

Application for Environmental Authorization in terms of Section 24 G of NEMA:  
Development of Lodges and other Tourist Infrastructure in Qwabi Private Game  
Reserve, Limpopo Province  
Reference No. 12/1/9/s24G-W50

DRAFT OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME (OEMPr)

Compiled by:



NULEAF PLANNING AND ENVIRONMENTAL PTY LTD

On behalf of:

Qwabi Private Game Reserve

July 2023

## ACRONYMS AND ABBREVIATIONS

BA:	Basic Assessment
BAR:	Basic Assessment Report
CDF:	Conservation Development Framework
CMP:	Construction Management Plan
DEA:	South African National Department of Environmental Affairs
DWS:	South African National Department of Water and Sanitation
EA:	Environmental Authorisation
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EMPr:	Environmental Management Programme
EMS:	Environmental Management System
EO:	Environmental Officer
I&AP:	Interested and Affected Party
IEM:	Integrated Environmental Management
LED:	Local Economic Development
NCR:	Non-conformance Report
NEMA:	National Environmental Management Act, Act No. 107 of 1998
NEMPAA:	National Environmental Management: Protected Areas Act, Act No. 57 of 2003
OEMPr:	Operational Environmental Management Programme
OMP:	Operational Management Plan
SAHRA:	South African Heritage Resources Agency
WHO:	World Health Organisation

## GLOSSARY OF TERMS

Alien Vegetation:	Alien vegetation defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations.
Alien Species:	A plant or animal species introduced from elsewhere: neither endemic nor indigenous.
Applicant:	Any person who applies for an authorization to undertake an activity or to cause such activity to be undertaken as contemplated in the National Environmental Management Act (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 20010.
Buffer zone:	Is a collar of land that filters out inappropriate influences from surrounding activities, also known as edge effects, including the effects of invasive plant and animal species, physical damage and soil compaction caused by trampling and harvesting, abiotic habitat alterations and pollution. Buffer zones can also provide more landscape needed for ecological processes, such as fire.
Construction Activity:	Any action taken by the Operator, his sub-contractors, suppliers or personnel during the construction process.
Construction Camp:	is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;
Ecology:	The study of the inter relationships between organisms and their environments.
Environment:	All physical, chemical and biological factors and conditions that influence an object and/or organism.
Environmental Impact:	An Impact or Environmental Impact is the degree of change to the environment, whether desirable or undesirable, that will result from the effect of a defined activity. An Impact may be the direct or indirect consequence of an activity and may be simple or cumulative in nature.
Environmental Impact Assessment:	Assessment of the effects of a development on the environment.
Operational Environmental Management Programme:	A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the operational lifespan of the development. .
Indigenous:	Means a species that occurs, or has historically occurred, naturally in a free state within the borders of South Africa. Species that have been introduced to South Africa as a result of human activity are excluded (South Africa (Republic) National Environmental Management: Biodiversity Act, 2004: Chapter 1).
Interested and Affected Party:	Any person, group of persons or organization interested in or affected by an activity contemplated in an application, or any organ of state that may have jurisdiction over any aspect of the activity.

Invasive vegetation:	Plant species that show the potential to occupy in unnatural numbers, any disturbed area, including pioneer species.
Public Participation:	The legislated process contemplated in terms GN R543, in which all potential interested and affected parties are informed of the S24 G and afforded the opportunity to input, comment and object. Specific requirements are listed in terms of advertising and making draft reports available for comment.
Road Reserve:	The road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.
Road Width:	The area within the Road Reserve including all areas beyond the Road Reserve that are affected by the continuous presence of the road i.e. the verge.
Mitigate:	The implementation of practical measures to reduce adverse impacts Public Participation Process: is a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.
Non-conformance Report:	A Non-Conformance Report is a construction related document issued to the Operator as a final step towards rectifying a failure in complying with a requirement of the OEMPr.
Red data plant species:	Are fauna and flora species that require environmental protection based on the World Conservation Union (IUCN) categories and criteria.
ROD:	Record of Decision pertaining to the Application for Environmental Authorisation issued by the Competent Authority. The RoD is legally binding on the Applicant and may contain a positive or negative decision on the Application as well as conditions and provisions for each.
Soil Compaction:	Mechanically increasing the density of the soil, vehicle passage or any other type of loading. Wet soils compact easier than moist or dry soils.
Species:	Means a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind. The term "species" include any sub-species, cultivar, variety, geographic race, strain, and hybrid or geographically separate population (South Africa [Republic] National Environmental Management: Biodiversity Act, 2004: Chapter 1).
The Contractor:	The contractor, as the developers agent on site, is bound by the ROD and EMP conditions through his/her contract with the developer, and is responsible for ensuring that conditions of the EMP and ROD are strictly adhered to at all times. The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site agent in terms of the EMPr.
The Developer:	Remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMP and the conditions of the Environmental Decision throughout all phases of the project.
The Operator:	Remains ultimately responsible for ensuring that the development is implemented according to the requirements of the OEMPr and the conditions of the Environmental Decision throughout all phases of the operational phase.
The Environmental Control Officer (ECO):	The ECO is appointed by the Operator as an independent monitor of the implementation of the OEMPr i.e. independent of the Applicant and Operator.

The Environmental Officer (EO):	The Operator shall submit to the Site Agent a nominated representative of the Operator as an EO to assist with day to day monitoring of the construction activities for the contract.
Vegetation:	Is a collective word for plants occurring in an area.
Vulnerable:	A taxon is 'Vulnerable' when it is not 'Critically Endangered' or 'Endangered' but is facing a high risk of extinction in the wild in the medium term future.
Watercourse:	A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may by notice in the Government Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks" (South Africa [Republic] National Water Act, 1998).

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## SECTION A: GENERAL

### 1. INTRODUCTION

A key requirement of the National Environmental Management Act (NEMA) of 1998 is compliance with the principles of Integrated Environmental Management (IEM). Chapter Five of NEMA deals with IEM and its objective to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities.

Among these tools are Environmental Impact Assessments (EIAs) and Environmental Management Programmes (EMPr's). In compliance with the above-mentioned environmental legislation, the Limpopo Department of Economic Development, Environment and Tourism (LEDET) requires that the Applicant undertake *ex post facto* approval in the form of a S24G for all of the developments that were constructed without the necessary environmental authorization, and that the S24G includes a detailed Operational Environmental Management Programme (OEMPr).

The EMPr typically becomes part of the Environmental Authorization (EA) prepared by the relevant environmental authority and becomes the basis for monitoring compliance with the recommendations of the EIA both during the Construction and Operational Phases. However, since the activities have already taken place the purpose of the OEMP is to provide a framework for the management of environmental impacts associated with the operation of the facilities and associated infrastructure, as well as, any rehabilitation and site maintenance activities that may need to take place during the operation.

The purpose of this OEMP is to describe:

- How adverse environmental impacts will be managed.
- How environmental damage or degradation will be mitigated.
- How site rehabilitation will be undertaken.
- What monitoring is necessary to ensure that the above measures are successful
- Stipulate time frames within which the mitigation measures are to be implemented

It should be noted that the guidelines listed hereunder are not to be considered finite. Experience has shown that additional environmental issues are bound to arise during the operational phase of the project. When this happens, the Operational Environmental Management Programme (OEMPr) must be updated accordingly.

### 2. DETAILS AND EXPERTISE OF EAP

Environmental Assessment Practitioner	NuLeaf Planning and Environmental (Pty) Ltd.
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Expertise	BSc Hons. EMA
Professional body affiliations	EAPASA registered Environmental Practitioner (EAPASA Reg nr: 2019/655)

Please refer to Appendix A for EAP curriculum vitae.

### 3. BACKGROUND

SARPHC Properties purchased the Qwabi Reserve in 2010 from the previous owners. The following infrastructure was already present at the time of the purchase:



Table 1: Infrastructure present pre-2007

Infrastructure	Year of construction	Size (Ha)	Number of staff/guests
Babohi Lodge (original)	Prior to 2007	6.69 Ha	34
Letamo Lodge (original)	Prior to 2007	3.1 Ha	Unknown
Triangle Farmstead	Prior to 2007	0.5 Ha	Unknown
Workshop, GM house and APU	Prior to 2007	1.53 Ha	30
Youth House	Prior to 2007	0.04 Ha	5
Post office house	Prior to 2007	0.04 Ha	2
East Block house	Prior to 2007	0.7 Ha	5
Southern Valley house	Prior to 2007	1.2 Ha	4
Rock house	Prior to 2007	0.07 Ha	2
Lake Panic	Prior to 2007	0.8 Ha	-

From the table above it can be noted that a total of 14.67 Ha of indigenous vegetation was cleared by the previous owners' pre-2007. To the author's knowledge, no environmental authorization was in place for these developments.

After the purchase of the Qwabi Reserve in 2010, SARPHC Properties looked to upgrade and construct additions to the existing Babohi and Letamo Lodges inclusive of new staff accommodation.

It should be noted that in February of 2009, environmental authorization was granted for the construction of an 18-hole golf course, 513 residential stands, ten 20 bed lodges, a hotel with 20 rooms, clubhouse, equestrian centre, stables, staff housing, workshop and maintenance centre. All development was approved to take place on farms Rookpoort 450 KQ and Rhenosterkloof 483 KQ which formed part of the far western portion of the property. All activities were to commence within a period of three (3) years from the date of issue (i.e. by 25 February 2012).

In 2017 the Thabazimbi Local Municipality granted planning approval for the proposed additions and upgrades on the back of a Record of Decision (RoD) that was issued by LEDET in 2009. Based on these approvals, SARPHC Properties was in good faith under the impression that the improvements were compliant in terms of NEMA and fell within the bounds of the RoD issued in 2009. The upgrades were effected and completed in 2019 as per the approved SDP's.

In 2022, Dr André Uys was appointed as the new General Manager of SARPHC Properties. As part of a good governance processes, an internal compliance audit was undertaken to verify that all authorizations were in place for the Qwabi Reserve if future developments were to take place.

The outcome of the internal compliance audit was that the RoD on which Thabazimbi Municipality approved the development may not have been valid and may have expired by the time the developments were undertaken in 2018/2019. Additionally, the development of the lodges are located in the centre and eastern portions of the Reserve and not in the west as per the EA. The infrastructure that SARPHC Properties constructed during the period of 2012-2022 are detailed in the table below:

Table 2: Infrastructure constructed between 2012-2022

Infrastructure	Year of construction	Size (Ha)	Number of staff/guests
Mvubu dam	2012	1 ha	-
Gravel pit	2012	0.29 Ha	-
Letamo Helipad	2016	0.62 Ha	-
Junior staff units	2018	1 Ha	160
Contractor's camp	2018	1 Ha	50
Letamo lodge expansion	2018	1.98 Ha	140
Admin office	2018	0.11 Ha	7

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Babohi lodge expansion	2018	3.3 Ha	168
Senior staff units	2019	0.45 Ha	14
Shooting range	2019	0.3 Ha	
Family unit 1	2020	0.1 Ha	4
Family unit 2	2020	0.1 Ha	4
New Babohi helipad	2022	0.3	-

It should be noted that the shooting range has been decommissioned and the area has been rehabilitated. Additionally, the Babohi helipad which was originally constructed in 2012 was expanded from approximately 300 m<sup>2</sup> to approximately 1800 m<sup>2</sup> in 2016. In February 2023 the helipad was removed and rehabilitated in accordance with the Qwabi Reserve Ecologist's rehabilitation plan.

All of these developments were constructed without the necessary environmental authorization and the Applicant is now applying for ex post facto approval.

**4. ROLES AND RESPONSIBILITIES**

**4.1. Parties' responsibilities**

Party	Responsibility
Applicant	<ul style="list-style-type: none"> <li>• Ensure adherence to, and compliance with, the OEMPr in a legal and timely manner. This relates to all phases of the project lifecycle.</li> <li>• Appoint an Independent Environmental Control Officer (ECO) during both Construction and Operation Phases.</li> <li>• Ensure that a monitoring programme is drafted and implemented to assess compliance with the OEMPr during the operational phase.</li> <li>• Ensure that the operators undertake to adhere to the provisions of the OEMPr as part of their respective contracts.</li> <li>• Ensure that independent Environmental Audits, including a Post Construction Close-Out audit is undertaken. The results of all audits must be forwarded to the Environmental Authority within 30 days after completion of the audit.</li> <li>• Ensure that all monitoring and audit reports are submitted to the Environmental Authority and that the operator implement recommendations.</li> <li>• Ensure that the OEMPr is included as part of the tender documentation and / or included within any service level agreements made, thereby making it part of the enquiry document to make the recommendations &amp; constraints as set out in this document, enforceable under the general conditions of contract.</li> </ul>
Operator	<ul style="list-style-type: none"> <li>• Ensure adherence to, and compliance with, the OEMPr in a legal and timely manner (as per the specified time frames).</li> <li>• Ensure that all staff members and suppliers have a comprehensive understanding of the OEMPr and adhere to the provisions for the duration of the operational phase.</li> <li>• Designate an Environmental Officer (EO) to monitor environmental compliance on a day-to-day basis.</li> <li>• Ensure that all staff members and suppliers are aware of potential environmental issues and of all mitigating and precautionary measures that must be implemented.</li> <li>• Ensure that staff members and suppliers are able to recognise environmental 'red flags' and ensure that these will:                             <ul style="list-style-type: none"> <li>○ Not be disturbed, damaged or removed; and</li> <li>○ Be brought to the immediate attention of the EO or ECO to determine an action plan and way forward.</li> </ul> </li> <li>• Ensure that all recommendations made in monitoring and audit reports are implemented throughout the operational phase.</li> <li>• Accept liability for any and all Work required in terms of the environmental specifications, resulting from environmental negligence, mismanagement and / or non-compliance.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Development of an Environmental Method Statement to be submitted and approved by the ECO. See point 4.2 below for more information.</li> <li>• Develop a layout of the operations of the reserve, lodges and all associated infrastructure indicating the position of all activities, including but not limited to: offices, ablution facilities, waste water treatment facilities, storage areas, workshops, batching plant, stockpile areas, waste disposal facilities, hazardous substance storage area, access routes, etc. This layout plan is to be submitted to the ECO prior to remedial actions taking place.</li> </ul>
Environmental Officer (EO)	<ul style="list-style-type: none"> <li>• Manage the day-to-day on-site implementation of the environmental specifications during the operational phase, and provide support and input where required.</li> <li>• Compile regular (usually weekly) monitoring reports for submission to the Operator / operator, and copied to the ECO.</li> <li>• Act as liaison and advisor on all environmental and related issues, and seek advice from the ECO where required.</li> <li>• Understand the provisions and limitations of the project in terms of the OEMPr and relevant regulations (such as NEMA and NEMWA) and provide advice accordingly.</li> <li>• Respond to incidents and keep records and reports as required.</li> </ul>
Environmental Control Officer (ECO)	<ul style="list-style-type: none"> <li>• Understand, interpret, monitor, audit and implement the OEMPr from the "cradle to grave" stage.</li> <li>• Retain independence and report on environmental compliance in an objective manner.</li> <li>• Explain the contents of the OEMPr to the Operator, the site staff, supervisors, and any other relevant personnel or I&amp;A's as required.</li> <li>• Undertake environmental audits for the duration of the remedial activities during the operational phase, as stipulated in the time frames.</li> <li>• Undertake yearly operational environmental audits.</li> <li>• Act as quality controller regarding all environmental concerns by conducting periodic site inspections, attending regular site meetings, pre-empting problems, suggesting mitigation and being available to advice on incidental issues that arise.</li> <li>• Submit audit reports to the applicant, operator and the Environmental Authority, including performance rating, recommendations and reports of non-compliance.</li> </ul>

#### 4.2. Operators Environmental Method Statement

Method Statements are written submissions to the ECO by the Operator in collaboration with the assigned EO, in response to a request by the ECO. The Method Statements should set out the plant, materials, labour and method that the operator proposes using to carry out the intended remedial activities. The Method Statement should contain the appropriate detail such that the ECO is able to assess whether the Operator's proposal is in accordance with the requirements of this OEMPr. The Operator must sign the Method Statement along with the ECO to formalize the approved Method Statement.

The Method Statements must be submitted to the ECO for approval prior to the commencement of any remedial activity. Any changes to the method of works must be reflected by amendments to the original approved Method Statement as is needed. Any changes in this regard must be approved by the ECO, understanding that such changes are environmentally acceptable and in line with the requirements of this OEMPr.

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, the Method Statement should briefly detail how and when a process will be carried out, the possible dangers/risks, and the methods of control required. This should be detailed for the following:

- Type of remedial activity;
- Timing and location of the activities;
- Construction procedures for the following specific activities;
  - Bunding;
  - Blasting;
  - Cement mixing / concrete batching/bentonite mixing;

- Contaminated water;
- Dust management;
- Environmental awareness course(s);
- Environmental monitoring;
- Erosion control;
- Fire, hazardous and/or poisonous substances including their storage;
- Personnel, public and animal safety;
- Rehabilitation of modified environment(s);
- Solid and liquid waste management;
- Sources of materials (including MSDSs);
- Top-soil management;
- Storm water Management.
- Materials and equipment to be used;
- Transportation of the equipment to / from site;
- How equipment/material will be moved while on site;
- Location and extent of storage areas;
- Identification of impacts that might result from the remedial activity;
- Methodology and/or specifications for impact prevention / containment;
- Methodology for environmental monitoring;
- Emergency/disaster incident and reaction procedures; and
- Rehabilitation procedures and continued maintenance of the impacted environment.

The Operator will be accountable for all actions taken in non-compliance of the approved Method Statement and this OEMPr.

## 5. COMPLIANCE

Compliance involves actions and programmes designed to ensure that all relevant environmental laws, legislation, standards and other requirements such as permits are followed and adhered to.

### 5.1. Environmental monitoring and auditing

Environmental monitoring is the continuous evaluation of the status and condition of environmental elements, whereas, environmental auditing is the process of comparing the impacts predicted with those which have actually occurred.

The key to a successful Environmental Management System (EMS) is regular monitoring to identify and implement corrective measures in a timely manner and independent auditing to evaluate successful compliance with environmental specifications and outcomes. The ultimate purpose of environmental monitoring and auditing is to confirm that all relevant programmes, legislation, laws and policies are adhered to and abided by and that the environmental specifications are being implemented in an effective and correct manner. Monitoring and auditing is intended to promote environmental best practice, ensure protection of resources and support sustainable development.

### 5.2. Monitoring Methods

In order to ensure that the above objectives are met, the following monitoring methods will be employed:

- Aspect monitoring (such as water quality);
- Incident reporting;
- Site inspections;
- Site monitoring and reporting;
- Independent external auditing.

### 5.3. Timeframes/ Frequency

Site monitoring should be undertaken daily on an on-going basis throughout the operational lifecycle of the reserve. External auditing should take place every 3 months during the remedial period and annually during the remainder of the operational period.

Remedial actions are also to be undertaken within the specific time frames as specified in this document.

The completed monitoring reports should be submitted to all relevant parties, including the ECO who will conduct audits at regular intervals. Audit reports will, in turn, be submitted to all relevant parties, including the EO, who will drive the implementation of recommendations.

### 5.4. Non-compliance

Failure by the operator and their staff and suppliers to comply with all relevant programmes laws, legislation, policies and mitigation measures laid out in this OEMPr will result in the following actions and consequences:

- Notifications will be issued in monitoring and auditing reports advising of failure to adhere to the measures stipulated in the S24 G/OEMPr.
- Failure to comply / respond to notifications and recommendations within a specified timeframe will result in written warning being issued.
- Failure to comply / respond to warnings within a specified timeframe will result in fines being issued.
- Continued and wilful failure to comply / respond will result in a Non-conformance Report being issued to the Operator.

### 5.5. Non-conformance

A Non-Conformance Report (NCR) will be issued to the Operator as a final step towards rectifying a failure in complying with a requirement of the OEMPr. This will be issued by the ECO to the Operator in writing. Preceding the issuing of an NCR, the Operator must be given an opportunity to rectify the non-conformance issues.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account;
- Agreed timeframe by which the actions documented in the NCR must be carried out; and
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Operator should sign the Close-Out portion of the Non-conformance
- Form and file it with the contract documentation.

### 5.6. On-site documentation

An Environmental File including the following documentation (if applicable) must be kept on site throughout the operational lifespan of the developments:

- OEMPr;
- Environmental Authorization;
- Licenses/permits related to any other legislation;

- Specialist remediation / rehabilitation plans;
- Storm Water Management Plan;
- Flood Assessment Plan;
- Environmental Method statements compiled by the Operator;
- Reserve Layout Plan;
- Letter of appointment of ECO;
- Written Notice of Commencement of remedial activities;
- Non-conformance Reports;
- Environmental register, which must include the following, but not limited to such:
  - Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR); and
  - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
  - Safe disposal certificate for all types of waste disposed off-site;
  - Environmental training records;
  - Waste disposal receipts from a registered landfill site;
  - Material Safety Data Sheets for all hazardous substances;
  - Method Statements; and
  - Notification of Emergencies and Incidents

## 6. ENVIRONMENTAL AWARENESS

An environmental awareness plan must be implemented for the operational phases. The approved OEMPr will provide the basis of the information to be supplied, as well as any other relevant documentation, including any specialist reports.

All operational staff, as well as, suppliers and regular out-sourced Operators will be required to attend a general orientation session prior to the commencement of any remedial activities. All impacts that could potentially arise and affect the environment will be discussed and explained in detail, as well as, required mitigation measures. The consequences of not following the mitigation measures as stipulated in the OEMPr (i.e. non-compliance) will also be addressed.

All permanent staff must receive detailed training relative to their specific job description. This training will focus on the environmental issues and impacts that are directly linked to their activities. Staff will be briefed on the correct protocol and procedures to follow going forth in the day-to-day operations, as well as, in the event of an incident or accident (spill, fire etc.) in order to minimize and contain the damage.

In addition, staff will be required to report all incidents so that the appropriate mitigation measures can be implemented in a timely manner.

## SECTION B: MANAGEMENT PLANS

The mitigation and recommendations contained in the Management Plans that follow have been based on best environmental practice and have been supplemented with specialist recommendations extracted from specialist reports developed in support of the S24G process for this project.

*Since the planning and design phase, as well as the construction activities have already taken place for this development, it must be noted that this OEMPr will not be dealing with these phases specifically, therefore no Planning Management Plan (PMP) or Construction Management Plan (CMP) have been developed. Instead, a retrospective assessment was conducted in order to assess potential impacts that might have occurred as a result of the unauthorised activities during these phases and the potential mitigation measures and remedial actions will be implemented during the remedial activities of the operational phase. These mitigation measures are addressed in Section 7: Operations Management Plan of this report. Please refer to Section 7 below for more detail.*

*In the future no construction activities are to commence without first obtaining environmental authorization.*

### 7. OPERATIONAL MANAGEMENT PLAN

The Operational Management Plan (OMP) identifies and addresses the environmental impacts associated with the unauthorised development, as well as, addresses day-to-day operation of the development hence forth. This plan must be adhered to at all times during the remedial activities and operational phase.

It is the Operators responsibility to ensure the implementation of all mitigation measures contained in the OMP are adhered to in order to remediate the impacts of the unauthorised developments and prevent/minimize the environmental impacts associated with the operations.

#### 7.1. Environmental Authorisation

*To ensure that measures are put in place to obtain environmental authorization prior to construction of future developments.*

##### Specific mitigation:

- Do not commence with any activities prior to obtaining environmental authorization
- Implement operational environmental management plan to mitigate impacts caused by poor planning and construction activities
- No additional vegetation should be cleared within the Qwabi Reserve without prior authorisation

##### Time frames:

- Throughout operational phase

#### 7.2. Hydrology

##### 7.2.1. Ground water protection

*To ensure that measures are put in place to prevent the waste of water, as well as the potential pollution and contamination of ground water owing to unmanaged sewage discharge from the existing WWTWs during the operational phase.*

##### Specific mitigation:

- Ensure that the Water Use license for the property is in place and up to date.
- All facility staff will be trained in water wise principles, and prudent use of water will be practiced at all times for the lifetime of the development.
- Guests are to be sensitized to water conservation efforts through notices at the lodges.
- A Code of Conduct will be placed in guest rooms advising guests of relevant Reserve rules and regulations.
- During maintenance and upgrades of the lodges, water saving devices such as low flow shower heads and taps, and the use of grey water for activities such as road wetting and irrigation will be installed.

- Water saving measures will be implemented where possible and practical. The use of draught resistant species in landscaping around the lodges will be planted.
- Leak detection systems will be installed during routine maintenance and upgrades and any leaks promptly attended to.
- Installation of water consumption monitoring meters to be undertaken at each borehole abstraction point. The installation of these meter must be undertaken within 6 months of the S24G being approved.
- Water consumption will be monitored on a monthly basis to ensure that there is no undue waste. Keep up to date records of water monitoring.
- Potable water abstracted from all boreholes must continue to be regularly tested to ensure compliance with the DWS standards.
- A storm water management plan will be compiled and adopted within 6 months of the S24G being approved.
- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- Tanks containing fuel will have lids, which will remain firmly shut.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Gas and liquid fuel will not be stored in the same storage area.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, bunded areas. The bunded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be collected by a private contractor as employed by QPGR.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- Potable water monitoring will be undertaken on a monthly basis to ensure that the output quality of the water complies with the minimum standards as prescribed by DWS. These records will be kept up to date and made available upon request.
- Quality tests on the treated waste water discharged from the existing WWTWs must be undertaken on a 4 monthly basis to ensure that the output quality of the effluent complies with the minimum standards as prescribed by DWS. These records will be kept up to date and made available upon request. The first test is to be undertaken within 2 months of the S24G being approved.

#### 7.2.2. Surface water: Disturbance, degradation and alteration of various dams and drainage lines

*To ensure that measures are put in place to prevent further disturbance, alteration, and loss of ecological and hydrological functions along the dams and drainage lines due to the construction of river crossings, alien invasives, vegetation clearing, infrastructure located within the flood lines and river beds, uncontrolled discharges, alteration of surface characteristics, removal of stabilizing vegetation, as well as sedimentation and siltation from erosion.*

#### Specific mitigation:

- Ensure that the Water Use license for the property is in place and up to date.
- All disturbed sites will be evaluated immediately from S24G approval for the presence of alien invasive species
- All declared alien plants within a 50 m radius of each construction area must be eliminated according to the DFFE's published guidelines (DEA, 2015). These are species that have been listed under the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004). It is imperative that the team/s tasked with this action be suitably training in removal methods, including the identification of alien plants and safe use of herbicide.



- Special attention should be paid to removing *Flaveria bidentis* (Speedyweed) and *Opuntia stricta* (prickly pear), which currently pose the greatest alien invasive plant threat to biodiversity at Qwabi.
- QPGR will develop a management and monitoring programme for alien and invasive species 6 months from the date of the S24G being approved. This programme will detail basic ID information, actions to prevent the establishment of invasive plants and methods of removal.
- Inspections should be made at least every 6 months around the application sites to ensure that no alien plants are establishing. If any are located, they should be removed immediately.
- Manual / mechanical removal is preferred to chemical control.
- Grounds staff will be trained to recognize and eradicate potential invasive plants.
- Removal of aliens within the area (done in summer) will be done annually until equilibration is reached. This may take several years.
- QPGR will implement an alien plant control program 6 months from the date of the S24G being approved to combat the infestation present, especially along the edges and within drainage lines and wetlands. This program will include regular inspections and follow-ups.
- To compensate for the loss of sensitive riparian habitat, it is recommended that all existing erosion gullies around the application sites and along the Sandriver tributaries be rehabilitated. This may necessitate engineering works and sediment traps.
- Existing watercourse crossings should have regular maintenance undertaken to prevent degradation, siltation and blockages.
- All dam walls should be inspected after rain events to assess whether any structural damage has taken place. If found, these should be repaired promptly.
- It is recommended that all plants used for landscaping or rehabilitation be indigenous to the Waterberg.
- Monitor all rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.
- Flood debris will not be permitted to build up against structures, plinths and columns and will be removed every 3 months or more frequently if required.
- Erosion of river banks will be monitored every 3 months. Should any erosion or destabilization of banks be noted, this will be rectified immediately utilizing gabion baskets, reno mattresses or the like.
- A flood evacuation policy will be developed 3 months from the S24G being approved.
- No unauthorised access is permitted into buffer areas or any natural areas outside of the facility footprints.
- It is recommended that natural vegetation adjacent to existing infrastructure should be deemed out of bounds to all but authorised staff to restrict movement of people and disturbance of the surrounding habitat.
- Every effort should be made to avoid unnecessary erosion of soil and sedimentation of downstream areas around the application sites, particularly as a result of stormwater. This may include, but not be restricted to, the installation of drains and sediment traps along the roads.
- A storm water management plan will be compiled and adopted within 6 months of the S24G being approved.

### 7.2.3. Surface water: Pollution and contamination

*To ensure that measures are put in place to prevent further pollution and contamination of surface water owing to unmanaged storm water runoff, litter and waste, sewage leaks and spills from the existing WWTWs.*

#### Specific mitigation:

- The existing septic tank and soakaway systems at the Management houses and APU should be replaced with a package plant WWTWs or these septic tanks connected to the existing sewer network that is connected to an existing WWTW. This should be undertaken within 2 years of the of the S24G being approved.
- Quality tests on the treated waste water discharged from the existing WWTWs must be undertaken on a 4 monthly basis to ensure that the output quality of the effluent complies with the minimum standards as prescribed by DWS. These records will be kept up to date and made available upon request. The first test is to be undertaken within 2 months of the S24G being approved.

- It is imperative that staff employ good housekeeping around each of the application sites, i.e. avoid spillage of tar and concrete, waste and toxic such as paint and diesel, store hazardous materials in designated safe areas.
- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, banded areas. The banded areas will be clearly marked.
- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be collected by a private contractor as employed by QPGR.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- Tanks containing fuel will have lids, which will remain firmly shut.
- Gas and liquid fuel will not be stored in the same storage area.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, banded maintenance areas/workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- All waste generated at the site should be strictly controlled to avoid access from scavengers such as baboons and hyaenas and to avoid contamination of surrounding soils.
- A storm water management plan will be compiled and adopted within 6 months of the S24G being approved.

### 7.3. Biodiversity management

*To ensure the continued integrity of the natural environment and the conservation of fauna and flora, particularly in rehabilitated areas.*

#### 7.3.1. Soil: Contamination and Pollution

*To ensure that measures are put in place to prevent contamination and pollution owing to unmanaged storm water runoff, litter and uncontrolled waste, treated waste water discharge from the WWTWs, herbicides, pesticides and fertilisers, discharge and spill of solvents, paints, chemicals and cleaning products, as well as discharge and spill of hydrocarbons and fuel.*

##### Specific mitigation:

- The existing septic tank and soakaway systems at the Management houses and APU should be replaced with a package plant WWTWs or these septic tanks connected to the existing sewer network that is connected to an existing WWTW. This should be undertaken within 2 years of the of the S24G being approved.
- Quality tests on the treated waste water discharged from the existing WWTWs must be undertaken on a 4 monthly basis to ensure that the output quality of the effluent complies with the minimum standards as prescribed by DWS. These records will be kept up to date and made available upon request. The first test is to be undertaken within 2 months of the S24G being approved.
- All diesel, tar and other hazardous chemicals should be stored in environmentally safe areas and be used in environmentally sound practices.
- All waste generated at the site should be strictly controlled to avoid access from scavengers such as baboons and hyaenas and to avoid contamination of surrounding soils.
- All waste generated at the site should be strictly controlled to avoid access from scavengers such as baboons and hyaenas and to avoid contamination of surrounding soils.
- All hazardous substances (chemicals, oils, etc.) will be stored in appropriate, tamper proof containers in locked stores.
- Petroleum, chemical, harmful and hazardous materials will be stored in enclosed, banded areas. The banded areas will be clearly marked.

- The bund will have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab will be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump will be disposed of as hazardous waste. This will be removed by a private contractor as employed by QPGR.
- No oil, petrol, diesel etc. will be discharged onto the ground.
- All hazardous products dispensed from 200 litre drums will be transferred by pump, and not dispensed by tipping of the drum.
- Tanks containing fuel will have lids, which will remain firmly shut.
- Gas and liquid fuel will not be stored in the same storage area.
- The maintenance of all vehicles and equipment, including oil and lubricant changes, will only take place within properly equipped, bunded maintenance areas/workshops.
- Pumps and other machinery requiring oil, diesel etc., which are to remain in one position for longer than two days will be placed on drip trays. The drip trays will be watertight and will be emptied regularly and the contaminated water disposed off-site at a facility capable of handling such waste liquid. Drip trays will be cleaned before any possible rain events that may result in the drip trays overflowing
- All machinery and/or vehicles standing in place for more than 2 days will be placed on drip trays.
- Solid waste to be sorted at source into the various recyclables (paper, plastic, glass, cans) and non-recyclables.
- Only inert construction rubble and natural materials to be used to fill in the old quarry pit. All other waste (i.e. plastic, metal, etc) to be removed and disposed of at a registered landfill site. Proof of such disposal must be kept on record.
- The old quarry pit site is to be rehabilitated within 2 months from the date of filling and closure and fully rehabilitated within 3 months thereof. All waste will be removed and disposed of at a licenced landfill site.
- A storm water management plan will be compiled and adopted within 6 months of the S24G being approved.

### 7.3.2. Soil: Erosion

*To ensure that measures are put in place to prevent erosion owing to compaction by uncontrolled movement of staff and visitors, runoff over exposed or cleared areas that have failed to rehabilitate.*

#### Specific mitigation:

- To compensate for the loss of sensitive riparian habitat, it is recommended that all existing erosion gullies around the application sites and along the Sandriver tributaries be rehabilitated. This may necessitate engineering works and sediment traps.
- Every effort should be made to avoid unnecessary erosion of soil and sedimentation of downstream areas around the application sites, particularly as a result of stormwater. This may include, but not be restricted to, the installation of drains and sediment traps along the roads.
- Inspections should be performed around all of the application sites after rain events to determine if erosion and/or blockages of culverts has occurred. Any sections of road or soil found to have eroded or blocked should be repaired as soon as possible.
- A storm water management plan is to be compiled and adopted within 6 months of the S24G being approved and adopted and measures implemented to avoid erosion such as:
  - The accumulation of water on the surface will be prevented. The drainage of the surface will be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
  - Surface water or storm water will not be allowed to canalize or be concentrated.
  - Runoff from roads will be managed to avoid erosion and pollution problems.
  - Concentrated storm water flows will be dissipated through energy dissipaters or vegetated areas.
  - Proactively protect steep access roads, cuttings against and other areas susceptible to erosion by installing all the necessary temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent surface water being concentrated in water sources and from scouring the slopes, banks or other areas.
  - All erosion damage will be repaired as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.
- All disturbed and eroded areas will be rehabilitated with indigenous vegetation. Rehabilitation will commence within 3 months from the S24G approval.
- It is recommended that all plants used for landscaping or rehabilitation be indigenous to the Waterberg.

- Storm water management plan to be compiled within the next 6 months
- Rehabilitation of disturbed sites to be undertaken in the next growing season (August/September)
- Storm water management plan to be compiled within the next 6 months

#### 7.3.3. Air quality

*To ensure that measures are put in place to prevent air pollution by emissions from game drive vehicles.*

##### Specific mitigation:

- Avoid unnecessary clearing of vegetation
- Site vehicles and equipment will be maintained in an acceptable state of repair.
- Carpools and lift clubs will be encouraged and staff picked up at a central point. Staff will be discouraged from travelling to site in private vehicles.
- No waste will be incinerated on site.
- All non-recyclables will be stored at the waste sorting site in waste cages prior to collection from a private contractor and transportation to a licenced landfill.

#### 7.3.4. Biodiversity (flora): Rehabilitation of old lands

*To ensure that measures are put in place to ensure the successful and continued rehabilitation of old fields.*

##### Specific mitigation:

- All rehabilitation will make use of indigenous plant species, and species native to the study area and immediate surroundings. The species selected will strive to represent habitat types typical of the ecological landscape prior to the clearing of these old lands.
- All rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.

#### 7.3.5. Biodiversity (flora): Loss of CBAs and sensitive habitats

*To ensure that measures are put in place to prevent further the loss of critical biodiversity areas and sensitive habitats, specifically riparian woodland, owing to uncontrolled vegetation clearing, encroachment of alien invasives, litter and waste.*

##### Specific mitigation:

- No additional vegetation should be cleared within Qwabi Reserve without prior assessment and environmental authorization.
- No new developments/infrastructure should be located within Riparian Woodland vegetation rated as having a very high sensitivity.
- Natural vegetation adjacent to existing infrastructure should be deemed out of bounds to all but authorised staff to restrict movement of people and disturbance of the surrounding habitat.
- Vegetation disturbance and removal will be kept to a minimum and the areas monitored to ensure that areas are exposed for brief periods of time only.
- No natural feature will be marked or defaced.
- No large tree (with a stem diameter exceeding 200mm) will be felled without the permission of the ECO.
- Selective trimming of branches will be considered before opting to remove any trees.
- All conserved species and specimens will be suitably protected for the duration of the operational phase.
- No protected trees or plants will be removed without the relevant permits from the national or local authorities (whichever is applicable).
- Guests and staff will not tamper or remove flora and neither will anyone collect seed from the plants without permission from the local authority.
- The picking of flowers or removal of plants will be prohibited in the Guest Rules.

- No bush clearing is allowed, either to enhance game viewing, for firewood or for any other purpose (with the exception of the clearing of invasive species and the control of unnatural bush encroachment)
- Maintenance workers and guests will not trample natural vegetation and work will be restricted to dedicated roads, paths and gardens within the development footprint.
- No unauthorised access is permitted to buffer areas or any natural areas outside of the facility footprint.
- No wood will be collected for firewood or any other purpose.
- All disturbed sites will be evaluated immediately from S24G approval for the presence of alien invasive species
- All declared alien plants within a 50 m radius of each construction area must be eliminated according to the DFFE's published guidelines (DEA, 2015). These are species that have been listed under the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004). It is imperative that the team/s tasked with this action be suitably training in removal methods, including the identification of alien plants and safe use of herbicide.
- Special attention should be paid to removing *Flaveria bidentis* (Speedyweed) and *Opuntia stricta* (prickly pear), which currently pose the greatest alien invasive plant threat to biodiversity at Qwabi.
- QPGR will develop a management and monitoring programme for alien and invasive species 6 months from the date of the S24G being approved. This programme will detail basic ID information, actions to prevent the establishment of invasive plants and methods of removal.
- Inspections should be made at least every 6 months around the application sites to ensure that no alien plants are establishing. If any are located, they should be removed immediately.
- All disturbed sites will be monitored every 3 months for colonisation by exotics or invasive plants and control these as they emerge.
- Manual / mechanical removal is preferred to chemical control.
- Grounds staff will be trained to recognize and eradicate potential invasive plants.
- Removal of aliens within the area (done in summer) will be done annually until equilibration is reached. This may take several years.
- QPGR will implement an alien plant control program 6 months from the date of the S24G being approved to combat the infestation present, especially along the edges and within drainage lines and wetlands. This program will include regular inspections and follow-ups.
- It is recommended that all plants used for landscaping or rehabilitation be indigenous to the Waterberg.
- All rehabilitation will make use of indigenous plant species, and species native to the study area and immediate surroundings. The species selected will strive to represent habitat types typical of the ecological landscape prior to construction.
- All rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.
- All recyclables and non-recyclables will be stored in waste cages to prevent spread into the natural environment prior to being collected by outside contractors

#### 7.3.6. Biodiversity (flora): Conservation important species

*To ensure that measures are put in place to prevent the destruction and damage to conservation important species and protected trees i.e. Sclerocarya birrea, Boscia albitrunca, Elaeodendron transvaalense, Combretum imberbe, Spirostachys Africana, Vachellia erioloba and Phyllogeiton zeyheri, due to uncontrolled vegetation clearing and access by staff and visitors.*

#### Specific mitigation:

- To compensate for the loss of potentially destroyed protected trees, a plant nursery should be constructed on Qwabi in an existing modified area to propagate the following species; *Sclerocarya birrea, Boscia albitrunca, Elaeodendron transvaalense, Combretum imberbe, Spirostachys Africana, Vachellia erioloba and Phyllogeiton zeyheri*. These trees can later be planted within the application sites to prevent elephant damage.
- No further development will take place on QPGR without ecological studies taking place first to assess the impact of the developments on untransformed habitats.
- No large tree (with a stem diameter exceeding 200mm) will be felled without the permission of the ECO.
- Selective trimming of branches will be considered before opting to remove any trees.

- All conserved species and specimens will be suitably protected for the duration of the operational phase.
- No protected trees or plants will be removed without the relevant permits from the national or local authorities (whichever is applicable).

#### 7.3.7. Biodiversity (flora): Alien plant control

*To ensure that measures are put in place to prevent an increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful.*

##### Specific mitigation:

- All disturbed sites will be evaluated immediately from S24G approval for the presence of alien invasive species
- All declared alien plants within a 50 m radius of each construction area must be eliminated according to the DFFE's published guidelines (DEA, 2015). These are species that have been listed under the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004). It is imperative that the team/s tasked with this action be suitably training in removal methods, including the identification of alien plants and safe use of herbicide.
- Special attention should be paid to removing *Flaveria bidentis* (Speedyweed) and *Opuntia stricta* (prickly pear), which currently pose the greatest alien invasive plant threat to biodiversity at Qwabi.
- Inspections should be made at least every 6 months around the application sites to ensure that no alien plants are establishing. If any are located, they should be removed immediately.
- QPGR will develop a management and monitoring programme for alien and invasive species 6 months from the date of the S24G being approved. This programme will detail basic ID information, actions to prevent the establishment of invasive plants and methods of removal.
- All disturbed sites will be monitored every 3 months for colonisation by exotics or invasive plants and control these as they emerge.
- Manual / mechanical removal is preferred to chemical control.
- Grounds staff will be trained to recognize and eradicate potential invasive plants.
- Removal of aliens within the area (done in summer) will be done annually until equilibration is reached. This may take several years.
- QPGR will implement an alien plant control program 6 months from the date of the S24G being approved to combat the infestation present, especially along the edges and within drainage lines and wetlands. This program will include regular inspections and follow-ups.
- All rehabilitation will make use of indigenous plant species, and species native to the study area and immediate surroundings. The species selected will strive to represent habitat types typical of the ecological landscape prior to construction.
- All rehabilitated areas will be monitored annually following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required.

#### 7.3.8. Biodiversity (Fauna): Faunal Habitat and possible disturbances

*To ensure that measures are put in place to prevent the loss of faunal habitat and prevent faunal disturbances, displacement of taxa and changes in distribution or abundance due to uncontrolled vegetation and bush clearing and access by staff or visitors, general operational activities, noise from staff and vehicles, night drives, perimeter safety fences, and placement of infrastructure in habit for conservation-important species.*

##### Specific mitigation:

- QPGR will maintain connectivity between ecologically important habitats by retaining natural corridors for the movement of fauna.
- No unauthorised access will be permitted to buffer areas or any natural areas outside of the facility footprint.
- A game / security fence or suitable equivalent will be maintained around the perimeter of the lodges and staff villages. These fences will allow access by small mammals, tortoises etc.
- No bush clearing is allowed, either to enhance game viewing, for firewood or for any other purpose.

- Maintenance workers and guests will not trample natural vegetation and work should be restricted to dedicated roads, paths and gardens within the development footprint.
- To compensate for the loss of faunal habitat, it is recommended that current conservation efforts, including tracking of SCC and security infrastructure, be maintained.
- It is recommended that all plants used for landscaping or rehabilitation be indigenous to the Waterberg.
- It is recommended that natural vegetation adjacent to existing infrastructure should be deemed out of bounds to all but authorised staff to restrict movement of people and disturbance of the surrounding habitat.

#### 7.3.9. Biodiversity (Fauna): Injury and mortality

*To ensure that measures are put in place to prevent injury and mortality of fauna due to persecution and extermination, solvents, paints, chemicals and cleaning products (poisoning), litter and waste (suffocation).*

Specific mitigation:

- A game / security fence or suitable equivalent will be maintained around the perimeter of the lodges and staff village. These fences will allow access by small mammals, tortoises etc.
- Personnel will be briefed on the potential occurrence of protected faunal species, what they look like, and where they are likely to be found. Personnel will be instructed that these species are not to be hurt or destroyed if encountered. This applies specifically to the snakes, lizards, chameleons and spiders, as these are often perceived to be vermin and pests.
- Personnel will be instructed to report the presence of protected species to the Operator or EO so that arrangements may be made to relocate these to adjacent bush areas.
- A procedure for dealing with animals encountered on the site, including dangerous animals and vermin will be developed within 6 months from the date of the S24G approval. Where necessary, call-in professionals to remove the animals.
- All personnel will be aware of what the procedures for dealing with animals are. It is the operator's responsibility to ensure that proper procedures are followed. In this regard, Environmental awareness training will be conducted annually
- Livestock are not allowed on site.
- No poaching or snaring of any game is permitted. Reserve Management must implement fines in this regard.
- Guests will be briefed on the dangers of feeding wildlife, and will be discouraged from feeding any animal. Guests will also be informed of recommended measures to secure food and food waste from animal scavengers.
- All food and waste storage areas will be properly secured against animal scavengers at all times.

#### 7.3.10. Biodiversity (Fauna): Poaching

*To ensure that measures are put in place to prevent injury and mortality of fauna due to poaching.*

Specific mitigation:

- No poaching or snaring of any game is permitted. Reserve Management will implement fines in this regard.
- QPGR will undertake bimonthly checks of the surrounding natural vegetation and along game paths to ensure no traps have been set. Remove and dispose of any snares or traps found on or adjacent to the site. Must implement fines in this regard.

### 7.4. Heritage management

#### 7.4.1. Heritage: Damage to and destruction of identified sites

*To ensure that measures are put in place to prevent the damage to and destruction of identified archaeological, paleontological or historical sites and artefacts owing to general operational activities.*

Specific mitigation:

- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

- If archaeological or historical 'chance finds' are encountered, then work in the area must be halted, and a heritage specialist must be called to assess the situation and make recommendations.
- If any fossils are discovered then a palaeontologist must be called to assess their importance and rescue them if necessary.

## 7.5. Socio-economic management

*To mitigate the socio-economic impacts associated with the operation of the facility, specifically pertaining to visual and noise impacts*

### 7.5.1. Visual impact management

*To ensure that measures are put in place to mitigate the visual impact on sensitive visual receptors in close proximity and within the region, as well as, the visual impact due to safety and security lightening.*

#### Specific mitigation:

- Natural vegetation will be retained and maintained in all areas outside of the development footprints.
- The general appearance of all of the sites as a whole will be maintained, including roads and servitudes.
- Down lighting will be utilized.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc.
- Retain and maintain natural vegetation in all areas outside of the development footprints.
- Maintain the general appearance of all of the sites as a whole, including roads and servitudes

### 7.5.2. Socio-economics: Stimulation of the economy and creation of employment opportunities

*To ensure that measures are put in place to maximize the positive benefits of the development in terms of the local economy, the creation of long-term employment opportunities and opportunities for SMME's and to ensure that adjacent land users and activities are not negatively impacted upon by the operational activities.*

#### Specific mitigation:

- The Operator is responsible for making the necessary arrangements for transporting staff to and from site on a daily basis.
- Where feasible, efforts will be made to employ local employees that are compliant with Black Economic Empowerment (BEE) criteria.
- Where feasible, training and skills development programmes for locals will be initiated and maintained throughout the operational phase.
- The recruitment selection process will seek to promote gender equality and the employment of women wherever possible.
- The contractor must make the necessary arrangements for allowing workers from outside the area to return home over weekends. This would reduce the risk posed by construction workers to local family structures and social networks.
- Noisy activities will be conducted during daylight hours only.
- All neighbours will be notified ahead of time of any noisy activities that are to take place.
- Vehicles of outside contractors should be checked when entering and existing QPGR.

### 7.5.3. Services and Traffic: Traffic

*To ensure that measures are put in place to prevent any undue traffic on the local roads and to ensure there is no undue noise, dust and safety concerns as a result thereof.*

#### Specific mitigation:

- Speed limits on all roads will be strictly adhered to at all times. Fines will be implemented in this regard.
- Carpools and lift clubs must be encouraged and staff picked up at a central point. Staff must be discouraged from travelling to site in private vehicles.



## SECTION C: SPECIAL MANAGEMENT PLANS

### 8. WASTE MANAGEMENT PLAN

#### 8.1. Preliminaries

##### 8.1.1. Purpose of this document

As part of Qwabi Private Game Reserves (hereafter referred to as "QPGR") continued commitment to environmental improvement and their duty to fulfil requirements of the National Environmental Management Act (Act 107 of 1998), the National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014) as well as other obligatory policies and legislation; the development and implementation of a waste management plan was deemed a necessary tool.

##### 10.1.2 Objectives of the IWMP

The overall aim and goals of the waste management plan are to:

- Reduce the overall environmental footprint of QPGR by implementing measures that will focus on preventing, reducing, reusing, recycling, composting, treatment and disposal of waste products.
- Implement formal and accountable approaches, that are of an environmentally conscience manner, to the handling, storage, transferring and disposal of waste products off QPGR premises.
- To prevent inappropriate management of waste and associated risk of pollution of the environment;
- Provide guidelines to QPGR and its contractors that will ensure waste management actions are in line with current policies and legislations.
- Define roles and responsibilities for all involved in the waste management process.
- Educate employees on wise waste management practices.
- Ensure feasible and achievable targets for waste management are set.
- Prevent avoidable mismanagement of waste and the associated risks.

#### 8.2. Operational Overview and Waste Types

##### 8.2.1. Property overview

QPGR is a private game reserve of just under 15 000 hectares in extent situated in Limpopo Province. QPGR has developed two commercial lodges throughout the Reserve, as well as, staff accommodation and other management infrastructure. The lodges offer various facilities and activities, these include but are not limited to; restaurants, spas and recreational facilities. In order to provide adequate service to guests, as well as for general maintenance of the property, a number of ancillary facilities including sewage systems and maintenance facilities are also present on the property.

- **Solid waste management**  
Solid waste generated from both lodges, the staff village and APU and workshop are collected in 240 litre wheeled bins. These bins are located at the back of house in a caged off area. The solid waste is then collected twice per week via a truck or vehicle with a trailer and transported to the Rooiberg landfill site. Currently the solid waste is not separated into recyclables and non-recyclables and no incineration of waste takes place.

However, QPGR are in the process of contracting waste service provider to separate, sort and transport the solid waste generated on the Reserve. General waste will be collected and taken to the Rooiberg Landfill site, while recyclables will be transported to the Neo-Recycling plant in Thabazimbi twice per week or as and when necessary. No part of the general solid waste can be classified as hazardous in terms of the relevant legislation.

Adjacent to the staff village, is an old quarry/borrow pit which is currently being filled with construction rubble and natural materials such as wood, brush etc. This area is not fenced off and is freely accessible to staff members.

- **Wastewater Management**

##### Letamo Lodge

The waste water treatment work installed at Letamo Lodge is the Aqua Media High speed Moving bed bioreactor system. The sewage treatment process is as follows:

- **Collection tank:** Wastewater flows into the collection sump and then from the collection sump to the bioreactor via pumps.
- **MBBR Tank:** MBBR consists of two chambers. The first chamber where the wastewater enters is the aeration tank no. 1. From the aeration tank 1 the wastewater enters into the aeration tank no. 2 where in CBOD is removed. Air is introduced through a combination of fine and coarse bubble diffusers. In the CBOD removal chambers the organic material is oxidized with the help of aerobic bacteria and is converted into water and carbon dioxide. The oxygen for oxidizing the organic material is provided from the air, which is introduced with the help of air blowers and through the coarse bubble diffusers, installed at the bottom of the aeration tank. In order to have proper functioning of the aeration tank and to produce good settling sludge required MLSS (mixed liquor suspended solids) is maintained in the aeration tank. From the CBOD chambers wastewater flows to the settling tank. Here the suspended matter and the bio mass are allowed to settle. The clear water flows by gravity to drain.
- **Sludge Pump:** The purpose of the sludge pump is to recycle the sludge from the settling tank to the first aeration tank at the start of the plant to build up the MLSS in the aeration tanks. Once the required MLSS is developed in the aeration tanks, the sludge is then wasted on a regular interval to the collection tank.
- **Air blower:** The purpose of the air blower is to provide oxygen (Air) to the aeration tanks through coarse bubble diffusers. The air also keeps the bio media and the biomass in a mixed condition in addition to supply of oxygen to bacteria and oxidation of organic material.

#### Babohi Lodge and Staff Village (Senior)

Both Babohi Lodge and the Senior staff housing utilize Calamite Bio-Mite waste water treatment plants. The Bio-Mite has been engineered to treat domestic and industrial waste water to a level that conforms to the National Standards as required by DWS. This system consists of a series of tanks that are buried underground.

The Bio-Mite incorporates a Biological process to clean incoming waste water. In this process a Biomass of bacteria breakdown biodegradable waste and convert it into carbon dioxide and water. Any non-biodegradable matter collects at the bottom of the tank and is periodically removed in the same way as the septic tank is pumped out.

The Bio-Mite process is broken down into three (3) treatment phases as described below:

- **Primary Treatment** is undertaken in the SABS approved septic tanks/anaerobic reactors. The liquid capacity of the tanks is determined by the number of users connected to the septic tanks. In the anaerobic reactor solids are intercepted and biologically broken down by anaerobic microorganisms that are in contact with the waste water. This process requires at least twenty-four hours but should be retained for at least forty-eight hours. The longer retention time translates into a higher quality effluent with significant Biological Oxygen Demand (BOD) reduction occurring before it flows into the biological reactor for secondary treatment.
- **Secondary Treatment** is done in the Aerobic Biological Reactor. In the process, air (oxygen) is pumped into the reactor to mix and supply air to the waste water. The design for the secondary treatment process allows the waste water to circulate between an aerobic zone and an anoxic zone to facilitate the de-nitrification process. The microorganisms metabolize the organic material into carbon dioxide and other end products and new biomass. The putrescibility and soluble oxygen demand is reduced to a small amount. The two major advantages of this fixed film technology are that diluted waste water can be treated and the bacterial colony will not be flushed out should the system be hydraulically overloaded.
- **Tertiary treatment** process is a disinfectant/sterilizing process. Treated waste water from the secondary treatment process is subjected to chlorination on the domestic treatment plants and ozonising on the bigger and custom-built plants. This is as a precaution against pathogens that may have passed on from the second stage. For this to be effective a contact period of at least thirty minutes should exist for pathogen destruction. This is achieved with a pumping chamber that has a storage capacity of 200 litres before the submersible pump pumps out the contents for discharge.

Table 3: Size of waste water treatment plant

Site	Bio-Mite Size	Flow rate (Litres per day)
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## DRAFT OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME

Babohi	100	20 000
Babohi Extension	75	15 000
Staff village (Senior)	75 x 2	15 000

### APU and Management houses

The APU accommodation and Management Houses utilize septic tanks with soak aways.

#### 8.2.2. Waste streams

QPGR is expected to generate the following predominant waste streams:

- **General Waste**  
This is classified as waste that is generated as a result of daily operations, that is not directly harmful to humans or the environment. Products falling into this group include paper, plastic, glass etc.
- **Kitchen Wastes**  
Kitchen waste will be one of the largest waste generating components. It includes all food products whether it be during the preparation stage (e.g. vegetable peels) or the final stage (e.g. leftovers); however, products that will not naturally be included into the environment, such as oils and greases, will not be classified in this category.
- **Sewage Waste**  
This is classified as grey (showers, baths etc.) and black (toilet) water and is made up of "contaminated" water. The possibility of harmful bacteria is probable and so can be harmful to humans and the environment if left untreated or adequate systems are not in place.
- **Landscaping**  
Landscaping waste will take into account most vegetation waste which will predominantly be generated from the gardens surrounding the lodges and staff residence, this will include grass cuttings, leaves, weeds as well as trimmings from hedges and bushes. This category is predicted to produce the least amount of the total waste produced by QPGR.
- **Hazardous Waste**  
This is classified as any product that can have adverse impacts on the environment due to its chemical, toxicological and/or physical properties. Cleaning detergents, certain office supplies such as batteries, flammable material (gas, petrol, etc.), fluorescent lights as well as oils/grease/fat used for cooking are considered as hazardous waste.

### 8.3. Waste Management Plan Principles

#### 8.3.1. Waste management hierarchy

The Hierarchy of Waste Management (HWM) (Figure 1) is the backbone of any Waste Management Plan (WMP) and provides the basic principles for an organization to sufficiently manage its waste streams while complying with their legal duty towards the environment.

The hierarchy provides different waste management strategies according to their importance and the desirability of their outcomes – the most desirable strategy is placed on the top while the strategy that is least desirable is at the bottom (Figure 1). The overall objective of the HWM is to create an IWMP where the least amount of waste product possible is generated and maximum practical benefits from the product is achieved.

Below are the waste management strategies:

- **Avoid/Prevent**  
Avoidance/prevention focuses on not creating any type of waste and promotes the reduction of virgin materials extracted and used. This strategy usually targets the design and the manufacturing stage of the item and so requires a change in

mindset and behaviour in order for it to be successful (i.e. selecting items with less or recycled packaging). This is ranked first as it is the best and most cost-effective strategy.

- **Reduce/Minimize**  
In most cases avoidance of waste is not possible. In such cases reduction of waste is the next most preferred option. Reduction of waste consists of the efficient and educated use of resources that lead to less waste production. The fewer products that generate waste that are brought onto the property will result in fewer waste products that need to be removed from the property.
- **Reuse**  
The reuse of materials involves using an existing item in its original form before disposing of it. If the lodges themselves cannot reuse the item, then it is advised that the possibility of donating or selling the material to an individual/organization that can use it be looked into.
- **Recycle/Compost**  
This strategy should only be implemented once the company has reduced and reused as much of the waste products as possible. Recycling and composting of items are more difficult for a lodge to implement than the previous strategies. This strategy involves converting an existing item into a new item that may have a different use/purpose. Waste segregation and management is essential in correctly implementing a successful recycling or compost program on the lodges.
- **Dispose/Treat**  
Disposal and treatment of waste is the least desirable strategy and should therefore only be used where the alternatives are not possible or when the alternatives would create a safety concern (i.e. when dealing with hazardous materials).

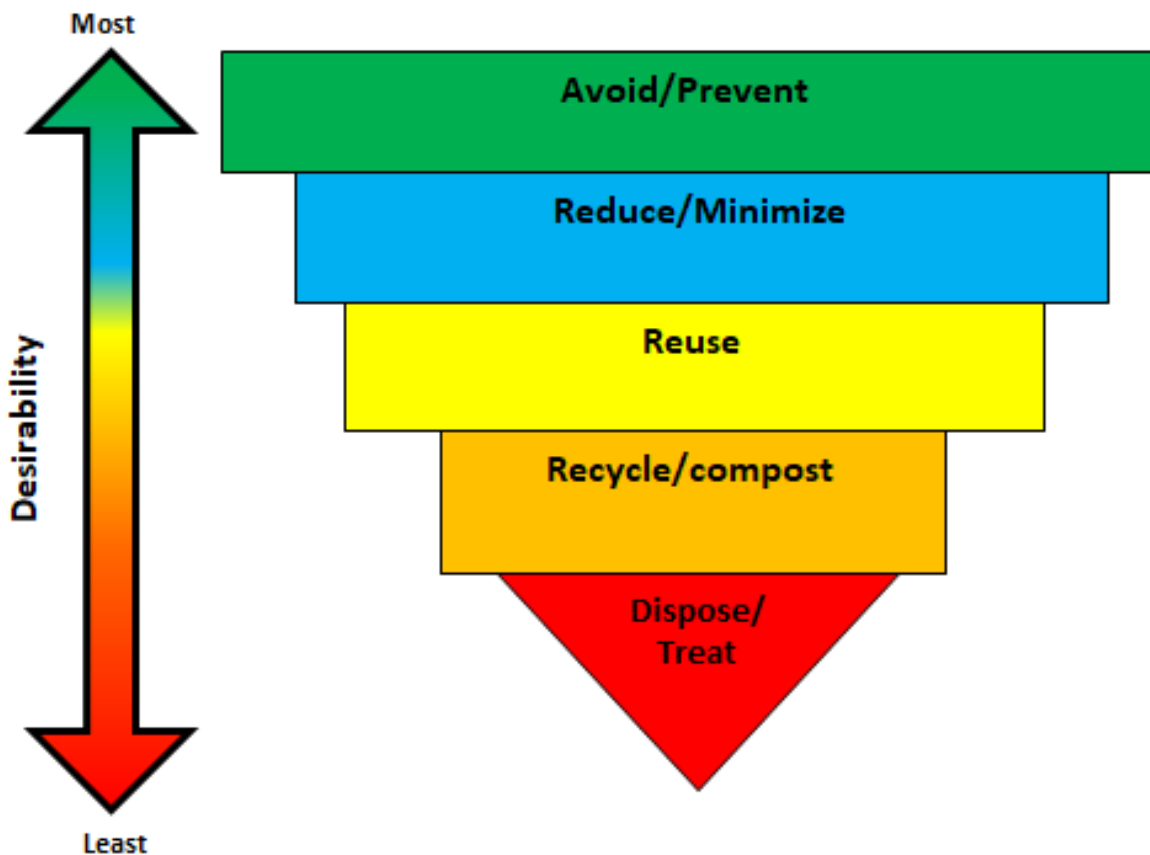


Figure 1 – Waste Management Hierarchy

## 8.4. Management Actions

This section details the steps that will be taken by the QPGR in order to successfully implement the IWMP. The management actions take into consideration all the principles previously discussed (HWM) and offer steps that will be taken during all stages of the waste production cycle (generation, collection, transportation, recovery, and disposal) in order to reach the given objectives.

The following guidelines, recommendations and mitigation measures should be implemented and adhered to; however, it also creates a platform for continual improvement where waste is concerned.

### 8.4.1. Solid waste management

## 8.5. General waste

General waste should be separated at source into recyclables and non-recyclables and stored safely onsite. The waste should then be transported to onsite storage areas where it can be kept until it can be transported to an approved re-cycling depot or landfill site.

The following is recommended:

- Waste at all lodges, APU, Management houses and staff village are to be separated at source into recyclables and non-recyclables and wet waste
- Waste needs to be sorted according to the licensed waste contractor's requirements.
- Waste sorting and storage to occur at designated areas at each facility
- Recyclables are to be separated into the various categories namely, paper, plastic, cans and glass
- All sorted waste to be stored in marked 240-liter wheeled bins inclusive of wet waste and non-recyclables
- Marked bins are to be placed in strategic waste holding areas in the back of house area in a shaded, caged off area to prevent waste being blown into the surrounding environment and accidental ingestion by animals. These areas need to be well organized and maintained in order to prevent pests and scavengers from entering.
- All external bins throughout the lodges need to be animal proof and these bins need to be maintained and serviced on a regular basis.
- Recyclables and non-recyclables to be transported to main waste holding area within QPGR at least once per week, or as and when necessary.
- Recyclables and non-recyclables are to be transported via a caged tractor-trailer
- Storage and transportation of waste needs to be done in such a way that natural elements leave the waste unaffected.
- Recyclables are to be collected once a week by a local contractor and transported in a waste cage to the local recycling centre, Neo-Recycling plant in Thabazimbi.
- All non-recyclables are to be collected once a week by a local contractor and transported in a waste cage to the local licensed landfill site, Rooiberg Landfill site.
- When separating general waste; containers must be emptied and cleaned, all ancillary items must be removed from the material (paper clips, plastic covers etc.)
- Safe disposal certificates must be kept on file for record.

The following general guidelines are also recommended:

- The less waste brought onto the property = the less waste to remove. The lodges should purchase materials/items in such a way that they keep this in mind. QPGR can look into drafting a purchasing policy for the lodges. This policy can look at:
  - I. Buying products with less packaging
  - II. Buying products that are more environmentally friendly
  - III. Purchasing recycled, durable and reparable products
  - IV. Purchasing biodegradable bags for waste bins
  - V. Avoid purchasing one-use, disposable items
  - VI. Minimize the use of products that produce hazardous waste
- Educate staff on waste management and QPGR's aim to reduce, reuse and recycle waste. This can be done through posters hung up in various areas or through regular staff meetings.
- Avoid and reduce the use of paper use. This can be done by trying to completely go online and eliminate the need for printing. Where this cannot be avoided use less paper by printing on both sides and using smaller fonts.
- Avoid replacing toilet rolls before they are finished where possible. If the lodges do replace toilet rolls before they are finished then these should be given to staff.

- Where possible donate useful items to staff or surrounding areas.
- Raise awareness surrounding recycling for staff and guests. This can be done through hanging posters in strategic places. Below is a table showing some of the items that can be recycled vs those that cannot be:

Material	Recyclable	Non-recyclable
Paper	<ul style="list-style-type: none"> <li>• Newspaper</li> <li>• Office paper</li> <li>• Magazines</li> </ul>	<ul style="list-style-type: none"> <li>• Laminated paper</li> <li>• Food wrappers</li> <li>• Adhesive tape</li> </ul>
Cardboard	<ul style="list-style-type: none"> <li>• Toilet roll tubes</li> <li>• Cereal boxes</li> <li>• Food boxes</li> </ul>	<ul style="list-style-type: none"> <li>• Boxes that still contain food or liquid items</li> </ul>
Glass	<ul style="list-style-type: none"> <li>• Food and drink containers</li> </ul>	<ul style="list-style-type: none"> <li>• Ceramics</li> <li>• Window glass</li> <li>• Containers that still have food or liquids in.</li> </ul>
Metal	<ul style="list-style-type: none"> <li>• Steel food cans</li> <li>• Metal container lids</li> </ul>	<ul style="list-style-type: none"> <li>• Cans containing hazardous materials</li> <li>• Power tools</li> <li>• Silverware</li> <li>• Aerosol cans</li> </ul>
Plastic	<ul style="list-style-type: none"> <li>• Cling wrap</li> <li>• Polystyrene items</li> </ul>	<ul style="list-style-type: none"> <li>• Soft plastic containers (eg. Milk bottles)</li> <li>• Hazardous waste containers</li> </ul>

### 8.6. Kitchen waste

Kitchen waste will be one of the largest waste generating components at the lodges and staff village. In the case of QPGR, food waste from the kitchens can either be composted or given to a nearby farmer (i.e. pig farmer). This allows for the waste handling system to be simplified. Benefits of finding a local farmer (i.e. pig farmer) who can utilise the kitchen waste is that they can accept a wider variety of waste products as opposed to composting systems.

The following is recommended for the non-hazardous kitchen waste products generated at QPGR:

- Kitchen waste to be separated into the following waste streams:
  - Organic waste that is not classified as hazardous.
  - Recyclable items –non-food items that are generated in the kitchen. This will essentially be made up of the packaging of the food items (see requirements for general waste above)
  - Hazardous waste – This will include food sources classified as hazardous (oils, fats and greases) as well as chemical cleaning products.
- Waste sorting and storage to occur at designated areas at each lodge and staff village
- All sorted waste to be stored in marked 240-liter wheeled bins inclusive of wet waste and non-recyclables
- Marked bins are to be placed in strategic waste holding areas in back of house in a shaded, caged off area to prevent waste being blown into the surrounding environment and accidental ingestion by animals. These areas need to be well organized and maintained in order to prevent pests and scavengers from entering.
- All external bins throughout the lodges need to be animal proof and these bins need to be maintained and serviced on a regular basis.
- Non-hazardous organic kitchen waste to be composted in a designated fenced off area or collected by the local pig farmer at least twice a week to reduce the chance of bad odour and health reasons.
- Grease traps need to be installed in kitchens for the reliability of the system and adequate separation of hazardous materials.
- Look into the feasibility of using more environmentally friendly cleaning products.
- Freeze and preserve fresh produce where possible and use certain left-overs such as vegetable peels and meat scraps to make stocks and soups.
- Avoid purchasing large amounts of fresh produce that cannot be frozen or preserved.

## 8.7. Hazardous waste

Hazardous waste can be detrimental to an environment and therefore disposal of such needs to be done with the utmost care. Hazardous waste can be divided into; chemical waste, used oil waste, oil contaminated waste, used cooking oils, fats and greases, paint waste, fluorescent bulb waste, battery waste and e-waste.

The following recommendations are provided for the lodge operators to choose the best practicable option:

- Ideally hazardous waste needs to be reduced as much as possible. This can be done by;
  - I. Educating staff on QPGR's aim to reduce hazardous waste production.
  - II. Avoid contamination of the surrounding environment. This should be done through insuring adequate, durable containers, fitting the required description are used and that these containers are routinely inspected and maintained.
  - III. Looking into drafting a purchasing policy to try purchase non-hazardous alternatives where possible. Housekeeping, pool products and paint products can all be replaced with organic certified, eco-friendly products.
  - IV. Battery use should be limited and where possible solar-powered items should be used.
  - V. When looking at fluorescent lighting; use bulbs with the longest lifespan, encourage all to use natural lighting wherever possible, make sure all lights can be switched off manually, look into presence detectors for lights in areas that aren't used a lot. QPGR should investigate replacing all bulbs with LEDs.
- Hazardous waste should be separated at the source from the general waste stream. This will prevent the chance of cross contamination therefore decreasing the risk to staff and the environment.
- If possible contaminated equipment should be appropriately cleaned of all hazardous materials in order for equipment to be recycled with non-hazardous waste.
- Liquid hazardous waste to be stored in enclosed, banded areas.
- The bund must have a volume of 10% of the volume of the largest tank in the storage area plus 10% of the volume of all other tanks.
- The slab must be sloped towards a sump to enable any spilled fuel and water to be removed.
- Any wastewater collected at the sump shall be disposed of as hazardous waste.
- All hazardous waste containers should be clearly labelled with the product within the container as well as the volume the container can hold. Personal protective equipment (PPE) required during handling the product should also be clearly stated on the container.
- Hazardous waste containers should be stored in an area where they are protected from the elements but can be reached with the transport vehicle.
- Used oil and oil contaminated materials should be stored away from any watercourse in an impermeable banded container that is sealed with a roof.
- Sufficient absorbent spill cleanup kits should be placed nearby the used oil waste storage area.
- Hazardous waste such as oil, batteries and light bulbs can and should be recycled through a reputable licensed agent or returned to supplier.
- QPGR needs to continuously evaluate its waste production streams and identify any new waste product that may be classified as hazardous and then implement a system for the safe disposal of it.
- Hazardous waste should be handled in such a way that it does not become an environmental, health or safety hazard.
- Hazardous material storage areas must be constructed of an impermeable bund.
- Used cooking oil must be kept separate from fats and greases that are extracted from kitchen fans and filters as used cooking oils can be recycled.
- The recommended personal protective equipment (PPE) should always be utilized by those handling hazardous waste.
- All service providers handling hazardous waste (transportation and disposal) must be suitably qualified and hold the relevant permits and licenses.
- A safe disposal certificate should be issued by the waste management service provider to the lodge when hazardous waste is removed from the premises. This certificate should be kept on record for if it is needed by environmental authorities.
- When disposing hazardous waste, it is essential to comply with all regulations and standards regarding it.
- Vehicles transporting hazardous waste must comply with all regulations.

## 8.8. Landscaping

Landscaping waste takes into account most vegetation waste which will predominantly be generated from the landscaping surrounding the lodges, staff village and housing which includes grass cuttings, leaves, weeds as well as trimmings from hedges

and bushes. It should be noted that QPGR generates a very small quantity of landscaping waste as most of the areas surrounding the lodges are vegetated with natural veld grasses and vegetation.

The following recommendations can be used with regard to landscape waste:

- Landscaping waste should be shredded/cut up and onsite compost facilities should be considered.
- Composting activities will reduce the organic waste stream and also reduce the maintenance costs of the gardens (no need to buy fertilizers and mulch).

## 8.9. Waste storage areas

QPGR must maintain the intermediate waste storage areas so that they comply with all safe storage requirements and in doing so, allowing for adequate and safe storage of waste prior to the removal offsite.

The following is recommended:

- Where possible the generated waste should be directly transported from the point of generation to a designated waste storage area i.e. initially to storage areas at the back of house and then at the larger storage area from where collection takes place.
- Waste storage areas should be of a sufficient size and be able to comfortably accommodate all waste produced by QPGR.
- Waste storage containers must be intact and in good condition.
- The floors of the waste storage areas should be designed in such a way that water is directed away from the waste containers.
- Waste storage containers should be clearly marked with what should go into them.
- Durable walls/fences should enclose the waste storage areas. These should be at least the height of the containers, with gates/doors of the same size that open from both sides.
- The storage and transportation of waste should be done in such a way that the intervention from natural elements (such as wind) is planned for and avoided.
- Waste cages should be used for all transportation and storage of waste areas as this will limit the impact caused by natural elements as well as minimizing the chances of animals getting into the sights.
- A separate designated area should be used for storage of hazardous waste. This area should comply with the following requirements:
  - I. Surrounded by an impermeable bund capable of containing 110% of the total volume of waste stored at any given time. One side of the bund should comprise a ramp to allow vehicle access.
  - II. Should be clearly labelled with "Hazardous Waste", the capacity of the bund storage area as well as the personal protective equipment (PPE) that should be used when handling the material.
- Regular maintenance and cleaning of waste storage areas is essential.

QPGR should continually assess waste production and ensure no new requirements are required for handling and storage of waste. Currently the legal compliance for waste storage areas:

- Storage volumes for General Waste should not exceed 100m<sup>3</sup> unless a Waste Management License has been granted.
- Storage volumes for Hazardous Waste should not exceed 35m<sup>3</sup> unless a Waste Management License has been granted.

## 8.10. Off-site (landfill) disposal

The IWMP aims to reduce the total amount of waste generated by QPGR, particularly that of the waste that will be disposed of to landfills, however, there will still be a portion that will need to be disposed of in a permitted landfill site. The closest permitted landfill site to QPGR is Rooiberg Landfill site located on the outskirts of Rooiberg.

When dealing with landfill disposal it is detrimental to adhere to the following principles:

- Ensure the legal requirements and policies regarding waste transportation and storage are met. This means that only reputable waste transport companies should be used and that the waste disposal facilities all have permits.
- Waste types and quantities need to be recorded as accurately as possible; this will allow for future improvements as well as for reporting purposes. All lodges should adopt a system of recording and filing this information.
- If a contractor is involved with the transportation of waste, this contractor needs to be suitably qualified and a letter stating agreement needs to be kept on file.



### 8.11. Wastewater management

In order to produce the required effluent quality and meet the legislative requirements as set out in the National Water Act (Act No 36 of 1998), it has been recommended that the septic tanks and soakaway systems located at Management houses and APU be replaced with package plant WWTWs or connected to an existing sewer network that is connected to an existing WWTW.

- Sewage systems must be of a standard to be able to sufficiently handle effluent quantities produced by all the various sites
- Effluent quality needs to be assessed on a regular basis and needs to comply with General Standards.
- Only suitably qualified personnel should operate and maintain the sewage treatment works.
- The septic tanks at all lodges and staff village to be de-sludged periodically (e.g. every 3-5 years), by an approved sludge removal contractor.

### 8.12. Irrigation with treated waste water (if applicable)

- Should waste water to be used as irrigation, then it must comply with the following quality requirements:
  - pH levels between 5.5-9.5
  - EC must not exceed 70 mS/m
  - Suspended solids must be less than 25 mg/l
  - Chlorine does not exceed 0.25 mg/l
  - Fluoride does not exceed 1 mg/l
  - Soap, oil, grease does not exceed 2.5 mg/l
  - Chemical oxygen demand does not exceed 75 mg/l
  - Faecal coliforms do not exceed 1000 per 100 ml
  - Ammonia does not exceed 3 mg/l
  - Nitrate/Nitrite does not exceed 15 mg/l
  - Phosphorus does not exceed 10 mg/l
- Sand filter be provided to remove any residual suspended solids prior to irrigation.
- Granular Activated Carbon filters should also be installed, upstream of the final disinfection.
- Irrigation may only take place above the 100-year flood line or at a distance greater than 100 meters from the edge of a water resource or borehole which is used for drinking water, whichever is the greatest.
- No contamination of ground- or surface water may take place.
- QPGR must measure the quantity of wastewater irrigated on a weekly basis.
- QPGR must measure the quality of the irrigated wastewater on a quarterly basis. Samples should be drawn from the irrigation system from a point located immediately prior to the emitters.
- Solid particles must be removed before irrigation and disposed of safely and efficiently.
- Stormwater (rain water) originating from the irrigation area must be collected to prevent contamination of any surface water resource.

## 9. STORM WATER MANAGEMENT PLAN

The purpose of the Storm Water Management Plan is to provide general guidelines and principles for the management of storm water during both the construction and operational phase. This is done to ensure minimal erosion and ecological damage as a result of increased volumes of storm water and runoff from hard surfaces (roofs, roads, paving etc.).

As this section forms part of the OEMPr, the overall responsibility of ensuring compliance with the Storm Water Management Plan ultimately lies with the applicant.

### 9.1. Operational Phase

Maintain the storm water management system for the facility on an ongoing basis and ensure that this is always in good working order. The following is of relevance:

- All activities that affect surface drainage will be designed so as to ensure that storm water runoff does not lead to excessive surface erosion problems on the site.
- Porous paving surfaces will be used in place of hard paved surfaces in order to promote and encourage the infiltration of storm water.

- The protective buffer around the watercourses will be respected as it acts as a trap for sediment and contaminants. Measures will be put in place around sensitive areas to protect these from sediment and contaminants.
- Measures will be put in place to control the flow of excess water so that it does not impact on the surface vegetation.
- The accumulation of water on the surface will be prevented. The drainage of the surface will be done in such a way that storm water will be led away quickly and efficiently without any erosion taking place.
- Surface water or storm water will not be allowed to canalize or be concentrated.
- Runoff from roads will be managed to avoid erosion and pollution problems.
- Place and maintain erosion control barriers as appropriate to prevent sedimentation.
- Storm water or contaminated water will be prevented from directly entering any watercourse.
- Waste traps will be installed to catch litter conveyed by surface runoff.
- All waste traps within the storm water system will be emptied / cleaned regularly to ensure their efficient functioning.
- Dissipate concentrated storm water flows through energy dissipaters or vegetated areas.
- Repair all erosion damage as soon as possible. Do not allow erosion to develop on a large scale before effecting repairs.
- Monitor all rehabilitated areas for at least a year following the completion of rehabilitation works for failure of vegetation to establish and / or erosion. Immediately implement remedial measures as required

## 10. FIRE PROTECTION MANAGEMENT PLAN

The National Veldt and Forest Fire Act (Act No. 101 of 1998) deals with the prevention and combat of veld, forest and mountain fires throughout South Africa, and should be adhered to at all times. This Act provides guidelines regarding fire break preparation and maintenance, the equipment needed for fighting fires and availability of personnel during fire emergencies, the roles and responsibilities of persons and officials during fire emergencies, the offences and penalties, as well as the powers of registered fire protection officers and law enforcement.

In terms of the National Veldt and Forest Fire Act 101 of 1998 there is a restriction on the making of fires, in that no fires may be made without a permit.

Both the National Environmental Management (NEMA): Protected Areas Act, 57/2003 and National Veld Forest Fire Act are very clear on the penalties (fines, imprisonment or both) and/or disciplinary action which may be imposed on persons who are found guilty of not complying with the laws stipulated.

### 10.1. Operational Phase

The following general fire management actions apply throughout the operational phase of the facility:

- A fire break will be established and maintained around the perimeter of Lodges.
- Lines of communication will be maintained with all of the adjacent farm owners so that they can be contacted in the event of a fire.
- Fire-fighting training will be provided to selected operational staff.
- Management will ensure that the necessary firefighting equipment is on site in terms of relevant legislative requirements.
- Staff members or the persons who give the instruction to light a fire without complying with the abovementioned regulations will be subjected to disciplinary action and may also face criminal charges in terms of the Veld and Forest Fire Act 101 of 1998.

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## APPENDICES

*Appendix A: Curriculum Vitae of the Environmental Assessment Practitioner*

*Appendix B: Sensitivity Layout Map*

APPENDIX A: CURRICULUM VITAE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Curriculum Vitae  
**BRYONY PAIGE VAN NIEKERK**

**PERSONAL INFORMATION**

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**FORMAL EDUCATION**

Date	Qualification	Institution
2005	Grade 12	Pretoria High School for Girls
2012	Bachelor of Science in Natural Sciences: Chemistry and Zoology Stream	University of South Africa
2015	Bachelor of Science Honours in Environmental Management	University of South Africa

**MEMBERSHIPS & AFFILIATIONS**

- Professional member: Environmental Assessment Practitioners Association of South Africa (EAPASA) No. 2019/655

**TECHNICAL SKILLS**

Software	Skill level
MS Word	proficient
MS Excel	proficient
MS Outlook	proficient
MS PowerPoint	proficient
Corel DRAW	proficient
Corel PHOTOPAINT	proficient
Global Mapper GIS	proficient
Locus Maps	proficient

**BRIEF SUMMARY OF CORE COMPETENCIES**

Bryony is a registered Environmental Assessment Practitioner (EAPASA) with an Honors Degree in Environmental Management, and 8 years of experience. Bryony has specialized in Environmental Planning and Management, with specific expertise in Bioregional Planning, Environmental Impact Assessments and Environmental Management Planning.

**CAREER HISTORY**

Date	Company / Organization	Position
2015 - present	NuLeaf Planning and Environmental (Pty) Ltd	Environmental practitioner
2013 - 2014	Ecotourism Solutions	Project Administrator

**RELEVANT WORK EXPERIENCE (KEY PROJECTS)**

(All projects in South Africa unless otherwise stated)

COMPANY	YEAR	PROJECT NAME	CLIENT	DESCRIPTION OF DUTIES
Nuleaf Planning & Environmental	2023	Qwabi PGR	Qwabi PGR	Environmental practitioner and Project Leader.
Nuleaf Planning & Environmental	2022	Poortjie WES PV Cluster	Savannah	Visual Impact Assessments
LOGIS	2022	Sibanye PV facilities and grid connection	Savannah	Visual Impact Assessments
LOGIS	2022	Vlakfontein Open pit mine	EMA	Visual Impact Assessments
LOGIS	2022	Ratel Battery Energy Facility and Grid infrastructure	CSIR	Visual Impact Assessments
LOGIS	2022	ZEN Grid Infrastructure	Savannah	Visual Impact Assessments
LOGIS	2022	Pixley Park PV and Grid Connection	Savannah	Visual Impact Assessments
LOGIS	2022	Narina (Blanco) 400kV LILO	EIMS	Visual Impact Assessments
LOGIS	2022	Kapa Wind Energy Facilities	Savannah	Visual Impact Assessments
LOGIS	2022	Castle to Hydra Overhead Powerline/Grid connection	Savannah	Visual Impact Assessments
LOGIS	2022	Buffelspoort PV Facility	Savannah	Visual Impact Assessments
LOGIS	2022	Hydra B PV Facilities	Savannah	Visual Impact Assessments
Nuleaf Planning & Environmental	2022	Umsinde Overhead powerline	Nala Consulting	Visual Impact Assessment
NuLeaf Planning and Environmental	2022	Newcastle Wind Energy Facility	CES	Visual Impact Assessments
Nuleaf Planning & Environmental	2021-2023	Basic Assessment for the proposed Lapalala Custodian Sites and Management Infrastructure- Melote	Lapalala Wilderness Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2021 - 22	Victoria West Wind Energy Facility	CES	Visual Impact Assessments
Nuleaf Planning & Environmental	2021	Visual Impact Assessment for Eskom OHL	CESNET	Visual impact specialist
Nuleaf Planning & Environmental	2021	Development of a walkway and expansion of infrastructure at River Lodge and Drakensig Village	Kapama Game Reserve Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the BA Report and overall project management.
Nuleaf Planning & Environmental	2020-2023	Proposed Expansion to River Lodge and WWTW Upgrades in Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2020-21	Tenbosch Resort and Residential Estate BAR (EIA)	Automotive Window Manufacturer CC	Basic Assessment (EIA) process for development of a resort and residential estate, Komatipoort, Mpumalanga.
Nuleaf Planning & Environmental	2020-2022	Proposed Expansion to Ngwenya Lodge	Quality Time Marketing (Pty) Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the BA Report and overall project management.
Nuleaf Planning & Environmental	2020	Proposed Amendment to the Vredenburg Landfill site (VIA)	JG Afrika	Review and amend visual impact assessment.



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Nuleaf Planning & Environmental	2019-2020	Proposed Expansion to River Lodge and WWTW Upgrades in Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the BA Report and overall project management.
Nuleaf Planning & Environmental	2019-2020	Proposed Expansion to the Runway in Lapalala Wilderness Reserve and the construction of an access road.	Lapalala Wilderness Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the Report and management of specialists
Nuleaf Planning & Environmental	2019	Proposed Expansion to Pestana Kruger Lodge.	Pestana Lodge	Preparation of a basic assessment report for the expansion of the existing Pestana Lodge, near Kruger National Park.
Nuleaf Planning & Environmental	2019	Proposed relocation of the Sabie Sands Wildtuin Shaw's Head Quarters, Mpumalanga	Sabie Sands	Visual Impact Assessment
Nuleaf Planning & Environmental	2019	Application for Environmental Authorization in terms of S24G for Tourist Lodges and Management Infrastructure within Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Preparation and submission of a Section 24(g) rectification application for NEMA non-compliant development on Kapama Game Reserve.
Nuleaf Planning & Environmental	2019	Ngwenya Lodge and WWTS Basic Assessment Process	Quality Time Marketing (Pty) Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2018-2020	Basic Assessment for the proposed Lapalala Custodian Sites and Management Infrastructure	Lapalala Wilderness Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2018-2019	Proposed Expansion to Founders Lodge in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2018-2019	Sekhukhune District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Team Leader, Project coordinator. Compilation of the Bioregional Plan
Nuleaf Planning & Environmental	2018-2019	Capricorn District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Team Leader, Project coordinator. Compilation of the Bioregional Plan
Nuleaf Planning & Environmental	2018-2019	Proposed Amendment to the Custodian Sites in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Responsible for compilation of various Amendment Reports and overall project management
Nuleaf Planning & Environmental	2018	Proposed Establishment of a Staff Village in Lapalala Wilderness Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2018	Proposed Expansion to River Lodge, Kapama Private Game Reserve	Kapama Game Reserve Pty Ltd	Environmental practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2017-2018	Proposed Establishment of an Aquaculture Development Zone in Amatikulu, KZN	Department of Agriculture, Forestry and Fisheries	Preparation and submission of a Full Scoping and EIR.
Nuleaf Planning & Environmental	2017-2018	Amendment: Hans Hoheisen Wildlife Research Station	University of Pretoria	Environmental Practitioner

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Nuleaf Planning & Environmental	2017	Ngwenya Lodge and WWTS Basic Assessment Process	Quality Time Marketing (Pty) Ltd	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2017	Tenbosch Lodge / Resort Basic Assessment Process	Roosmaryn Boerdery (Edms) Bpk	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2017	Vhembe District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Team Leader, Project coordinator. Compilation of the bioregional plan, project management and hosting of workshops
Nuleaf Planning & Environmental	2017	Application for Proclamation as Protected Area: Lapalala Wilderness Private Game Reserve	Lapalala Wilderness Pty Ltd	Environmental Practitioner. Compilation of application and motivational report.
Nuleaf Planning & Environmental	2017	Application for Proclamation as Protected Area: Kapama Private Game Reserve	Kapama Private Game Reserve	Environmental Practitioner. Compilation of application and motivational report.
Nuleaf Planning & Environmental	2017	Moses Kotane District Municipality: -Integrated Environmental Management Plan	Moses Kotane District Municipality	Environmental Practitioner & Project Leader. Compilation of the IEMP
Nuleaf Planning & Environmental	2017	Egoli Gas Waste Management License	Egoli Gas	Environmental Practitioner.
Nuleaf Planning & Environmental	2016	Basic Assessment for the proposed Lapalala Custodian Sites and Management Infrastructure	Lapalala Wilderness Pty Ltd	Environmental Practitioner and Project Leader. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2016	Monate Game Reserve Application for Proclamation	Monate Game Reserve	Application for Proclamation as a Protected Area
Nuleaf Planning & Environmental	2016	Makolo mine: Appeal		Review of EIA documents and compilation of appeal for submission.
Nuleaf Planning & Environmental	2015-2016	Mopani District: Bioregional Plan	Limpopo Province Department of Economic Development, Environment and Tourism	Compilation of the bioregional plan, project management.
Nuleaf Planning & Environmental	2015-2016	Section 24G Application for the Lapalala Private Game Reserve	Lapalala Private Game Reserve	Environmental Practitioner. Responsible for compilation of the Report and overall project management
Nuleaf Planning & Environmental	2015-2016	Basic Assessment for the proposed Sebele Game Lodge	Barokologadi Community Property Association	Environmental Practitioner. Responsible for compilation of the Report and management of specialists.
Nuleaf Planning & Environmental	2015	Spa at Bakubung Lodge	Pilanesberg Resorts Pty Ltd	Environmental control officer, compilation of environmental compliance audit reports.
Nuleaf Planning & Environmental	2015	Various VIAs	Exheredo	Visual impact assessment
Nuleaf Planning & Environmental	2015	Basic Assessment for the proposed Bhundu Inn Hotel	Paul Mojapelo	Environmental Practitioner. Responsible for compilation of the Report.
Nuleaf Planning & Environmental	2015	AIR Resource Mapping and Management Planning	CESVI / European Commission	Compilation of reports.
Nuleaf Planning & Environmental	2014-2015	EIA for the proposed Malelane Safari Lodge near the Malelane gate, Kruger National Park	Marakele Safari Resort Investments Pty Ltd	Environmental Practitioner. Compilation and submission of reports.
Nuleaf Planning & Environmental	2014-2015	EIA for proposed upgrades to the Maropeng Interpretation Centre	GAPP	Environmental Practitioner. Compilation and submission of reports.



APPENDIX B: SENSITIVITY LAYOUT MAP

