2023

Environmental Management Plan

Marshall Rock No 10 Private Hospital

ITEMS	INFORMATION DETAILS
Project Title	Environmental Management Plan
Proponent Address	Marshall Rock No 10, P.O. Box 2135, Rundu
Proponent Contact Details Tel: Email:	Mr. Sampie Pienaar Marshall Rock No 10 264 66 267 233 info@runduprivatehospital.com
Project Location	Marshall Rock No 10, Rundu, Kavango East
Status	Environmental Management Plan
Consultant	Conserver Investment CC
EAP	Michael Matengu
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Acronyms and definition

Table 1. Acronyms

ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
MEFT	Ministry of Environment Foresty and Tourism
EMP	Environmental Management Plan
EAP	Environmental Assessment Practitioner
WM	With Mitigation
WOM	Without Mitigation

Definition of Terms

Table 2. Definitions of Terms

Alternatives	Different means of meeting the general purpose and requirements of the activity.
Assessment	The process of identifying, predicting and evaluating the significant effects of activities on the environment, the risks and consequences of activities and their alternatives and options for mitigation with a view to minimise the effects of activities on the environment.
Competent Authority	An organ of state which is responsible, under any law, for granting or refusing an authorisation; or The Minister or any other organ of state may under subsection (1) be identified as the competent authority. EMA (Act 7 of 2007)
Cumulative Impacts	The changes in the environment caused by the combined effects of the projects and other actions, and they should be assessed using methods such as scenarios, thresholds, or models.
Duration	The time during which something continues.
Environment	The environment is defined in terms of the National Environmental Management Act, No 107 of 1998, as the surroundings within which humans exist and that are made up of – the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being
Environmental Assessment Practitioner	A person designated by a proponent to manage the assessment process
Environmental Impact Assessment	
Environmental Management Plan	The EMP is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The MP contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMP specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle. Therefore the EMP will be a working document, which will be reviewed when necessary, or if required by the authorities.
Extent/Scale	The physical extent of the impact
Intensity	The quality or state of being intense, the magnitude of a quantity

Mitigate	Make (something bad) less severe, serious, or painful.
Nature of Impact	A brief description of the type of impact the proposed development will have on the affected environment
Probability	The likelihood of the impacts actually occurring
Proponent	Is the project applicant (i.e. the developer) is responsible for complying with the requirements of the EIA and for all associated costs incurred when following the EIA process, is responsible to appoint an independent consultant who will act on the proponent's behalf in the EIA process
Operational Phase	The period following the Construction Phase, during which the proposed development will be operational.
Rehabilitation	Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re- vegetation of a disturbed area and the insurance of a stable land surface. Re- vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

1. Background Information

1.1. Introduction

Conserver Investment CC (The Consultant) was requested by the proponent (Marshall Rock No 10 Private Hospital) to update the existing environmental management plan (EMP) for previously Marshal Rock No 10 Private Hospital, situated in Eugene Kakuuru Street, Rundu, Kavango East Region. In order to comply with Namibian legislation, codes and standards, the Proponent wishes to apply for an Environmental Clearance Certificate (ECC) for the private hospital. In support of the ECC renewal application, the EMP will be submitted to the Ministry of Environment, Forestry and Tourism (MEFT).

Environmental Management Plan (EMP) is a guidance document to measure and achieve compliance with the environmental protection and mitigation requirements of a project, which are typically requirements for project permits/approvals. An EMP is an essential product of an Environmental Assessment (EA) process. This EMP has been drafted in accordance with the Namibian Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (2012). Section 44 of that Act, I list in the Annexure to the Schedule, activities that may not be undertaken without an environmental clearance certificate. A baseline environmental assessment for the private hospital was conducted in order to understand of the existing environmental conditions in the area and to identify the potential impacts of the future expansion may have on the environment and the community.

The current development comprises of a building cluster, consisting of three floors (Floor 1: Specialist Practice, Rundu Dental Practice and Admin Block; Floor 2: Radiology, Maternity, Female ward, Paediatric ward; Floor 3: ICU , High Care, Male ward, Theatre, and Neo Natal ICU. As part of this legal permit process an EMP has been drafted as part of the Environmental Impact Assessment process. The Environmental Management Plan EMP serves as a legal document that must be complied with and strictly enforced by the proponent, contractor and any other party associated with the Lodge.

1.2. Project Standard

1.2.1. Regulations/Standards

Environmental legislation in Namibia a was promulgated because environmental degradation must at the very least be minimised and at the most prevented.

Table 3: Regulations

The Constitution	Promote the welfare of people Incorporates a high level of environmental protection. Incorporates international agreements as part of Namibian law.
Environmental Management Act (Act No. 7 of 2007)	Defines the environment and Promote sustainable management of the environment and the use of natural resources, provide a process of assessment and control of activities with possible significant effects on the environment
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	Commencement of the Environmental Management Act, Lists activities that require an environmental clearance certificate and provide Environmental Impact Assessment Regulations.
The Water Act (Act No. 54 of 1956)	Remains in force until the new Water Resources Management Act comes into force, defines the interests of the state in protecting water resources. Controls the disposal of effluent.
Water Resources Management Act (Act No. 11 of 2013)	Provide for management, protection, development, use and conservation of water resources, prevention of water pollution and assignment of liability.
Public and Environmental Health Act (Act No. 1 of 2015) Government Notice No. 86 of 2015	Provides a framework for a structured more uniform public and environmental health system, and for incidental matters. Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.
Soil Conservation Act (No 76 of 1969)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister
The Regional Councils Act (No. 22 of 1992) and Local Authorities Act (No. 23 of 1992	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 “to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.” The main objective of this Act is to initiate, supervise, manage and valuate Development.
Labour Act No 11 2007	Provides for Labour Law and the protection and safety of employees. Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997

Atmospheric Pollution Prevention Ordinance No. 11 of 1976	Governs the control of noxious or offensive gases , prohibits scheduled process without a registration certificate in a controlled area, requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.
Hazardous Substances Ordinance No. 14 of 1974	Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export. Aims to prevent hazardous substances from causing injury, ill-health or the death of human being

1.3. Purpose of the EMP

The EMP contains the necessary mitigation and recommended actions as well as the timeframe and person responsible for the actions. The ultimate responsibility of the implementation of the EMP rests on the Proponent (Marshall Rock No 10). The EMP is a legally binding document that is an important part of the Environmental Assessment process and needs to be strictly adhered to. Workers and contractors must be made aware of the EMP, their responsibilities.

1.3.1. Objectives of EMP

This EMP has the following objectives:

- To outline functions and responsibilities of the responsible persons involved in the construction and operation and decommissioning of Marshall Rock No 10 Private Hospital
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
- To establish a method of monitoring and auditing environmental management practices during operation, construction and decommissioning phases of development.
- Specify time periods within which the measures contemplated in the environmental management plan must be implemented, where appropriate
- To outline mitigation measures and environmental specifications which must be implemented to ensure environmental and social protection of the surrounding environment; and
- To prevent long-term or permanent environmental degradation.

1.3.2. Structure of EMP

The EMP is separated into Three (3) phases. Each phase has specific issues unique to that phase. The impacts are identified and given a brief description. The Three (3) phases of the Development are identified as below:

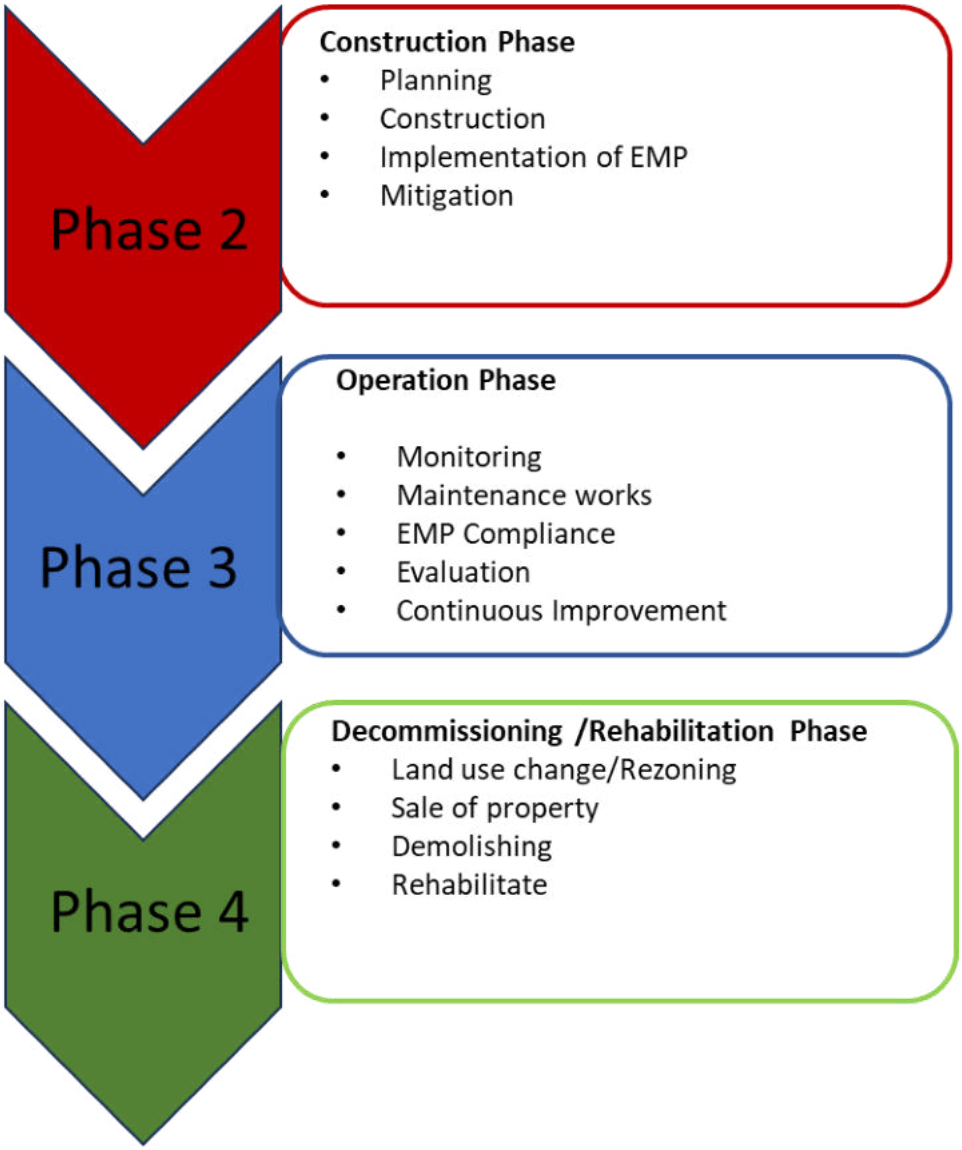

Figure 1. EMP Phases

After analysing the criteria such as extent, duration, intensity, etc. under each phase, a discussion is presented where appropriate. The Environmental Management Plan is then shown and the Mitigation measures in each development phase identified.

1.3.3. Roles and Responsibilities

The Proponent (Applicant)

The proponent (Marshall Rock No 10 Private Hospital) shall

- Ensure that the engineer and contractors comply with the approved EMP.
- Ensuring compliance with the provisions for duty of care and remediation of damage in accordance Environmental Management Act, 2007 (Act No. 7 of 2007)
- Ensuring that the mitigation measures identified in EMP to address environmental impacts identified are carried out by the contractor.
- Ensure that the contractor adhere to the health and safety of the employees as stipulated in the Labour Act No 11 2007
- The ECO(Environmental Compliance Officer) must be contracted by the applicant as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of ECC and the EMP for the project.
- The Proponent is further responsible for providing and giving a mandate to enable the ECO to perform his/her responsibilities. The applicant must ensure that the ECO is integrated as part of the project team to monitor the condition of the ECC.

Project Manager/Engineer

The Project Manager or Engineer is responsible for:

- Appointing a qualified contractor and ensuring that they have read and understood the EMP.
- Ensuring all work undertaken is in accordance with the EMP.
- Ensuring adherence to safety, health and environment (SHE) standards and ensuring the construction activities comply with the EMP
- Overall responsibility and accountability for the site during the construction phase.
- Mitigating impact on the environment through responsible operation and adherence to the EMP.
- Ensuring transparency in their operation and environmental management of the site.
- Managing the contractor to ensure that they adhere to the EMP and ensuring that all necessary documentation is maintained on site.
- Ensuring that the contractor has a copy of the EMP and Method Statements relating to the construction

Site Contractor

The Site Contractor(s) is/are responsible for:

- Providing a suitable person to operate as Environmental Officer (EO) to undertake the monitoring of the day to day requirements of the EMP

- Operating in accordance with the EMP and carrying out construction activities with due care and diligence.
- Ensuring that any communications from stakeholders are reported to the Environmental Control Officer (ECO).
- Maintaining relevant documentation for review by the ECO.
- Undertaking the mitigation measures to address environmental impacts identified.

The Environmental Officer (EO) or designated Safety Health Environment (SHE) officer

The Environmental Officer (EO) or designated Safety Health Environment (SHE) officer is responsible for:

- Daily compliance monitoring of construction against the requirements set out in this EMP, and the Environmental Clearance.
- Undertaking the mitigation measures to address environmental impacts identified.
- Ensuring that all site staff are adequately trained in environmental matters.
- Liaising with site staff and I&APs through the Community Liaison Officer (CLO), if required.
- Must be conversant with the applicable legislation pertaining to the environment.
- Liaise directly with the ECO on the monthly audit findings.
- Identification of possible areas of improvement during construction.
- Advising the Project Manager and the contractors on environmental matters.
- Monitoring implementation of the EMP by the contractor.

The Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is responsible for:

- Conducting regular auditing against the requirements of the EMP and Environmental Clearance Certificate.
- Liaising directly with the DEA and supplying them with copies of the audit reports.
- Liaising directly with the contractor and EO and supplying them with a copy of the audit reports.
- Ensure the requirements of the EMP and Environmental Clearance Certificate are adhered to throughout the validity of the ECC.

1.3.4. Awareness and Training

- Environmental awareness training must take place throughout the construction phase of the private hospital.
- Workers to be informed strictly abide by the EMP, Health and Safety Regulations, as well as conditions of the Environmental Clearance Certificate, if granted by the Competent Authority.
- An environmental awareness plan must be implemented for both the operational and decommissioning phases.

- The approved EMP will provide the basis of the information to be supplied, as well as any other relevant documentation, including any specialist reports. All impacts that could potentially arise and affect the environment will be discussed and explained in detail, as well as required mitigation measures.
- All personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimization of environmental harm.

2. Project Location and Description

2.1. Location and Project Details

Marshall Rock No 10 Private Hospital is located Eugene Kakukuru Street, Address :Erf 904 Eugene Kakukuru Street Rundu.

Map Here

Figure 2. Marshall Rock No 10 Map

Figure 3 . Erven Layout Marshal Rock No 10.

2.2. Description of the Environment

2.2.1. Climate

Rundu has a hot semi-arid climate, with hot summers and relatively mild winters (with warm days and chilly to cool nights). Even though it has a hot semi-arid climate, the area experiences high diurnal temperature variation during the winter with average high temperatures at roughly 26 °C and average low temperatures at 6 °C. This large swing in daily temperature is more common place among areas with cold semi-arid climates. During the summer, the diurnal temperature variation is less pronounced. The average annual precipitation varies between 450- 600 mm although in the 2010/2011 rainy season 757 millimetres were measured. Rains fall almost entirely in summer, with the months from May to September usually being dry, and the first early rains coming to the region in October and November. Highest rainfalls usually occur in January and February.

2.2.2. Topography

The region is topographically fairly flat with elevations ranging from 1000 to 1200 . The topography descends northwards towards the Okavango River and eastwards towards Botswana (Makgaikgadi Depression). On this general flat topography subtle changes occur due to longitudinal dunes and associated inter dunal depressions and “dry-fossil” river valleys known locally as the “omirambas”

2.2.3. Geo and Hydrogeology

The area consists of completely weathering reddish sandy soils. The area is dominated by sand substrate upon observation during the baseline assessment conducted. The area is underlain by the Kalahari and Namib sands, which are dominated by cambic arenosols, albic arenosols and calcic xerosols (Mendelsohn & el Obeid, 2003). two aquifer types are present in the Kavango region. Firstly the primary porosity aquifers present in the Kalahari Group sediments, which occur throughout the region. Secondly, the secondary permeability aquifers (fractures/faults) of the Damaran meta-sediments and the Karoo basalts. The Kalahari Group sediments constitute the most important aquifers being utilized for bulk water supply, in particular paleo-channels of the Okavango River and rural settlements.

2.2.4. Flora and Fauna

The Erven (No 904 and 905) being located in the Central Business District (CBD) are characterised by bar gravel soil, compacted and have been long cleared fro vegetation. No vegetation of major concern of significant was observed on site. Neither was there any fauna observed as the erven are located in the CBD an area that was previously a road.

2.2.5. Demographic and economic characteristics

According to the 2011 National Census, Rundu had the second highest population (63,431) among all towns in the country following Windhoek with a population of 325 858. The town was founded in 1936 by the South African colonial government and have always served as an administrative centre for the Kavango region. The last labour force survey of 2016 estimated the unemployment rate in Kavango East region at 40 percent above the 33 per cent national unemployment rate. The population is estimated at 63,431 residents excluding those living in nearby villages that are not part of the jurisdiction of the town, with an annual population growth of 5.4 percent (2011 National Census).

2.3. Project Phases

2.3.1. Construction Phase

Construction activities for Mashall Rock No 10 and extension of the currently known as Rundu Private Hospital will be done in such a way as to limit the impact on the environment and surrounding communities. Construction waste, noise, medical waste, hydrocarbons, traffic are among the impacts generated during the construction phase of the private hospital. Social impact which is positive such as employment will be generated during the same period. Any construction activities around the facility will be done in such a way as to minimise the impacts on the environment. Waste management is and will be conducted by a service provider(Rent a drum and the town council) whenever required in order to minimise the waste produced.

2.3.2. Operational Phase

During operation the private hospital patient will be accommodated at the hospital and all sorts of medical waste including general waste will be generated by the hospital. Waste collection facilities as provided by the town council will be utilised. Sewerage and other affluent waste will be directed to the local sewerage system as a provision made by the local authority for all operations that are in CBD and local surrounding.

2.3.3. Decommission and Rehabilitation Phase

Rehabilitation should be seen as an on-going process during the operational phase of the establishment.

- The site must be cleared of rubbish, surplus materials, and equipment
- Excess topsoil is to be spread evenly over the area in a manner that blends in with the natural topography.
- Excess stockpiled building material generated during the construction phase of the private hospital will be removed completely and the areas levelled
- Should the Lodge shut down, an appropriate closure and rehabilitation must be implemented. It is the responsibility of the proponent to ensure adequate funds are available for rehabilitation should closure take place.
- Should the facility be sold competent authority should be notified and all management reports, regulatory requirement be handed over to the new owner.
- In case the facility change land use or rezone, environmental requirement should be communicated to the local authority and or competent authority.

2.4. Health Safety and Environment

The Proponent must adhere to the Labour Act No 11 2007 and Public and Environmental Health Act (Act No. 1 of 2015) provision. This includes, but is not limited to the following:

- Workers must be provided with dust masks when working in conditions that require personal protective equipment
- Operators of equipment and vehicles must be licenced and trained
- Vehicles must be properly maintained. Hooters and lights must be in working order
- There must be a registered first aider and medical equipment, should the need arise
- Spill kits must be available if the need arises
- Acceptable sanitation must be provided to all workers
- Inspection of the area by health official when necessary

3. Potential Environmental Impacts

3.1. Impact Rating Criteria and Assessment Scale

Significance = (probability + duration + scale) x intensity

Probability	1-5
Extent	1-5
Duration	1-4
Intensity	1-10

Table 4. Impact Probability, Scale and significance

>75	High Environmental Significance
50-75	Medium Environmental Significance
<50	Low Environmental Significant

3.2. Environmental Impact Assessment

Table 5. Impact Assessment

A). Soil Quality

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
Loss of Top soil	C	Negative	Site	Long	Medium	Medium	High	1. Topsoil should be used as the final cover for all disturbed areas 2. Gravel and sand added on topsoil, covered with pavement blocks and concrete, Storm water water channel created 3. Gravel and sand added on topsoil, covered with pavement blocks and concrete, Storm water water channel created	**Low**
	O	Negative	Site	Long	Low	Medium	High		**Low**
	D	Negative	Site	Long	Low	Medium	High		**Low**
Soil Contamination	C	Negative	Local	Short	High	Medium	High	1. Should diesel or any other chemical be stored on site, it will need to be stored on a bunded areas and away from any drainage lines. 2. Repairs done to construction vehicles should be conducted on concrete surfaces. 3. Under no circumstances should oil, diesel or any other chemicalbe disposed of at the site. 4 Mobile toilet facilities should be made available to workers 5. A Spill Contingency Plan should be adopted.	**Low**
	O	Negative	Local	Short	Low	Low	High		**Low**
	D	Negative	Local	Short	High	Medium	High		**Low**
Soil Erosion	C	Negative	Site	Short	High	Medium	High	1. On any areas where the risk of erosion is evident, special measures may be necessary to stabilise these areas and prevent erosion. 2. No vegetation clearance required as area is bare and gravel	**Medium**
	O	Negative	Site	Long	High	High	High		**Low**
	D	Negative	Site	Long	High	High	High		**Low**

Soil Compaction	C	Positive	Local	Short	Medium	Medium	Medium	1. Soil compaction required before construction 2. Soil compaction required to minimize erosion 3. Pavement of compacted areas	**low**
	O	Positive	Local	Long	Medium	Medium	Medium		**Low**
	D	Negative	Local	Short	Medium	Medium	Medium		**low**

B). Water Quality

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
Pollution of groundwater/ surface water	C	Negative	Local	Short	High	Medium	High	1. Chemical toilets must be provided by the contractor in accordance with Labour Act 2. Machine maintenance of the equipment to be done on impermeable surfaces 3. Watercourses must be avoided during any construction 4. Hazardous substances must be stored away from the buffer areassurrounding any water bodies on site to avoid pollution 5. Chemicals, hydrocarbons be stored on impermeable surfaces 6. Spills be cleaned out immediately	Low
	O	Negative	Local	Long	High	Low	High		Low
	D	Negative	Local	Short	Medium	Medium	High		Low
Storm water runoff on site	C	Negative	Site	Medium	High	High	High	1. Protect area from erosion through storm water drainage 2. Pavement of impermeable surfaces be created to divert water runoff into storm drainages	Low
	O	Negative	Site	Medium	High	High	High		
	D	Negative	Site	Medium	Medium	High	Medium		Low

Water quantity	C	Negative	Site	Medium	Medium	High	High	1. Place water saving measures in place 2. Limit the wastage of water	Low
	O	Negative	Site	Medium	Medium	High	High		Medium
	D	Negative	Site	Medium	Medium	High	High		Medium

C) Air Quality

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
Air pollution	C	Negative	Site	Short	Short	Medium	Medium	1. Dust suppression techniques should be implemented during dry and windy season i.e Sprinkler system 2. Vehicles and equipment must be properly maintained to limit the release of harmful gases 3. Dust producing activities be reduced to periods of low wind speed or in areas with wind breaks or burricades	Low
	O	Negative	Site	Short	Short	Low	Medium		Low
	D	Negative	Site	Short	Short	Medium	Medium		Low

D). Waste Management

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
Waste disposal	C	Negative	Local	Medium	Medium	Medium	Medium	1. Ensure sustainable waste management practises are in place 2. Implement recycling where possible 3. Bins must be provided on site and coded 4. Littering by the workers shall not be allowed 5. Make use of local waste remover	**Low**
	O	Negative	Local	Long	Medium	Medium	Medium		Low
	D	Negative	Local	Local	Medium	Medium	Medium		Low

E) Flora and Fauna

Nature	Phase	Type	Extent	Durationn	Intensity	Probability	WOM	Mitigation	WM
Impact on faunal activity	C	Negative	Local	Short	Low	Low	High	1. No snaring, trapping, or killing of any birds on the construction site.	Low
	O	Negative	Local	Short	Low	Low	High		Low
	D	Negative	Local	Short	Medium	Medium	High		Medium
Impact on vegetation	C	Negative	Site	Short	Low	Low	High	1. Limit the removal of vegetation. 2. Prevent illegal removal of protected plants species 3. Minimize disturbance and loss of topsoil. 4. Keep surrounding vegetation, especially larger trees. 5. Remove any Invasive alien species on site 6. Training to be provided on the protected plant species of Namibia to all employees	Low
	O	Negative	Site	Short	Low	Low	High		Low
	D	Negative	Site	Short	Medium	Medium	High		Medium

F) Noise

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
1. Noise	C	Negative	Site	Medium	Medium	High	High	1. Noise levels must be kept within acceptable limits 2. Operation of machineries be limited to day hours only during construction 3. No noise during the operational phase	Low
	O	Negative	Site	Medium	Medium	High	High		
	D	Negative	Site	Medium	Medium	High	High		Low

G) Light

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
Light pollution	C	Negative	Site	Short	Minor	High	Medium	1. Operational hours will be restricted today operations where possible 2. Implement light suppression techniques during construction and operational phases (Yellow lights)	Low
	O	Negative	Site	Short	Minor	High	Medium		Low
	D	Negative	Site	Short	Minor	High	Medium		Low

H) Visual

Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	WM
Visual Impact	C	Negative	Site	Short	Minor	High	Medium	1. The site must be kept neat and tidy at all times 2. Sustainable practices must be used to guide the design of buildings 3. After construction rehabilitation of the site must occur. 4. Renovation of dilapidated structure	Low
	O	Negative	Site	Short	Minor	High	Medium		Low
	D	Negative	Site	Short	Minor	High	Medium		Low

I) Social

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Nature	Phase	Type	Extent	Duration	Intensity	Probability	WOM	Mitigation	
2. Social	C	Positive	Local	Medium	Medium	Long	None	None	
	O	Positive	Regional	Long	Long	Long			
	O	Positive	Local	Medium	Medium	Medium			

3.3. Environmental Management Plan

Table 6. Management Plan

ENVIRONMENTAL MANAGEMENT PLAN			
Objective	Action/ Description	Timeframe	Responsibility
Minimize the potential for ground and surface water pollution	All run off materials such as hydrocarbons, waste water and other potential contaminants should be contained on site and disposed of in accordance to municipal waste water discharge standards	Continuous	Project Manager
	Construction within or near drainage lines should take place outside of the rainy season when the flow of the rivers is at a minimum dry season	Continuous	Project Manager
	Buildings and other hardened surface infrastructure (including storm water attenuation measures) should be located outside of buffered watercourses, sensitive areas and riparian habitat	Continuous	Project Manager
	Servicing and maintenance of vehicles as far as possible must occur outside of the boundaries of the hospital. If maintenance does occur on site due to breakdown, all steps must be undertaken on paved surfaces to avoid hydrocarbon spills/leakages.	Continuous	Project Manager/Contractor
	Minimize petrol, diesel, and oil leaks by allocating a loading zone, which is protected against such leaks. Drip trays must be secured and emptied regularly.	Continuous	Project Manager
	Should diesel or any harmful chemical be stored on site, it will need to be stored on a hard bunded surface	Continuous	Contractor
	Spilled hydrocarbon or any harmful chemical must be treated as a hazardous waste and needs to be disposed of as it occurs in appropriate hazardous waste containers and removed off site as soon as possible.	Continuous	Contractor
	No washing of equipment or machinery may occur oat the construction site	Continuous	Project Manager
	Bio-remediation of soils must take place after any accidental spills	Immediate	Project Manager
	Specify water saving devices and technologies wherever possible. Measures include thespecification of low flow shower heads and taps, and the use of grey water for on potable activities such as road and construction site wetting	Continuous	Project Manager

Minimize the wastage of water	Ensure that consumption does not exceed permitted quantities. Take action to reduce consumption if necessary.	Continuous	Project Manager
	Ensure that all construction personnel are trained in water wise principles, and that they practice prudent use of water during the operational phase.	Continuous	Project Manager
	Topsoil stripped from the operation footprint must not be spoiled but stockpiled and preserved at a designated area for use in rehabilitation.	Continuous	Project Manager
	All stockpiles must be kept neat and tidy and free of weeds	Continuous	Project Manager
	Compacted areas must be paved with to avoid erosion and water directed into drainage channels	Continuous	Project Manager
	On any areas where the risk of erosion is evident, special measures need to be implemented to prevent erosion. These may include, but not restricted to:Using mechanical cover or packing structures such as geofabric to stabilise steep slopes or hessian, gabions and mattress and retaining walls; Brushcut packing Mulch or chip cover; Constructing anti-erosion berms; Erection of barriers; Erection of shade nets etc. These erosion control measures must be regularly maintained. Suitability be based on construction characteristic.	Continuous	Project Manager
	Where erosion does occur on any completed work/working areas, these areas shall bereinstated to previous condition.	Continuous	Project Manager
Soil Pollution	Soil that has been polluted must be removed from site and disposed of at a relevant landfillsite	Continuous	Project Manager
	If soil pollution/contamination does occur, the site must be immediately rehabilitated	Rehabilitation	Project Manager
Limit the disturbance anddestruction of vegetation, fauna and habitat	Plan to leave as much of the natural vegetation intact where possible.	Once Off	Project Manager
	Consider the selective trimming of branches before opting to remove any trees	Continuous	Project Manager/SHE Officer
	Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. No vegetation outside of the demarcated construction areas may be removed whatsoever	Continuous	Project Manager/SHE Officer

	There shall be no unauthorized entry, litter, stockpiling, dumping or storage of equipment or materials	Continuous	Project Manager
	Keep surrounding vegetation, especially larger trees and shrubs, where possible to create a screen that reduces flood impacts	Continuous	Project Manager/SHE Officer
	Protected trees must be marked, their location recorded and must be avoided as best as possible. If any protected species cannot be avoided a permit must be applied for from MEFT Forestry Department.	Once Off	Project Manager/SHE Officer
	Develop a procedure for dealing with animals encountered on the site, including dangerous animals and vermin. Where necessary, call in professionals to remove the animals. Personnel are to be instructed on the presence of dangerous game and the appropriate behaviour and safety upon encountering such game	Continuous	Project Manager
	Where possible, large/canopy trees should be retained (pertaining to all developmentareas) since they provide critical important breeding habitat for bird species;	Continuous	Project Manager
	Any alien plants which appear or begin to establish must be removed	Rehabilitation Phase	Contractor/SHE Officer
Vehicle access	The main access road to the permit area must be established before operation commences	Continuous	Project Manager
	Determination of the construction vehicle/truck routes and times of operation/delivery must be carefully planned	Continuous	Project Manager
	Vehicle access must be strictly contained onsite. Vehicles may only use designated roads and access points as determined by the construction engineer during operationscommence	Continuous	Project Manager
	Access road and loading area will be properly maintained, and this includes appropriate storm water management and dust control (i.e. wetting)	Continuous	Project Manager
Chemicals	Provide the ECO with a list of all petroleum, chemical, harmful and hazardous substancesand materials on site, together with storage, handling and disposal procedures for these materials.	Continuous	Project Manager

	Ensure that all hazardous substances (chemicals, oils, etc.) are stored in appropriate,tamper proof containers in locked stores.	Continuous	EO/SHE Officer
	No smoking is allowed inside the stores or within 5m of a bund.	Continuous	EO/SHE Officer
	The proponent must ensure that there is adequate fire-fighting equipment at the fuel stores	Continuous	EO/SHE Officer
	Fuels and chemicals may not be stored under trees	Continuous	EO/SHE Officer
	After construction has been completed excess material and chemicals must be removed.	Rehabilitation Phase	EO/SHE Officer
Construction	Ensure that concrete and cement works are undertaken in specified areas only	Continuous	EO/SHE Officer
	Ensure that all operations that involve the use of cement and concrete are carefully controlled. Water and slurry from concrete mixing operations must be contained to prevent pollution of the ground surrounding the mixing points.	Continuous	Lodge Manager/Owner
	Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground	Continuous	SHE Officer
	Excess concrete from mixing must be deposited in a designated area awaiting removal to an approved landfill site	Continuous	Contractor/SHE Officer
	All visible remains of excess concrete shall be physically removed immediately and disposed of as waste. Washing the visible signs into the ground is not acceptable. All excess aggregate shall also be removed.	Continuous	Contractor/SHE Officer
	Once construction ceases there must be a removal of all toilets, bins, machinery and otherequipment on site. Site must be rehabilitated	Continuous	Contractor/SHE Officer
Waste Management	Waste generated on site must be disposed of in clearly marked bins. These must be emptied daily	Continuous	Contractor/SHE Officer
	Domestic/general waste and hazardous waste must be separated and bins clearlymarked.	Continuous	Contractor/SHE Officer
	The use of toilets must be adhered to	Continuous	Contractor/SHE Officer

	If portable toilets are used, they must be regularly emptied.	Continuous	Contractor/SHE Officer
	Temporary drains and berms may be required to capture storm water	Continuous	Contractor/SHE Officer
	The installation of the storm water system is of priority and must comply with thestorm water management plan	Continuous	Project Manager/Contractor
	No disposal of raw sewage should occur on or near the site. If disposal of sewerage occurs near site Sand filtration process to be applied.	Continuous	Project Manager/Contractor
Minimise atmospheric emissions and dust generation	Wetting of construction area or road must occur during very dry or windy conditions or if dust becomes a major problem	On windy days	Contractor/SHE Officer
	Dust fallout monitoring will be introduced if dust becomes an on-going problem.	Monthly	Contractor/SHE Officer
Control noise	Operational hours during the construction phase will be restricted to day hours. No noise producing activities may take place outside of days hours	Continuous	Contractor/SHE Officer
	Noise from workers during the construction phase must be controlled.	Continuous	Contractor/SHE Officer
	Where possible noise suppression and silencers must be applied to all construction equipment and vehicles. Construction equipment and vehicles must be maintained.	Continuous	Contractor/SHE Officer
	Hearing protection will be provided for employees operating heavy or noisy machinery.	Continuous	Contractor/SHE Officer
	Noise level monitoring will be implemented if necessary.	Monthly	Contractor/SHE Officer
Reduce the visual impact	The Lodge and stockpiling site must be kept neat and tidy at all times	Continuous	Contractor/SHE Officer
	Restrict construction activities if any to daylight hours in order to negate or reduce the visual impacts associated with lighting. No afterhours construction work should be permitted.	Continuous	Contractor/SHE Officer
	Tilt spotlight luminaires to direct the light to the intended spot, instead of allowing it to light areas outside its purpose	Continuous	Contractor/SHE Officer

	Avoid shiny metals in structures. If possible shiny metal structures should be darkened.	Continuous	Contractor/SHE Officer
	Night-time light sources must be directed away from nearby neighborhood	Continuous	Contractor/SHE Officer
	Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of works		Contractor/SHE Officer
Safety	Construction access, should be fenced off to prevent unauthorized access.	Continuous	Project Manager/ Contractor
	Correct signage must be erected at the main access road and entrance to the construction areas - includes access authorization, warning of construction activity , safety warning signs (protective equipment, fire & medical equipment) and contact numbers	Continuous	Project Manager/ Contractor
	Speed limits on access roads and onsite must be set at 10km/hr.	Continuous	Project Manager/ Contractor
	An armed security must be on site during , to ensure the protection of workers and Property	Continuous	Project Manager/ Contractor

4. Conclusion

Negative impacts associated with the operations and maintenance and during rehabilitation can successfully be mitigated if This EMP is implemented. It is the duty of the lodge manager and owner to ensure to ensure that all regulation relating to the operation of the lodge are followed

5. References

Directorate of Environmental Affairs, 2008. Procedures and Guidelines for Environmental Impact Assessment (EIA) and Environmental Management Plans (EMP), Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek.

Namibia Statistics Agency. Namibia 2011 Population and Housing Census Main Report.

Water Surveys (Botswana) (Pty.) Ltd. 2011. Preliminary Report September 2011: Kavango Region Namibia Regional Monitoring Network Study

6. Appendices

Appendix A. Form 1

Appendix B. ECC Copy