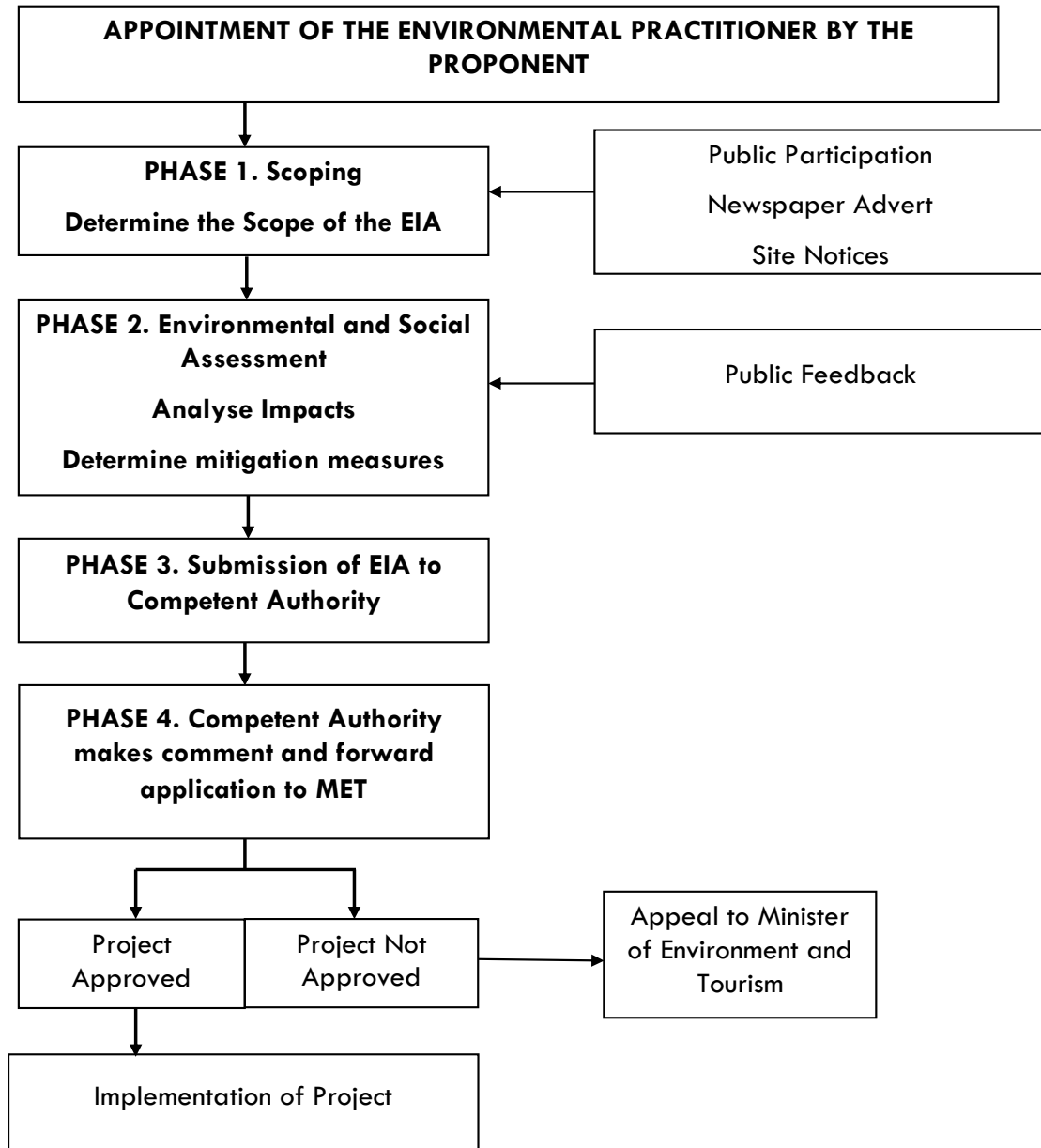


Figure 1. The ESIA process in Namibia

2 PROJECT DESCRIPTION

2.1 Location

The WDH will be constructed within Windhoek Townlands, on an approximately 15ha of virgin land on the outskirts of Havana Informal Settlement, Katutura at coordinates -22.483033°S, 17.011375°E (**Figure 2**).

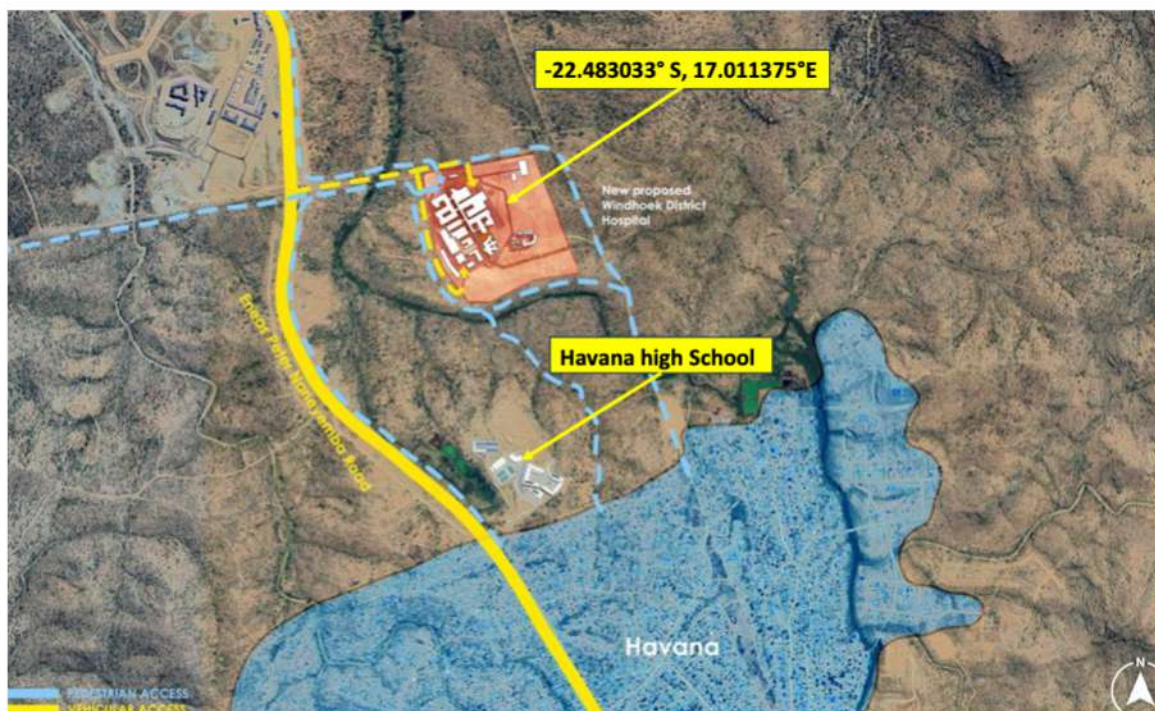


Figure 2. Locality Map of Windhoek District Hospital

2.2 Description of the Hospital

The WDH will be a 500-bed hospital that will provide the package of service for a class C hospital with some specialized services to support Windhoek Central Hospital. Overall, the hospital capacity is provided in **Table 3** below:

Table 3. Capacity of WDH

Clinical Capacity	Clinical Profile	Clinical Support Services	Hospital Support Services
1. 500 District bed hospital	13. Medicine	15. Allied (Rehabilitation	23. Cafeteria
2. 20 bed Day Surgery facility	14. General Surgery	Services: Dietetics, Social	24. Engineering and
3. 40 bed Mother Lodge	15. Day Procedures - Surgical and	Services, Speech and Hearing,	Maintenance (Workshops)
4. 10 bed Pregnant mothers waiting lodge	Internal Medicine	Physiotherapy, Occupational	25. Food Services
5. Staff accommodation for both staff and students	16. Maternity and Neonatal (incl. Kangaroo Mother Care (KMC))	Therapy, Dentistry).	26. Main Kitchen
	17. Paediatrics incl. Critical Care (High Care)	16. Clinic Forensic Unit	27. Student dining room
	18. Adult Inpatient services: Surgical, Medical (incl. Tuberculosis (TB),	17. Central Sterile Services Department (CSSD)	28. Ground Cleaning Services
	19. Acute Psychiatry	18. Diagnostic Radiology Department (Digital X-Rays)	29. Housekeeping & cleaning
	20. Emergency Medicine and Observation	19. Emergency Centre (Emergency medicine)	30. Linen Bank
	21. Clinical Forensics	20. Operating theatres x 6 (1 x emergency theatre, 1 x obstetric theatre, 3 x general theatres, 1 x septic theatre)	31. Lodging facilities
	22. Outpatient Services (OPD)	21. Day unit – minor theatres x 2,	32. On Call Facilities
	23. Ambulatory Rehabilitation Services	1 x endoscopy theatre	33. Plant Rooms
			34. Portering
			35. Registry and Reprographics
			36. Security
			37. Staff Facilities
			38. Staff Accommodation
			39. Supply Chain Management
			40. Bulk Stores

Clinical Capacity	Clinical Profile	Clinical Support Services	Hospital Support Services
	24. Diagnostic Radiology	22. Laboratory and Blood bank services to support the hospital and the clinics in the area 23. Mortuary 24. Incinerator 25. Outpatients 26. Dental OPD with training facilities 27. Pharmacy 28. Clinical Training Centre	41. Condemned equipment 42. Transport – Patient and Government 43. Parking 44. Waste Management

2.3 Supporting Infrastructures

2.3.1 Rooftop Photovoltaic Solar system

The hospital will be constructed in accordance with the green building principle. This principle is a response by actors across the real estate towards a net-zero carbon in line with the Paris Climate Agreement¹⁰. In this regard, the hospital will be equipped with rooftop photovoltaic solar panels that will generate a maximum of 500 watts of clean electricity (**Figure 3**). The installation of Solar PV system will be done in accordance with relevant national and international laws.



Figure 3. Artistic impression of rooftop photovoltaic solar panels

2.3.2 Waste Water Treatment Plant

Currently, the City of Windhoek (CoW) does not have sewer facilities that would enable the proposed hospital to be connected to its Waste Water Treatment Plant (WWTP). However, CoW plans to construct a WWTP that will cater for the northern townships including the WDH. In the meantime, the project is planning to set up an onsite WWTP for the operational phase of the hospital and in line with Section 72 (1) of the Water Resources Management Act No. 11, 2013 and the Namibia Integrated Health Care Waste Management Plan (IWMP).

¹⁰ World Economic Forum Green Building Principles 2021: The Action Plan for Net-Zero Carbon Buildings

According to literature, wastewater from hospitals contains pharmaceutical residues, disinfecting agents, viruses, and pathogenic microorganisms, including antibiotic-resistant bacteria (ARB) and antibiotic-resistant genes (ARG) which poses serious threat to the environment.

A study done on an onsite WWTP for a Germany Hospital¹¹ concluded that, full-scale on-site treatment of hospital wastewater is technically feasible and contributes to sustainable hospital effluent management. It further argued that, monitoring of biological markers on the building level might be a useful complementary tool for disease surveillance.

2.3.3 Access Roads

The hospital is accessible via the Peter E. Nanyemba Road¹². This road connects the northern townships to the newly constructed A1 Freeway ~8km to the East from its intersection with Matshitshi Street and represents the main arterial road for these areas.

Development of the Ongos Valley to the Northwest of the CoW necessitated the upgrading of this road. To this end, a Traffic Impact Assessment¹³ (TIA) was undertaken in 2018 by Innovative Transport Solutions (ITS) as part of the Cow's Transport Master Plan (TMP). The recommendations from this report were that the road be upgraded to a dual carriage way and that provision be made for Non-Motorized Transport (NMT) infrastructure before the entire Phase 1 of the Ongos Valley is developed – these efforts aim to smooth the flow of traffic. The road is currently being upgraded as follows;

1. Link 1: A1 Freeway to Matshitshi Street – upgrade to bitumen Dual Carriageway (DCW) standard and,
2. Link 2: Matshitshi Street to Ongos Valley – upgrade to bitumen Single Carriageway standard with provision for future upgrade.

At the time of compiling this report Link 2, the single carriageway from Matshitshi Street to Ongos Valley, is nearing completion with less than 1km of the road still to be constructed and

¹¹ Sarah H et al 2023., On-site treatment of hospital wastewater in a full-scale treatment plant in Germany: SARS-CoV-2 and treatment performance *Water Sci Technology* (2023) 87 (7): 1747–1763.
<https://doi.org/10.2166/wst.2023.088>

¹² Former Monte Christo Road

¹³ Transportation Master Plan by INNOVATIVE TRANSPORT SOLUTIONS (PTY) Ltd., 2018

Link 1 is also under construction. A Traffic Impact Assessment for the hospital has been done (Annex 4).

2.4 Construction Phase

2.4.1 Bulk Earthworks

The initial phase of the WDH project will involve levelling portions of the site through cut and fill operations to construct a platform upon which the hospital will be constructed. Ideally the material removed from excavations could be used to fill on site depressions to balance the cut and fill operation however, this is rarely the case as the material quality should be considered. Hence, material from cut and fill operations will be removed from site and material from off site will be transported to site to be used as fill.

2.4.2 Construction Activities

Construction vehicle / equipment: Similar to any civil construction, the project will use heavy construction equipment (yellow plant) such as tip trucks, crane trucks, water tankers, bulldozer, front loaders, excavators etc.

Digging: The area is rocky, hence it could be a possibility to use explosions during digging.

Concrete Batching: An onsite concrete batch will be developed.

2.4.3 Construction Materials

2.4.3.1 Sand and Concrete

Sand and concrete will be sourced from existing quarries, transported to site with 10m³ dump trucks and stock piled on site. Hence, the contractor will not be involved in the quarrying and sand mining activities.

3 GENERATION AND MANAGEMENT OF HEALTH CARE WASTE¹⁴¹⁵¹⁶

Waste from the healthcare industry waste poses various safety and health risk to the environment. At workplace, inappropriate handling or accidental instances can affect health workers, hospital patients by sharp-inflicted injuries, chemical burn from waste sterilization. Unsafe injections especially in developing countries are responsible for significant cases of HIV and hepatitis B&C new infections. While inappropriate disposal of hazardous healthcare waste leads to contamination of water resource and air pollution from hospital incinerators. It is thus imperative that a robust management system of healthcare waste is designed and adequately implemented to ensure environmental sustainability

3.1 Hospital waste generation

Literature indicated that of the total amount of waste generated by health care activities, about 85% is general, non-hazardous waste while the remaining 15% is considered hazardous waste / material that may be toxic, infections or radioactive. The World Health Organization (WHO) has listed the types of waste generated by healthcare facilities as follows;

- **Infectious waste:** waste contaminated with blood and other bodily fluids (e.g., from discarded diagnostic samples), cultures and stocks of infectious agents from laboratory work (e.g., waste from autopsies and infected animals from laboratories), or waste from patients with infections (e.g., swabs, bandages, and disposable medical devices);
- **Pathological waste:** human tissues, organs or fluids, and body parts;
- **Sharps waste:** syringes, needles, disposable scalpels, and blades, etc.;
- **Chemical waste:** for example, solvents and reagents used for laboratory preparations, disinfectants, sterilants and heavy metals contained in medical devices (e.g., mercury in broken thermometers) and batteries;

¹⁴ World Health Organization 2014., Safe management of wastes from health-care activities

¹⁵ IAEA (1996). Regulations for the safe transport of radioactive material. Vienna, International Atomic Energy Agency (IAEA Safety Standards Series, No. ST-1)

¹⁶ WHO. Definition and characterization of health-care waste. In Chartier Y, Emmanuel J, Pieper U, Pr,ss A, Rushbrook P, Stringer R, et al., editors. Safe management of wastes from healthcare activities: 2nd edition.: WHO Press; 2014.

- **Pharmaceutical waste:** expired, unused, and contaminated drugs and vaccines;
- **Cytotoxic waste:** waste containing substances with genotoxic properties (i.e., highly hazardous substances that are, mutagenic, teratogenic, or carcinogenic), such as cytotoxic drugs used in cancer treatment and their metabolites;
- **Radioactive waste:** such as products contaminated by radionuclides including radioactive diagnostic material or radiotherapeutic materials; and
- **Non-hazardous or general waste:** waste that does not pose any biological, chemical, radioactive, or physical hazard.

3.2 Hospital waste management

3.2.1 Waste segregation and packaging

The critical stage to attain appropriate management of health care waste is to ensure that they are segregated in accordance to their type (general and hazardous). General practise in health care facilities uses colour coded plastic bag for waste separation (**Table 4&Table 5**). To ensure effectiveness, segregation should take place where the waste is generated and should be maintained throughout at storage and during transport to treatment areas.

Table 4. Colour Coding for segregation of healthcare waste (Source¹⁷)

Bag Colour	Container type	Waste to be stored	Treatment options
Red	Disinfected container/plastic bag	Waste which is hazardous and will later be incinerated is segregated in this bag. Used Syringes (without needles), soiled gloves, catheters, IV tubes etc should be disposed of in a red coloured bag.	Autoclaving/Micro waving/Chemical Treatment/Incineration

¹⁷ Deepak S Khobragade 2019., Health Care Waste: Avoiding Hazards to Living and Non Living Environment by Efficient Management

Bag Colour	Container type	Waste to be stored	Treatment options
Yellow	Plastic Bag	All dressings, bandages, and cotton swabs with body fluids, blood bags, human anatomical waste, body parts are to be discarded in yellow bags.	Incineration/deep burial
Blue	Cardboard box with marking	Glass vials, ampoules, other glass ware is to be discarded in a cardboard box with a blue marking/sticker	Autoclaving/Micro waving/ shredding
White	Puncture Proof Container (PPC)	White translucent puncture proof container are used to disposed of Needles, sharps, blades etc	Autoclaving/Micro waving/ Chemical Treatment and destruction/ shredding
Black Bags	Plastic Bags	These are to be used for non-biomedical waste. In an HCC, these includes stationary, vegetable, fruit , leftovers, packaging including that from medicines, disposable caps, disposable masks, disposable shoe covers, disposable tea cups, cartons, sweeping dust, kitchen waste etc.	Disposal in specially secured landfill.

Health care waste needs to be treated before disposal. If not treated, pathogens and toxic pollutants will contaminate surface and ground water especially in developing countries with poorly constructed landfill sites (commonly dumping sites). Traditionally, the most common treating method is incineration. Alternative to incineration is sterilization by autoclaving, microwaving.

Table 5. Management of biomedical waste (*Source: WHO*)

Category 1	Human Anatomical Waste (human tissues, organs, body parts)	Incineration ^{@@}
Category 2	Animal waste (animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals/ colleges, discharge from hospitals, animal houses)	Incineration ^{@@}
Category 3	Microbiology & Biotechnology waste and other laboratory waste (wastes from clinical samples, pathology, bio-chemistry, haematology, blood bank, laboratory) cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biological, toxins, dishes and devices used for transfer or cultures)	Disinfection at source by chemical treatment [@] or by autoclaving / microwaving followed by mutilation/ shredding ^{##} and after treatment final disposal in secured landfill or disposal of recyclable wastes (plastics or glass) through registered or authorized recyclers.
Category 4	Wastes sharps (needles, glass syringes or syringes with fixed needles, scalpels, blades, glass etc., that may cause puncture and cuts. This includes both used and unused sharps)	Disposal in secured land fill or Incineration ^{@@}
Category 5	Discarded medicines and Cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)	Disposal in secured land fill or Incineration ^{@@}
Category 6	Soiled Waste (Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, linen, beddings, other material contaminated with blood)	Incineration ^{@@}
Category 7	Infectious Solid Waste (Wastes generated from disposable items other than the waste sharps such as tubings, hand gloves, saline bottles with IV tubes, catheters, glass, intravenous sets etc.)	Disinfection by chemical treatment [@] or Autoclaving or Microwaving followed by mutilation or shredding ^{##} and after treatment final disposal through registered or authorized recyclers
Category 8	Chemical Waste (Chemicals used in production of biological, chemicals used in disinfection, as insecticides etc.)	Chemical treatment [@] and discharge into drains meeting the norms notified under these rules and solids disposal in secured landfill.

[@] Chemical treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.

^{##} Mutilation/ shredding must be such that so as to prevent unauthorized reuse.

^{@@} There will be no chemical pre-treatment before incineration. Chlorinated plastics/ bags shall not be incinerated

3.2.2 *On-site storage, collection, and transport of waste*

Ordinarily, the hospital must have a waste storage facility. The storage facility must have separate storage compartment / rooms based on waste segregation. Waste must not be kept in the storage for longer periods. Generally, during summer, storage could last up to two (2) days while in winter storage may only last for two (2) days and in hot season, storage is recommended only for 24 hours (1 day). Clinical staff must ensure that the waste bags are tightly closed or sealed when they are half-full or three quarter full. The WHO recommends storage for health-care waste as follows¹⁸;

- The storage area should have an impermeable, hard-standing floor with good drainage; it should be easy to clean and disinfect.
- There should be a water supply for cleaning purposes.
- The storage area should afford easy access for staff in charge of handling the waste.
- It should be possible to lock the store to prevent access by unauthorized persons.
- Easy access for waste-collection vehicles is essential.
- There should be protection from the sun.
- The storage area should be inaccessible for animals, insects, and birds.
- There should be good lighting and at least passive ventilation.
- The storage area should not be situated in the proximity of fresh food stores or food preparation areas.
- A supply of cleaning equipment, protective clothing, and waste bags or containers should be located conveniently close to the storage area.

Transportation of waste within the hospital needs to be well coordinated. Waste should be transported with designated wheeled trolleys and containers which should not be used for any other purposes. The trolleys must be (i) easy to load and unload; (ii) does not have sharp edges that could damage waste bags or containers during loading and unloading, and (iii) easy to clean. Vehicle transporting waste are required to be cleaned on daily basis with appropriate disinfectants.

¹⁸ WHO 2021 Handling, storage, and transportation of health-care waste

3.3 Hospital waste treatment

3.3.1 Incineration

Generally, incineration is recognised as a safe and an effective way for the disposal of all kinds of pathological and medical waste due to high temperature that can kill pathogens and toxic material. According the National Waste Management Policy, incineration is the current practice used in Namibia for medical/clinical waste disposal. The policy indicated that if not properly managed it can cause harmful substances which may cause air pollution and other risks to human and the environment.

Emission from incinerator causes odour and emits particulate matter, hydrogen chloride (HCl), nitrogen oxides (NO_x), sulphur dioxide (SO₂), carbon monoxide (CO), and volatile organic compounds (from methane to polycyclic aromatic hydrocarbons (PAH), dioxins and furans (PCDD/F) Dioxins known to be carcinogenic. The acid gas concentrations HCl and SO₂ in the emission are directly related to the chlorine and sulphur content of the waste. While oxides of NO_x represent a mixture of nitric oxide (NO) and nitrogen dioxide (NO₂) which are formed during combustion by: (i) oxidation of nitrogen chemically bound in the waste, and (ii) reaction between molecular nitrogen and oxygen in the combustion air. Lastly, CO is a product of incomplete combustion that could be attributed to insufficient oxygen, combustion time, temperature, and turbulence (fuel/air mixing) in the combustion zone¹⁹²⁰²¹²².

It is thus important that the installation of the incinerator needs to be in line with national and international standard to ensure health and safety to the operators and public.

3.3.2 Sterilization

¹⁹ Locating And Estimating Air Toxic Emissions From Medical Waste Incinerators, U. S. Environmental Protection Agency, Rochester, New York, September 1991

²⁰ Medical Waste Incineration Emission Test Report, Lenoir Memorial Hospital, Kinston, North Carolina, U. S. Environmental Protection Agency, August 12, 1991

²¹ Alvim-Ferraz M.C.M et al 2003., Incineration of different types of medical wastes: emission factors for gaseous emissions

²² Mr. Bernt Johnke (Germany) and reviewed by Robert Hoppaus (IPCC/OECD/IEA), Eugene Lee (US), Bill Irving (USEPA), T. Martinsen (IPCC/OECD/IEA), and K. Mareckova (IPCC/OECD/IEA): Emissions From Waste Incineration

Sterilization is the complete elimination or destruction of all forms of microbial life on an object so that no life will grow on it or from it. This means destroying or disabling all bacteria, fungi, viruses, and spores²³. In health care facilities, it can be achieved by either a physical or chemical processes. Depending on the method, sterilization can be applied to surgical equipment, rooms, floors and counters. Methods of sterilization including moist heat, dry heat, radiation, liquid chemical solutions, and gaseous sterilization. Autoclaves are often used in health facility where an equipment is heated to 30 minutes at 121°C.

3.3.2.1 *Autoclaving*

Autoclaving involves the use of steam for sterilization in an autoclave²⁴. It is accomplished by exposing each equipment to direct steam contact at the required temperature and pressure for the specified time. Thus, steam, pressure, temperature, and time are critical parameters of steam sterilization. The size of the autoclave varies based on the capacity needed for the area where the autoclave will be used. The installation of the incinerator must follow national and international standard to ensure health and safety.

²³ William A. Rutala and David J. Weber 2021., *Disinfection, Sterilization, and Control of Hospital Waste*

²⁴ Autoclaves also known as steam sterilizers, is a machine that uses steam under pressure to kill harmful bacteria, viruses, fungi, and spores on items that are placed inside a pressure vessel.

4 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 Bio-Physical Environment

Windhoek falls within the Tree and Shrub Savanna Biome of Namibia (Atlas of Namibia Team, 2022²⁵). The vegetation type is the Highland Shrubland and the dominant soils are Leptosols and Regosol which supports Shrubs and low trees.

4.1.1 Flora

The proposed site falls mainly within land cover classified as open bush/grassland, which will be cleared during the construction phase and result in the permanent loss of the current land cover within the project footprint. The area with vegetation as well as the surrounding area indicated that, vegetation is mainly short shrubs of encroacher bushes of *Acacia Merifera* and no mature trees were found on site (**Figure 1**).



Figure 4.Baseline vegetation cover (*Source: Red-Dune Consulting CC, May 2024*)

²⁵ Atlas of Namibia Team, 2022, Atlas of Namibia: its land, water and life, Namibia Nature Foundation, Windhoek

It is estimated that at least 79-111 species of larger trees and shrubs (>1m) – Coats Palgrave 1983²⁶, Curtis and Mannheimer 2005²⁷, Mannheimer and Curtis 2009²⁸ – occur in the general area northwest of Windhoek. The most important tree/shrub species occurring in the general area northwest of Windhoek are *Cyphostemma bainesii* (endemic, NC), *Cyphostemma currorii* (NC), *Cyphostemma juttae* (endemic, NC), *Erythrina decora* (Forestry, endemic), *Heteromorpha papillosa* (endemic) and *Manuleopsis dinteri* (endemic) and the most important grass expected in the area is the endemic *Setaria finite* associated with ephemeral drainage lines.

Other species which potentially occur in the general area and viewed as important are *Aloe hereroensis* and *A. zebrina* (Rothmann 2004).²⁹ Many endemic *Commiphora* species are found throughout Namibia and *Commiphora crenato-serrata* potentially also occurring in the general area. Other species with commercial potential that could occur in the general area include *Harpagophytum procumbens* (Devil's claw) – harvested for medicinal purposes and often over-exploited – and *Citrullus lanatus* (Tsamma melon) which potentially has a huge economic benefit (Mendelsohn et al. 2002³⁰).

Although the focus during site visits was on the more visible trees, shrubs, grasses, and more important other species potentially occurring in the general area, many more species – e.g., herbs – occur throughout the area and are viewed as important. During site assessment, most of the areas was cleared and the community of Havana were allowed access to gather the cleared shrubs for their firewood (**Figure 5**).

²⁶ Coats Palgrave, K. 1983. Trees of Southern Africa. Struik Publishers, Cape Town, RSA.

²⁷ Curtis, B. and Mannheimer, C. 2005. Tree Atlas of Namibia. National Botanical Research Institute, Windhoek, Namibia.

²⁸ Mannheimer, C. and Curtis, B. (eds) 2009. Le Roux and Müller's field guide to the trees and shrubs of Namibia Macmillan Education Namibia, Windhoek.

²⁹ Rothmann, S. 2004. Aloes, aristocrats of Namibian flora. ST promotions, Swakopmund.

³⁰ Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. 2002. Atlas of Namibia: a portrait of the land and its people. David Philip Publishers, Cape Town.



Figure 5. Cleared shrubs collected as firewood by Havana community members

4.1.2 Fauna

During site assessment, only small birds were observed, however, baboons were sited outside the study site, an indication that they do frequent / live in the area. During site clearing, no animals were reported harmed or killed. This is expected in all areas within the city boundaries that, once a habitat to biodiversity, many areas will be cleared to make way for development. The clearing however should be done in an environmentally friendly manner to ensure biodiversity protection. The fauna which occurs in the general area of Havana and the site is described as follows;

4.1.3 Reptiles

Around the general area of Havana and surrounding areas, endemic reptile species are known and/or expected to occur in the general area (Griffin 1998 a).³¹Reptiles of greatest concern are probably the tortoises – *Stigmochelys pardalis* and *Psammobates oculiferus* which are often consumed by humans; *Python anchietae* and *P. natalensis* which are indiscriminately killed throughout their range and *Varanus albigularis* as well as the various *Pachydactylus* species geckos of which 80% are viewed as endemic species. Other important species would be the 3 Blind snakes (*Rhinotyphlops* species of which 2 species are endemic) and 2 Thread snakes (*Leptotyphlops* species of which 1 species is endemic) which could be associated with the sandier soils in the area.

³¹ Griffin, M. 1998a. Reptile diversity. In: Barnard, P. (ed.). Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.

4.1.4 Amphibians

Of the 9 species of amphibians expected to occur in the general area, northwest of Windhoek 33.3% (3 species) is of conservation value with 2 species being endemic (*Poyntonophrynus hoeschi* and *Phrynomantis annectens*) (Griffin, 1998b³²) and 1 species (*Pyxicephalus adspersus*) viewed as near threatened (Du Preez and Carruthers 2009³³).

4.1.5 Mammals

Of the 83 species of mammals expected to occur in the general area, northwest of Windhoek, 7.2% are endemic and 36.1% are classified under international conservation legislation.³⁴ The most important species from the general area are probably all those classified as near threatened and vulnerable under international legislation (IUCN 2012) and rare (Namibian Wing-gland Bat, Hedgehog and Black-footed Cat) under Namibian legislation.

4.1.6 Avian Diversity

The most important species known/expected – although not exclusively associated with the general area – are viewed as Monteiro's and Damara Hornbills, Rüppell's Parrot, Rosy-faced Lovebird and Rockrunner, all of which breed in the general area, but not exclusively associated with the area.

³² Griffin, M. 1998b. Amphibian diversity. In: Barnard, P. (ed.). Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.

³³ Du Preez, L. and Carruthers, V. 2009. A complete guide to the frogs of southern Africa. Struik Publishers, Cape Town, RSA

³⁴ Mannheimer, C. and Curtis, B. (eds) 2009. Le Roux and Müller's field guide to the trees and shrubs of Namibia. Macmillan Education Namibia, Windhoek.

4.2 Socio-Economic Environment

4.2.1 National Economic Overview

Namibia is one of the least densely populated country in Southern Africa, with a population of 3.02 million and a surface area of 824 300 km² and 1,500 km long coastline of the Atlantic Ocean³⁵. It shares borders with Angola in the North, South Africa in the South, Botswana in the East, and Zambia and Zimbabwe in the North East. Namibia enjoys political stability and has a stable economy.

The country's climatic conditions is predominantly arid especially the Namib Desert along its west coast and Kalahari Desert in the east. Owing to these limiting climatic conditions, Namibia is one of the hottest and driest country in Sub-Saharan Africa. The country has high climatic variability in the form of persistent droughts, unpredictable, low, and variable rainfall patterns leading to scarcity of water³⁶. Persistent extreme drought conditions caused government to declare national emergencies in 1992/1993, 1995/1996, 2012/2013, 2013/2014, 2015/2016, and 2018/2019.

These droughts severely affected the agricultural sector, a backbone to the livelihood of 70% of the population who are dependent on rain-fed agriculture, majority found in rural areas³⁷. However, the country is rich in mineral resources such as gold, diamonds, and uranium. The country's economy is mainly driven by the mining sector.

Windhoek the capital city of Namibia covers a geographic area of 36 949km², comprising of ten (10) constituencies. The Havana Informal Settlement of Moses //Garob Constituency in which the WDH will be located is amongst the impoverished informal settlements in Windhoek.

³⁵ Namibia Statistics Agency, 2023. Namibia Population and Housing Census Preliminary Report.

³⁶ Namibia Fourth National Communication to the United Nations Framework Convention on Climate Change. Windhoek: Ministry of Environment Forestry and Tourism, March 2020.

³⁷ Namibia Statistics Agency, 2019. The Namibia Labor Force Survey 2018.

https://d3rp5jat0m3eyn.cloudfront.net/cms/assets/documents/Labour_Force_Survey_final_-_2018.pdf

4.2.2 *Baseline Socio-Economic Conditions*

Since 1990, Namibia is known to have made significant progress on economic and social indicators where poverty rate has generally declined³⁸. As per the World Bank classification, the country is characterized as a higher middle-income in 2009³⁹. This characterization is referred to as Middle-Income Trap (MIT), theoretically defined as “an economic environment of policy misdiagnosis when countries fail to match their growth strategies with prevailing structural characteristics of their economies”⁴⁰.

In 2023, the Namibia economy grew by 4.2%; and Gross domestic product (GDP) is expected to remain above 3% subject to high uncertainty around the possible implementation of large-scale projects. Poverty is expected to improve but remain high at 17.2% in 2024⁴¹.

The economic environment of policy misdiagnosis in Namibian economy is characterized by high socioeconomic inequalities resultant of colonialism and apartheid, high level of unemployment and poverty. The absolute measure of the economic performance based on GDP per capita mask the reality of the country being the second in world with high income inequalities, second to South Africa, where the two countries experienced Apartheid brutality that was based economic exclusion of black majority.

To-date, the country continues to experience systematic exclusion of the black majority from full participation in formal economy. Black majority are mainly found in informal economy.

4.2.3 *National Population Demography*

The 2024 population demographic for Namibia are summarized as follows:

- The Namibia population figure from the 2023 PHC is 3.02 million people (**Figure 6**). The population has increased by 909,324 people from the 2.1 million people recorded in 2011, constituting an annual growth rate of 3.0% per annum. This rate is double what was observed in the previous intercensal period (2001 to 2011 which was 1.4% per annum) and

³⁸ <https://thedocs.worldbank.org/en/doc/bae48ff2fefc5a869546775b3f010735-0500062021/related/mpo-nam.pdf>

³⁹ Source: World Bank (<http://data.worldbank.org/about/country-and-lending-groups>)

⁴⁰ Bernie Zaaruka and 1 Charlotte Tjeriko 2019., Is Namibia in a middle – income trap? A comparative analysis

⁴¹ <https://thedocs.worldbank.org/en/doc/bae48ff2fefc5a869546775b3f010735-0500062021/related/mpo-nam.pdf>

is the highest observed since independence. At this rate, by the year 2050 the population of Namibia would be over 6 million.

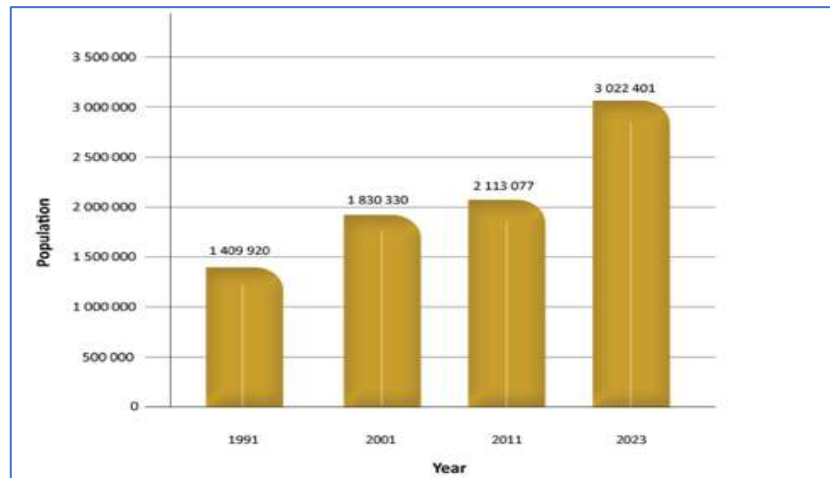


Figure 6. Trend of the Namibia Population (*Source: NSA PHC 2023*)

- Females make up a greater proportion of the population in the 2023 PHC as has been the trend for the past four censuses.
- The population is growing, at an increasing rate compared with previous censuses.
- Khomas region remains the most populous region in Namibia with a population of 494,729 people. Ohangwena region closely follows as the second most populous region with a population count of 337,729 people. These two regions are respectively four and three times bigger than the size of the least populous region, the Omaheke Region. Omusati is the third most populous region, with a population count of 326,671 people and these are similar trends as observed in the 2011 census.
- Erongo region is the fifth populous region, whose population in 2011 was 150 809 and grew to 240 206 representing 59.3 % change and 7.9% of the total population.
- //Kharas Region and Erongo Region recorded the smallest household size of 3.1 people per household while the largest household size was recorded in Kavango East and Kavango West Regions, with a household size of 5.3 and 5.5 respectively. In nine out of the 14 regions, households had less than four members, on average.
- Average household size, which has been on the decline since 1991, is 3.8 persons per household.
- The total number of households has grown by 291,500 (representing a 62.7% increase) over the 464,839 households enumerated in 2011. Household size decreased by 0.6 persons per household from 4.4 in the 2011 census.

- The region with the highest population density is Ohangwena with 31.5, persons per square kilometre, followed by Oshana Region with 26.7 persons per square kilometre, and Khomas Region with 13.4 persons per square kilometre. //Kharas Region, Hardap, and Kunene represent the most sparsely populated regions with 0.7 and 1.0 persons per square kilometre respectively (**Figure 7**).
- It is observed that from 2011, urban population increased from 903 434 to 1,494,992 people in 2023 while the rural population increased from 1,209 643 in 2011 to 1,527,409 in 2023. This represent 65.5 and 26.3 percent increase in urban and rural population respectively

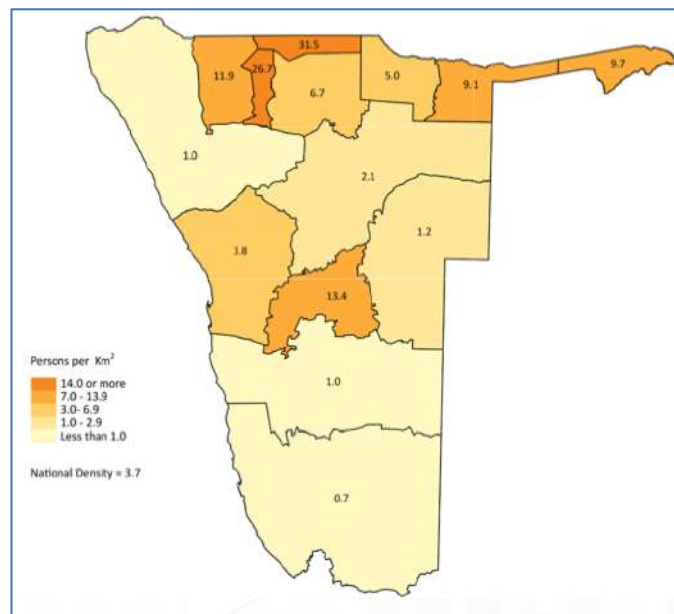


Figure 7. Namibian Regional Population Density

4.2.4 *Khomas Population Demography*

Located in Khomas Region in central Namibia, Windhoek is the capital city of Namibia and the seat of the central Government as declared by the Constitution of the Republic of Namibia. This means that the capital city houses all the main offices of governmental ministries, educational institutions, embassies, and international organisations, among others.

Windhoek is the social, economic, political, and cultural hub of the country and its roads serve as networking veins to the rest of the towns in Namibia. According to the Namibian 2023

census results, the population of Windhoek stands at 494 605 inhabitants⁴². In 2011, Khomas Region had a population of 342 141 which means that the population has in the region has increased by 70%. The annual growth rate is pegged at 5.8% per year, which is almost double that if the national growth rate. Unemployment rate is currently at 33.4% while the GDP is at 4.2%⁴³. Such a growth rate translates to a lot of pressure on infrastructure and provision of social amenities for the residents in Windhoek.

4.2.5 Havana Informal Settlement Population Demography

Havana is an informal settlement within Moses //Garob Constituency in Windhoek. This settlement was established approximately two decades ago when the city of Windhoek experienced a high rate of urbanization and influx of people in search of better economic opportunities. The population in Moses //Garob Constituency stands at 68 932 inhabitants, making it the second densely populated constituency in Khomas Region¹. Many of the inhabitants do not own the land, but they rent at nominal rates which results in overcrowded informal structures.

Social amenities are limited in the area, communal water taps are found at designated water points and a few communal toilets results in people sharing the facilities. The limited water facilities in Havana often impact the health of residents. In 2021, high cases of hepatitis E were recorded from Havana informal settlement consequently due to overcrowded and poor living conditions; as well as limited safe drinking water, sanitation, and hygiene⁴⁴. Electricity is available at few places and many residents have illegal connections.

There are two schools in the area: Havana Secondary Project School and Havana Primary School. The well-known Havana four way is a commonly known hub of economic activities, whereby many street vendors line up along the streets to sell their goods. This place is also notorious for traffic jams due to the absence of traffic lights that would assist in regulating vehicle movements. The current construction and upgrade of the Eneas Peter Nanyemba road (former Monte Christo Road) is expected to smooth traffic flow in the area.

⁴² Namibia Statistics Agency, 2023. Namibia Population and Housing Census Preliminary Report.

⁴³ Namibia Statistics Agency, 2023. Namibia Population and Housing Census Preliminary Report.

⁴⁴ Nangolo, 2021. Knowledge, Attitude and practices regarding the risk of hepatitis E virus among the residents of Havana Informal settlement in Windhoek

4.3 Heritage and Archaeology

The United Nation Education Scientific Cultural Organization (UNESCO) provide the following definition of Heritage and Archaeology as follows;

“World Heritage is the designation for places on Earth that are of outstanding universal value to humanity and as such, have been inscribed on the World Heritage List to be protected for future generations to appreciate and enjoy. Places as diverse and unique as the Pyramids of Egypt, the Great Barrier Reef in Australia, Galápagos Islands in Ecuador, the Taj Mahal in India, the Grand Canyon in the USA, or the Acropolis in Greece are examples of the 1007 natural and cultural places inscribed on the World Heritage List to date”.

“Archaeology studies human cultures through the analysis of their historical traces and their context. It aims at explaining the origin and development of civilizations, as well as the understanding of culture and history.

The World Heritage Convention, created in 1972 is aimed to the Protection of the World Cultural and Natural Heritage. Namibia is a signatory to this convention, henceforth, the Namibian government has committed to the protection of cultural and heritage through the National Heritage Council Act 27 of 2004. This act provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Register; and to provide for incidental matters.

The proposed project site is not known to have any historical significance prior to or after Independence in 1990. The specific area does not have any National Monuments and the specific site has no record of any cultural or historical importance or on-site resemblance of any nature. No graveyard or related article was found in the area. However, in line with world best practise, a chance find for the heritage and archaeological materials is developed

4.3.1 *Chance find.*

A chance find is an important aspect towards the protection and conservation of heritage and archaeological materials. It provides awareness to all people involved in the development of

the project to ensure that such materials are not destroyed. The proponent must implement a chance find procedure for the project as follows;

1. All employees / contractors must be trained on the possible find of archaeological materials before the commencement of the project to create awareness. The training must be provided by an expert to ensure adequate understating of archaeological materials.
2. The proponent / employees / contractors must implement steps to be taken for archaeological material finding (Heritage (rock painting and drawings), human remains or artefacts) are unearthed through the following procedures;
 - i. Stopping the activity immediately
 - ii. Informing the operational manager or supervisor
 - iii. Cordoned of the area with a danger tape and manager to take appropriated pictures.
 - iv. Manager/supervisor must report the finding to the following competent authorities, National Heritage Council of Namibia (061 244 375) National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).
3. Archaeological material must NOT be touched. Tempering with the materials is an offence under the heritage act and punishable upon conviction by the law.

4.4 Physical Environment

4.4.1 Climate

The construction of WDH and operational activities falls within the boundaries of the CoW. Windhoek has a hot semi-arid climate, according to Köppen climate classification as the annual average temperature is between 18 – 20 °C (**Figure 8**). The temperature throughout the year would be called mild, due to altitude influence. The annual average high and low temperature range is 13.6 °C. The coldest month is July, with an average temperature of 13.1 °C, while the hottest month is December, with average temperature 23.5 °C. Precipitation is abundant during the summer season, and minimal during the winter season. The average annual precipitation is between 300 to 350 (**Figure 9**). Rainfall is experienced mostly within the summer months, with some thunderstorms experienced during October to April. Due to its location near the Kalahari Desert, the city receives 3,605 hours of sunshine.

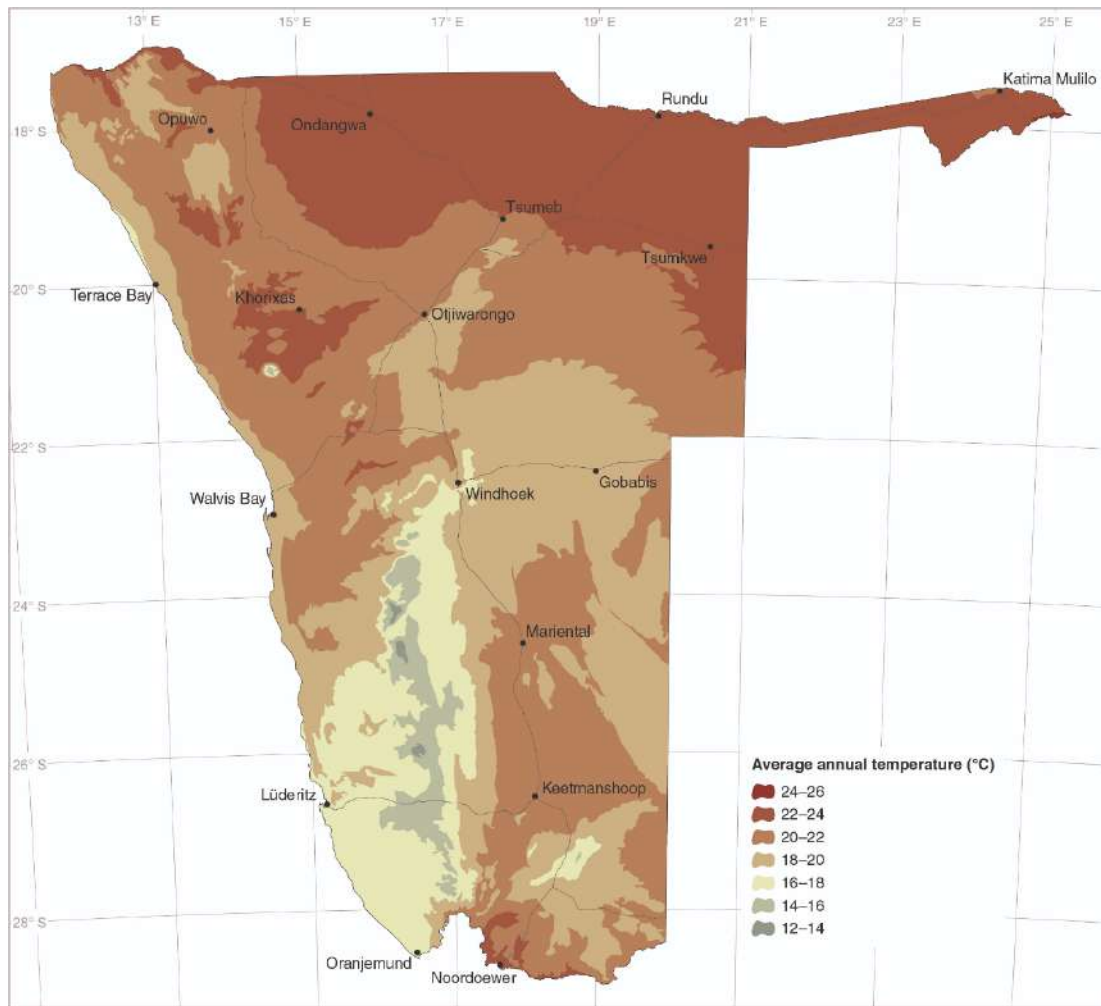


Figure 8: Average annual Temperatures in Namibia (Atlas of Namibia Team, 2022⁴⁵)

⁴⁵ Atlas of Namibia Team, 2022, Atlas of Namibia: its land, water and life, Namibia Nature Foundation, Windhoek

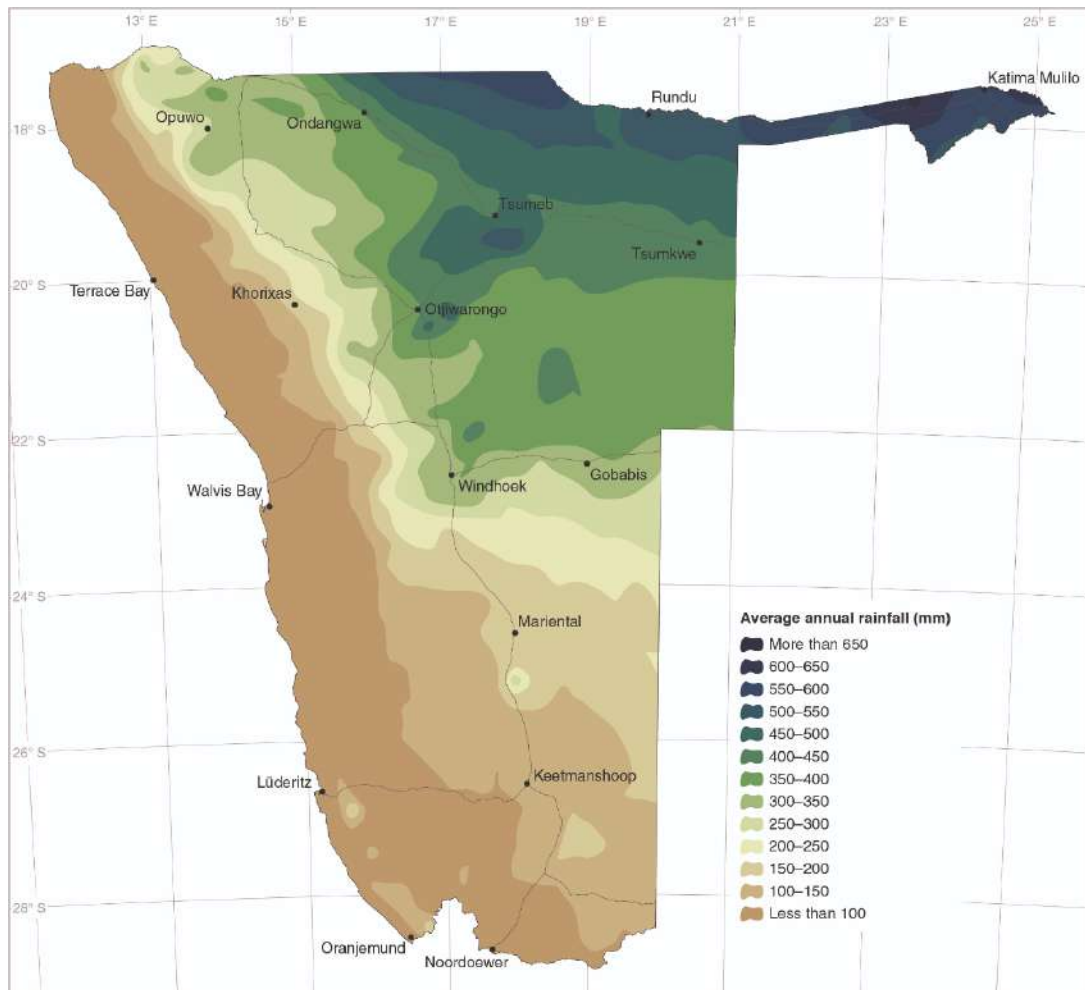


Figure 9: Annual average rainfall in Namibia (Atlas of Namibia Team, 2022⁴⁶)

4.4.2 Geology and Topography

The main body of the Khomas Hochland consists of mica schists of the Kuiseb and schists and mixtites of the Chuos Formation (**Figure 10**). The mica schists of the Kuiseb Formation are dissected by a narrow band of ortho-amphibolites of the Matchless Member. The southern rim is formed by hardened quartzites of the Auas Formation, before merging with older rocks (granites and metamorphites of the Rehoboth Sequence) of the Kalahari Craton. To the north of the Kuiseb formation, intrusive granites resulted also in the formation of several marble ridges (**Figure 11**).

⁴⁶ Atlas of Namibia Team, 2022, Atlas of Namibia: its land, water and life, Namibia Nature Foundation, Windhoek

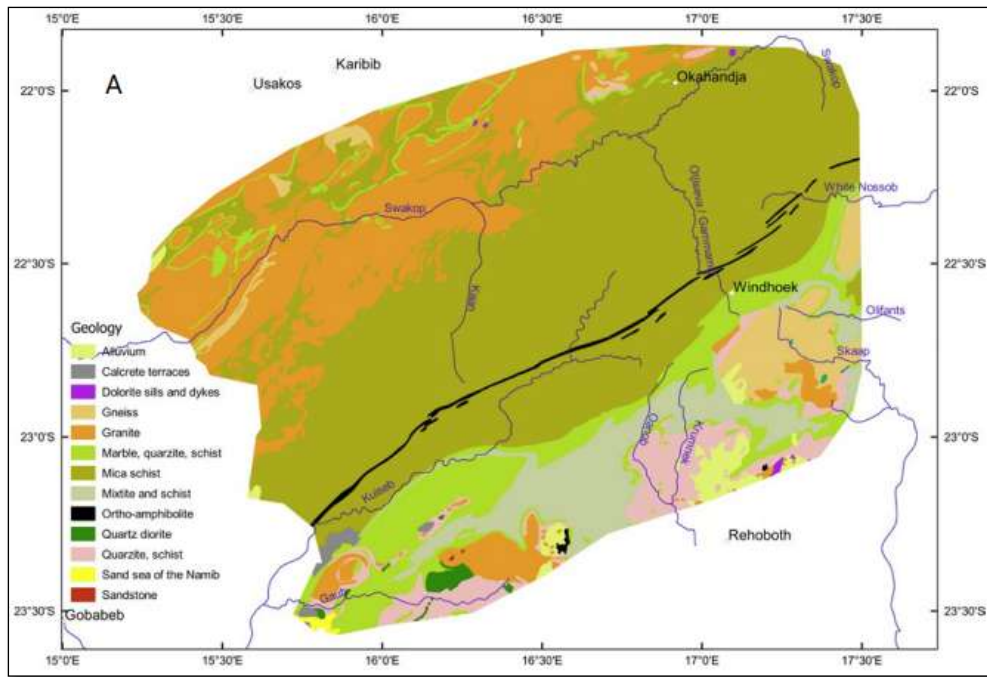


Figure 10: Simplified geological map of the study area, indicating the major lithological substrates (Strohbach, B., 2021)⁴⁷

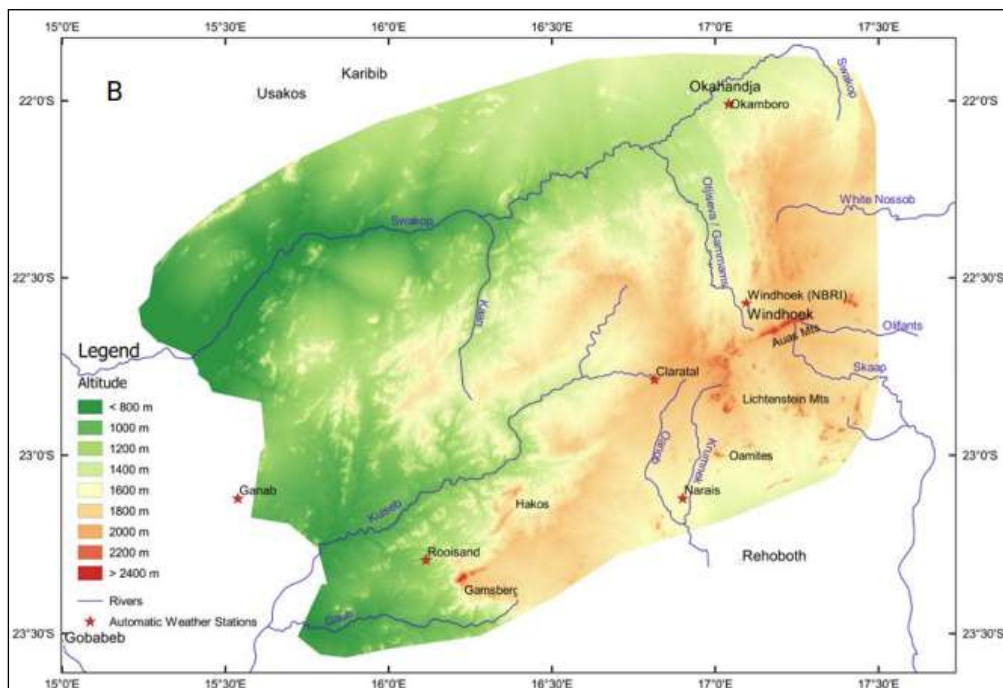


Figure 11: Topography of the study area, indicating several landmarks and major rivers draining the Khomas Hochland ((Strohbach, B., 2021)¹

⁴⁷ Strohbach, B., 2021, 'Vegetation survey of the Khomas Hochland in central-western Namibia: syntaxonomical descriptions', *Bothalia* 51(2), a4. <http://dx.doi.org/10.38201/btha.abc.v51.i2.4>

The escarpment of the Khomas Hochland raises from the Namib desert plains at about 900 m above sea level (asl) to well over 1 400 m asl. The central Khomas Hochland forms a deeply dissected, steep mountainous highland, raising to over 2 000 m asl in places (**Figure 11**).

The geology of the central region is dominated by the Damara Sequence. This sequence underlies most of central and northern Namibia. The basal arenitic succession of the Nosib Group was laid down between 850 and 700 million years ago.

Windhoek owes its existence to the presence of springs, which provided an ample supply of water when the area was first settled. The map below shows the position of springs and the Windhoek aquifer. The mostly thermal springs emerged from deep-seated faults in quartzites that form the main aquifer (**Figure 12**).

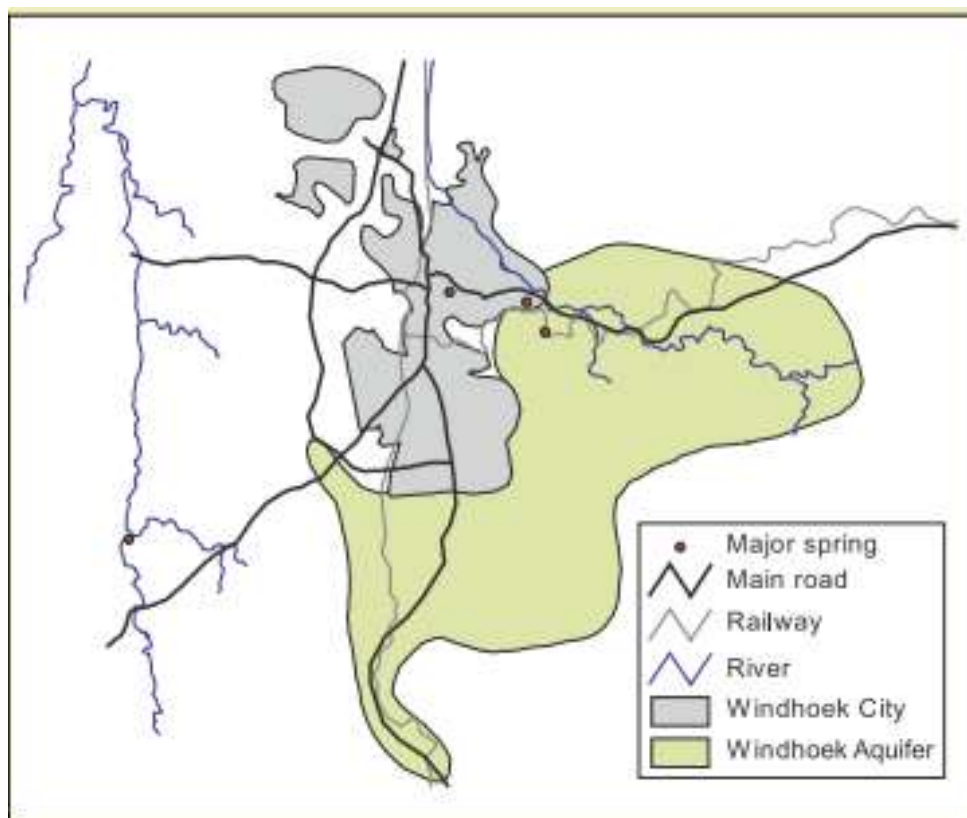


Figure 12: Map of Windhoek city and aquifer ⁴⁸

⁴⁸ Christelis and Struckmeier (eds), 2011. Groundwater in Namibia - an explanation to the Hydrogeological Map. Windhoek. Ministry of agriculture, Water, and Land Reform.

The springs dried up when pumping of groundwater from boreholes started in the 1920s. The wellfield currently consists of approximately 50 boreholes and contributes about 10 % of the city’s total water supply. Another 10 % is provided by wastewater reclamation, but most of the town’s water comes from a surface water supply scheme consisting of three interconnected dams.

4.4.3 Hydrology and Drainage

In general, Windhoek falls within the Central Namib – Windhoek Area hydrogeological region (**Figure 13**).

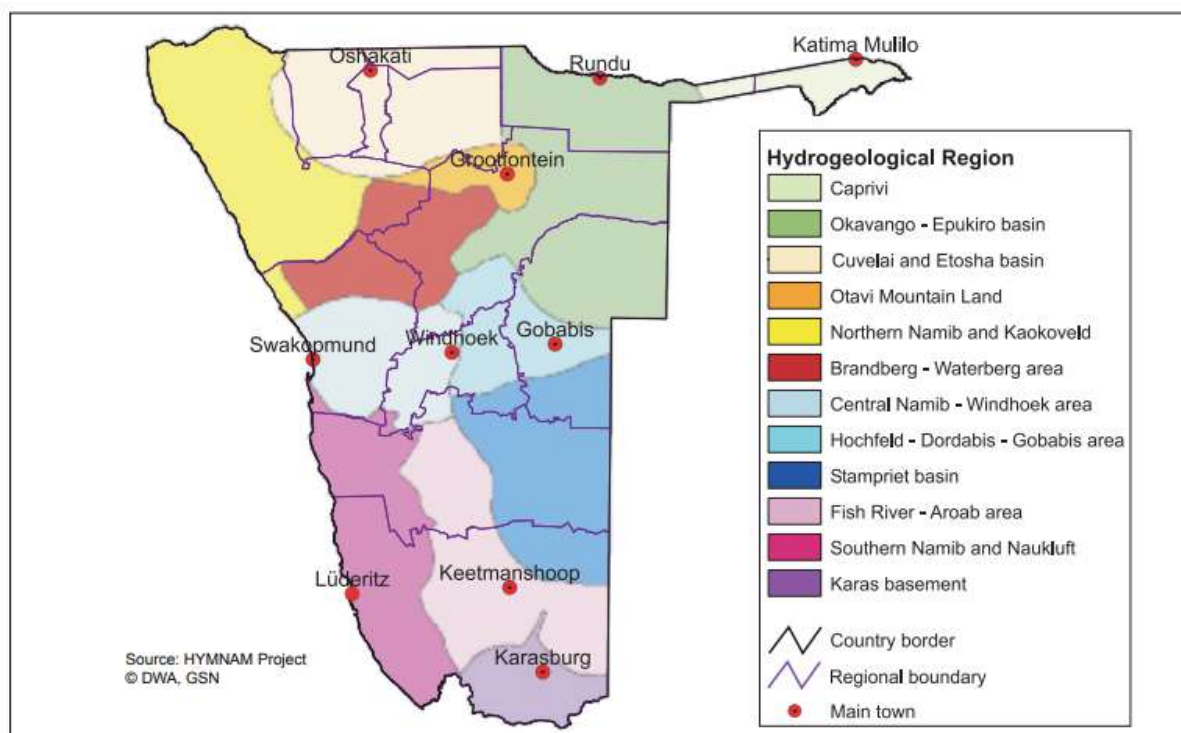


Figure 13: Groundwater basins and hydrogeological regions in Namibia (Christelis and Struckmeier, 2011)⁴⁹

The Central Namib -Windhoek region extends from Windhoek in the east to the Atlantic Ocean in the west. The Ugab and Kuiseb rivers form the northern and southern boundaries. Windhoek is situated in a valley surrounded by the Auas, Eros and Otjihavera mountains, which form the country’s central watershed from where large river systems radiate in all directions. The Swakop and Kuiseb rivers flow to the north and west, while the Oanob drains to the south and

⁴⁹ Christelis and Struckmeier (eds), 2011. Groundwater in Namibia - an explanation to the Hydrogeological Map. Windhoek. Ministry of agriculture, Water, and Land Reform.

the Nossob and Olifants to the east. The Windhoek valley is a geological graben structure bounded by north-south striking fault systems in the east and west.

The Khomas Hochland is a deeply dissected mountain land of intermediate elevation, where the geomorphology is closely related to the underlying geology. The fracture pattern of the Kuiseb schist determines the direction of the drainage system. The area has a thin soil cover and supports a thornbush savanna, which is ideal for cattle ranching. West-flowing rivers have carved deep gorges (e.g., Kuiseb canyon) across the Khomas Hochland, especially where they break through the Great Escarpment.

The aquifers of Namibia have been classed according to whether they are consolidated (hard rock) or unconsolidated; according to the type of porosity and permeability they show (porous/intergranular or fractured, fissured or karstified); and according to how much groundwater resource potential they have. The hydrogeological map, shown in Figure 14 below, shows the distribution of these aquifer types across the country.

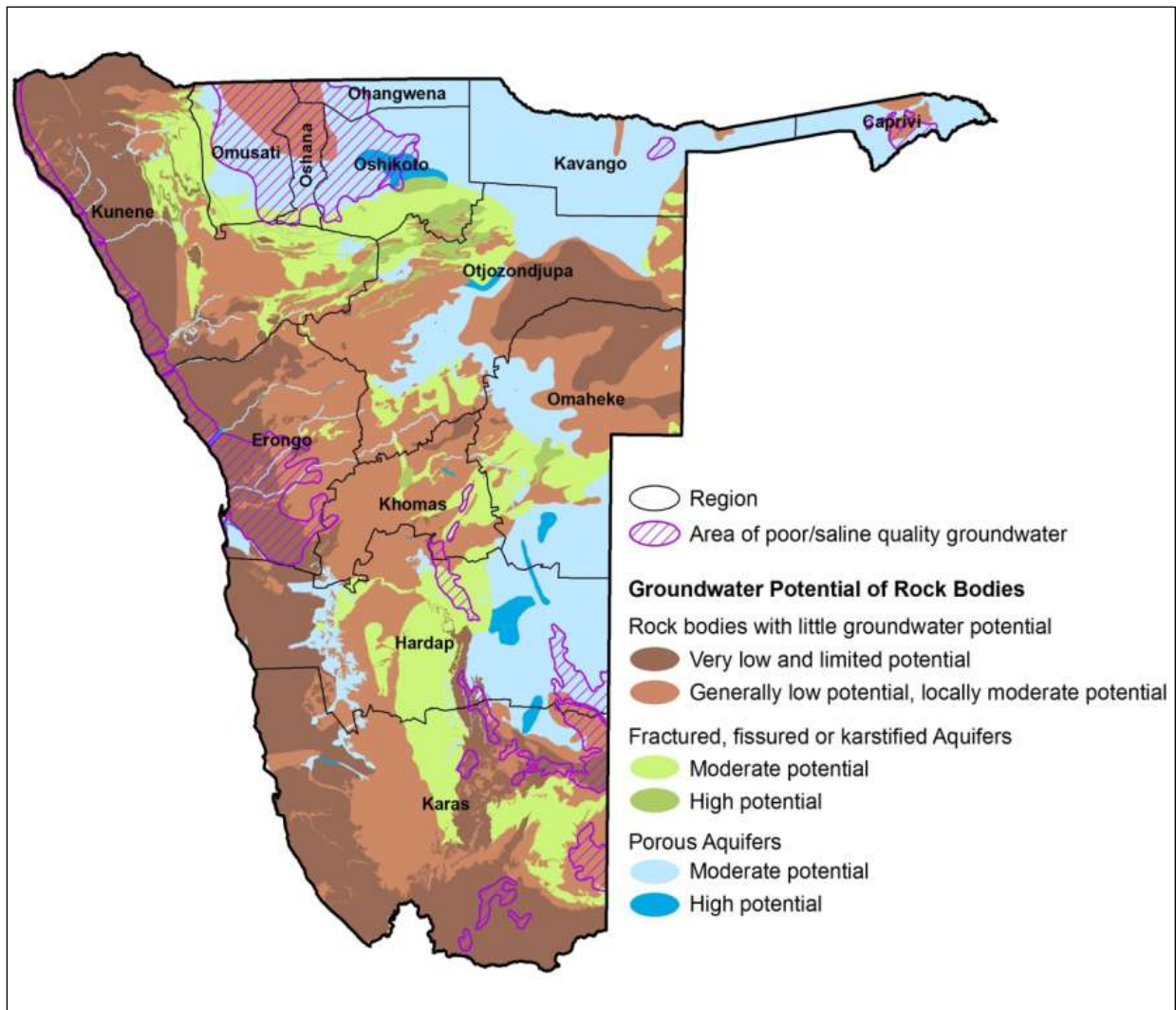


Figure 14: Hydrogeological map of Namibia. (Christelis & Struckmeier 2011)

Only the quartzite aquifer in the Windhoek area can be classified as high yielding. The Windhoek aquifer is developed in an area that exhibits numerous north to north-west striking faults and extensive jointing. The high yields of the Auas quartzites are due to secondary porosity derived from brittle deformation, while the interbedded schist layers were more susceptible to plastic deformation.

The Windhoek aquifer is recharged mainly by direct infiltration of rainwater over areas of quartzite outcrop. The Khomas Hochland situated between the Kuiseb and Swakop rivers is underlain by mica schist with occasional quartzite intercalations. The prevailing fracture directions are north-south, north-west, and north-east (**Figure 15**).



Figure 16. Area topography on the north east of the study site

The site has a water course / drainage stream running in middle formed by relatively low-lying converging hills which forms part of the north-west flow of Otjiseru River (**Figure 17**).



Figure 17. Site topography and drainage

Overall, the watercourse through the site drains in a north-easterly direction where it converges with the overflow watercourse from Goreangab dam, enroute to the Swakopoort dam. (**Figure 18, Figure 19**).

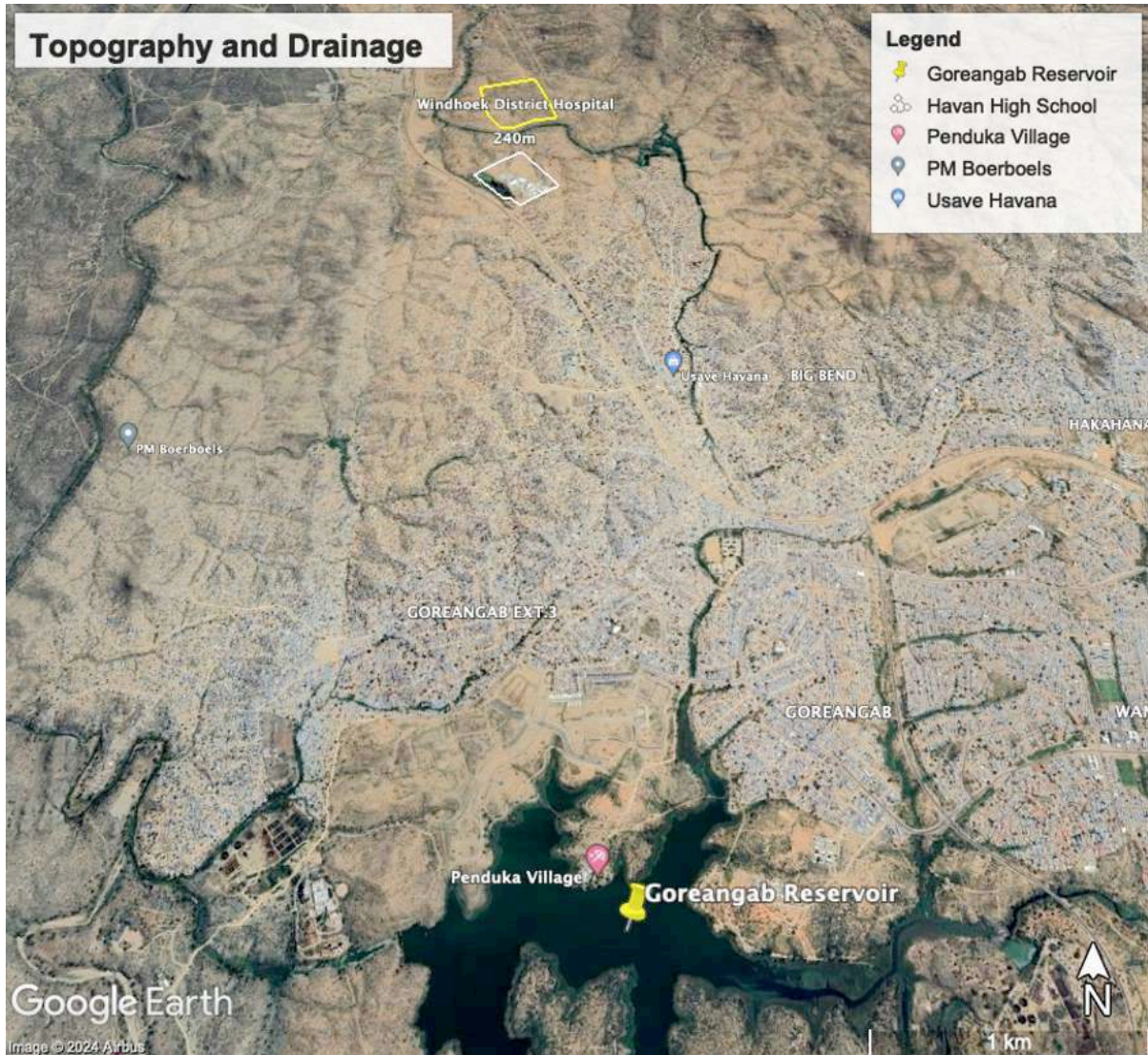


Figure 18: Aerial topography and drainage system



Figure 19: Drainage stream with tall grass and drainage sieving point

5 PROJECT ALTERNATIVE

The EMA requires an ESIA to explore various project alternatives which aims to ensure that a chosen project component does not have significant impact to the environment. Section 1 of ESIA regulation defines “alternatives” as different means of meeting the general purpose and requirements of the activity, which may include alternatives to -

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity; and
- (e) the operational aspects of the activity;

Project alternatives ranges from not implementing the project (no go alternative), when the environmental impacts are severe, or there is high degree of uncertainty. Other alternative considers the project site, technology, and equipment to be used. The description of alternatives is as follows;

5.1 Site Alternative

The location is strategically located to bring health service closer to the low-income households who relies on public health. The site is secluded, does not have critical environmental concern. The area topography is highly undulating which could cost more for the project.

5.2 Designs and Layout⁵⁰

The designs and layout incorporated the principle of green building, which ensure an environmentally friendly approaches for a healthy community. The built environment influences health and is responsible for between 40% and 60% of greenhouse gas emissions in cities making buildings a major contributor towards global climate change, toxic pollution, biodiversity loss and more through building production and maintenance⁵¹. The urgency of

⁵⁰ Adopted from New WINDHOEK DISTRICT HOSPITAL: BRIEF- Operational Narrative : Version 3-
Revision 6

⁵¹

reducing greenhouse gas emissions and other environmental impacts is therefore driving the change to a more sustainable built environment which the Brundtland report (1987) defines as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The greater the amount of energy consumed in a hospital, the greater the release of toxic wastes to the environment, causing damage which may put human lives at risk of other diseases and even death.

Hospitals utilize more resources and produce more waste materials than most other commercial buildings of a similar size. Healthcare facilities can consume more than 1192 litres of water per bed every day. In a typical healthcare centre, lighting, water heating, and space heating can account for more than 65% of the energy consumption.

The health sector has the potential, through its market power, to influence the construction industry to develop safer, more resilient, greener and healthier building products and systems. It is therefore essential to ensure that the construction of the new hospital, implements the principles of green design and concepts into the planning, design, operation, management and maintenance of the building to reduce the impact on the environment.

The guiding principles of green buildings should:

- Aspire to carbon-neutral building operation;
- Conserve the natural environment - Protect and restore natural habitat; minimize the combined footprint of building, parking, roads and walks;
- Use high reflectance roofing and paving, or “green roof” systems and pervious paving, in order to reduce urban heat island impacts, manage stormwater and promote habitat;
- Design within local natural and social contexts in order to better integrate the building with the community and natural environment;
- Site facilities in accordance with solar orientation and prevailing wind;
- Employ passive systems wherever possible to provide increased resilience and redundancy – use narrow floor plates for daylighting and natural ventilation;
- Prioritize health impacts of material extraction, transport, use and disposal in assessing them for use in health care settings, and use materials that are replenishable and support human and ecosystem health in all phases of their life cycle;
- Utilise locally sourced materials and skills;
- Be locally appropriate through the use of local and regional materials (reducing transportation energy);

- Avoid materials such as lead and cadmium-containing paint and coatings, as well as asbestos;
- Substitute materials containing persistent bio-accumulative toxic chemicals (PBT's), including PVC, CPVC, and halogenated and brominated flame retardants, with safer alternatives;
- Create civilized built environments that foster inhabitant choice and control, advanced indoor air quality (through natural ventilation and mechanical systems), lighting and acoustical settings that reduce stress and support health and productivity;
- Refer to guidelines created by national or regional green building organizations;
- Advocate for policy guidelines and public funding that support green and healthy building;
- Use resources efficiently and effectively;
- Plan on a life-cycle basis;
- Minimise waste;
- Use renewable resources - utilize salvaged and recycled materials (reducing energy otherwise expended on new production);
- Leave a positive legacy.

Core measures that green principles should adopt include the use of energy-efficient lighting systems and medical equipment and use of tech-enhanced renewable energy systems. In addition to using energy more efficiently, the design should investigate how to create designs that allow more daylight exposure and natural ventilation into the environment.

Improving the air quality is an essential component of designing the green hospital. The design will need to explore efficient ways of reducing the air content of toxins and contaminants across all aspects of the building. Globally, green buildings are anticipated to save as much as 84 gigatonnes of carbon dioxide by 2050. This is significant and makes the case for striving for a “green hospital” imperative.

6 LEGAL AND POLICY FRAMEWORK

6.1 National Regulatory framework

Table 6. Policy and Legal framework governing the project

Legislation	Summary	Applicability
The Namibian Constitution	The Namibian constitution is the supreme law of the country which is committed to sustainable development. Article 95(1) of the Constitution of Namibia states that:- “The State shall actively promote and maintain the welfare of the people by adopting policies aimed at ... The maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.	Contact an ESIA to maintain the ecological process and diversity of the project area
The Environmental Management Act	The Environmental Management Act No 7 of 2007 aims to promote the sustainable management of the environment and the use of natural resources and to provides for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters. The acts provides a list of activities that may not be undertake without an environmental clearance certificate. Further, the Act ensures that; <ul style="list-style-type: none"> (a) Potential threats are considered timeously (b) A comprehensive stakeholder’s consultations is conducted and all Interested and affected parties are given an opportunity to comment on the project (c) Decision are robust by considering the above-mentioned activities 	Statutory requirement of the ESIA and guidelines

Legislation	Summary	Applicability
Draft Pollution Control and Waste Management Bill	This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill will repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976) when it comes into force. The Bill also provides for noise, dust or odour control that may be considered a nuisance. Further, the Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any activity relating to waste or hazardous waste management.	Management of Waste
Atmospheric Pollution Prevention Ordinance Act No.11 of 1976)	This Ordinance serves to control air pollution from point sources, but it does not consider ambient air quality. This ordinance is being repealed by the proposed Pollution Control and Waste Management Bill. Any person carrying out a ‘scheduled process’ which are processes resulting in noxious or offensive gases typically pertaining to point source emissions must obtain a registration certificate from the Department of Health.	Emission of noxious gasses from Incinerators.
Environmental Policy framework (1995)	This policy subjects all developments and project to environmental assessment and provides guideline for the Environmental Assessment. Its provision mandate that Environmental Assessment take due consideration of all possible impacts and incorporate them in the development or planning stages.	General requirement of the ESIA and guidelines
The Occupational Safety and Health Act No. 11 of 2007;	Safety: A safety risk is a statistical concept representing the potential of an accident occurring, owing to unsafe operation and/or environment. In the working context “SAFETY” is regarded as “free from danger” to the health injury and to properties.	Handling of dangerous good, fire and explosion risk

Legislation	Summary	Applicability
	<p>Health: Occupational Health is aimed at the promotion and maintenance of the highest degree of physical, mental, and social wellbeing of workers in all occupations. This is done by ensuring that all work-related hazards are prevented and where they occur, managed.</p>	Maintain a health working environment
<p>Public and Environmental Health Act, 2015 (Act No. 1 of 2015)</p>	To provide a framework for a structured uniform health system within Namibia; to consolidate the laws relating to state hospitals and state health services, and to regulate the conduct of state hospitals and state health services; to provide for financial assistance for special medical treatment of State patients; and to provide for incidental matters.	To ensure hospital is in line with the Namibian's health laws
<p>Hospital and Health Facilities Act No. 1 1998</p>	The regulation of all health facilities and how they interlink.	The use of public hospital bed or space by private hospitals. Application of Dispensing of Medicine License
<p>Public Health Act No. 36 of 1919</p>	The Act serves to protect the public from nuisance and 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 handling and disposing of hazardous and Bio-Medical waste must not pose health hazard to the public
<p>Water Resources Management Act (2004)</p>	This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources.	Prevention of water pollution and optimum usage of water resource.

Legislation	Summary	Applicability
Water Act No, 54 of 1956	<p>This act states that, all water resources belongs to the State. It prevents pollution and promotes the sustainable utilization of the resource. To protect this resources, this act requires that permits are obtained when activities involve the following;</p> <ul style="list-style-type: none"> • Discharge of contaminated into water sources such as pipe, sewer, canal, sea outfall and • Disposal of water in a manner that may cause detrimental impact on the water resources 	Prohibition of contaminated water into water body
Labour Act No. 6 of 1992	<p>This Act aims to regulate labour in general and includes the protection of the health, safety, and welfare of employees. The 1997 Regulations relating to the Health and Safety of employees at work sets out the duties of the employer, welfare and facilities at the workplace, safety of machinery, hazardous substances, physical hazards, medical provisions, construction safety and electrical safety.</p>	No employer shall require or permit an employee to work in an environment that is deemed unfit without protective measures in place.
Regional Council Act, 1992 (Act No. 22 of 1992)	<p>The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage, and evaluate development at regional level.</p>	Adhere to regional by laws
Soil Conservation Act No. 76 of 1969	<p>This act promotes the conservation of soil, prevention of soil erosion.</p>	Improper planning of construction can cause soil degradation and erosion through earth work.
Hazardous Substances	<p>This ordinance gives provision to control the handling of hazardous substance in all circumstances, such as manufacturing, imports and exporting of these to ensure human and environmental safety.</p>	Handling of Chemical, Medicines, Human Anatomical Parts, Blood

Legislation	Summary	Applicability
Ordinance No. 14 of 1974		Contaminated items and disposing.
National Heritage Act No. 27 of 2004	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration, or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits such as	Scrapping and excavation may unearth archaeological material.

7 STAKEHOLDER CONSULTATION

Section 21 of the ESIA Regulations requires the undertaking of an ESIA to follow a robust and comprehensive stakeholder consultation. This is an important process, because it gives members of the public, I&APs an opportunity to comment or raise concerns that may affect their socio-economic or general environment consequent of the project. Furthermore, it solicits crucial local knowledge that the Environmental Assessment Practitioner (EAP) may not have.

7.1 Site Notices and invitation to register as I&AP

In accordance with Section 21 (a) a notice board was placed at the project site to inform and create public awareness about the project and the application of ECC.



Figure 20. Site notices at project site

7.2 Written Notice

In accordance with Section 21 (b) written notices (see **Annex 1**) was sent out to the public, to inform them and create awareness about the project and the application of ECC.

7.3 Newspaper Advertisement

In accordance with Section 21 (c), the project must be advertised once a week for two consecutive weeks in two newspapers that are widely circulated in Namibia. The public was notified through Newspaper adverts as per (Table 7 and Annex 2).

Table 7. Newspaper Adverts

Newspaper	Advert	Date Advertised
The Namibian	1 st Advert	06 June 2024
	2 nd Advert	13 June 2024
New Era	1 st Advert	06 June 2024
	2 nd Advert	13 June 2024

7.4 Public Meeting

In accordance with Section 21 (5,6) a public meeting was undertaken at Havana High School near the project location (**Figure 21 and Annex 3**). The meeting was mainly attended by the staff of the MoHSS. RDC presented a power point presentation outlining the regulatory requirement in accordance to the EMA and the process to be followed for applying the ECC.

The MoHSS staff had few concern pertaining to some design component as follows;

- i. The Incinerator to be constructed must be of a bigger capacity to be able to handle big volumes of waste that will be coming from the other public hospitals around Windhoek. The current incinerator at Katutura Hospital is small in capacity and is often malfunctioning which results in MOHSS resorting to the use of City of Windhoek's incinerator at a higher cost.
- ii. Consider adequate cool rooms to store waste in cases where the incinerator breaks down or there are long periods of waiting while the incinerator is operating.
- iii. The waste handling or storage area must be big enough to handle bulk storage of medical waste while awaiting disposal.
- iv. Consider ample parking space. Parking is a challenge at the existing public hospitals in Windhoek.

- v. It is recommended that the design must make provision for teaching and office blocks to enable delivery of practical lessons at the hospital.
- vi. Further, the staff recommended that the draft design for the hospital be made widely availed to enable input from the ministry's staff members.

Overall, general member of the public / Havana communities has been calling RDC after seeing the site notices / advert. Their concern is to be considered for job opportunities by the project.



Figure 21. Public meeting at Havana High School

8 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

8.1 Introduction

This chapter outlines the potential impacts (negative and positive) associated with the construction and operation of the WDH. The identified impacts are categorized into three components: impacts on the biophysical environment; Impacts on the health and safety; and impacts on socio-economic. It further provide the criteria used for impact assessment. A project of this magnitude is not envisioned to be decommissioned, rather, maintenance and/or upgrade of its infrastructures will be taking place from time to time. The developed Environmental Social Management Plan (ESMP) for the project is a living document. Hence, impacts that could be identified during future maintenance or upgrade of infrastructures will require an amendment to the ESMP.

8.2 Impact Identification

The ESIA is structured to assess the impact of construction and operational phase as outlined in **Table 8** below. Potential impact were identified during sites assessment, stakeholder consultations and using literature review.

Table 8. Impact identification

Component	Impact	Description	Impact Type
CONSTRUCTION PHASE			
Bio-Physical Environment	Loss of Biodiversity	Clearing of land result into loss of biodiversity	Negative
	Dust emission	Land clearing, digging and excavation of trenches, movement of vehicles and heavy machinery on project sites, concrete work, transportation of sand to site and concrete stones, cement mixing may create fugitive dust. Uncoordinated / reckless driving on gravels roads could cause low visibility to other road users. Dust could be nuisance to the nearby surrounding and health hazards to the workers.	Negative

Component	Impact	Description	Impact Type
	Land degradation / Soil erosion	Uncoordinated movement of heavy vehicle transporting sand and concrete. Operation of quarries by private contractors to supply concrete and sand must be licensed. Further, possible formation of gullies during rainwater run-off may cause soil erosion.	Negative
	Noise and vibration	Noise is one of the major impact caused by construction activities. Trucks, excavators, concrete mixers, blasting, and heavy earth moving equipment produce significant amount of noise that could be nuisance to the nearby surrounding and health hazards to the workers. Breaking rock from the bedrock may require the use of explosives. Although this will be site specific, the shock vibration could cause damage to surrounding properties and if not communicated properly, it could be noise nuisance to people. Increased noise levels interfere in oral communication, disturbance in sleep, disturbance in teaching and concentration in class. However, the construction site is isolated hence there are no immediate receptors or affected parties. Thus, noise impact will not be diverse in comparison if the project vicinity had residents.	Negative
	Traffic emission	Traffic will generate dust and exhaust emission of SO ₂ , CO ₂ , CO, NO _x and particulates. Construction vehicles will contribute to increases in emissions greenhouse gases which contribute to global warming.	Negative
	Waste generation	Construction produce significant amount of solid waste including, building rubbles, planks, household waste such as, liquid waste, plastic and parts of equipment.	Negative
	Household waste	The workers on site will generate solid waste such as containers, plastics used to carry their food and sewerage.	Negative
	Soil and water pollution	Oil, fuel and lubricant (hydrocarbons) leaks from, machinery and constructing vehicles and cements from mixers could cause pollution of soil and water.	Negative
	Health and Safety	Safety risk	Accidents from falling objects, collision of construction vehicles, falling from heights and occupational injuries.
Traffic congestion and road safety		Slow movement of heavy vehicles could cause traffic congestion and impact the Level of Service. Increased traffic congestion,	Negative

Component	Impact	Description	Impact Type
		increased traffic accident, fast degradation of road structure, poor new road designs and insufficient parking bays at hospitals.	Negative
	Health risks	Risks of hearing impairment from excessive noise, respiratory risks from dust inhalation. New social relationships are often a recipe for spreading of communicable diseases and sexually transmitted diseases such as HIV/AIDS. Furthermore, alcohol and drug use could be prevalent during construction.	
	Hazardous Impact	Heavy vehicle use a lot of oil during construction. Excavators, would not necessarily drive to service station for re-fuelling, thus handling of hydrocarbons will be done on site. The site where grease, oils, lubricant and fuel get handled requires to be properly designed to avoid soil contamination that may could contaminate soil and underground water.	
Social Environment	Visual impacts	Poor housing keeping on site, disturbance of surrounding view by the height of the hospital, uncoordinated painting.	Negative
	Employment creation	Namibia is grappling high unemployment especially among the youth. Significant employment opportunities will be created during construction phase for a period of three (3) years. Huge infrastructure development are crucial for economic advancement and equally for skills and national capacity development through skill transfer from big cooperation to Small Medium Enterprises (SME).	Positive
	Increase in land value	The development will add value to the land and surrounding and will stimulate more investment in the surrounding areas.	Positive
	Increase in local economy	Construction provides an opportunity for local people, especially women to sell their produce (food) to construction workers. Additionally, the project will require large amounts of construction materials worth billions of Namibian dollars. Consequently, the local economy will increase from procurement of construction materials and increased buying power.	Positive
	Increased demand for water	Windhoek is often hit with lack of water, epically during drought. The project will increase water consumption during construction.	Negative

Component	Impact	Description	Impact Type
	Heritage and Archaeological Resource	Digging and excavation has the potential to unearth archaeology material. Awareness is therefore required to prevent potential damages.	Negative
OPERATIONAL PHASE			
Bio-Physical Environment	Inadequate handling and disposing of waste	Risk of environment pollution and sewer contamination from hazardous healthcare waste	Negative
	Air pollution from incinerators	Risk of air pollution from incinerator and burning of hazardous healthcare waste. Emission from incinerator causes odour and emits particulate matter, hydrogen chloride (HCl), nitrogen oxides (NOx), sulphur dioxide (SO2), carbon monoxide (CO), and volatile organic compounds (from methane to polycyclic aromatic hydrocarbons (PAH), dioxins and furans (PCDD/F) Dioxins known to be carcinogenic. The acid gas concentrations of hydrogen chloride (HCl) and sulphur dioxide (SO2) in the emission are directly related to the chlorine and sulphur content of the waste. While oxides of nitrogen (NOx) represent a mixture of nitric oxide (NO) and nitrogen dioxide (NO2) which are formed during combustion by: (i) oxidation of nitrogen chemically bound in the waste, and (ii) reaction between molecular nitrogen and oxygen in the combustion air. Lastly, carbon monoxide (CO) is a product of incomplete combustion that could be attributed to insufficient oxygen, combustion time, temperature, and turbulence (fuel/air mixing) in the combustion zone ⁵²⁵³⁵⁴⁵⁵ .	Negative

⁵² Locating And Estimating Air Toxic Emissions From Medical Waste Incinerators, U. S. Environmental Protection Agency, Rochester, New York, September 1991

⁵³ Medical Waste Incineration Emission Test Report, Lenoir Memorial Hospital, Kinston, North Carolina, U. S. Environmental Protection Agency, August 12, 1991

⁵⁴ Alvim-Ferraz M.C.M et al 2003., Incineration of different types of medical wastes: emission factors for gaseous emissions

⁵⁵ Mr. Bernt Johnke (Germany) and reviewed by Robert Hoppaus (IPCC/OECD/IEA), Eugene Lee (US), Bill Irving (USEPA), T. Martinsen (IPCC/OECD/IEA), and K. Mareckova (IPCC/OECD/IEA): Emissions From Waste Incineration

Component	Impact	Description	Impact Type
	Possible water and soil contamination	Hazardous hospital waste are contaminated with bacteria, biomedical waste, detergent and oil and fats from hospital operations. Poor waste decontamination and disposal can cause public health risks due to environmental pollution such as; impaired air quality, stormwater contamination of water courses and infections to recycler or people scavenging for food at landfill sites.	Negative
Health and Safety	Risks of occupational health and Safety	Health workers exposure to dangers such contagious diseases and injury at work place from sharp objectives, chemical, biological, electrical hazards	Negative
	Fire Risk	Ignitable materials in laboratories and electrical connection can result in fire that could cause fatalities.	Negative
Social Environment	Health care provision	Health care is an integral part of human life, The Namibian public health sector serves 85% of the population, the private sector serves the remaining 15% middle- and high-income groups. Speaking during the hospital inauguration ceremony, Namibian Vice President, Hon Netumbo Nandi-Ndaitwa said "A sick nation is an unproductive nation. An unproductive country remains underdeveloped and people will continue to live in poverty,". Hence provision of health care is high priority.	Positive
	Employment creation	A significant amount of health professional in the country are unemployed due to limited health care facilities. The hospital will create employment of health practitioners and non-technical support staff such as drivers, clerk (administrators) and cleaners etc.	Positive
	Increase in local economy	The operation of the hospital will provide opportunity in procuring of good and service, maintenances which will provides economic opportunity for local business. Additionally, the operation will provide long term business opportunity especially women who sell their product in the surroundings of public infrastructures.	Positive

Component	Impact	Description	Impact Type
	Skill enhancement	The hospital will provide an opportunity to medial student to improve their skills through on job training	Positive

8.3 Cumulative Impacts

Cumulative Impact are possible environmental and social impacts on the receptor caused by the combination effects of more than one project/development. Cumulative impact assessment aims to identify the environmental threats of the proposed project in combination with the existing similar project in the area.

The project will be developed on an isolated area hence there is not much of combination effects of impact. However, the traffic to be generated will cause cumulative impact with the current ongoing construction for the upgrades of Peter Nanyemba Street and usual city traffic. A Traffic Impact Assessment (TIA) has been undertaken as part of this ESIA to assess the traffic impact.

9 IMPACT ASSESSMENT AND MITIGATION

This chapter outlines the criteria used to assess the identified impacts, mitigation measures, and determine residual impact significance. Allocation of responsibilities and monitoring framework are presented in the Environmental and Social Management Plan (ESMP).

9.1 Criteria of Impact Assessment

The criteria used to assess the impacts and the method of determining their significance is outlined in **Table 9** below. This process conforms with international best practices and the Environmental Impact Assessment Regulations of Environmental Management Act, 2007 (Government Gazette No. 4878) EIA regulations. The core principle of impact assessment followed a mitigation which aims to avoid the negative impact through preventative means, minimise the negative impacts to acceptable low levels and, if the two are not possible, remedy or compensate the impact.

Table 9. Criteria for Impact Assessment

Risk Event	Rating	Description of the risk that may lead to an Impact
Probability	The probability that an impact may occur under the following analysis	
	1	Improbable (Low likelihood)
	2	Low probability
	3	Probable (Likely to occur)
	4	Highly Probable (Most likely)
	5	Definite (Impact will occur irrespective of the applied mitigation measure)
Confidence level	The confidence level of occurrence in the prediction, based on available knowledge	
	L	Low = limited information
	M	Medium = moderate information
	H	High = sufficient information
Significance (Without Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)

Risk Event	Rating	Description of the risk that may lead to an Impact
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects is altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Mitigation	The applied measure / alternative to reduce / avoid an impact	
Significance (With Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localised, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects is altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no-go implication unless the project is re-designed or proper mitigation can practically be applied)
Duration	Time duration of the impacts	
	1	Immediate
	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent
Scale	The geographical scale of the impact	
	1	Site specific
	2	Local
	3	Regional
	4	National
	5	International

9.2 Impact Assessment

The impact significance was determined using a risk matrix (**Table 10**). A five-by-five matrix was used where the impact severity was categorised and assigned scores from 1 to 5 as follows: Improbable=1, Low=2, Medium=3, High=4 and Severe=5. Similarly, the likelihood was assigned scores as follows; improbable=1, Low Likely=2, Probable=3, High Probability=4, Definite=5. The impact rating was determined by multiplying the impact severity and likelihood.

Table 10. Risk assessment matrix⁵⁶

LIKELIHOOD	5 Definite	5 Low	10 Medium	15 High	20 Severe	25 Severe
	4 High Probability	4 Low	8 Medium	12 High	16 High	20 Severe
	3 Probable	3 Low	6 Medium	9 Medium	12 High	15 High
	2 Low	2 Low	4 Low	6 Medium	8 Medium	10 Medium
	1 Improbable	1 Negligible	2 Low	3 Low	4 Low	5 Low
	1 Negligible	2 Minor	3 Medium	4 High	5 Severe	
	IMPACT SEVERITY / CONSEQUENCE					
	Negligible	Low	Medium	High	Severe	

9.3 Impact Mitigation and Significance

The mitigation measures were developed by applying the mitigation hierarchy; (i) avoid adverse impacts to the extent possible by using preventative measures; (ii) reduce adverse impacts to low levels; (iii) if unavoidable and cannot be reduced to practical low levels, remedy / offset⁵⁷ for adverse residual impacts and explore applying the principle of precautional approach to prevent irreversible damage (**Figure 22**). The residual effect of the impact is assessed after applying mitigation measure to determine its significance.

⁵⁶ Risk Management Guideline for the BC Public Sector (Province of British Columbia Risk Management Branch and Government Security Office 2012)

⁵⁷ This step is the last resort to address significant residual impacts that could not be prevented through avoidance and minimization, or adequately corrected through restoration/rehabilitation.

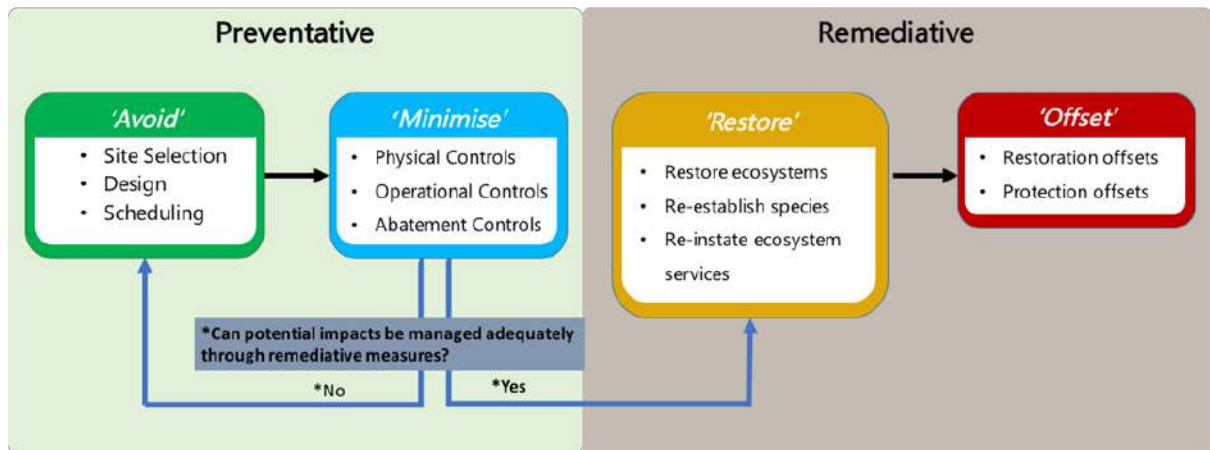


Figure 22. Mitigation Hierarchy Source ⁵⁸

9.4 Impact during construction phase

9.4.1 Positive Impact

9.4.1.1 Employment creation and skill transfer

Enhancement measures

1. Unskilled labour must all be reserved for local
2. Only employ foreigners where skills and expertise in not in Namibia
3. Abide by the labour act
4. Provide contract to employees
5. Support local training to develop capacity.
6. Abide by the Namibian Labour Act

9.4.1.2 Increase in local economy

Enhancement measures

1. Contractors should ensure construction materials are locally procured
2. Make provision for local people to sell their goods such as food items to construction workers
3. Subcontract SMEs

⁵⁸ Cross-Sector Biodiversity Initiative (CSBI). (2015). A Cross-sector Guide for Implementing the Mitigation Hierarchy (p.9)

9.4.2 *Negative Impact.*

9.4.2.1 *Lack of knowledge to understand the ESMP*

General workers often has little education background to understand the provisions of the ESMP which could lead to violation of the ESMP provision. To enhance understanding of the ESMP, management must;

1. Provide an induction training to workers on the provision of the ESMP,
2. Produce infographics of the ESMP,

9.4.2.2 *Loss of Biodiversity*

Summary of Impact: Destruction of and habitat and biodiversity													
Key Mitigation Measures:													
1. Only remove shrubs that are on demarcated site for the construction and access													
2. Do not kill animals													
3. Workers must not leave food unattended as it will attract monkeys / baboons in the surrounding													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Scale	Duration	Significance	Confidence	Impact type	Probability	Severity	Scale	Duration	Significance	Confidence
-ve	Definite	Low	Local	Immediate	Medium	High	-ve	Low	Low	Local	Immediate	Low	High
Quantitative assessment							Quantitative assessment						
-ve	5	2	1	1	10	3	-ve	2	2	1	2	4	3

9.4.3 *Traffic congestion and road safety*

Adapted from the TIA study.

Summary of Impact: Reduced Level of Service by slow flow of traffic and potential increase of road accidents.	
Key mitigations measures	
<ol style="list-style-type: none"> 1. Place a traffic law enforcement at the intersection during peak hours (06:00am – 09:00am and 16:00pm – 19:00pm) to regulate traffic flow during construction phase until traffic signals are installed. 2. Abnormal vehicles should be escorted to ensure the road is cleared for their passages. 3. All construction vehicle must be roadworthy and fitted with reflectors and amber lights 4. Ensure all drivers are in possession of drivers licences and are screened with an alcohol breathalyser for alcohol. 5. Provide workers with safe and liable passenger transport 6. Ensure heavy vehicles are within the road capacity payload 7. Ensure the design guidelines for new access roads are in accordance with the City of Windhoek Standard Drawings, the CSIR Red Book and the Urban Transport Guidelines (UTG) manuals. 8. Ensure the new road has provisions for NMT and emergency vehicles 9. Ensures sufficient parking bay in accordance to National Requirement 10. Designate special parking for emergency vehicles 11. Designate parking for bi-cycles 	
Without Mitigation	With Mitigation

Impact type	Probability	Severity	Scale	Duration	Significance	Confidence	Impact type	Probability	Severity	Scale	Duration	Significance	Confidence
-ve	Highly probable	High	Local	Short term	High	High	-ve	Low	Low	Local	Project life	Low	High
Quantitative assessment						Quantitative assessment							
-ve	4	3	1	2	12	3	-ve	2	2	2	2	4	3

9.4.4 Noise and Vibration

Summary of Impact: Noise pollution and vibration could be nuisance to the local environment. Blasting may cause vibration and flying rocks which could be safety hazard to workers.

Key Mitigation Measures:

1. Maintain low speed on project sites
2. All vehicles must be well serviced to prevent excessive noise
3. Do not hoot unnecessary
4. Do not rev the vehicle engines
5. No employees must be exposed to noise levels above the 85dB (A) limit over a period of 8 hours. Should the noise level be higher than 85dB (A), the employer must implement a hearing conservation program such as noise monitoring;
6. Stationary vehicles and machines must be switched off at time
7. Warn public and employee on blasting times.
8. Blasting site / areas must be free of people.

9. Use approved contractor to undertake blasting													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	Medium	Site specific	Short term	Medium	High	-ve	Low	Low	Local	Short term	Low	High
Quantitative assessment							Quantitative assessment						
-ve	3	3	2		9	3	-ve	2	2	3	2	4	3

9.4.5 Dust emission

<p>Summary of Impact: Blasting, digging and excavation, crushing, transportation of aggregate and sand, piling of aggregate on site, movement of vehicles and heavy machinery in site will produce excessive dust. which is a safety risk due to reduced visibility and health hazard to workers</p>
<p>Key Mitigation measures:</p> <ol style="list-style-type: none"> 1. Apply dust suppression measures such as water spraying. 2. Spray water on stock piles of aggregate and rock dust 3. Movement of heavy vehicles must strictly be restricted on site. 4. Adhere to the minimum speed limit of 30 or 40km/hour. 5. Do not excavate and/or offload sand during heavy winds. 6. Trucks carrying sand must be covered. 7. Sand stock piles must be covered or regularly water sprayed with water. 8. On site where soil is loosened by vehicle movement, apply dust a suppression method such as water spraying.

<p>9. Install an onsite concrete batching plant</p> <p>10. Cement and concrete must be mixed with concrete mixers and not manually in the open.</p> <p>11. Cement bags must be stored and disposed of properly and may not be shaken in the open.</p>													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Highly probable	High	Local	Immediate	High	High	-ve	Low	Minor	Local	Immediate	Low	High
Quantitative assessment							Quantitative assessment						
	4	3	2	1	12	3	-ve	2	1	2	1	2	3

9.4.6 Land degradation / Soil erosion

Summary of Impact: Loss of natural scenic and aesthetic value
Key mitigations
<ol style="list-style-type: none"> 1. Movement of heavy vehicles must be coordinated and restricted to be within the site and access roads 2. Loosen soil must be sprayed with water and compacted 3. Pits must be well rehabilitated to avoid formation of gullies
Without Mitigation
With Mitigation

Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	Minor	Local	Short term	Medium	High	-ve	Low	Low	Site Specific	Short term	Low	High
Quantitative assessment							Quantitative assessment						
-ve	3	2	1	2	6	3	-ve	2	2	1	1	4	3

9.4.7 Exhaust emission

Summary of Impact: Greenhouse gas emission from construction vehicles													
Key mitigations													
1. Ensure that vehicle are well serviced and road worthy													
2. Stationary vehicles must be switched off													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	Minor	International	Short term	Medium	High	-ve	Low	Low	International	Short term	Low	High
Quantitative assessment							Quantitative assessment						

-ve	3	2	5	3	6	3	-ve	2	2	5	1	4	3
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9.4.8 Occupational health and Safety Risk

Summary of Impact: Injuries and health risks to employees during working hours as well to public
<p>Key mitigations</p> <ol style="list-style-type: none"> 1. Provide awareness to the employees on dangers of HIV/AIDS, alcohol and drug abuse 2. All employees must be screened with the breathalyser to avoid intoxicated personnel on site 3. Provide condoms on site 4. Develop a healthy and safety plan / policy. 5. All employees must go through a health and safety induction. 6. Only licensed employees should be allowed to operate specialized vehicle 7. All heavy vehicles must have a rotating flashing light installed for visibility 8. Ensure that all vehicles are well serviced and roadworthy 9. All employees must be provided with adequate Personal Protective Equipment (PPE) 10. No employee must be allowed to be at work station without adequate PPE 11. There must be a first aid kit with adequate medicine 12. Provide adequate gender sensitive ablution facility 13. Provide clean drinking water. 14. Erect warning signs at designated sites to alert public of potential dangers 15. Trucks carrying sand and aggregate must be covered to avoid material flying off 16. Trucks must maintain a five-kilometre in-between distance to avoid traffic congestion

- 17. Transportation of construction material at night is not allowed
- 18. Adhere to the Labour act, non-toxic human dust exposure levels may not exceed 5mg/m³ for respiratory dust and 15mg/m³ for total dust.
- 19. Abide by the Occupational Health and Safety and Labour Act of Namibia and other statutory requirement such as International Labour Practise (ILO)
- 20. Supervisors must undergo an occupational health and first aid course,
- 21. Train employees on the possible health hazards to avoid potential risks
- 22. Cordon off the construction areas / sites

Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	High	High	Local	Short term	High	High	-ve	Low	Low	Local	Short term	Medium	High
Quantitative assessment							Quantitative assessment						
-ve	4	4	3	2	16	3	-ve	2	2	2	2	4	3

9.4.9 General Waste and Pollution

Summary of Impact: General littering and household (solid and liquid) waste pollution
Key mitigations
1. Develop a construction phase waste management plan

2. Develop a biological temporary onsite waste water treatment plant
3. Ensure good house keeping
4. Provide dustbins and ensure waste segregation to enable recycling.
5. Designate a storage area for building rubbles.
6. Provide labelled household waste drums for household solid waste.
7. Ensure separate ablution facilities for men and women.
8. Construction sites generate garbage, refuse and building rubbles. Therefore, waste generated from the construction site should be classified into different categories, e.g., Material Waste (Wood, steel, corrugated iron, etc.), Building Rubble (concrete, bricks etc.), Garden Waste (tree stumps, branches, etc.), Domestic Waste (Litter – cans, plastics, tissue, plastics etc.)
9. Each category should be collected separated disposed of, in the most suitable and environmentally acceptable manner
10. All waste produced on site should be contained and disposed as required by law
11. There must be sufficient skip containers at the site for building rubbles
12. There must be sufficient temporally ablution facility at the site for designated for males and female. Waste generated must be disposed of at approved sites
13. No onsite burying, dumping or burning of waste material shall be permitted.
14. Ensure appropriate waste collection and removal from the site and dispose at appropriate waste disposal site.
15. There must be sufficient waste bins. Colour segregated for different waste;
16. General waste must be separated from hazardous waste;
17. Hazardous waste must be disposed of at an approved site;
18. The Waste Bin for oil cans must be clearly marked Hazardous;

Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence

-ve	Probable	Low	Site specific	Short term	Medium	High	-ve	Low	Low	Site specific	Short term	Low	High
Quantitative assessment							Quantitative assessment						
-ve	3	2	1	2	6	3	-ve	2	2	1	1	4	3

9.4.10 Hazardous waste

Summary of Impact: Pollution of the environment with hazardous waste													
Key mitigations													
<ol style="list-style-type: none"> 1. Vehicles must be well serviced to avoid oil spills and excessive emissions 2. All hydrocarbons must be stored in an enclosed environment. 3. Fuelling of site bound equipment such as excavators must be done on bunded structure 4. Parked vehicles must be provided with drip trays 													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	Medium	Site Specific	Short term	Medium	High	-ve	Low	Low	Site Specific	Short term	Low	High
Quantitative assessment							Quantitative assessment						
	3	3	1	1	9	3	-ve	2	2	1	1	4	3

9.4.11 Visual Impact

Summary of Impact: To prevent eye shore and destruction view of surrounding area													
Key mitigations													
<ol style="list-style-type: none"> 1. Ensure the building paints reflect the surrounding to blend in. The use of earth colours is advised 2. Ensure good house keeping 													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Low	Minor	Site specific	Short term	Medium	High	-ve	Low	Minor	Site specific	Short term	Low	High
Quantitative assessment							Quantitative assessment						
-ve	3	2	1	2	6	3	-ve	2	2	1	1	4	3

9.4.12 Increase demand for water

Summary of Impact: In appropriate use of water													
Key mitigations													
<ol style="list-style-type: none"> 1. Ensure optimal utilization of water 2. Use as far as possible approved grey water for dust suppression 													
Without Mitigation							With Mitigation						

Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Low	Medium	Local	Short term	Low	High	-ve	Low	Minor	Site specific	Short term	Low	High
Quantitative assessment							Quantitative assessment						
-ve	2	3	2	2	6	3	-ve	2	2	1	1	4	3

9.4.13 Heritage and Archaeological Resource

Summary of Impact: Destruction of Heritage and Archaeological Materials													
Key Mitigation Measures													
<ol style="list-style-type: none"> Workers must be trained on the possible find of archaeological material in the area Establish a “Chance Find Procedure” where if any archaeological finding (Heritage (rock painting and drawings), human remains or artefacts) is encountered; The activity must be stopped immediately and the operation manager of that activity be informed; The manager must ensure the cordoning off the area with a danger tape and take appropriate records and pictures The manager must immediately report the findings to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). 													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Low	High	Site specific	Short term	Medium	High	-ve	Low	Low	Site specific	Immediate	Low	High
Quantitative assessment							Quantitative assessment						
-ve	2	4	2	2	8	3	-ve	2	2	1	1	4	3

9.5 Impact during operational phase

9.5.1 Positive Impact

9.5.1.1 Employment creation and skill transfer

Enhancement measures

1. Only employ foreigners where skills and expertise is not in Namibia
2. Abide by the labour laws of Namibia
3. Implement skills development and training programs to enhance capacity.

9.5.1.2 Health care provision

Enhancement measures

1. Equip the hospital with equipment of modern technology
2. Ensure the hospital has sufficient medicines
3. Employ qualified health professional
4. Ensure a conducive environment by implementing adequate occupational health and standards

9.5.2 Negative Impacts

9.5.2.1 Lack of knowledge to understand the ESMP

1. Provide an induction training to workers on the provision of the ESMP,
2. Produce infographics of the ESMP,

9.5.2.2 Inadequate handling and disposal of waste

(a) Hospital Waste Water

Summary of Impact:	
1. Waste water must be chemically disinfected before transferring into the municipal sewage system. Applicable permits must be obtained from relevant authorities	
2. The treated effluent must be disposed of in line with relevant laws	
3. Sewage from the hospital must never be re-used for any other purpose (e.g., watering lawns, as a dust suppression at construction sites, road construction etc)	
4. Use approved sewage pipes that are corrosive resistant and leakage proof	
5. Continuous monitoring to ensure that sewage discharge pipes are not broken and not leaking	
Without Mitigation	With Mitigation

Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	High	Local	Short term	High	High	-ve	Low	Medium	Local	Immediate	Low	Medium
Quantitative assessment							Quantitative assessment						
-ve	3	4	2	2	12	3	-ve	2	2	1	1	4	2

(b) Hospital solid waste

Summary of Impact:
<ol style="list-style-type: none"> 1. The generated solid waste must be segregated in accordance with applicable laws and health practices (e.g., WHO standards) 2. Medical waste containers must be colour coded for ease of segregation 3. Solid waste must be stored in a secure place with restricted access, only authorized personnel may enter the place. The place must have impermeable concrete bund. The place must have a drainage system leading to the disinfectant chamber for purposes of cleaning. 4. Infectious waste must be package in leak-proof materials with adequate strength. 5. Sharp objects must be packed in puncture-proof containers. 6. Waste should be labelled properly, stating the substance class, packaging symbol (e.g., infectious waste, radioactive waste), waste category, mass / volume, place of origin within hospital, and final destination; 7. Waste intended for off-site treatment facilities should be transported in accordance with the guidelines for transporting of hazardous wastes / biomedical wastes 8. Biomedical waste should be transported by approved vehicles with clear signs and the vehicle compartments carrying waste must be sealed.

9. Implement a biomedical solid treatment plant													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	High	Local	Short term	High	High	-ve	Low	Minor	Local	Immediate	Low	Medium
Quantitative assessment							Quantitative assessment						
-ve	3	4	2	2	12	3	-ve	2	2	1	1	4	2

9.5.2.3 Air pollution from incinerator

Summary of Impact: Harmful gaseous emissions	
<ol style="list-style-type: none"> The incinerator must be installed in accordance to relevant laws; Incinerator emissions should be monitored on regular intervals; The incinerator must be placed at an open fields or hilltops without trees; Valleys, areas near ridges, wooded areas should be avoided as these tend to channel winds and/or plumes tend to impinge on elevated surfaces or downwash under some conditions Areas near the incinerator should not be populated, e.g., containing housing, athletic fields, markets or other areas where people congregate. Areas near the incinerators should not be used for agriculture purposes, e.g., leafy crops, grasses or grains for animals. 	
Without Mitigation	With Mitigation

Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	High	High	Local	Short term	High	High	-ve	Low	Low	Local	Long term	Low	Medium
Quantitative assessment							Quantitative assessment						
-ve	4	4	1	2	12	3	-ve	2	2	1	1	4	2

9.5.2.4 Risks of occupational health and Safety

<p>Summary of Impact: Health workers exposure to danger such contagious diseases and injury at work place</p> <ol style="list-style-type: none"> 1. Ensure smooth operation of water reticulation system and correct electricity connections 2. Adhere to relevant health and safety legal frameworks 3. Develop a Health and Safety Plan in accordance with relevant legal framework 4. Employees must be provided with adequate Personal Protective Clothing and enforce the use of PPE. 5. Ensure that all employees undergoes proper training and are orientated with associated risks. 6. Train employees for basic first aid, fire safety training, and Occupational Safety and Health through approved training institutions 7. Provide firefighting equipment at strategic sites; 8. Conduct drills at reasonable intervals to test the disaster preparedness level at the workplace, using the results to improve the response mechanisms; 9. Set up emergency evacuation points and develop evacuation procedures. 10. Provide emergency showers close to all workstations 11. Materials handling should follow the instructions of use given by the manufacturer

12. Unauthorized personnel must be restricted to enter high risk areas i.e., radiation rooms, surgery rooms;													
13. Radiation equipment must be operated in accordance with relevant laws.													
14. Use visible signage to warn staff or visitors of dangerous places. Signs must be put on doors and areas.													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	High	High	Site specific	Short term	High	High	-ve	Low	Low	Site specific	Immediate	Low	High
Quantitative assessment							Quantitative assessment						
-ve	4	4	2	2	12	3	-ve	2	2	1	1	5	3

9.5.2.5 Fire Risk

Summary of Impact: Fire accident
<ol style="list-style-type: none"> 1. Provide appropriate Personal Protective Equipment (PPE) to each employee which includes helmets, overalls, safety shoes, etc 2. Ensure that every employee goes through an induction course about safety 3. Staff must be properly trained on how to react and handle fire 4. There must be automatic fire alarm system installed at the site 5. Firefighting equipment must be on site 24hours and regularly inspected to ensure that they are working 6. Emergency response numbers must be on clear and visible space 7. There must be clear hazard signs “NO OPEN FIRE” “NO SMOKING” “SWITCH ENGINE OFF”

8. There must be drills to test staff about their readiness to fight the fire													
Without Mitigation							With Mitigation						
Impact type	Probability	Severity	Extent	Duration	Significance	Confidence	Impact type	Probability	Severity	Extent	Duration	Significance	Confidence
-ve	Probable	High	Site specific	Immediate	Severe	High	-ve	Low	Low	Site specific	Immediate	Low	High
Quantitative assessment							Quantitative assessment						
-ve	3	5	1	1	12	3	-ve	2	2	1	1	4	3

10 DECOMMISSIONING AND REHABILITATION

A project of this magnitude is not envisioned to be decommissioned, rather, maintenance and/or upgrade of its infrastructures will be taking place from time to time. The developed Environmental Social Management Plan (ESMP) for the project is a living document. Hence, impacts that could be identified during future maintenance or upgrade of infrastructures will require an amendment to the ESMP.

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusions

Developing countries are faced with major health challenges. Establishment of health facilities or improvement thereof is crucial to address health challenges. The development of the WDH is in line with government developmental goals. The construction is taking place on an isolated virgin land. The impacts during construction will be short-term, localized and low.

The operation of a health facility produces biomedical wastes, which are generated during the diagnosis, treatment of human beings. The country has relevant policies and regulatory framework which gives guidelines on handling and disposal of health care waste.

The developed ESMP complements the Regulatory framework of Namibia in ensuring environmental and social sustainability. This ESMP is aimed to provide logical framework and guideline to be undertaken by the project proponent during the construction and operation of the project in order to mitigate environmental and social threats. Possible environmental impacts were identified and assessed based on the developed mitigation measures.

11.2 Recommendations

The study recommends the following;

- i. That MEFT, the Environmental Commissioner in particular, approves the project and issue the project with the ECC.
- ii. Proponent should ensure to appoint of fulltime environmental officer during construction.

- iii. Proponent should ensure adequate implementation of the ESMP
- iv. Proponent should ensure should undertake bi-annual environmental performance and submit environmental audit report to the MEFT

12 REFERENCES:

1. Air Water Earth (AWE) LTD., 2014. Environmental and Social Impact Assessment for the Construction/ Rehabilitation of the National TB Reference Laboratory and Five Satellite Laboratories in Uganda. Project area: Area Regional Referral Hospital
2. Atlas of Namibia Team, 2022, Atlas of Namibia: its land, water and life, Namibia Nature Foundation, Windhoek.
3. Ayse Cebe et al., 2013. Hospital Solid Wastes and Its Effect on Environment, J. Int. Environmental Application & Science, Vol. 8 (5): 733-737.
4. Christelis and Struckmeier (eds), 2011. Groundwater in Namibia - an explanation to the Hydrogeological Map. Windhoek. Ministry of agriculture, Water, and Land Reform.
5. Coats Palgrave, K. 1983. Trees of Southern Africa. Struik Publishers, Cape Town, RSA.
6. Curtis, B. and Mannheimer, C. 2005. Tree Atlas of Namibia. National Botanical Research Institute, Windhoek, Namibia.
7. Dr. John Muriuki., 2015. Environmental Impact Assessment Study Report for the Proposed Kenyatta University Children, Research and Referral Hospital at Kenyatta University, Nairobi County.
8. Du Preez, L. and Carruthers, V. 2009. A complete guide to the frogs of southern Africa. Struik Publishers, Cape Town, RSA.
9. EathCare Services Limited., 2016. Environmental Impact Assessment Full Study Report for the proposed Nairobi Hospital Expansion Project (phase 2) on Ir. no. 209/4209 and 209/644/1, Nairobi County
10. Griffin, M. 1998a. Reptile diversity. In: Barnard, P. (ed.). Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.
11. Griffin, M. 1998b. Amphibian diversity. In: Barnard, P. (ed.). Biological diversity in Namibia: a country study. Windhoek: Namibian National Biodiversity Task Force.
12. Ianthe Smith., 3004. Environmental Impact Assessment for the Installation of a New Incinerator at the University Hospital of the West Indies
13. Mannheimer, C. and Curtis, B. (eds) 2009. Le Roux and Müller's field guide to the trees and shrubs of Namibia. Macmillan Education Namibia, Windhoek.
14. Mendelsohn, J., A. Jarvis, C. Roberts & T. Robertson 2002. Atlas of Namibia. A Portrait of the Land and its People. David Philip Publishers, Cape Town.
15. Mendelsohn, J., Jarvis, A., Roberts, C. & Robertson, T., 2009. Atlas of Namibia. 3rd

- ed. Cape Town: Sunbird Publishers.
16. Mendelsohn, J., Jarvis, A., Roberts, C., and Robertson, T. 2002. Atlas of Namibia: a portrait of the land and its people. David Philip Publishers, Cape Town.
 17. Nikos E et al., Environmental and health risks associated with biomedical waste management
 18. Population Demography for Hardap Region for 2001 and 2011 (Namibia Population and Census Report of (2011).
 19. Risk Management Guideline for the BC Public Sector (Province of British Columbia Risk Management Branch and Government Security Office 2012).
 20. Rothmann, S. 2004. Aloes, aristocrats of Namibian flora. ST promotions, Swakopmund.
 21. Strohbach, B., 2021, 'Vegetation survey of the Khomas Hochland in central-western Namibia: syntaxonomical descriptions', *Bothalia* 51(2), a4. <http://dx.doi.org/10.38201/btha.abc.v51.i2.4>.
 22. UN (1997). Recommendations on the transport of dangerous goods-model regulations, 10th revised ed. New York, United Nations (ST/SG/AC.10/1/Rev. 10).
 23. WHO (1997). Product information sheets: equipment for Expanded Programme on Immunization, Acute Respiratory Infections, Blood Safety, Emergency Campaigns, Primary Health Care. Geneva, World Health Organization (unpublished document WHO/EPI/LHIS/97.01, obtainable from Expanded Programme on Immunization, World Health Organization, 1211 Geneva 27, Switzerland).
 24. World Health Organization., 2002. Fundamentals of health-care waste management, National Health-Care Waste Management Plan • Guidance Manual, United Nations Environment Programme / SBC.
 25. World Health Organization., Colour Coding for Bio-Medical Waste Management

13 ANNEXURES

13.1 Annex 1: Written Notices



Red Dunes <reddunes18@gmail.com>

Invitation to Stakeholder Consultation: Environmental Impact Assessment for Windhoek District Hospital

8 messages

Red Dunes <reddunes18@gmail.com> 5 June 2024 at 13:50

To: Timoteus Mufeti <Timoteus.Mufeti@mefi.gov.na>, ed@mhss.gov.na, Thomas.Mbeeli@mhss.gov.na, Allan.Ogonje@mhss.gov.na, Martin.Mukulu@mhss.gov.na, kamanaku@gmail.com, Vee.Tagarira@mhss.gov.na, Tomas.Ukola@mhss.gov.na, ed@mwt.gov.na, ed@mur.gov.na, "ed@mawlr.gov.na" <ed@mawlr.gov.na>, information@hpcna.com.na, naphboard@gmail.com, EnquiriesFHSVM@unam.na, ncbeukes@unam.na, "BP: Begona Garcia" <begona@burmeister.com.na>, perez@burmeister.com.na, "BP: Hendrik Boshoff" <hboshoff@burmeister.com.na>, Horst.Lisse@windhoekcc.org.na, Koujo.freddy@windhoek.org.na, hub@ongosvalley.com.na, pr@khomasrc.gov.na
Cc: Grace Shihepo <grace.shihepo@gmail.com>, Nangula Amutenya <nangula.a@gmail.com>

Dear ESTEEMED stakeholders,

Kindly allow me to observe all protocols. I trust this email finds you well. My Name is Ipeinge Mundjulu, Director at Red-Dune Consulting CC. Our Company has been appointed to undertake an Environmental Impact Assessment and subsequently develop an Environmental Management Plans for the application of the Environmental Clearance Certificate.

Your institution has been identified as a key stakeholder for the project. Thus, you are hereby invited to register as an Interested and Affected Party as well as to the public consultation meeting.

Please find attached invitation letter and the Background Information Document (BID) for your perusal.

Sincerely yours
Mr. Ipeinge Mundjulu (Bsc, MSC)
+264 81 147 7889

2 attachments

Background Information Document_Windhoek District Hospital.pdf
1403K

Invitation Letter_EIA for Windhoek District Hospital.pdf
500K



Reg No. cc2018/09606

Mobile: (+264 81) 147 7889
Email: [reddunes18@gmail.com](mailto:redunes18@gmail.com)
Red-Dune Consulting CC
P O Box 27623
WINDHOEK
9000

Environmental Management | Socioeconomic Valuations | Fisheries and
Marine Resources Management | Wildlife Management

5th June 2024

Dear ESTEEMED Stakeholder

RE: NOTICE AND INVITATION TO AN ENVIRONMENTAL IMPACT ASSESSMENT CONSULTATION MEETING FOR THE CONSTRUCTION OF WINDHOEK DISTRICT HOSPITAL

The Ministry of Health and Social Services and the Ministry of Works and Transport are constructing a new Windhoek Class C District Hospital (WDH). The proposed construction is a listed activity under the Environmental Management Act 2007, (Act No 7 of 2007) that cannot be undertaken without Environmental Clearance Certificate (ECC).

Consequently, Red-Dune Consulting cc has been appointed to carry out an Environmental Impact Assessment (EIA) and compile an Environmental Management Plan (EMP), which will be used to apply the ECC for the construction and operation of WDH and associated infrastructures.

Section 21 of the Environmental Impact Assessment Regulation requires the undertaking of an Environmental Impact Assessment (EIA) to follow a robust and comprehensive stakeholder consultation. This process notifies members of the public, Interested and Affected Parties (I&APs) and provide them an opportunity to comment or raise concerns that the project may cause to their socio-economics or general environment.

With this letter, Red-Dune is inviting you to a public meeting scheduled as follows;

Place	Date	Time
Havana High School	20 th June 2024	10:00 – 13H00

Attached, kindly find the Background Information Document, that provides an overview of the project and the EIA process. Please register as I&APs on [reddunes18@gmail.com](mailto:redunes18@gmail.com).

Please accept assurance of my highest consideration

Sincerely Yours,

Ipeinge Mundjulu
DIRECTOR



The Republic of Namibia
Ministry of Health and Social Services
&
Ministry of Works and Transport



Let's play... Ongwediva Town Council officially handed over the site for construction of a football pitch to Windhoek Consulting Engineers as a consultant and ROHA Trading CC as the contractor. Photo: Nampa

Ongwediva to construct modern sports complex

ONGWEDIVA – The Ongwediva Town Council will construct a new state-of-the-art sports complex at a cost of N\$5 million. Ongwediva Town Council acting spokesperson Penda Kashihakumwa said in a press statement on Tuesday this significant project marks a pivotal moment in the town's development and commitment to enhancing recreational opportunities for its residents and visitors alike. Council officially handed over the construction contract to the appointed companies on Monday and the first phase of the project is scheduled to be complete by November 2024. "The initial phase of construction focuses on the development of a football pitch, encompassing essential elements such as earthworks, irrigation and subsoil drainage," he said. He indicated that the envisioned sport complex situated at Extension 17 in Ongwediva signifies the council's dedication to meeting the growing demand for modern sports facilities in the town. Kashihakumwa noted that the facility is designed to international standards, and will serve as a hub for both local and international sporting events, fostering a vibrant culture of athleticism and community engagement. He said the complex would accommodate a diverse range of sports codes, including but not limited to football, netball, volleyball and athletics. In future, the complex will incorporate additional sports disciplines reflecting the evolving needs and aspirations of the community. Windhoek Consulting Engineers are the project consultants while ROHA Trading CC will construct the facilities. -Nampa

N\$690m budget to drive Swakopmund's growth



Fix... The Swakopmund Municipality has allocated N\$29.5 million for road infrastructure. Photo: Contributed

■ Eveline de Klerk

SWAKOPMUND - The Swakopmund Municipal Council has tabled an ambitious budget plan for the 2024-2025 fiscal year, focusing on infrastructure development, housing and maintenance geared towards sustainable growth. The chairperson of the management committee Blasius Goraseb tabled the council's budget, which totals N\$690 million, on Wednesday evening. The budget, comprising 84% operating and 16% capital expenditure, is set to drive significant growth and improvements in the town. The council has approved a capital budget of N\$111.7 million and N\$578.2 million for the operational budget. Goraseb said the council's key allocations include N\$29.5 million for road and street infrastructure, N\$19.3 million for bulk wastewater infrastructure, and N\$19 million for design and construction. Additionally, N\$18.9 million is earmarked for bulk water infrastructure, N\$10.1 million for town planning and housing, N\$6 million for beach development, N\$4.7 million for solid waste management and N\$980 000 for vehicles, machinery and equipment. "This year's budget priorities are designed with a clear focus on the main areas of expenditure that are pivotal to Swakopmund's development, with the major areas that are crucial for any growth and development," he said. These are not merely expenses, but investments in future services aimed at

ensuring sustainable growth, enhanced quality of life and resilience in the face of future challenges for a very fast-growing town. Goraseb added that the budget also aims to enhance water infrastructure, with N\$18 million allocated to improve water accessibility. This includes designing a water reservoir for various regions, and introducing pilot domestic prepaid water meters to promote financial inclusivity and effective water management. "Urban planning is another priority. We allocated N\$10 million for zoning and development projects to ensure environmentally-sustainable and economically-viable growth. This includes developing master plans, and establishing new townships in northern Swakopmund," he said. The budget allocates substantial funds towards salaries and wages (N\$218 million), general expenditure (N\$137 million), and social contributions (N\$64.5 million). The current administration has paved a structured plan to identify potential socio-economic opportunities for enhancing the growth and development of Swakopmund, creating a vision to move towards sustainable growth in terms of the standard of living and

environmental sustainability. "Our mission is to make Swakopmund work by investing, on an unprecedented scale, in Swakopmund's development," he said. -edeklerk@nepc.com.na



The Republic of Namibia
Ministry of Health and Social Services
& Ministry of works and Transport

PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF THE WINDHOEK DISTRICT HOSPITAL IN KHOMAS REGION & INVITATION TO A PUBLIC MEETING

In accordance with the Environmental Management Act 2007 (Act No. 7 of 2007), notice is hereby given to all possible interested and Affected Parties (I&APs) that an application will be made to the Environmental Commissioner for environmental clearance as follows:

Project: Construction of a new Windhoek Class C District Hospital.

Proponent: Ministry of Health and Social Services and Ministry of Works and Transport.

Location: Havana Informal Settlement, Windhoek.

Public Meeting Date: 20th June 2024.
Venue: Havana High School.
Time: 10H00-13H00.

Deadline for submission of comments: 20th July 2024.

Register as I&APs @:
 reidunes18@gmail.com;
 Ministry of Works and Transport.
Tel: +264 81 147 7889.




Supreme Court sends Menzies packing

■ Maria Sheya

The Supreme Court has upheld the High Court's decision to have Menzies Aviation vacate Hosea Kutako International Airport, where it was providing ground handling services. Menzies lodged an appeal against the High Court's decision that the notice to vacate, given by the Namibia Airports Company (NAC) to the company, was unreasonable, and suggested that a 30-day notice was reasonable. The aviation company reasoned that it was not the court's place to suggest a time frame, and such determination should have been left to the NAC. Menzies also appealed against the High Court's decision to set aside the certification of the personnel and the equipment of the joint venture between Paragon and Ethiopian airlines as being fit for purpose for the ground handling services at the HKIA. Supreme Court acting judges of appeal, Theo Frank, Sylvester Mainga and Elton Hoff found that Menzies' application lacked details as to why they could not hand over to the joint venture within the time stipulated by NAC. "It was for Menzies to persuade the court based on facts that it was impossible to give



Legal loss... The fight over the ground handling services tender at HKIA is still raging. Photo: Menzies Aviation

effect to the eviction order by 13 June 2023 and how long it would take them, having regard to what is feasible and practical in the circumstances to give effect to the order," said the judges. The court noted that without such information, the High Court could not halt the eviction notice. On the certification, the judges said despite agreeing with Menzies that the certification process was flawed, it was up to NAC to deal with any breaches of its contract with the joint venture. "Menzies does not make out any case why they are detrimentally affected by such breaches, or that the legislative requirements are put in place for their benefit, among others," said the judges.

They further said Menzies' attack on the certification is irrelevant to their application. Thus, the court dismissed the application with costs. In its fight to keep on providing ground handling services at HKIA, Menzies has a review application before the High Court, where it wants the court to declare that NAC is a category one public entity and in terms of the law, may not handle a bidding process of a tender that exceeds N\$25 million. According to Menzies, the tender handled by NAC and awarded to the joint venture exceeds the threshold, suggesting the Central Procurement Board of Namibia should have handled the bidding process instead. The company also wants the court to review and set aside NAC's decision to declare its bid invalid because it failed to initial all its pages, and certify its registration documents. Furthermore, it wants the court to set aside NAC's decision to award the joint venture the tender, and disqualify it. Apart from the decisions to be reviewed, Menzies wants section 4(2) of the Public Procurement Act, 15 of 2015 to be declared unconstitutional. -mamakali@nepc.com.na

GIVE BLOOD SAVE LIVES

OKAHANDJA MALL

For any assistance or transport call Michael on 081 1550184

SATURDAY

08

JUNE

VENUE: Next to MTC

TIME: 09h30-15h30

TARGET: 50+ blood donations



NAMBTS
Namibia Blood Transfusion Service

1 801 280 200 | info@nambts.com.na | www.nambts.com.na

Lowe, Hough win Nedbank Namibia Rock, Rut XC2

■ Staff Reporter

Cyclist Kevin Lowe and Mimi Hough produced stunning masterpiece rides to win the Nedbank Rock and Rut XC2 races at the IJG Trails in Windhoek last weekend.

In the elite men's category, Lowe beat Theuns van der Westhuizen and Adrian Key to win the race in 01:07:11.

Van der Westhuizen clocked 01:09:11 in second place, while Key was third in 01:13:24.

Hough completed the elite women's race in 01:02:19 after six laps.

She was the only cyclist competing in

the category.


Mitchell Dorman was crowned winner in the sub-vet women's category ahead of Nicola Fester, while Sonja Obholzer triumphed in the veteran women's category.

Lowe said he was happy to have won despite the low turnout.

"I enjoyed the track, it was nice and fast. The weather was a bit cold. Hence, I knew a decent warm-up would do the trick. The first two laps. I could feel my feet were a bit cold - but after that, I was fine. I had a good battle in the first two laps with Marco (Thiel), but I decided to ride my race. It's good to see the young ones coming through," said Lowe.



Victor... Namibian cyclist and winner of the elite men's race in the Nedbank Rock and Rut XC2, Kevin Lowe.
Photo: Contributed



INVITATION FOR BIDS

NAMIBIAN PORTS AUTHORITY (NAMPORT)

Bids are invited through Open National Bidding (ONB) bidding procedures for the **Main Entrance Gate Complex Civil Works Port of Walvis Bay (Earthworks, Bitumen and ICB Pavements, Palisade Fence, Etc.)**. The bid is open to all Eligible Namibian Bidders and a margin of preference will apply as detailed in the bidding document.

The Bid is open to all eligible Namibian entities or persons ("Bidders") who wish to respond. Bidders may only associate with each other in the form of a joint venture or under a sub-contractual agreement to complement their respective areas of supply to enhance their capacity to carry out the supply of goods and provision of required services and so long as any association is formed, or sub-contract is entered into in accordance with the bidding document associated with this IFB.

Bid Reference Number	Brief Description	Pre-bid Conference	Last Day for Clarification Requests	Closing Date
W/ONB-NAMP-ORT-3622/2024	Main Entrance Gate Complex Civil Works Port of Walvis Bay (Earthworks, Bitumen and ICB Pavements, Palisade Fence, Etc.	Non-Compulsory Pre-bid/ Site Visit meeting on 14/06/2024 @ 10h00 AM	01/07/2024	19/07/2024 @ 12h00 PM (Virtual Bid Opening Link will be available on website)

Interested eligible bidders are requested to visit the Namport website at <https://www.namport.com.na/Procurement/> for details of the bidding requirements. Bidders must register as suppliers, express interest in a specific bid, make a payment of the bid levy (non-refundable) **NS6000.00** and submit the proof of payment in order to be granted access to the bidding documents. The Namport Banking Details are available on the Procurement Portal on the website.


A Non-compulsory Pre-Bid/Site Visit meeting is scheduled for **14 June 2024 at 10h00 am**. Bidders should take note that the meeting venue is at **Namport, Head Office, Executive Boardroom, thereafter bidders will be directed to the site**.

Bids must be delivered to the following address before or on the deadline for submission: **The Tender Box, Namibian Ports Authority (Namport) Reception, No. 17 Rikumbi Kandanga Road**. Electronic submission of bidding documents will not be accepted.

All enquiries related to these bids must be directed in writing by email to the following contact details:

Tender and Contracts Administrator
Owiike Amunkete
Tel.: +264 64 208 2217
E-Mail: o.amunkete@namport.com.na or procurement@namport.com.na

Procurement Manager
Melani de Klerk
Tel: +264 208 2319
Email: m.deklerk@namport.com.na



www.namport.com



The Republic of Namibia
Ministry of Health and Social Services
& Ministry of works and Transport

PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF THE WINDHOEK DISTRICT HOSPITAL IN KHOMAS REGION & INVITATION TO A PUBLIC MEETING

In accordance with the Environmental Management Act 2007 (Act No. 7 of 2007), notice is hereby given to all possible Interested and Affected Parties (I&APs) that an application will be made to the Environmental Commissioner for environmental clearance as follows:

Project: Construction of a new Windhoek Class C District Hospital.


Proponent: Ministry of Health and Social Services and Ministry of Works and Transport

Location: Havana Informal Settlement, Windhoek.

Public Meeting Date: 20th June 2024.
Venue: Havana High School.
Time: 10H00-13H00.

Deadline for submission of comments: 20th July 2024.

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REPORT



ENERGY AGREEMENT ... Namibia and Angola's energy ministers held a bilateral meeting on Monday on the 881 megawatt Baynes Binational Hydro power project. The two governments are developing the project on the lower Kunene River, along the common border of the two countries. The two ministers, João Baptista Borges and Tom Alweendo, signed an agreement at the Laúca Hydroelectric Power Station in Angola.

Photo: Contributed

B1 credit rating reflects improved growth prospects – Shiimi

• DONALD MATTHYS

FINANCE and public enterprises minister Iipumbu Shiimi hailed Moody's Investor Service's decision to upgrade the country's credit rating outlook at B1, saying that the shift from stable to positive reflects positive growth expectations, fuelled by Namibia's emerging hydrocarbon industries.

Shiimi says the concerted efforts of the government in ensuring fiscal sustainability and the economic recovery and development of new industries have produced formidable outcomes.

"The positive outlook reflects Namibia's improved growth prospects supported not only by cyclical factors like higher commodity prices in a post-pandemic environment and renewed investments in the traditional mining industries, but also by the prospect of significant new hydrocarbon and renewable energy resource developments," Shiimi told parliament on Tuesday.

In its assessment, Moody's said the positive outlook reflects Namibia's improved growth

prospects, which are supported by renewed investments in the mining and energy sectors, especially the nascent oil and gas and green hydrogen industries.

However, the agency warned that the future of these promising new industries remains highly uncertain.

"The affirmation of the B1 rating captures the government's relatively high debt burden and elevated cost of debt compared to higher-rated peers, in addition to its comparatively large gross financing needs," Moody's said.

Moody's expects continued robust economic growth and a stabilisation in debt levels over the medium term, which will stem the tide of credit rating downgrades that Namibia has faced since 2017.

With an economy highly dependent on the exportation of minerals, the highly volatile commodity prices are generally considered a risk to Namibia's revenue performance.

With the post-2016/2017 economic recession and the bust in commodity price cycles, Namibia's economy weakened and the government debt, both domestic and foreign, started

rising, which led to the high cost of debt service.

"These developments affected the trust and credibility of the fiscal policy stance as public debt levels were deemed unsustainable, which led to the adjustment in the outlook to negative, and eventually the first downgrade of Namibia's credit rating in August 2017 from Baa3 to Ba1," Shiimi said.

In the subsequent years until 2022, Namibia's credit rating came under pressure and continued on the downward path until April 2022, when the sovereign credit rating was downgraded to stable at B1.

Shiimi said the downgrade reflected the economy's reduced shock absorption capacity and the continued increase in the debt ratio to gross domestic product at the time induced by Covid-19 effects.

"The government implemented the economic growth strategy and post-Covid-19 policy reforms to resuscitate economic activities and boost government revenue. The outcome of these policy initiatives is reflected in our growth and fiscal metrics as tabled in this august house in February 2024," Shiimi said.

Namibia, Angola maintain energy talks

• CHARMINE NGATJIHEUE

THE Angolan and Namibian governments have reiterated the need for the two countries to collaborate on the Baynes Binational Power Project.

The two countries held a bilateral meeting on the 881 megawatt hydro power project at the Laúca Hydroelectric Power Station in Angola on Monday.

The two governments plan on developing the project on the lower Kunene River, along the common border of the two countries.

Monday's meeting was followed up to a bilateral virtual meeting

between the two countries' energy ministers in November last year.

In a joint statement, João Baptista Borges and Tom Alweendo stressed the importance of the Baynes Binational Power Project for Angola and Namibia, as well as for the Southern African Development Community (SADC) region.

"Considering that Angola is not yet connected to the regional transmission network of SADC, it has become crucial that the Angola-Namibia

Transmission Interconnection is expedited to ensure that Angola is connected to the regional power trading platform," noted the statement.

The transmission network to

the Baynes project will further complement the interconnectivity of the two countries to the rest of the region and provide extra export routes for excess power on the Kwanza and Kunene river basins.

It has been recommended that a joint Baynes implementation unit be set up in either country, as well as a joint bank account, with both governments expected to allocate annual budgets.

The two countries' energy ministers also approved the updated Techno-Economic Feasibility Study report of 2023, as well as the development of an additional regulating dam, about 12km down-

stream from the main dam. The dam will have an installed capacity of 21 megawatts.

"It will also serve as a road corridor bridge," noted the ministers.

The two governments are expected to finalise and endorse that the project be implemented using the public model, before September this year.

"The government lawyers of Angola and Namibia have to meet and finalise the legal review of the Baynes Binational Implementation Agreement, and that Namibia is to host the joint review meeting in Windhoek in June 2024," the statement noted.

Strategy Tips

by Desmond

'I Did Not Have Enough Time'

• DESMOND NIKANOR

OF the many reasons one may give for not completing a task, not having enough time should never be one.

We often use this flimsy reason to justify why something was not done, but it is almost never the real reason.

Since we cannot own or control time, we cannot claim we did not have enough of it.

We all have the same amount of time allotted to us in any given period.

The only differing factor is how you use it. No individual or organisation has more time than the next.

There is always enough time, and we have all there is to have of it.

Granted, in certain circumstances some tasks are psychically impossible to do within a specific period of time, but even those are rare.

For instance, it is impossible for me to drive to Johannesburg in the morning, drop off an envelope and drive back before lunch.

But that is not a time issue, that is a task issue. In other words, if I had a plane to travel on, it would be possible.


Or if I had known weeks ago that the letter needs to be in Johannesburg on a specific date, then it's a planning and procrastination issue.

The point is that time is the ultimate equaliser, because it is equally applied to all.

A minute will always be 60 seconds – irrespective of circumstances.

Habits such as planning, foresight, scheduling, delegating, and upskilling are all disciplines that can increase what can be done within that minute.

You do not have time for everything, but you have enough time for anything if you so choose.



Republic of Namibia



Ministry of Health and Social Services
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Ministry of Works and Transport

PUBLIC NOTICE

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF THE WINDHOEK DISTRICT HOSPITAL IN KHOMAS REGION & INVITATION TO A PUBLIC MEETING

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Challengers director serves fun sport drama

• ANNE HAMBUDA

CHALLENGERS is a tennis themed film that managed to capture the riveting back and forth excitement of the sport in its 131-minute run.

Starring Zendaya as retired tennis star Tashi Donaldson volleying between her ex boyfriend and husband—who also happen to be players and former best friends Patrick Zweig, played by Josh O'Connor, and Art Donaldson, played by Mike Faist—the film chronicles a steamy and seemingly never-ending love triangle between the three.

The story unfolds against the backdrop of a tennis tournament known as Challengers, as it goes back and forth along two timelines.

One timeline shows how two friends went from

being teammates and best friends to foes, while the other timeline shows the present, where Tashi and Art are married with one child and trying to revitalise his competitive and professional spirit.

The jumps in time would definitely be a bit much if this were not a movie about the constant back and forth motion a tennis ball makes during a match.

This parallel is drawn quite often in the film, showing itself in the fact that Zendaya's character is never fully sure of which side she wants to be on.

O'Connor and Faist compliment each other well; equals, peers, but different from each other in so many ways.

They've always competed against one another and while Patrick seems to be in the lead initially, as both the superior tennis



Photo: Contributed

player and the one who won Tashi's heart, by the end of the film you might still not be sure who's the real winner.

This is Tashi's dilemma. As a character, it's clear early on that she cares very little about anything other than tennis.

In a heart-breaking flash-

back, we come to learn how she went from being a rising star athlete to coaching her husband through multiple victories.

We come to understand how the two of them found love with each other years after her relationship and his friendship with Patrick fell apart.

We come to see how she met the both of them at the same time, how they both wanted to be with her and how they both seem to satisfy her spirit in different ways.

What seems like a good marriage at the start of the film is quickly exposed to be something else.

As we go back and forth between the three's interactions in the past and the face off that is taking place in the present, it feels like we too are darting our eyes back and forth.

That's what makes this film interesting.

And what makes it hard to guess what would happen next.

You can call this film many things, but definitely not predictable.

I think O'Connor and Faist's acting was good and their natural chemistry was inviting.

By the end of the film, I felt it was a story about their journey, if anything else.

Zendaya, on the other hand, left a lot to be desired.

I don't know if it's how it was scripted and how she was directed or if this is emanating from her, but I couldn't stand the scowl

she wore the entire time. Her character, which is the case for many of this actress' roles, seemed bored and disinterested.

While some of the visuals were breathtaking, like seeing the vantage point of the ball as it flies across the court, I feel that too much time was spent zooming in and out of the match without the plot progressing.

There were plenty of good artistic choices made, but it left some of the film a bit boring.

Overall, Challengers was a good watch.

It stirred up a lot of emotions; intrigue, anger, laughter and hope and it showcased the world of tennis in an interesting way.

— Anne Hambuda is a poet, writer and social commentator. Follow her online or email her annehambuda@gmail.com for more.



Vasilios 'Billy' Kalaitzis

Greek restaurant caters for those freezing and in a hurry

• FENI HIVELUAH.

IF you're looking for Greek comfort food in the chilly season, look no further than the corner of Rehobother Road and Dr Agostinho Neto Road in Windhoek.

Here you will find Greek restaurant Billy's BBQ Temple.

Restaurant owner Vasilios 'Billy' Kalaitzis says the family business is the only one of its kind in Namibia.

"I believe we are between 'good enough' and 'perfect'. It's not about the skills, I have made these lunches a hundred times, it's about the craft of making these foods," he says.

Kalaitzis says he and his family relocated to Namibia from Germany after a visit to the country had them hooked.

He says he realised Namibia has no Greek restaurant.

"A lot of people told me they were fed

up with eating the same food all the time: pizza, pasta, burgers, kapana... We need Greek here, they said," Kalaitzis says.

This was his 'a-ha' moment, he says. The small restaurant's walls are covered in pictures of his hometown in Greece.

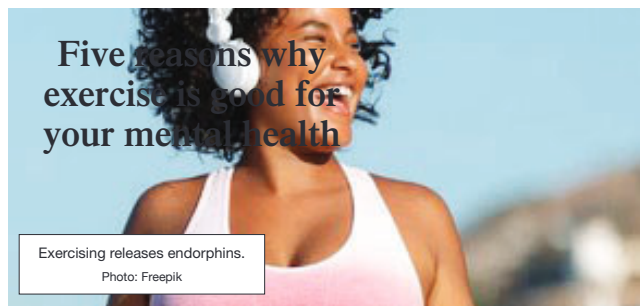
Kalaitzis says the restaurant's current location is not ideal due to a lack of traffic.

He says the establishment does have a few regulars and people coming in for a morning coffee or lunch.

The restaurant caters for "he who has no time, he who is freezing outside" he says.

For "he who is freezing", Billy's BBQ Temple's menu offers a variety of coffees, such as from espressos, cappuccinos and Americanos.

For "he who has no time" the restaurant offers a range of feel-good foods, such as pork gyros (marinated pork necks), kotopoulo (chicken breast fillet), bifteki (traditional beef patty) and more.



Exercising releases endorphins.

Photo: Freepik

REGULAR exercise has long been recommended for its physical health benefits, but did you know it also has a significant effect on your mental health? In fact, numerous studies have shown that exercise can help improve mood, reduce anxiety and depression and even boost self-esteem.

Here are five reasons why exercise is good for your mental health.

Releases endorphins

When you exercise, your body releases chemicals called endorphins, which are known to reduce pain and induce feelings of euphoria.

These "feel-good" chemicals can help combat feelings of stress and anxiety, leaving you feeling happier and more relaxed.

Improves sleep

Regular exercise can help improve the quality of your sleep, which is essential for maintaining good mental health.

A lack of sleep can contribute to feelings of irritability, anxiety and depression, so getting enough exercise can help

you get the rest you need to feel your best.

Reduces cortisol levels

Cortisol is a hormone that is released in response to stress and high levels of cortisol have been linked to anxiety and depression. Exercise has been shown to reduce cortisol levels, helping to alleviate symptoms of stress and improve overall mental well-being.


Boosts self-esteem

Engaging in regular exercise can help boost your self-esteem and confidence. As you set and achieve fitness goals, you'll gain a sense of accomplishment and pride in your abilities, which can translate to improved self-image and overall mental well-being.

Provides a distraction

Exercise can serve as a healthy distraction from negative thoughts and worries. Focusing on physical activity allows you to shift your attention away from stressors and instead concentrate on the present moment, promoting mindfulness and relaxation.

— IOL Lifestyle



Republic of Namibia


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Deadline for submission of comments: 20th July 2024.
Register as I&Aps @: rad@lines18@gmail.com
Tel: +264 81 147 7889.



SUITING **REDE**

13.3 Annex 3 Attendance Register



Environmental Impact Assessment For The Construction Of The Windhoek District Hospital In Khomas Region


Place: Havana High School, Windhoek

Date: 20th June 2024

Time: 10:00

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13.4 Annex 4: Traffic Impact Study



The Republic of Namibia
Ministry of Health and Social Services
&
Ministry of Works and Transport

Traffic Impact Study

For

**Environmental Impact Assessment for The Construction and Operation of
The Windhoek District Hospital at Havana Informal Settlement, Moses
!Garob Constituency, Khomas Region**



RED-DUNE CONSULTING CC


DOCUMENT INFORMATION		
DOCUMENT STATUS	FINAL	
PROJECT TITLE	Traffic Impact Study for The Construction and Operation of The Windhoek District Hospital	
CLIENT	Ministry of Health and Social Services Ministry of Works and Transport	
LOCATION	Havana Informal Settlement, Moses !Garob Constituency, Khomas Region	
DATE	21 August 2024	
AUTHOR	Mr. Ipeinge Mundjulu	Signature
		
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Table of Contents

ACRONYMS.....	I
1 INTRODUCTION.....	1
2 OBJECTIVES	2
3 APPOINTMENT AND SCOPE	2
4 APPROACH AND METHODOLOGY	3
5 STATUS QUO ASSESSMENT	4
5.1 TRANSPORT SERVICES IN WINDHOEK.....	4
5.2 PETER NANYEMBA ROAD	4
6 TRAFFIC IMPACT ASSESSMENT	7
6.1 TRAFFIC GENERATION AND ASSIGNMENT: CONSTRUCTION PHASE	7
6.1.1 Construction Personnel.....	7
6.1.2 Bulk Earthworks.....	8
6.1.3 Construction Materials	9
6.2 TRAFFIC GENERATION AND ASSIGNMENT: OPERATIONAL PHASE	10
6.3 ANTICIPATED IMPACTS AND POTENTIAL MITIGATING UPGRADES.....	11
6.3.1 CONSTRUCTION PHASE SCENARIO	12
6.3.2 OPERATIONAL PHASE SCENARIO	12
7 IMPACTS AND MITIGATION	13
7.1 CRITERIA FOR IMPACT ASSESSMENT.....	13
7.2 IMPACT IDENTIFICATION APPROACH	15
7.3 IMPACT ON TRAFFIC CONDITIONS	15
7.3.1 Intersection of Peter Nanyemba Road and Matshitshi Street.....	15
7.3.2 Intersection of Peter Nanyemba Road and Winnie Madikizela Mandela Road	15
7.3.3 Intersection of Peter Nanyemba Road and Hereford.....	16
7.3.4 Section between Matshitshi Street and Ongos Valley	16
7.4 IMPACT ON ROAD INFRASTRUCTURE.....	16
7.5 IMPACT ON TRAFFIC SAFETY	16
8 RECOMMENDED MITIGATION MEASURES AND MONITORING	18
9 ASSESSMENT OF IMPACTS SIGNIFICANCE	20
10 REFERENCES	21

List of Figure

Figure 1. Locality Map of Windhoek District Hospital 1

Figure 2. Peter Eneas Nanyemba Road (Source: Matrix Consulting Services 2021)5

Figure 3. Peter Nanyemba Road Implementation Plan (Source: ITS)6

List of Tables

Table 1 Ongos Current Peak Trips 12

Table 2 Traffic Scenario 1 12

Table 3 Traffic Scenario 2 13

Table 4. Criteria for Impact Evaluation 13

Table 5. Traffic Management Plan 18

Table 6. Impact Significance 20

ACRONYMS

BRT	Bus Rapid Transit
CBD	Central Business District
CoW	City of Windhoek
DCW	Dual Carriage Way
GFA	Gross Floor Area
HV	Heavy Vehicles
ITS	Innovative Transport Solutions
LoS	Level of Service
MoHSS	Ministry of Health and Social Services
MWT	Ministry of Work and Transport
NMT	Non-Motorized Transport
O-D	Origin-Destination
SoW	Scope of Works
TIA	Traffic Impact Assessment
TMP	Traffic Master Plan
UB	Urban Collector
UTG	Urban Transport Guidelines
WDH	Windhoek district Hospital

1 INTRODUCTION

The Ministry of Health and Social Services [MoHSS, end-user] together with the Ministry of Works and Transport [MWT] intend on constructing a new Class C¹ District Hospital [WDH, the project] at the Havana Informal Settlement in the Moses !Garob Constituency of the Khomas region to the North-West of the City of Windhoek [CoW] – **Figure 1**.

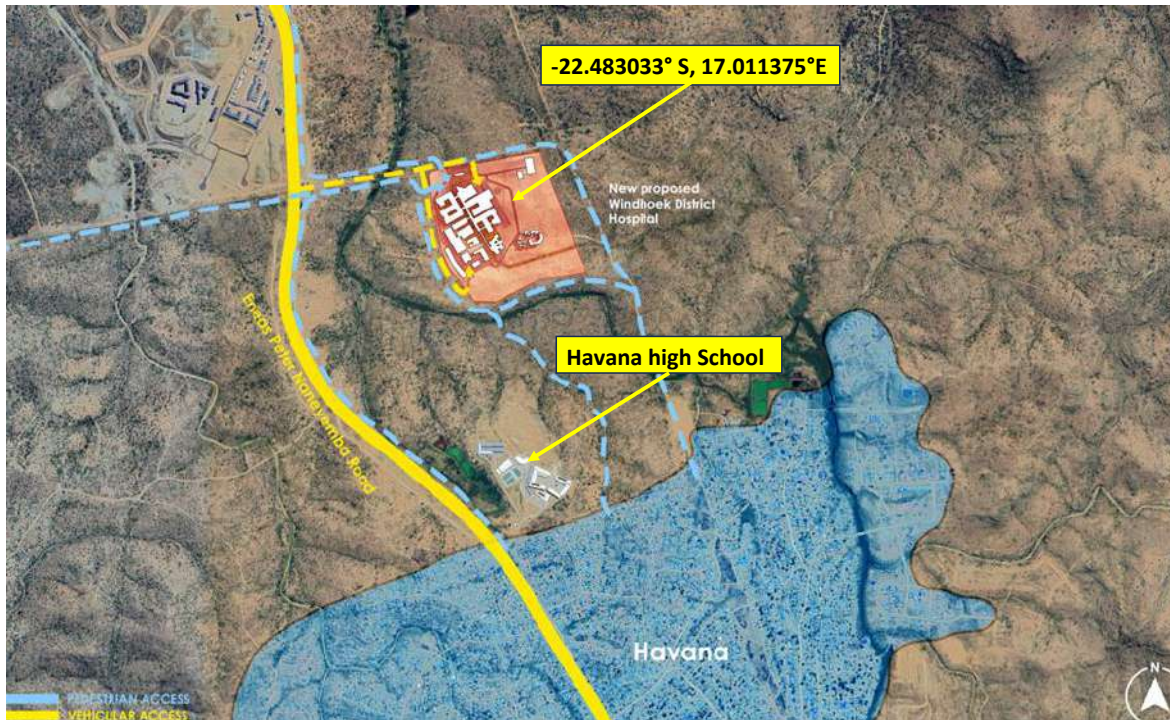


Figure 1. Locality Map of Windhoek District Hospital

The hospital is accessible via the Peter E. Nanyemba Road². This road connects the northern townships to the newly constructed A1 Freeway ~8km to the East from its intersection with Matshitshi Street and represents the main arterial road for these areas. The development of the Ongos Valley to the Northwest of the CoW necessitated the upgrading of this road. To this end, a Traffic Impact Assessment³ [TIA] was undertaken in 2018 by Innovative Transport Solutions [ITS] as part of the CoW's Transport Master Plan [TMP]. The recommendations from this report were that the road be upgraded to a dual carriage way and that provision be made for Non-Motorized Transport [NMT] infrastructure before the entire Phase 1 of the Ongos Valley is

¹ Type C Hospitals are basic district hospitals. In-patient and out-patient services are provided in general medicine, surgery, and child and maternity care. Basic X-ray and laboratory services are usually available.

² Former Monte Christo Road

³ Transportation Master Plan by INNOVATIVE TRANSPORT SOLUTIONS (PTY) Ltd., 2018

developed – these efforts aim to smooth the flow of traffic. The road is currently being upgraded as follows;

1. Link 1: A1 Freeway to Matshitshi Street – upgrade to bitumen Dual Carriageway [DCW] standard and,
2. Link 2: Matshitshi Street to Ongos Valley – upgrade to bitumen Single Carriageway standard with provision for future upgrade.

At the time of compiling this report Link 2, the single carriageway from Matshitshi Street to Ongos Valley, is nearing completion with less than 1km of the road still to be constructed and Link 1 is also under construction.

2 OBJECTIVES

The construction activities related to the ongoing road upgrade projects along with the expected increase in traffic due to the construction and operation of the hospital will result in an overall degradation in the Level of Service [LoS] experienced along the affected routes and at affected intersections.

It is the objective of this study to:

- Investigate the impact of the increased traffic volumes generated by the new District Hospital, during construction and operation, on the affected routes and intersections
- Propose mitigation measures for these impacts

3 APPOINTMENT AND SCOPE

Red-Dune Consulting CC [RDC, the consultant] was appointed to conduct a TIA aimed at addressing the aforementioned objectives thereby completing the below Scope of Works [SoW]:

- Undertake a status quo investigation of the current upgrades in comparison to the recommendations of the TMP
- Estimate Origin-Destination [O-D] traffic volumes generated by the hospital
- Assess the impact of this additional traffic on the post-upgrade LoS along affected routes and at affected intersections
- Provide practical mitigation measure to address degradations of the LoS due to the additional traffic

4 APPROACH AND METHODOLOGY

The CoW, together with its development partners, have undertaken numerous strategic planning studies for the transportation system in the past for the greater part of Windhoek, specifically the following studies bear reference to the current assignment:

- Integrated Strategic Transportation Master Plan for the City of Windhoek, Africon 2006.
- Sustainable Urban Transport Master Plan, GIZ 2013
- Pre-Feasibility Study for The Sustainable Urban Transport Master Plan for Windhoek including Rehoboth, Okahandja and Hosea Kutako International Airport, GIZ 2015
- Brakwater Bulk Services Masterplan, Lithon 2010
- Ongos Valley Sustainability Framework - Inception Phase Report, Dennis Moss and Partners, Sept 2017.
- Monte Christo and Ongos Land Use Budgets, Urban Dynamics Dec 2017.
- Windhoek North East Transport Model (Focus on Elisenheim, Abigail and Eros developments), ITS Study 2015
- Goreangab Waterfront Development Impact Assessment, ITS 2016
- Proposed Townships on Portion 8 & Portion 9 of the Farm Ongos 38 TIA, Lithon in Association with Mariteng Consulting Engineers, Nov 2016.
- Transportation Master Plan [TMP], INNOVATIVE TRANSPORT SOLUTIONS (PTY) Ltd, 2018

These previous studies considered the overall future development of the city. The TMP study, in particular, considered the development of the Ongos Valley, the larger Monte Christo area, and the Greater Brakwater development. The TMP gave specific recommendations for upgrades to alleviate anticipated degradation of the LoS along Peter E. Nanyemba, the main access road for the hospital, should the Ongos, Brakwater, and Monte Christo developments materialise. Additionally, the Peter E. Nanyemba road is currently being upgraded as per the recommendations of the TMP, the extent and progress of these upgrades is discussed below, and the Ongos Valley development has not been officially handed over to the CoW.

As a result, data to be gathered for the current study will not give an accurate reflection of the existing conditions. Consequently, the current study will not undertake a conventional TIA but will instead evaluate data gathered during previous studies along with recommendations made, this information will be used to conclude impacts on the LoS expected along Peter E. Nanyemba Road [the project road] and affected intersections because of the increased traffic

volumes. The relevant sections of the literature utilized for this assessment has been reference through the report.

5 STATUS QUO ASSESSMENT

To determine the impact of additional traffic on the project road and intersections it is necessary to firstly establish the existing infrastructure and the current LoS which they provide to road users

5.1 Transport Services in Windhoek

The public transport services of CoW mainly comprises of sedan taxis and minibuses. The public buses are mainly operated by the CoW however, the city transport system does not have lanes dedicated to buses but plan to operate 14 bus lanes envisages to cover most of the city's Municipal area⁴⁵.

The number of vehicle per household is low at low income township areas, it is estimated that Low-income households in Windhoek spend up to one quarter (25%) of their income on transport⁶. Consequently, their mobility depends largely on public transport system. The 2018 TMP therefore recommended a dedicated BRT on the project road.

5.2 Peter Nanyemba Road

As can be seen from the **Figure 2** below, Peter Eneas Nanyemba⁷ Road is one of the main roads connecting the northern and north-western portions of the CoW to the Central Business District [CBD]. It intersects Hosea Kutako Drive near the Van Eck Power Station and progresses westward to Ongos Valley (**Figure 2**).

⁴ Sustainable Urban Transport Master Plan: City of Windhoek

⁵ Non-Motorised Transport Strategy for the City of Windhoek

⁶ Non-Motorised Transport Strategy for the City of Windhoek

⁷ Former Monte Christo Road

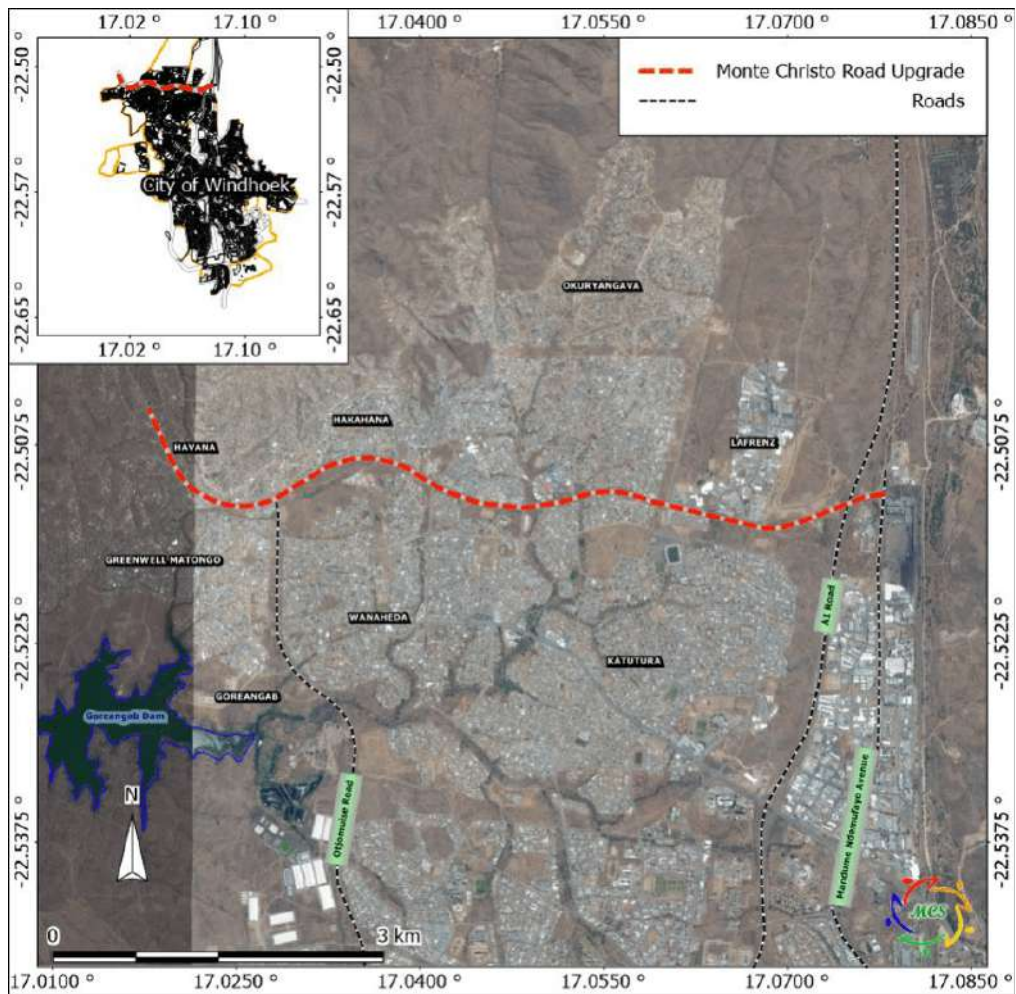


Figure 2. Peter Eneas Nanyemba Road (Source: Matrix Consulting Services 2021)

The road is currently being upgraded in line with the recommendations made by the TMP, i.e., 2 lanes in each direction starting from the intersection with Hosea Kutako Drive up to Matshitshi Street and 1 lane in each direction from Matshitshi Street up to Phase 1 of the Ongos Valley Development (Figure 3).

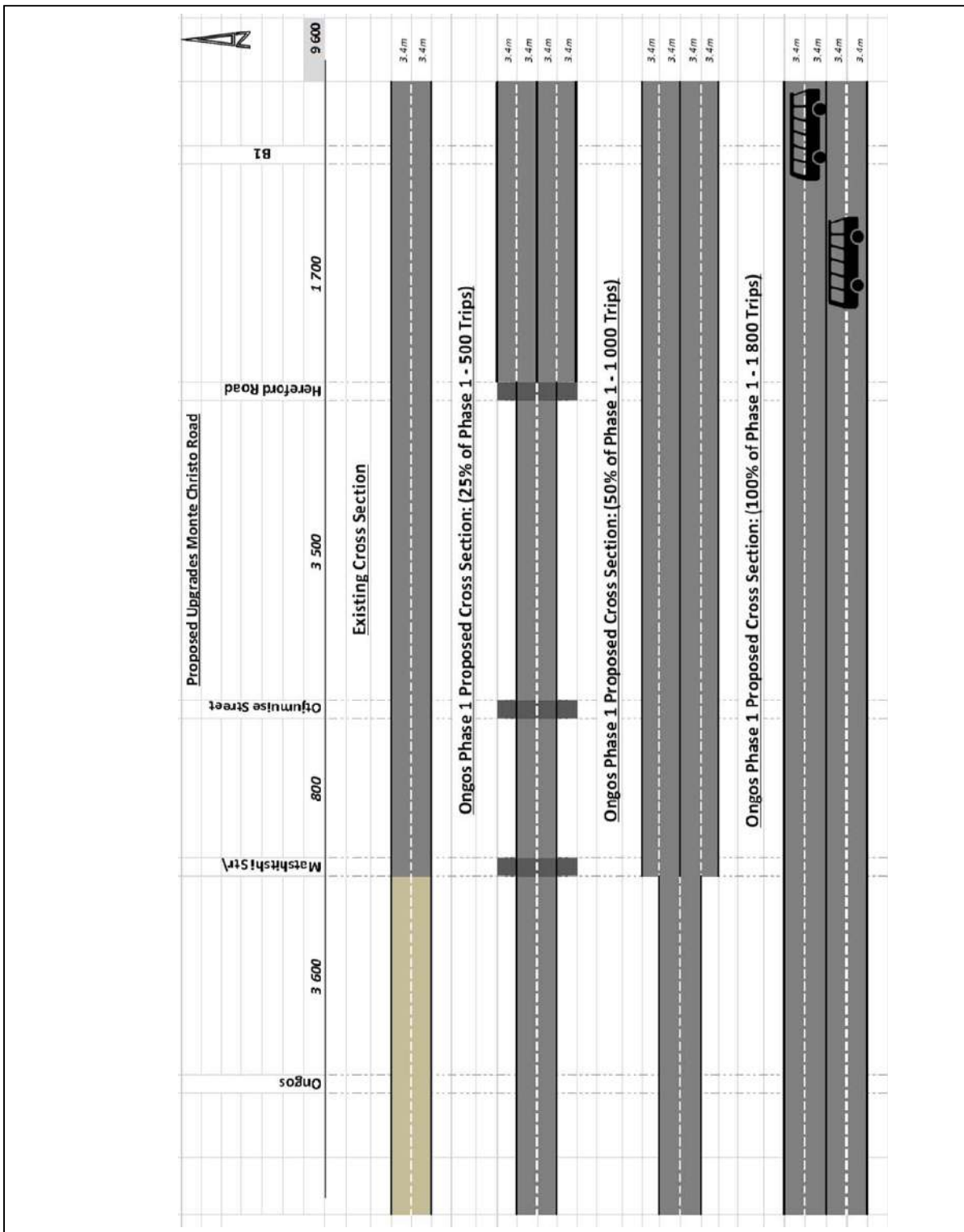


Figure 3. Peter Nanyemba Road Implementation Plan (Source: ITS)

This upgrade will provide sufficient capacity to accommodate up to 50% of Phase 1 of Ongos Valley being developed. Once 50% of Ongos Valley Phase 1 is exceeded (i.e., 100% of Ongos Phase is developed with 1800 peak hour trips), the entirety of the project road up to Ongos Valley must be upgraded to a Dual Carriageway with provision for bus routes. It is understood that the current upgrade can therefore accommodate a maximum of 1800 vehicles during the peak hour, this study will assume 1700 peak hour trips to allow a margin of safety.

6 TRAFFIC IMPACT ASSESSMENT

In assessing the impact of additional traffic on the existing infrastructure, a vital first step is to confirm the anticipated additional traffic volumes to be accommodated. In deriving these, the consultant wishes to note the following assumptions:

- i. abnormal vehicles will be escorted by traffic control officers in marked vehicles
- ii. all vehicles transporting personnel will be retained on-site during day
- iii. all concrete is to be batched on-site.
- iv. all payload to be transported will be within road specification

The 1700 peak hour trips previously adopted is meant to cater for at least 50% of Ongos Phase 1, the consultant will compare traffic generated by the project with the upgraded road capacity and the level of development of Ongos Phase 1 to show the impact on the road infrastructure.

6.1 Traffic Generation and Assignment: Construction Phase

The project is expected to employ a large contingent of semi-skilled and unskilled workers during the construction phase. Additionally, due to the undulating terrain and size of the project, the consultant anticipates significant traffic generated by material flow to and from the project site.

Using the feasibility study programme of works, it can be seen that construction is expected to take 2 – 3 years with the main work activities shown below.

- Phase 1: Bulk Earthworks – will involve extensive cut and fill operations with significant material flow to and from the site for the completion of the access road and bulk services. This phase is expected to last 8 months.
- Phase 2: Main Hospital, Accommodation, and Ancillary Substructure and Superstructure Construction – traffic generated will be in the form of construction materials, equipment, and employees to and from the site, the consultant anticipates that this phase will take 24 months
- Phase 3: Mechanical, Electrical, and Specialist installations – it is expected that this phase will generate less traffic compared to the previous phases but over a longer period, trips will typically include staff, materials, and equipment being transported to and from site.

6.1.1 Construction Personnel

Based on experience, the consultant assumes the following:

- The project will employ approximately 1500 employees for the duration of the construction period with 75% of these being needed on site during Phase 2
- 10% of these will be skilled, 30% semi-skilled, and the remaining 60% unskilled
- Staff transport will be via the project road during the morning and evening peak hours
- Skilled employees will use private transport at a rate of 2 people per vehicle
- Unskilled and semi-skilled labour will be transported in buses (65 pax) and minibuses (16 pax) respectively

From these assumptions, the following number of trips can be generated for personnel transport to and from site during the peak construction stage (Phase 2) of the WDH project:

75% of 1500 employees	=	1125 employees engaged on site during Phase 2
10% of 1125 employees	=	112.5 (say 113) skilled employees
30% of 1125 employees	=	337.5 (say 338) semi-skilled employees`
60% of 1125 employees	=	675 unskilled employees

No of trips generated per employee group:

Skill group	AM Peak	PM Peak	Daily total
Skilled	57	57	114
Semi-skilled	21	21	42
Unskilled	11	11	22
Total	89	89	176

This is a liberal estimate and does not account for employees near the WDH project who would opt to walk or use Non-Motorised Transport [NMT] (bicycles).

6.1.2 Bulk Earthworks

The initial phase of the WDH project will involve levelling portions of the site through cut and fill operations to construct a platform upon which the hospital will be constructed. Ideally the material removed from excavations should be used to fill on site depressions, this is a balanced cut and fill operation however, this is rarely the case as the material quality should be considered. Material from cut operations will have to be removed from site and material from off site will need to be transported to site to be used as fill – material flow will be limited to on-site movements as far as possible.

Regarding bulk earthworks, the consultant wishes to note the following assumptions:

- 20 000m³ of material will be produced during cut operations.
- 70% of this volume will be used on site as fill especially during the construction of the access road, and coarse and fine aggregate for concrete batching.
- The remainder will be transported off site to the municipal dump site, surrounding construction projects, etc.
- 10m³ trucks will be used along the project road throughout the day.
- Material movements from site will be carried out for 6 of the 8 months allocated to the Bulk Earthworks Phase with a workweek from Monday to Saturday.
- Due to the impacts caused by Heavy Vehicles [HV] on the flow of traffic, the contractor should start such operations outside of the peak AM, Midday, and PM hours.

The following trips will be generated from the bulk earthworks:

$$\begin{aligned} 30\% \text{ of } 20\,000\text{m}^3 &= 6\,000\text{m}^3 \\ 6 \text{ months transport period} &= 1000\text{m}^3/\text{month} = 42\text{m}^3/\text{day} \\ 10\text{m}^3 \text{ per truck} &= 4 \text{ truck trips per day leaving the site} \end{aligned}$$

With the HV traffic limited to outside the peak traffic hours, the consultant does not anticipate a significant impact on the LoS experienced at intersections along the project road. Additionally, this impact can be further reduced by allowing more time for the bulk earthworks thus resulting in even fewer trips.

6.1.3 Construction Materials

Various construction material will be needed for the WDH project, the majority of which will be cement, coarse and fine aggregate, bricks, and steel. Due to the scale of the project, the consultant assumes the following:

- Construction material will be procured from suppliers in Windhoek with bulk delivery of material when additional supply is needed
- Concrete will be batched on site
- Water for construction will be available from the nearby Goreangab Water Treatment Works

- Delivery of construction material will be scheduled outside peak AM, Midday, and PM hours

Generating trips for the delivery of construction material is purely based on experience and may need to be revised as it depends greatly on the contractor's chosen methodology. For this reason, the consultant has opted to assign 50 trips to the WDH project site during peak hours for the duration of the construction period. This is considered a liberal estimate.

6.2 Traffic Generation and Assignment: Operational Phase

Traffic generated by the hospital during its operational phase will include the following:

- Patient trips to and from the hospital in private or public (taxi) transport
- Staff trips to and from the hospital in private or public transport
- Trips to visit patients in the hospital
- Patient trips to the hospital in emergency vehicles
- Trips to the training facility
- Delivery of materials and supplies needed by the hospital

To determine the volume of traffic generated by a hospital the consultant will reference values generated by the Institute of Transportation Engineers' [ITE] Trip Generation Manual which aggregates information from existing studies to determine links between trip volumes and variables such as the number of beds and the gross floor area among others. In this regard, the following should be noted:

- The project structure has a Gross Floor Area [GFA] of approximately 50 000 m²
- As per the feasibility study, the project will accommodate 500 beds

For hospitals, the ITE provides the below extract which seeks to correlate GFA with trips to and from a hospital in a general urban/suburban setting. This data set was derived from 3 studies of a similar nature and shows that an average of 1.08 trip ends (trips to the hospital) can be expected for every 1000 sq. ft. of GFA (92.9m²).

Hospital (610)

Person Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

PM Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 3

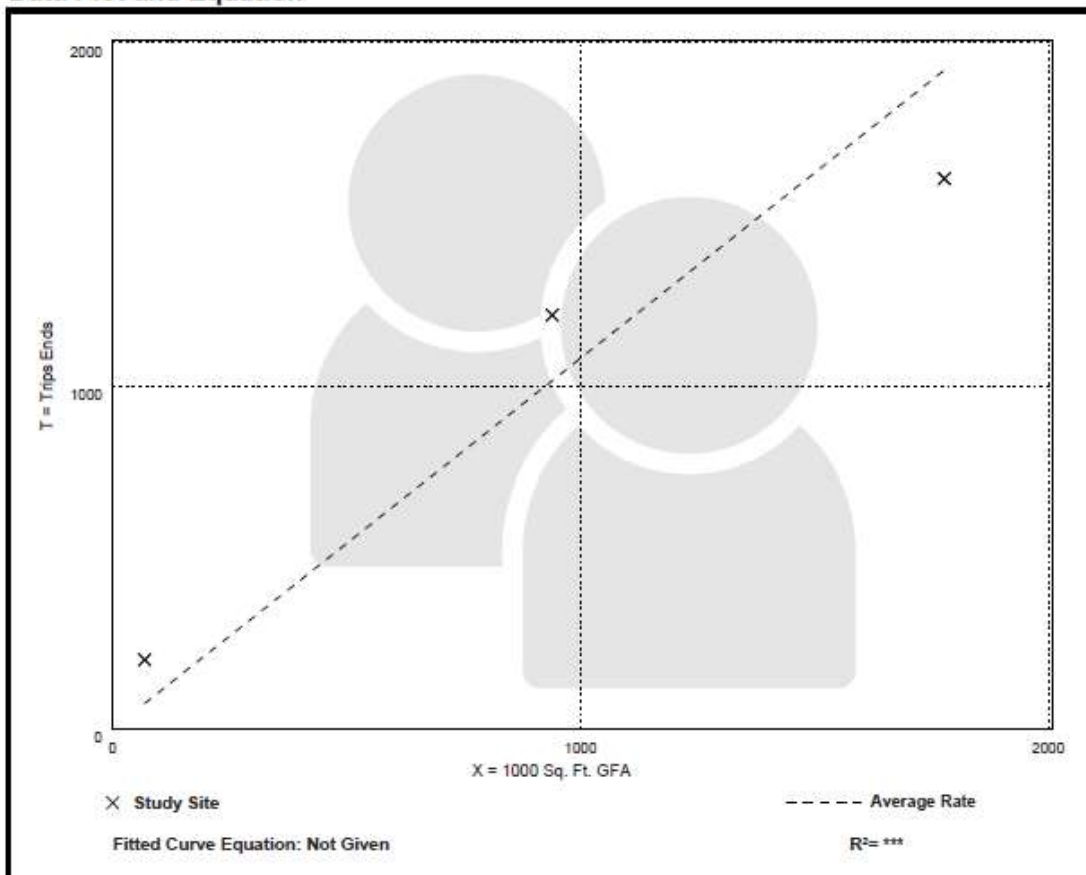
Avg. 1000 Sq. Ft. GFA: 929

Directional Distribution: 33% entering, 67% exiting

Person Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.08	0.90 - 2.96	0.42

Data Plot and Equation



Based on the above, the number of trips expected to the 50 000m² WDH equals to 581 during the PM peak hour. This study will adopt the PM peak volume as it is slightly larger than the AM volume given by the ITE Trip Generation Manual.

6.3 Anticipated Impacts and Potential Mitigating Upgrades

The upgraded capacity of the project road is directly related to the level of development of Ongos Valley Phase 1. As previously mentioned, once Ongos Valle Phase 1 is fully developed, i.e., 100% developed, the project road will need to be upgraded to a dual carriageway from the

A1 all the way up to Ongos Valley. Based on information from the developer, the current phase of Ongos valley is at 55%. This translates to total peak trips of 1078, as derived from a linear interpolation of the TMP study, see **Table 1** below.

Table 1 Ongos Current Peak Trips

Planned Development Phases		
% Developed	Units	Peak Trips
25	1150	500
50	2250	1000
100	4500	1700
Current Developed Unit - July 2024		
% Developed	Units	Peak Trips
55.56	2500	1078

It is noted that the upgrade of Peter Nanyemba Road to dual carriageway standards from Matshitshi Street to Ongos Valley should happen before Ongos Phase 1 is fully developed, because of the additional peak trips from WDH. See below details of the scenarios.

6.3.1 CONSTRUCTION PHASE SCENARIO

This scenario assesses the impact of the WDH Construction phase on the project road. The additional traffic generated by the WDH during the construction phase can be accommodated on the upgraded project road until the Ongos Valley Phase 1 is 97.06% developed. This is derived from a linear interpolation of the TMP study, as shown in **Table 2**.

Table 2 Traffic Scenario 1

Scenario 1	
Ongos Valley Current + WDH Construction Stage	
	Peak Trips
Ongos Valley Current	1078
Windheok District Hospital	50
Total	1128
Peter Nanyemba Road dual carriageway upgrade required when Ongos Valley Phase 1 reaches 97.06%, which translates to 4410 units.	

6.3.2 OPERATIONAL PHASE SCENARIO

This scenario assesses the impact of the WDH operations phase on the project road. The additional traffic generated by the WDH during the operation phase can be accommodated on the upgraded project road until the Ongos Valley Phase 1 is 65.82% developed. This is derived from a linear interpolation of the TMP study, as shown in **Table 3**.

Table 3 Traffic Scenario 2

Scenario 2	
Ongos Valley Current + WDH Operation Stage	
	Peak Trips
Ongos Valley Current	1078
Windheok District Hospital	581
Total	1659
Peter Nanyemba Road dual carriageway upgrade required when Ongos Valley Phase 1 reaches 65.82%, which translates to 2970 units.	

7 IMPACTS AND MITIGATION

7.1 Criteria for Impact Assessment

The criteria used to assess the impacts and the method of determining their significance is outlined in **Table 1** below. This process conforms with the Environmental Impact Assessment Regulations of Environmental Management Act, 2007 (Government Gazette No. 4878).

Impact significance is determined under two mitigation scenarios; **without mitigation** and **with mitigation**. The confidence of impact mitigation depends on the level of certainty based on available information to assess the impact. Impacts whose level of uncertainties are high, further study is recommended to understand and develop appropriate mitigation measures.

Table 4. Criteria for Impact Evaluation

Risk Event	Rating	Description of the risk that may lead to an Impact
Probability	The probability that an impact may occur under the following analysis	
	1	Improbable (Low likelihood)
	2	Low probability
	3	Probable (Likely to occur)
	4	Highly Probable (Most likely)
	5	Definite (Impact will occur irrespective of the applied mitigation measure)
Confidence level	The confidence level of occurrence in the prediction, based on available knowledge	
	L	Low
	M	Medium
	H	High
	0	None (Based on the available information, the potential impact is found to not have a significant impact)

Significance (Without Mitigation)	L	Low (The presence of the impact's magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects is altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no go implication unless the project is re-designed or proper mitigation can practically be applied)
Mitigation	The applied measure / alternative to reduce / avoid an impact	
Significance (With Mitigation)	0	None (Based on the available information, the potential impact is found to not have a significant impact)
	L	Low (The presence of the impact's magnitude is expected to be temporal or localised, that may not require alteration to the operation of the project)
	M	Medium (This is when the impact is expected to be of short term moderate and normally regionally. In most cases, such impacts require that the projects is altered to mitigate the impact or alternative method of mitigation is implemented)
	H	High (The impact is definite, can be regional or national and in long term. The impact could have a no go implication unless the project is re-designed or proper mitigation can practically be applied)
Duration	Time duration of the impacts	
	1	Immediate
	2	Short-term (0-5 years)
	3	Medium-term (5-15 years)
	4	Long-term (more than 15 years)
	5	Permanent
Scale	The geographical scale of the impact	
	1	Site specific
	2	Local
	3	Regional

	4	National
	5	International

7.2 Impact Identification Approach

Impact on traffic congestion was done at four major intersection along the Peter Nanyemba as follows;

- i. Intersection of Peter Nanyemba Road and Matshitshi Street
- ii. Intersection of Peter Nanyemba Road and Winnie Madikizela Mandela Road
- iii. Intersection of Peter Nanyemba Road and Hereford
- iv. Section between Matshitshi Street and Ongos Valley

For strategic planning and recommendation, please refer to the *TMP 2018, section 8.4 “Phased Implementation Approach for Ongos”*.

7.3 Impact on traffic conditions

7.3.1 Intersection of Peter Nanyemba Road and Matshitshi Street

Currently, traffic congestion at the intersection of Peter Nanyemba Road and Matshitshi Street is often worse, especially during peak hours. Seldomly, city traffic official are observed regulating traffic flow to ease congestion. In the absence of traffic official, ordinary resident were observed giving guidance to the traffic flow which also help congestion. But, instances where there is no one guiding traffic flow, traffic jams are often experienced.

Mitigation: *As part of the on-going upgrades, traffic signals with one effective through lane and one dedicated turning lane to Matshitshi Street is recommend (TMP 2018). In the interim however, it is recommended that a traffic officer is stationed at the intersection during peak hours (06:00am – 09:00am and 16:00pm – 19:00pm) to regulate traffic flow during construction phase.*

7.3.2 Intersection of Peter Nanyemba Road and Winnie Madikizela Mandela Road

The Winnie Madikizela Mandela Road was recommended for upgrade by the city’s Master Plan. Currently, the intersection experience heavy congestion particularly during peak hours which is expected to worsen with additional construction trips for the hospital.

Mitigation: *As part of the on-going upgrades, traffic signals with one effective through lane and one dedicated right turning lane to Winnie Madikizela Mandela Road is expected to be implemented (TMP 2018). In the interim, it is recommended that a traffic officer is stationed at the intersection on daily basis during peak hours (06:00am – 09:00am and 16:00pm – 19:00pm) to regulate traffic flow during construction phase.*

7.3.3 Intersection of Peter Nanyemba Road and Hereford

Traffic congestion at Hereford Street intersection with Peter Nanyemba was not observed to be worse with the ongoing upgrades. The traffic signals at this intersection were temporarily removed due to construction activities. However, additional trips of the hospital construction could worsen congestion⁸.

Mitigation: *It is recommended that a traffic officer is stationed at the intersection on daily basis during peak hours (06:00am – 09:00am and 16:00pm – 19:00pm) to regulate traffic flow during construction phase.*

7.3.4 Section between Matshitshi Street and Ongos Valley

According to the TMP, the LoS is expected to degrade on Peter Nanyemba from Matshitshi Street to Ongos when Ongos development reaches over 50%. However, the TMP has recommended mitigation measure to ensure smooth flow of traffic as follows;

Mitigation: The Monte Christo Road between Ongos Phase 1 and Matshitshi Street will be upgraded to Dual Carriageway and introduce a public transport bus service between Ongos and the Windhoek Central Business District (CBD) and other destinations. This upgrade capacity will be able to cater for the traffic to be generated by the hospital operation.

7.4 Impact on road infrastructure

Road infrastructure could be damaged by abnormal payload. During the study, the maximum payload of construction vehicle was not known. However, it is assumed that vehicle payload will conform with the road capacity.

7.5 Impact on traffic safety

⁸ This could only be the case if sand and concrete would not be sourced north of the project site.

Traffic safety will be critical during construction. Construction vehicles are normally bigger and could obstruct other road users which may result in accidents. Safety of construction workers could be compromised if transported by non-reliable transport. Construction vehicle that are not roadworthy and intoxicated drivers pose critical risk to public and passengers.

Mitigation: *Abnormal vehicles with width protruding on oncoming vehicles lanes should be escorted to ensure the road is cleared for their passages. All construction vehicle must be roadworthy and fitted with reflectors and rotating lights and ensure all drivers are in possession of drivers licences and are screened with an alcohol breathalyser for alcohol. The 2018 made recommendation provisions lane for Non-Motorised Transport (NMT) to ensure their safety.*

While on gravel road, dust pose a safety risk as it reduces visibility and can result into accident. There could be segments especially toward Ongos Valley where current construction vehicle use the gravel roads. It is should however be noted that, these segments are not official dedicated gravel roads but rather construction road aimed to smoothen traffic on the main paved roads.

Mitigation: *All vehicle using gravel roads must have rotating flash light to enhance visibility. Use dust suppression measure such as water spray to minimize dust.*

8 RECOMMENDED MITIGATION MEASURES AND MONITORING

Table 5. Traffic Management Plan

No	Traffic Impact	Mitigation Measures	Monitoring Indicators	Party Responsible	Frequency
1.	Congestion on major intersection on Peter Nanyemba Road	1. Place a traffic law enforcement at the intersection during peak hours (06:00am – 09:00am and 16:00pm – 19:00pm) to regulate traffic flow during construction phase until traffic signals are installed.	1. Dedicated traffic law enforcement during peak hours	City of Windhoek Traffic Department	Daily
2.	Traffic Safety	<ol style="list-style-type: none"> 1. Abnormal vehicles should be escorted to ensure the road is cleared for their passages. 2. All construction vehicle must be roadworthy and fitted with reflectors and rotating lights 3. Ensure all drivers are in possession of drivers licences and are screened with an alcohol breathalyser for alcohol. 4. Provide workers with safe and liable passenger transport 	<ol style="list-style-type: none"> 1. Record of heavy vehicle escorts 2. Vehicle roadworthy 3. Reflectors and rotating right on construction vehicle 4. Record of alcohol breathalyser 	Main Contractor City of Windhoek Traffic Department	Random checks once a week and when necessary

No	Traffic Impact	Mitigation Measures	Monitoring Indicators	Party Responsible	Frequency
3.	Damage of road by overloaded heavy vehicle	1. Ensure heavy vehicles are within the road capacity payload	1. Weighing records of heavy vehicles	City of Windhoek Traffic Department	Random checks
4.	Poor new road designs	1. Ensure the design guidelines for new access roads are in accordance with the City of Windhoek Standard Drawings, the CSIR Red Book and the Urban Transport Guidelines (UTG) manuals. 2. Ensure the new road has provisions for NMT and emergency vehicles	1. Approved road design by City Windhoek	City of Windhoek Roads and Storm Water Department	Monthly
5.	Insufficient Parking Bays at hospitals	1. Ensures sufficient parking bay in accordance to National Requirement 2. Designate special parking for emergency vehicles 3. Designate parking for bi-cycles	1. Approved designs by City of Windhoek and relevant authorities	City of Windhoek Roads and Storm Water Department	Monthly

9 ASSESSMENT OF IMPACTS SIGNIFICANCE

The significance of the identified impacts is assessed in accordance with the assessment criteria outlined in **Table 4** above under two scenarios. The residual impact after mitigation determines the impact level.

Table 6. Impact Significance

No	Nature of Impact	Impact Type	Probability	Scale	Duration	Significance (Without Mitigation)	Significance (With Mitigation)	Confidence Level
1.	Increased Traffic Congestion	Negative	Definitely	Local	Short-term	High	Low	High
2.	Increased Traffic Accident	Negative	Highly Probable	Local	Short-term	Medium	Low	High
3.	Fast degradation of road structure	Negative	Highly Probable	Local	Short-term	Medium	Low	Medium
4.	Poor new road designs	Negative	Possible	Local	Long-term	High	Low	High
5.	Insufficient Parking Bays at hospitals	Negative	Probable	Local	Long-term	High	Low	Medium

Overall, significance of all impacts were assessed to be low with the recommended mitigation measures.

10 REFERENCES

1. Burmeister & Partners (PTY) LTD Consulting Engineers 2019., Traffic Impact Assessment: The European Investment Bank and NamPower EIA for The Proposed Encroacher Bush Biomass Power Project in Namibia
2. Burmeister & Partners (PTY) LTD Consulting Engineers 2024, Draft Feasibility for Windhoek District Hospital Road Network
3. Deutsche Gesellschaft Für Internationale Zusammenarbeit (Giz) Gmbh, Sustainable Urban
4. Deutsche Gesellschaft Für Internationale Zusammenarbeit (Giz) Gmbh, Pre-Feasibility Study for The Sustainable Urban Transport Master Plan for Windhoek Including Rehoboth, Okahandja and Hosea Kutako International Airport, June 2015
5. Environmental Management Act (No.7 Of 2007). Government Gazette No. 3966.
6. Innovative Transport Solutions (Pty) Ltd 2018., Transportation Master Plan
7. Matrix Consulting Services 2024., Environmental Impact Assessment for The Construction and Operational Phase Proposed Ongos Portion 8 & 9 Township Development Project and Its Associated Waste Water Treatment Plant and Telecommunications Towers on Farm Ongos No.38 , Windhoek
8. Matrix Consulting Services 2021., Environmental Scoping Assessment Proposed Upgrade of The Existing Monte Christo Road (From Hosea Kutako Drive to Matshitshi Street), Windhoek Republic of Namibia.
9. Ssi Engineers And Environmental Consultants (Pty) Ltd 2009., Traffic and Roads Impact Study for Walvis Bay Container Terminal
10. Transport Master Plan, February 2013