

UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP)

THE EXISTING, UPGRADED & OPERATIONAL MUCHNJE RIVER LODGE DEVELOPMENT IN SIKUNGA CONSERVANCY OF KALIMBEZA COMMUNAL AREA IN ZAMBEZI REGION



Assessed by:



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Title	Environmental Management Plan (EMP) for the existing, Upgraded & Operational Muchenje River Lodge (Measuring 3.7 Hectares)
Environmental Practitioner	Nyepez Consultancy cc
Reviewer	Mr. Erongo Consulting Pty Ltd
Client	Martinus Jacques van der Merwe and William Keith Blair
Status	Final Updated Environmental Management Plan (AEMP)
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Definitions and abbreviations

DEA	Directorate of Environmental Affairs
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
I&APS	Interested and affected parties
MAWF	Ministry of Agriculture Water and Forestry
MEFT	Ministry of Environment, Forestry and Tourism

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1. INTRODUCTION

This document presents an amended and updated Environmental Management Plan (EMP) to manage the existing, upgraded and operational Muchenje river Lodge, a Lodge that operates within Kalimbeza Communal area located along the banks of the Zambezi River channel in the Zambezi Region. The total carrying capacity of the Lodge is 20- 30 people per day. The size of the land parcel for the Lodge 3.7 hectares.

The proponent, (**Martinus Jacques van der Merwe and William Keith Blair**) the new developers and operators that manages and operates the Muchenje River Lodge within the Sikunga Conservancy in Kalimbeza Communal area. The Lodge is located on the banks of one of the main channels of the Zambezi River in the Eastern part of Zambezi region. The Lodge is located some +-30km East of the Katima Mulilo, Zambezi region of Namibia

The proponent (Martinus Jacques van der Merwe and William Keith Blair) is obliged by the competent authority to seek to acquire an environmental clearance certificate for compliance of the existing and upgraded Tourist lodge against the environment its operating from. The lodge operations require a ECC that is based on business principle of an eco- Tourist and conservation of environment. Given the need and requirements of the needed clearance certificate, and in order to ensure compliance to the Environmental Management Act of 2007, the proponent is obliged to apply for a valid Environmental Clearance Certificate that informs the general public and operating management of the existing lodge operation activities and mitigation measures put in place to ensure sustainability and effective environmental protection of the Tourist facility.

Thus, any changes in the operations of the Lodge development have and will not change the scope of the physical environment, the physical characteristics of the project area, no change in the extent or size of portion where the first scoping study of Lodge was conducted and hence the subsequent approval of the environmental clearance certificate. It is therefore required as per the Environmental Act no. 7 of 2007 that an updated Environmental Management Plan detailing such physical changes in project activities be included, compiled and submitted to the environmental commissioner for approval.

1.1 OPERATIONAL ACTIVITIES & OPERATION MODEL

The operations of Muchenje River Lodge created approximately +-20 to 30 full time jobs plus several indirect casual jobs. The Proponent fulfilled his social responsibility by recruiting local residents from the Kalimbeza Communal area and surrounding villages to access job opportunities through an established employment framework. The objectives of this employment and skills development framework are to: enhance employment opportunities for the locals and to adhere to employment targets and agreements, to formulate plans for the development of skills of local employees, and develop a framework for regulating Social Responsibility efforts, assistance programs, donation and community welfare efforts.

The proponent is and has recruited local residents for all casual positions other than senior management work which required formal training and skills. There is an on-job training conducted by the Lodge's management for all available junior lodge positions. Senior management positions were made available to individuals that show enthusiasm, potential and that have developed initiative abilities over time

1.2 STRATEGIC LOCALITY OF MUCHENJE RIVER LODGE

The prevailing existing desktop research study shows that there are other businesses, Lodges or tourism facilities that exist in this part of the region, these include the Island River lodge, Kalimbeza research station and rice project. The Kalimbeza topography and landscapes shows that there are over 350 Bird Species within the Zambezi River, Birder's paradise and lies on the bird's migration Route which gives an exceptional view for Tourist and safari. Some existing Lodge activities include Guests will have the option of River cruises, Game drives and Nature Walks. Guests have a unique opportunity to visit the 'Schuckmansberg Living Museum' as a proactive way for visitors to engage and uplift the local community, and to learn their traditional ways, dances and plants

1.3 AVAILABLE CAMPSITE UTILITY SERVICES

Muchenje River Lodge was established with the goal to develop an upmarket glamping river Lodge to facilitate both local and international tourists with a community-based development initiative (community conservancy). Muchenje River Lodge has the following accommodation facilities; Fully fledged (10) suited sleeping Cabins, about five (5) Campsite area and Houseboat

lodge which is a floating lodge, sleeping a maximum of 8 people. The total accommodation lodge capacity is between 20 to 30 people per night. In addition, the lodge has also made further improvements on upgrading and construction of infrastructure such as;

- Managers House - There is are “accommodation rooms” for few casual staffs. Most Staff however are often drawn from nearby villages and commute by transport (vehicle) provided by the lodge
- Bar and Swimming Pool with toilets
- Volleyball Court and sitting deck area
- Vegetable Garden
- Electric fence

The Lodge campsite development consists of x5 camping sites. Each of our 5 campsites are equipped with basic amenities where each Camping Site Includes:

- Fresh water point
- Electricity connection
- Private/Shared Ablutions
- Swimming pool (communal)
- Braai stands and can accommodates up to four (4) People per stand

Furthermore, the sleeping cabins with an open plan, self-catering cabins (approx. 36sqm) have been designed to enhance the views of the beautiful bush veld surroundings. Each Cabin Includes:

- x Single beds
- Electricity
- Full en-suite bathroom
- Braai stands

According to the proponent, the existing, upgraded and operational Muchenje River Lodge serves as a precious, modest tourist resting area to suit the local and international level, which will boost the local socio-economic, promote and improve surrounding property values and land uses alongside the Kalimbeza area, Zambezi riverbanks and has brought competitive employment creation, promote the beautiful scenery, aesthetics of Kalimbeza communal area and communities.

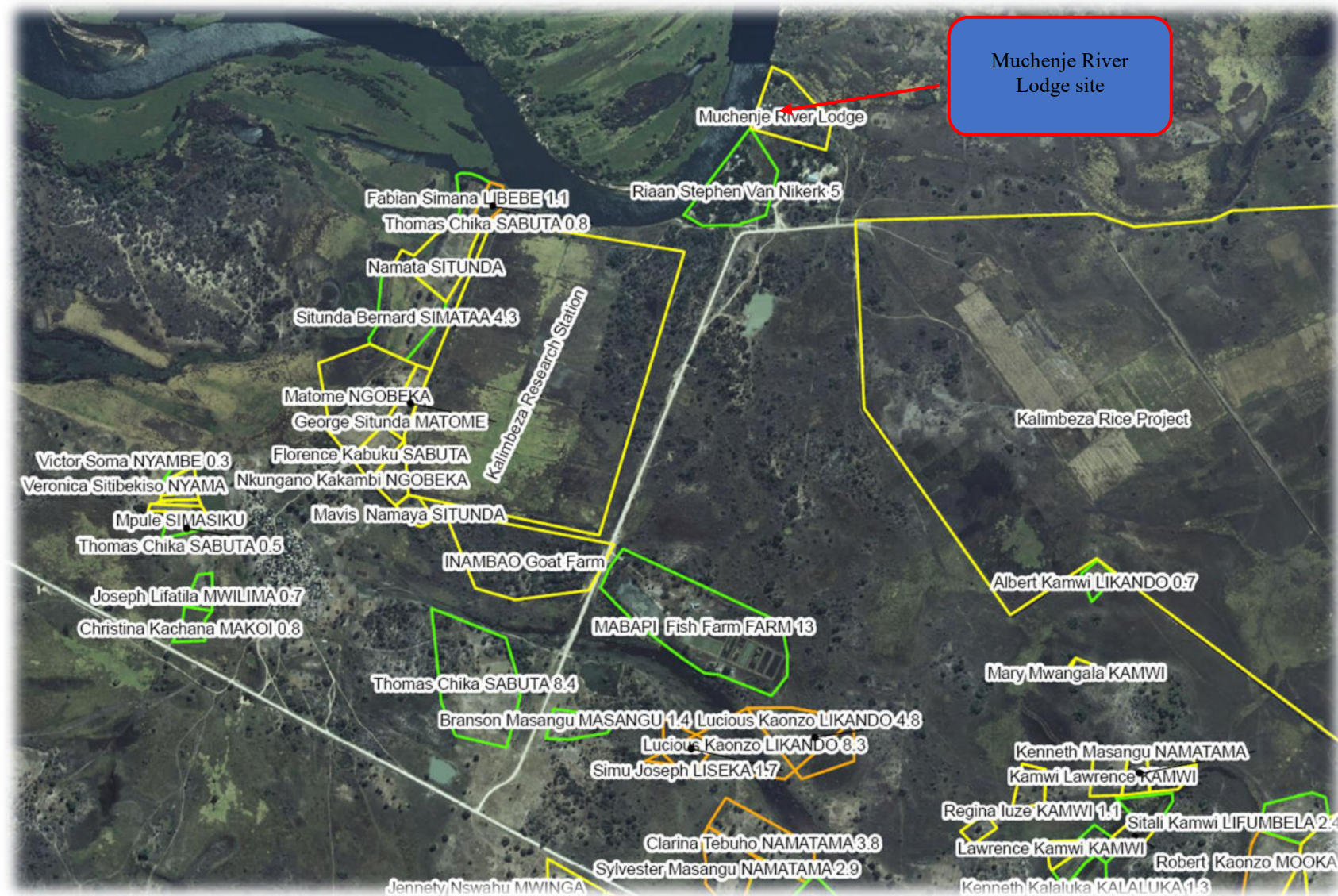


Figure 1: Lodge locality site map

According to the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007) (EMA) and the EIA Regulations (GN. No. 30 of 2012), an Environmental Management Plan (EMP) is required to obtain a valid Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry and Tourism (MET) for its business operation to continue.

NYEPEZ Consultants (NC) has been appointed to draft an updated and/or amended EMP as part of the application to acquire a valid ECC. The first ECC obtained in 2017 has since expired. This updated EMP is to be implemented to mitigate the potential impacts of the tourist lodge development and business operations. The contents of this updated EMP will be binding on all parties who will have a role to play in the Site operations as stipulated in the report and will be liable for the rehabilitation measures recommended in last section of this report.

2. PURPOSE THE EMP

The aim of an updated EMP is to ensure that the activities of this particular existing and operational business development are conducted as per the requirements of the Namibian Environmental Management Act (No. 7 of 2007) and EIA regulations of 2012. The updated EMP provides and explains a clear guideline on how the daily activities should be conducted and also provides a monitoring framework to ensure compliance against the recommended mitigation measures to avert any possible negative impacts.

Furthermore, other purpose of this updated EMP is to provide a management framework for the planning and implementation of the operations of the Lodge and provide standards and operating arrangements so that potential environmental and social impacts of the lodge facility are mitigated, prevented and minimized as far as reasonably practicable, and that statutory requirements and other legal obligations are fulfilled.

This updated EMP also presents protocols and procedures, and roles and responsibilities to ensure the management arrangements are appropriately and effectively implemented. This EMP is a live document and shall be reviewed at predetermined intervals, and/or updated when the scope of works alters, or when further data / information can be added. All personnel working on the project will be legally required to comply with the standards set out in this EMP. The 2012 EIA Regulations defines a ‘management plan’ as: a plan that describes how activities that may have significant environments effects on the environment are to be mitigated controlled and monitored.

2.1 EMP Requirements

EMP requirements as outlined in the below Sections of this EMP explains the EMP requirement of the draft management plan, which includes

- (aa) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure;
- (bb) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and
- (cc) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation remedy the cause of pollution or degradation and migration of pollutants.

2.2 Compliance to the EMP

Content of this updated EMP is tailored in accordance with the prevailing EMA Act and the EIA Regulations. The aim is to provide appropriate management measures that would address the identified impacts that the project could bring about as stipulated in the Lodge & Campsite development specifications. The remedial and mitigation measures recommended for rehabilitation remain binding to all staffs and all employees. Adherence to the specifications identified herein is highly recommended throughout the lifespan of the facility.

It should be noted that the updated and amended EMP shall not only be limited to the facility operations, but it encompasses the bigger picture. The document serves as the guiding tool to protecting the overall natural, bio-physical and socio-economic environment at large.

2.3 Proponent responsibility to the EMP

As the proponent shall assume overall responsibility and implementation of the updated EMP. The Lodge facility Manager holds the mandate and sole responsibility of managing the daily operations and shall ensure that any other person (e.g., Casual Workers) is conversant with the contents of the EMP and adhere to the requirements. The following environmental sensitive conditions as outlined the ECC certificate have been obeyed and complied to;

- That the proponent **Martinus Jacques van der Merwe and William Keith Blair** will not and does not intend to dispose any waste waters affluents in both on the natural environment, conservancy area and on the Zambezi River bank channels. The Lodge have well designed and connect septic tank where all affluent liquid wastes are channeled.
- That both the Kalimbeza Community and Conservancy entities are fully involved in the monitoring and overseeing that no Lodge activities operating within the Sikunga Conservancy, National Park and Zambezi River disposes waste water affluent in the rivers. This empowers the conservancies and community members to give them full responsibility of protecting the river and the environment
- Muchenje River Lodge operators has ensured that the most sensitive and key biodiversity habitats along the river and within the rivers and surrounding wetland areas remain protected. A copy of the updated EMP shall be kept at the Site premises and induction sensitization workshops are often conducted with all new employees prior to commencement of their responsibilities.

2.4 Possible adjustment to the EMP

The EMP should be considered as an open-ended document that can be updated or amended subject to new information. This EMP represent an amended and updated version of the existing Muchenje River Lodge operational activities. This allow for adjustments in the document as new information is made available and new mitigation where unforeseen environmental impacts arise.

3. LEGAL FRAMEWORK THAT AREA RELEVANT TO THE EMP

In addition to the EMA and the Environmental Assessment Policy, Namibia has a host of legal and policy documents and guidelines that govern environmental management as indicated in Table 1 below. The Proponent has the responsibility to ensure that NO restricted Lodge activities will be conducted and will be carried out during any preparation, construction and operation phase of the existing and operational Lodge & development.

Table 1: Relevant legislation and the applicability

Legislation considered	Aspect of Project
Regional Councils Act,	The Regional Councils Act legislates the establishment of Regional

1992 (Act No. 22 of 1992)	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 in respective regions. Zambezi Regional Council is an I&AP to this project and they have No objection to the proposed project proposal. Rights shall be reserved to them should they wish to review the EMP.
Water Resources Management Act (Act No. 11 of 2013)	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. Furthermore, any watercourse on/or in proximity to the site and associated ecosystems should be protected in alignment with the listed principles. Construction activities pose danger to surface and underground water resources through the inappropriate use of fuels and lubricants. The proponent shall ensure adequate handling of hazardous substances that could pollute water sources.
Pollution Control and Waste Management Bill (in preparation)	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) (below) when it comes into force. The Bill also provides for noise, dust or odour control that may be considered a nuisance. The Bill would repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976) (below) when it comes into force. Furthermore, 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.
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. Any person carrying out a ‘scheduled process’ which are processes resulting in noxious or offensive gases typically pertaining to point source emissions have to obtain a registration certificate from the Department of Health. Although we do not anticipate the mining activities to generate excessive dust particles, the proponent should implement the necessary mitigation measures to limit dust emissions to air.
Public Health Act (Act No. 36 of 1992)	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

1919)	premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health. The proponent should ensure that the site workers are provided with protective gear to safeguard their wellbeing. The activities should also be conducted in a manner that does not pose any danger to the public and that any emissions which could be considered a nuisance remain at acceptable levels.
Labour Act (Act No. 6 of 2007)	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. Specifically, no employer shall require or permit an employee to work in an environment that is deemed unfit without protective measures in place. The proponent as the employer should adhere with all the requirements of the Act and the associated Regulations.

4. PROJECT DESCRIPTION

4.1 Project Locality

Muchenje River Lodge is located ± 30 km east part of Zambezi region, located at the verge or close to the banks of the Zambezi River. The site is also situated nearest and/or adjacent to an already existing Lodge called (Island View Lodge), which is also developed on the banks of the Zambezi River. The site falls within a proclaimed Sikunga Conservancy and the size of the Lodge area is ± 3.7 hectares. The coordinates of the site are ***Lat -17.54150, Lon 24.52418.***

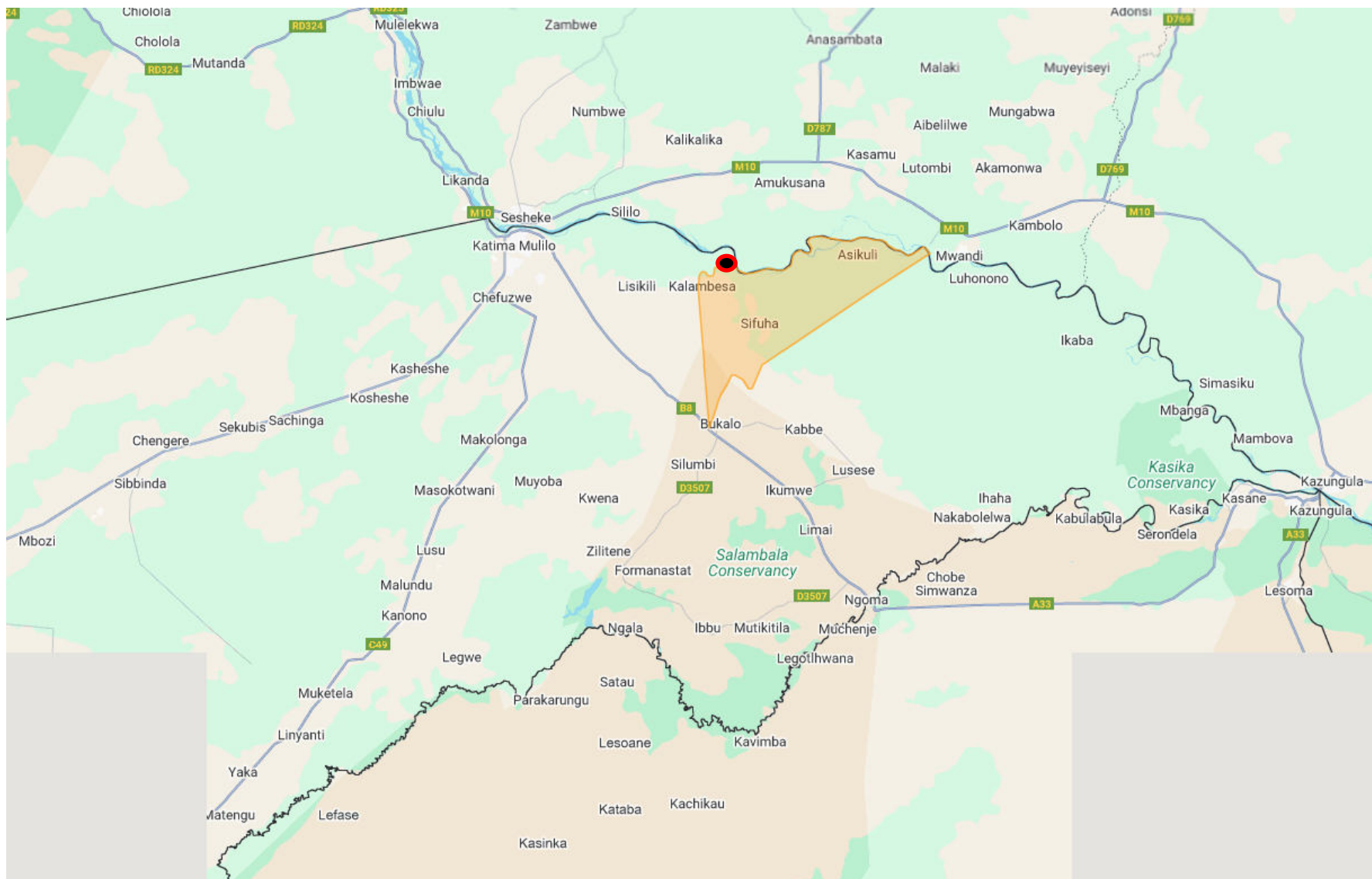


Figure 2: Regional Map & locality of lodge

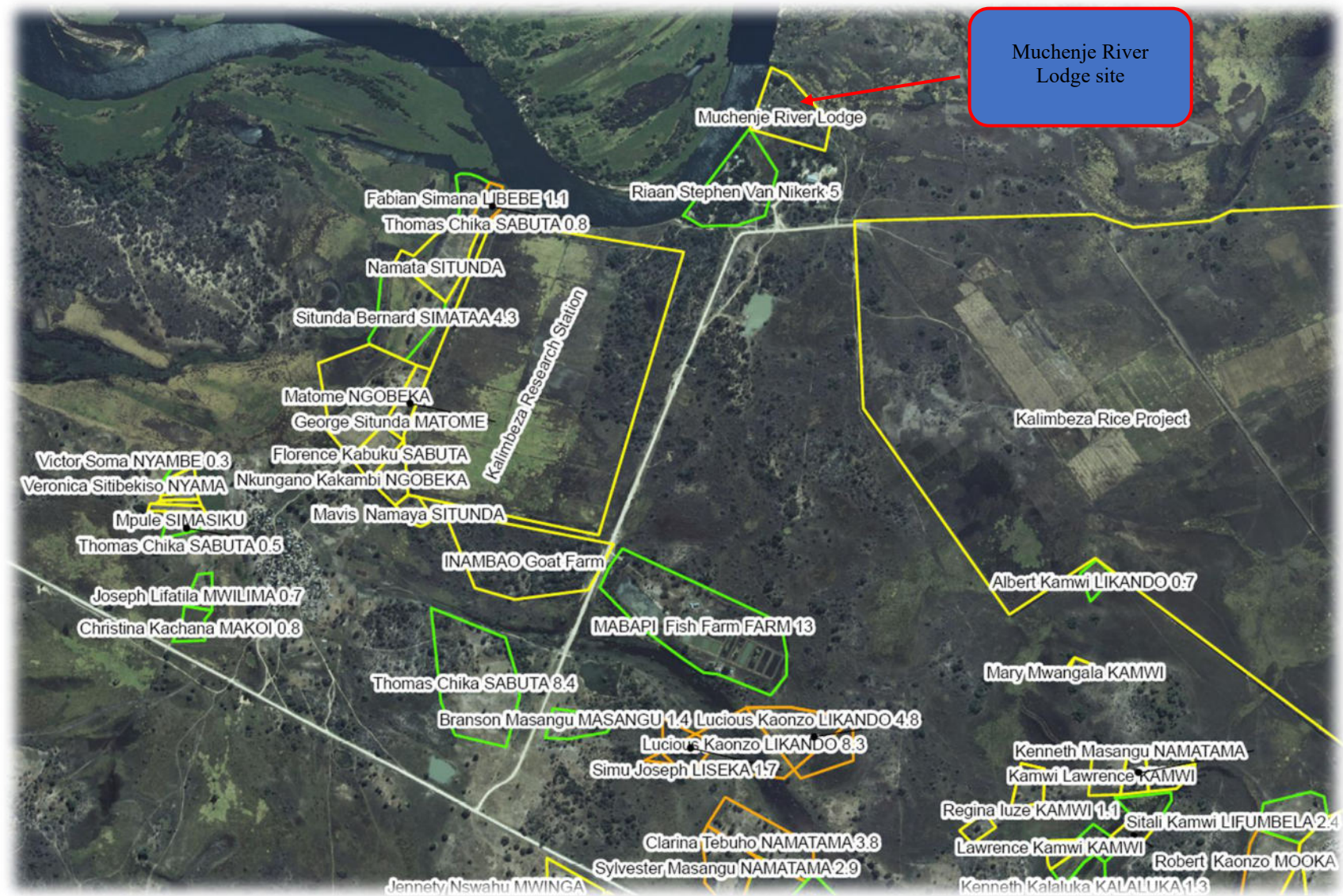


Figure 3: Location of Muchenje River Lodge



Figure 4: Project area Layout for Lodge

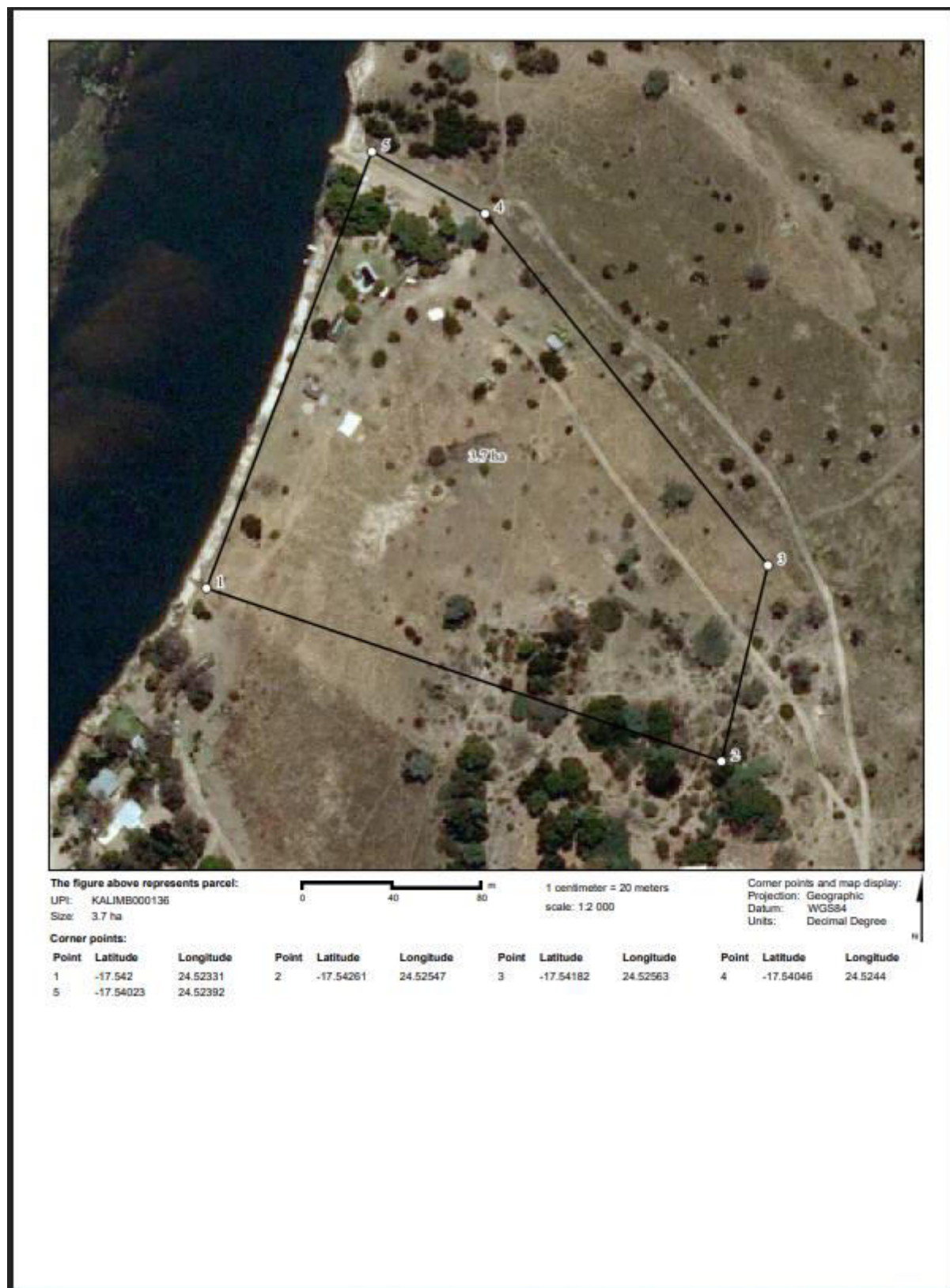


Figure 5: Project area coordinates



REPUBLIC OF NAMIBIA

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29 June 2017

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

The Manager
Muchenje River Lodge
P. O Box 1122
Ngweze
Katima Mulilo

Dear Sir/Madam

SUBJECT: ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE PROPOSED MUCHENJE RIVER LODGE, KALIMBEZA COMMUNAL AREA, ZAMBEZI REGION


The Environmental Scoping Report and Environmental Management Plan (EMP) submitted are sufficient as these have made an adequate provision of the environmental management for the proposed activities. From this perspective, regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored throughout this process.

This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project.

On the basis of the above, this letter serves as an environmental clearance certificate for the project to commence. However, this clearance letter does not in any way hold the Ministry of Environment and Tourism accountable for misleading information, nor any adverse effects that may arise from this project's activities. Instead, full accountability rests with Muchenje River Lodge and their consultants.

This environmental clearance is valid for a period of (three) 3 years, from the date of issue unless withdrawn by this office.

Yours sincerely


Teofilus Nghitila
ENVIRONMENTAL COMMISSIONER



"Stop the poaching of our rhinos"

All official correspondence must be addressed to the Permanent Secretary

Figure 6: Muchenje River Lodge Expired ECC

4.2 Tourist Lodge & Campsite project development

The proponent who also operates Muchenje River Lodge holds the accountability of the Lodge, Campsite and its operational activities and is therefore responsible for the implementation and management of this EMP. As the operations of the Lodge continue to operate, the EMP shall be reviewed by the Management, Lodge Manager, and shall be amended and updated as required and approved for implementation. The implementation and management of this updated EMP and the monitoring of compliance shall continue to be undertaken through daily duties and activities and monthly inspections. The existing upgraded tourist Lodge business activities include the following.

- Reception and Small Administration office
- Outdoor - indoor Kitchen & Outdoor viewing desks
- Accommodation House-boat cruises for safaris and game viewing.
- Dining area and Swimming pool
- Full suit-Cabins, campsite with bathrooms (20-30 people) sleeping rooms
- Volleyball court and sitting deck area
- Vegetable garden

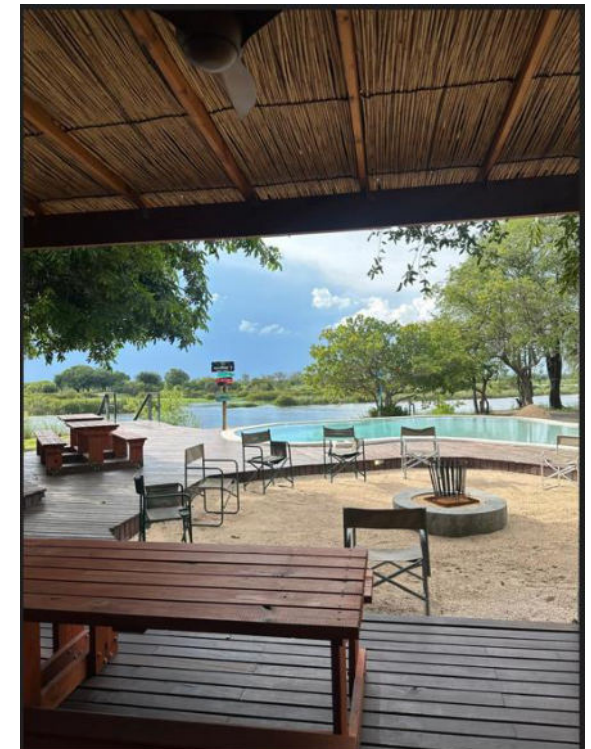


Figure 8: Muchenje river Lodge (structural development & facilities)

The proponent Muchenje River lodge cc is responsible for:

- Ensuring all members of the Project Team, including contractors and consultants comply with the procedures set out in this EMP
- Ensuring that all persons are provided with sufficient training, supervision and instruction to fulfil this requirement, and
- Ensuring that any persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood.

4.3 Employment and Skills Development

The Proponent hires and have hired local residents (Namibians) from Kalimbeza communal area and other surrounding villages as a way of empowering and uplifting local residents' livelihood by through provision of jobs. The main objectives of this Employment

and Skills Development Plan are to:

- Clarify employment and recruitment procedures of local community members
- Clarify and adhere to Employment targets
- Formulate plans for the development of skills of local employees, and
- Develop a framework for regulating Social Responsibility efforts, assistance programs, donation and community welfare efforts

5. PROJECT ACTIVITIES ASSESSMENT CRITERIA

According to Pastakia (1998) the Rapid Environmental Assessment method can be used to assess projects related to the guesthouse development project and Pastakia's method will be used during the assessment. The ranking formulas area calculated as follows;

$$A=A1 \times A2$$

$$B=B1 +B2+B3$$

$$\text{Environmental Classification (ES)} =A \times B$$

Table 2: Environmental Classification of Impacts according the Rapid Impact Assessment Method of Pastakia 1998

Environmental Classification (ES)	Class Value	Description of Class
108 to 72	5	Major positive change/impact
71 to 36	4	Significant positive change/impact

35 to 19	3	Moderate positive change/impact
10 to 18	2	Positive change/impact
1 to 9	1	Slight positive change/impact
0	0	No change/status quo/not applicable
-1 to -9	-1	Slight negative change/impact
-10 to -18	-2	Negative change/impact
-19 to -35	-3	Moderate negative change/impact
-36 to -71	-4	Significant negative change/impact
-72 to -108	-5	Major negative change/impact

The EMP will have specific targets for each year that will be evaluated by the annual Environmental audit. The audit can make recommendations which will necessitate Changes in the EMP. The EMP will be reviewed on an ongoing basis as new environmental challenges arise or targets/objectives are achieved. The Operations Manager will ensure that this review occurs in a timely manner.

Criteria	Score
Importance of condition (A1) –Assessed against the spatial boundaries of human interest it will affect	
important to national/international interests	4
important to regional/national interests	3
important to areas immediately outside the local condition	2
important only to the local condition	1
No importance.	0
Magnitude of changes /effects (A2) –measure of scale in terms of benefits of an impact or condition	
Major positive benefits	3
Significant improvement in the status quo	2
Improvement in status quo	1
No change in status quo	0
Negative change in the status quo	-1
Significant negative disbelief or change	-2
Major disbelief or change	-3
Permanence (B1) –defines whether the condition is permanent or temporary	
No change/not applicable	1
Reversible	2
Permanent	3

Cumulative (B3) –reflects whether the effects will be a single direct impact or will include cumulative impacts over time, or synergistic effect with other conditions. It is a means of judging the sustainability of the condition-not to be confused with the permanence criterion

Light or No cumulative Character /Not applicable	1
Modern Cumulative character	2
Strong Cumulative character	3

Summary of expected operational phase impacts prior to mitigation

BE=Biological/Ecological EO=Economical/Operational PC=Physical/ Chemical SC= Sociological/Cultural

Impact Category	Impact Type	Class Value
BE	Waste pollution	-1
BE	Ecosystem and Biodiversity impact	-1
EO	Fire	-2
PC	Groundwater, surface water and soil contamination	-1
SC	Skills, Technology and development	2
SC	Employment	2
SC	Cumulative	-2

4. ENVIRONMENTAL MANAGEMENT PLAN

An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measure needed. The Environmental Management Plan (EMP) provides management options to ensure impacts of the lodge & campsite development project operations are minimized. The EMP acts as a stand-alone document, which can be used during the various phases (operational and decommissioning) of the lodge & campsite project. All personnel taking part in the operation of the guesthouse project should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmental suitable way.

5.1. Objectives And Targets

Environmental objectives for the operations of the Lodge & Campsite are as follows:

- Zero pollution incidents
- Minimize waste sent to landfill or being burnt

- Protect local flora and fauna and minimize disruption
- Minimize light and noise pollution, and
- Use natural resources effectively and efficiently.

Procedures for monitoring processes against the project environmental objectives will be agreed with the Environmental officer

5.2. House-Boat Safety Information

A fully fledged Houseboat which provide accommodation to maximum of eight (8) guests, a safety management plan was developed and implemented in accordance with the specifications of the Lodge & Houseboat operation regulations in Namibia. The Lodge has Safari viewing guide inclusive of maps, was developed to serve as guide and directs the houseboats and tour guides during river and wildlife navigations along the river. The map also contains useful boating information as well as an index and GPS reference.

5.3 Infrastructure

The company was established with the goal to develop an upmarket glamping river Lodge to facilitate both local and international tourists with a community-based development initiative (community conservancy). Muchenje River Lodge has the following accommodation facilities; Fully fledged (10) suited sleeping Cabins with ten, x 5 Campsite area and sleeping houseboat which is a floating lodge, sleeping a maximum of 8 people. The total accommodation lodge capacity is between 20 to 30 people per night. In addition, the lodge has also made further improvements on upgrading and construction of infrastructure such as;

- Managers House - There is are “accommodation rooms” for few casual staffs. Most Staff however are often drawn from nearby villages and commute by transport (vehicle) provided by the lodge
- Bar and Swimming Pool with toilets
- Volleyball Court and sitting deck area
- Vegetable Garden
- Electric fence



Figure 7: *Utility services available on-site*

5.4 Pollution Control & Mitigations

5.4.1 Handling of Fuel, Oil and Chemicals

The Lodge development/facility Managers takes all reasonable precautions to prevent fuel, oil and chemical whilst undertaking works on site. To this end, the Site Manager ensures that:

- All necessary approvals are in place prior to bringing fuel, oil or chemicals to the Lodge & Campsite
- All fuel, oil and chemical deliveries (if any) shall be supervised by a responsible person, who shall be trained to deal with any spills
- Regular checks are performed to verify that no leaking or defective equipment, and
- Equipment is maintained regularly to ensure that no fuel, oil or hydraulic leaks occur.

The Lodge manager, Campsite Manager & Houseboat manager often ensures that there is sufficient absorbent material and spill & safety kits available on site to manage accidental spills. The location of and instructions on how to use this equipment is included in the included in the guest Induction booklet. Nominated Lodge, Campsite and Houseboat personnel are appropriately trained to use spill kits. Any accidental spillages of fuels and oils, or other hazardous substances, are usually cleaned up immediately and be reported Lodge Manager and Environmental Officer. The following responses shall be undertaken:

Minor spill: Only diesel and oil, with no human injury, contamination to water bodies or other environmental receptors. Contain and clean up the spill using available spill kit. The Lodge Manager shall inform the PM and Environmental Officer, supplying the following information:

- Date, time, and location
- Substance spilled and quantity, and
- Actions taken, and any future remediation required.

Major Spill: Resulting in human injury or/and environmental contamination and water body contamination. Personnel will contain the spill if possible and report the spill to the Lodge Manager, who shall then alert the appropriate emergency services and the Environment Officer. In addition to the above information for a minor spill, the Lodge & Houseboat Manager is also informed of any immediate dangers, e.g., fire, explosion, release of chemical fumes.

5.4.2 Sewerage and Greywater

The Lodge, Campsite & Houseboat have a well-maintained septic system that is completely closed, is a liquid waste management system to ensure that no solid waste or untreated sewage is discharged into the river. The Houseboat Lodge has inbuilt portable sewerage system where waste water is channeled and stored until such time when the waste water is pumped or released into the onshore septic tanks to avoid contamination of river water which serves as a mitigation measure to protect marine ecosystems inline with the Sikunga conservation principles and objectives. Thus, no liquid waste waters are released into the river from the boats. The existing onshore septic tank system is designed to service up to ~ 13,000 liters of sewerage per day, before discharging the effluent through sprinklers.

5.4.3 General Waste

Both the Lodge, Campsite area and Houseboat lodge is equipped with designated rubbish bins to ensure that all domestic waste is collected and disposed of sustainably through the existing waste management arrangements. Waste separation continues to be practiced, to ensure that all recyclable material is collected and sent for recycling. It is recommended that the Lodge, Campsite & houseboat produce a Waste Management Plan. The EMA (2007), Section 3, paragraph (i) states that waste must be reduced, re-used and recycled where possible, therefore in accordance with the Act, waste generated as a result of operating the Lodge, Campsite or Houseboat is often managed and dealt with in accordance with a Waste Management Plan. This Plan was produced prior to operations of the Lodge commencing and included the following information:

- Describe each waste type expected to be produced
- Estimate the quantity of each waste type
- Identify the waste management action proposed for each waste stream, including re-using, recycling, recovery and disposal
- Designated areas to collect and separate waste, and
- Identify waste carrier and waste disposal company.

The Waste Management Plan was and is updated on a regular basis to ensure all waste and disposal routes are identified. The aim of the Waste Management Plan is to achieve sustainable waste management. Their main purpose is to outline waste streams and identify the best treatment and disposal option for each one, applying the waste management hierarchy and avoiding as much waste as possible ending up at landfill or being burnt. In addition, it will also

outline any potential economical and investment requirements for the treatment and / or disposal of waste.

5.4.4 Environmental Monitoring

Monitoring during operations is and shall be undertaken to ensure the effects on society and the environment are minimized, and to evaluate how effective the environmental management has been, over an extended period of time. The Lodge & Campsite Manager will set out monitoring arrangements prior to the operations of the Lodge & Campsite.

6. ROLE PLAYERS & RESPONSIBILITIES

This section outlines the roles and responsibilities of the respective key personnel that would be responsible for effective implementation of the EMP.

6.1 Roles and responsibilities

Assigning responsibilities is necessary to ensure that key procedures are followed. The overall responsibility to ensure that the EMP is implemented rests with the Site Lodge & Campsite Manager, who shall appoint a team of workers to undertake the actual work.

The Key role-players for the project implementation are:

- a) An Environmental Compliance Officer (ECO) representing MET for environmental auditing and monitoring;
- b) The Site Lodge & Campsite Manager (or assigned representation by Muchenje River Lodge)

All instructions and official communications regarding environmental matters shall follow the organizational structure as determined by Muchenje River Lodge. The only exception to this rule would be in an emergency (defined as a situation requiring immediate action and where failure to intervene timeously would, result in unacceptable environmental degradation), where instructions may be given directly to any other Site personnel.

6.1.1 Project development Lodge & Campsite Manager:

The Lodge Site Managers well as the Houseboat lodge manager are responsible for the overall daily operations at the Lodge, Campsite and houseboat. They are responsible to adherence to the

EMP throughout the project span. All team members shall be well-versed with the contents of this document. The following are some **key responsibilities**;

- Ensure that the works on-site (Lodge, Campsite & houseboat) are conducted in an environmentally sensitive manner and in accordance with the requirements of the EMP at all times. Special care shall be taken to prevent irreversible damage to the environment.
- Ensure that all site Lodge, Campsite & houseboat staff are adequately informed of the requirements of the EMP pertaining to their site role, and that they have attended an environmental induction session (this session was and will be in the form of a talk and/or a written code of conduct that is clearly explained and understood by the team).

6.1.2 The Environmental Compliance Officer: ECO

The ECO in the context of this document refers to the party responsible for the environmental compliance and auditing activities required by the EMP for the lifecycle of the Site. The ECO shall be an independent environmental manager. The ECO shall have adequate environmental knowledge to understand the detailed environmental issues associated with the project, and is to be well versed in the contents of the EMP:

- The ECO shall undertake all monitoring and auditing activities to ensure compliance with the EMP.
- The ECO shall inspect the site at any suitable time during operation of the Lodge & Campsite
- The ECO shall compile progress reports following any site inspections, Compliance Reports following any non-compliance, and a Closure report following the conclusion of Lodge & Campsite activities.
- The ECO shall liaise closely with the Lodge, Campsite, & house-boat Manager and shall provide guidance on any environmental management issues, incidents or emergencies that are brought to their attention.
- The ECO shall assist in providing recommendations for remedial action in the event of any non-compliances.

6.2 Compliance with Requirements

Environmental management is not only concerned with the impacts on the environment, but also with how such operations are carried out. Tolerance with respect to environmental matters

applies not only to the finished product but also to the standard of the day-to-day operations as well as the wellbeing of the immediate communities

The development of an updated EMP for a project is therefore an important and necessary task that is aimed at assigning responsibilities and mitigation options to a variety of activities. However, it can also be an ineffective tool in the absence of auditing or monitoring activities. Auditing or monitoring activities involve the structured observation, measurement, and evaluation of environmental data over a period of time.

6.3 Disciplinary Action

The EMP is a legally binding document. Non-compliance with the EMP shall result in disciplinary action being taken against the perpetrator/s. Such action may take the form of (but is not limited to) financial penalties, legal action, fines and/or suspension of work. The disciplinary action shall be determined according to the nature of the non-compliance or crime, and exact penalties are to the discretion of MEFT (Ministry of Environment, Forest and Tourism) according to the severity of the incident. Measures to be implemented by Wildest Logistics cc with assistance of monitoring by the ECO are outlined in the table below.

6.4 Mitigation Measures during Constructions Phase & Operation Phases of the Muchenje River Lodge Development

Table 3: Summary Climate, Topography, Soils, Drainage, Surface and groundwater Impact

IMPACT	NATURE	EXTENT	MITIGATION MEASURES
Ground water pollution due to drainage	Negative effect on groundwater	Local	<p>Waste Water generated will be used in green-belt development & flushing requirement. Liquid effluents (Sewage) will be treated channelled to two (2) septic tanks. The treated recycled effluent will be used in flushing, landscaping development and wetting of road, as required. The treated effluent shall be of a quality suitable for use as flushing and for horticulture for external areas.</p> <p>The following parameters/ site conditions are kept in mind when designing the sewage, water drainage system:</p> <ul style="list-style-type: none"> • Natural slope of the area; • Sub-soil water table; • Provision of venting arrangement for manholes; • Construction of manholes & laying of pipes considering ground condition;
Solid Waste management	pollution	Site specific	<p>The collection and transportation of the solid waste generated during the operational phase of the project will be as follows:</p> <p>The solid waste generated will be collected and segregated as biodegradable and non-recyclable/ non-biodegradable waste. Biodegradable waste will be made compost and used in the</p>

			<p>form of manure in green belt development. Non-biodegradable waste will be stored separately and handed over to the authorized agency for its further disposal.</p> <p>To minimize littering and odors, waste will be stored in well – designed containers/bins that will be located at strategic locations to minimize disturbance. 74.8Kg/day of MSW and 20 Kg/day STP sludge will be generated during operation phase. STP sludge is used as manure for green belt development</p>
Removal of vegetation on the riverbank	Negative effect due to run off and erosion	Site specific	<p>Removal of soil vegetative cover should be kept at minimum and should only be carried out with absolute necessity. The development of the landscape and planting of trees and vegetative cover should be carried out after construction work.</p>
Biodiversity loss and habitat destruction	Negative effect on biodiversity	Regional	<p>The mitigation measure against changes in the topography of the land is geared towards minimizing the changes in the natural drainage pattern of the surrounding areas. To ensure this, the changes in the topography of the land should be kept at minimum. Otherwise, the restoration of the natural drainage of the site relating to the surrounding areas should be restored after construction</p>
Design and construction of septic tank not conforming to standards	Negative impact on water resources	Local	<p>Two (2) complimenting septic tanks will be developed with a high capacity to prevent it from reaching its maximum capacity. The chemical will be stored in the septic tank to allow fermenting of wastes and evaporation breezers to increase evaporation to reduce</p>
	Destruction of habitat	Local	<p>Firefighting equipment to be installed on the lodge premises. Selected village community members and staff members of the lodge to be trained on fire prevention measures and action</p>

Fires (Fire Fighting Systems)			<p>to be taken fire prevention measures should be in place, including the deployment of adequate functional extinguishers and simple dry sand buckets. The project monitoring programme should include inspection of safety equipment use.</p> <p>Additionally, the lodge will be protected with firefighting arrangement. A water holding tank for fire hydrant will be provided in the premises. The firefighting system will be designed by the consultants considering the prevailing standard</p>
Health and safety management	Lodge and workers	Site specific	<p>During the construction period there should be opportunities to increase awareness of health and safety issues and implement appropriate standards of performance. Occupational and environmental health in and around the contractor's camps and facilities should be subject to such scrutiny. It should be a requirement that the contractors supervising foremen will have basic First Aid training which should be available from hospitals and medical NGOs. There should also be plans for coping with emergencies. A fully stocked First Aid kit (and set of emergency numbers) will be available at each worksite and workshop. Appropriate safety protection equipment should be worn at all workshops, yards and construction sites to conform with national regulations and/or as specified by the Supervising</p>
Human wild life conflict	Negative impact on wildlife & lodge	Local	<p>A lethal blade fence will be developed around the lodge boundary to avoid conflict of wildlife animals and to ensure security of clients and customers on the lodge. The lodge is NOT situated in corridor for animals hence limited movement of animals are expected on the lodge site. Additionally, a varsity area of open savannah land is available around the lodge where animals will roam freely to access other areas</p>

ASSESSMENT OF ENVIRONMENTAL ASPECTS AND PROPOSED MITIGATION MEASURES TO BE PERFORMED BY THE CONTRACTOR AND PROPONENT DURING ALL PHASES OF THE PROJECT (MUCHENJE RIVER LODGE)

An environmental review for the operations of the Lodge & Houseboat is and/or has been completed to identify all the commitments and agreements made within the EIA report. From this, a schedule of environmental commitments and risks has been produced, which details deliverables including measures identified for the prevention of pollution or damage to the environment.

ACTIVITY	RISKS AND POTENTIAL IMPACTS	MANAGEMENT / MITIGATION MEASURES	MONITORING REQUIREMENTS	FREQUENCY	RESPONSIBILITY
Refueling tender boat and Lodge & Campsite generator	Spillages of fuel, oil and lubricants.	Use of solar panel power supply. Activity to be undertaken by a suitably qualified person. Spill kits available Use of dips trays during the transfer	Monitor fuel use	Daily	Lodge & Houseboat Manager Personnel
Operations of mechanical equipment and engines	Spillages of fuel, oil and lubricants.	Undertake regular checks of all plant and equipment Service plant and equipment annually Spill kits available Clear spills immediately	Daily checks Monthly inspections / compliance checks	Daily Monthly	Lodge & Houseboat Manager Personnel
Increased tourists to the area and taking part in activities – use of generators, engines and general noise sources	Increase noise levels	Boat engine and moving components are to be kept in good working order at all times to avoid capsizing and to minimize noise impact Guests are to be provided awareness on interactions and impacts on aquatic ecology No loud music Careful siting of generators Turn off engines when not required No idling	Daily checks Monthly inspections / compliance checks	Daily Monthly	Lodge & Houseboat Manager Personnel
Increased tourists to the area and taking part in activities / Safari boat in close proximity to animals	Human-wildlife conflicts – animal injury, disturbance or mortality	Train personnel and guides Provide environmental awareness to guests' No-go areas on the river Limit the number of tender boats on the river at any one time Prevent killing of animals No stopping	Monthly checks of environment	Monthly	Lodge & Houseboat Manager or Environmental Officer

		on the river unless approved by the Environmental Officer			
Abstraction of water from the river	Disturbance to the natural environment and use of resources	Use of borehole water for human consumption instead of river water. Train personnel and environmental awareness - minimize use of water Inform guests of water usage and consumptions issues / use water wisely Maintenance of plant and equipment – no leaks	Test water annually to ensure it is appropriate for consumption	Annual	Lodge & Houseboat Manager or Environmental Officer
Sewerage production and disposal	Contamination of water resources. Reduction in water quality Flora and fauna affected	Septic tank Sewerage waste absorption system onsite or on the Lodge & Campsite site.	The septic tanks must be designed to give a minimum of 24 hours retention of the sewage influent. Regular checks on the septic tank waste treatment facility. Regular water samples will be taken from those river & borehole to ensure that river water quality is maintained and comply with the prescribes general standards	Daily Monthly	Lodge & Houseboat Manager or Environmental Officer
Production and disposal of greywater (showers and kitchen operations) Use of chemicals	Reduction in water quality Flora and fauna affected	All of the zinks, showers, and toilets on each restroom are collectively connected to the specially designed liquid waste septic tank. The capacity of this tank accommodates all waste produced within the Lodge & Campsite. Therefore, no greywater is produced on the Lodge & Campsite tourist facility.	Regular water quality samples	Weekly / monthly	Lodge & Houseboat manager or Environmental Officer
Increased tourists - Increased waste	Solid waste (litter) escaping into the environment. Greater	Implementation of the Waste Management Plan and application of the waste	Monthly compliance checks	Monthly	Lodge & Houseboat Manager or Campsite personnel

	quantity to be disposed of – landfill = land take, burning = air pollution	management hierarchy Suitable collection points for the waste on Lodge & Campsite. Waste collected weekly and transported in suitable containers. Any hazardous waste such as waste oil/lubricant cans are stored in a hazardous waste storage bin and disposed of by an accredited hazardous waste handlers.			
Increased tourists – Food introduced into the ecosystem	Change in the local flora and fauna, and habits of aquatic species	Notices to inform guests of the rules Appropriate bins and removal of waste each day	None	None	Lodge & Houseboat Manager or Campsite personnel
Lodge & Campsite & Safari boats Maintenance or renovations	Oils, fuels, chemicals paints, waste entering the aquatic environment and causing pollution / contamination – reduce water quality, affect flora and fauna	Implementation of the Waste Management Plan Suitable collection points for the waste on Lodge & Campsite. Waste collected daily and transported in suitable containers Spill kits Limit use of chemicals Training of staff	Monthly compliance checks None	Monthly	Lodge & Houseboat Manager or Environmental Officer
Lighting from the safari boats & Lodge & Campsite	Artificial lighting could affect birds and fish in particular, as these species rely upon moonlight to navigate at night time. Amphibians, such as frogs could also be disturbed, and feeding and mating rituals could be affected. Sources	Use of energy efficient light forms Low beam / low LEDs Avoid lighting where unnecessary Avoid lights being grouped together. Lights switched off at night	Monthly compliance checks	Monthly	Lodge & Houseboat Manager or Environmental Officer
Maintenance of area in the vicinity of the Lodge & Campsite	Removal of vegetations	Remove invasive alien species Remove vegetation during the winter months or prescribed	Monthly checks to visually check the growth of vegetations	Monthly	Lodge & Houseboat Manager Environmental Officer

		times by the Environmental Officer			
Increased number of guests and operations	Water Resources: Use of Energy and waste production	Train staff so they are aware of the need to save energy Inform guests and include information on the Lodge & Campsite Use of energy wisely – solar power (ensure well maintained) and energy saving lightbulbs	Monitor fuel use. Monitor energy consumption and water abstraction Monitor waste as part of waste management plan	Monthly	Lodge & Houseboat Manager or Environmental Officer
Location of Lodge & Campsite amp	Geomorphology and ecological impacts	The Lodge & Campsite shall be moored at the same location which will not move during operations. These sites have been identified and shall not be deviated from except is sensitive environmental features are located in the area and the mooring spot needs to be moved by a few meters.	Weekly and monthly compliance checks	Weekly and monthly	Lodge & Houseboat Manager
Soil / water pollution	Negative impact on soil	Adequate solid waste containers are provided or must be provided for garbage collection to minimise entry into gullies and ultimately into the water. Workers must be instructed to use garbage containers and their use or lack of use monitored where possible	Weekly and monthly compliance checks	Weekly and monthly	Lodge & Houseboat Manager
Fires	Destruction of natural habitat	Placement of “NO Fire” sign boards around the Lodge & Campsite and Open fire to be avoided	Weekly and monthly compliance checks	Daily and monthly	Lodge & Houseboat Manager

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