



**De Beers Consolidated Mines (Pty) Limited
Venetia Limpopo Nature Reserve Lodge
Final Environmental Management Programme**

March 2021

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Project Ref: 141-002

Prepared by: Suzanne van Rooy



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VERSION CONTROL

Alta van Dyk Environmental cc

Version: Final

Approved by: Alta van Dyk

Signed:

A handwritten signature in black ink, appearing to read "Alta van Dyk", is written over a dotted line.

Position: Environmental Specialist

Date: March 2021

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Abbreviations

EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
LSA	Late Stone Age
NEMA	National Environmental Management Act
NWA	National Water Act
SAHRA	South African Heritage Resource Agency
SCC	Species of Conservation Concern
VLNR	Venetia Limpopo Nature Reserve

1 INTRODUCTION AND BACKGROUND

An Environmental Management Programme (EMPr) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

A site-specific EMPr has been prepared for the management of all activities at the Venetia Limpopo Nature Reserve (VLNR) Lodge in order to confirm the likely environmental issues that may arise from the activities, the likely harm that these activities may pose on the surrounding environment and how these activities will be managed as to minimise any harm to the environment.

The EMPr considers the Construction Phase related activities and impacts to manage the construction laydown area, the construction of the accommodation units and supporting buildings such as the reception and office areas, and the construction of the sewerage package plant.

Once the lodge is operational, the management responsibility of the lodge will vest with VLNR Reserve Manager as part of the overall VLNR Reserve Management.

1.1 Objectives of an EMPr

An EMPr is a plan or programme that sets out guidelines that describe how activities that have or could have an adverse impact on the environment, will be mitigated, controlled, and monitored and subsequently achieve a required operational and/or end state.

The purpose of the EMPr is to provide for preventative, corrective and best practice measures to ensure that activities are undertaken in an environmentally responsible manner and that such activities are sustainable in the long term. The primary objectives of the EMPr, include, but are not limited to the following:

- Describe actions that when implemented will achieve mitigation of environmental impacts, or result in approved management of activities thereby reducing the probability of impacts occurring;
- Define organisational and administrative arrangements for environmental management and monitoring, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures;
- Ensuring that discussions are held with the site supervision staff, regarding pro-active environmental management, such that potential problems can be identified and mitigation measures adopted prior to any work being carried out;
- Define the procedures to be followed as to ensure environmental control, in the event of pollution occurring that may require actions.

1.2 Content of the Environmental Management Programme

The EMPr has been structured in accordance with the requirements as specified in the NEMA EIA Regulations. Refer to Table 1

Table 1: Requirements of and EMPr

No	Description	Reference
1	An EMPr must comply with Section 24N of the Act and include-	
a)	details of: (i) the EAP who compiled the EMPr; and (ii) the expertise of the EAP to prepare an EMPr, including a curriculum vitae;	Chapter 2 Annexure A
b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 3

No	Description	Reference
c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 1 Figure 2
d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— <ul style="list-style-type: none"> (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities; 	Chapter 5 Table 6 Table 7
f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — <ul style="list-style-type: none"> (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable; 	Chapter 5 Table 6 Table 7
g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 9
h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Chapter 9
i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Chapter 4 Table 6 Table 7
j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Table 6 Table 7
k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Chapter 9
l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Chapter 9
m)	an environmental awareness plan describing the manner in which— <ul style="list-style-type: none"> (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and 	Chapter 8
n)	any specific information that may be required by the competent authority.	Not applicable

2 ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1 Details of the Environmental Assessment Practitioner

Table 2 provides the details of the Environmental Assessment Practitioner (EAP) for the VLNR Lodge project.

Table 2: Details of the Environmental Assessment Practitioner

Environmental Assessment Practitioner	Suzanne van Rooy
Company	Alta van Dyk Environmental Consultants cc
Qualifications	MPhil Environmental Management (University of Stellenbosch)
Professional Registrations	Pr.Sci.Nat (Reg nr.400378/11)
Postal Address	Postnet Suite # 745 Private Bag X 1007 Lyttelton 0140
Telephone number:	012 940 9457
Fax number:	086 634 3967
Email address	suzanne@avde.co.za

2.2 Expertise of the Environmental Assessment Practitioner

Suzanne is a senior environmental scientist and has 13 years' experience as an environmental assessment practitioner, having worked largely in South Africa's mining sector. She is a professionally registered environmental scientist with the South African Council of Natural Scientific Professionals (registration number 400378/11). Her field of expertise includes the compilation of environmental impact assessments and environmental management programmes, environmental auditing and stakeholder engagement.

Refer to Annexure A for the curriculum vitae of the EAP.

3 PROJECT DESCRIPTION

3.1 Project description

De Beers Consolidated Mines (Pty) Limited (De Beers) is the owner of the Venetia Limpopo Nature Reserve (VLNR), located near Alldays in the Limpopo Province. De Beers' Venetia Diamond Mine is located in the south of the VLNR, but does not form part of the VLNR. De Beers would like to develop a 12 room lodge on the reserve to house Tier 1 management employees of De Beers visiting Venetia Mine. Refer to Figure 1 for the location map.

The proposed VLNR Lodge will include the following:

- Gravel access road (existing access road to be utilised)
- 12 rooms (24 people maximum)
- Central building (kitchen and dining area)
- Swimming pool and lapa
- Storeroom
- Electrical boundary fence
- Potable water storage (ABECO tank)
- 12 carport parking bay
- Reception and administrative office
- General waste storage facility
- Sewerage package plant
- Staff quarters and locker room to accommodate a maximum of 4 staff members
- Bird hide

3.1.1 Access

Access to the lodge will be via an existing gravel road that runs from the VLNR's Luna Gate from the D1559 district road, running on the eastern side of the VLNR.

3.1.2 Energy and lights

The Lodge will make use of both Eskom electricity and solar panel systems. A new 11kV or 22kV overhead line will be constructed from the existing Eskom line approximately 1.5 km north east of the proposed VLNR Lodge development. To minimise visual impact, it is proposed to install and underground cable to a ground mounted transformer. The proposed line does not trigger any additional listed activities.

It is proposed to install a grid tied solar photovoltaic installation without batter backup to provide additional power for fridges, lighting and reducing required load from the supply authority during daytime.

3.1.3 Water

The lodge's estimated water use will be 150 L/person/day. Assuming a maximum number of people of 26, it is calculated that the maximum quantity of potable water required is 1 423.5m³/a, or 3.9m³/day. The potable water will be sourced from a recently drilled borehole.

3.1.4 Sewage

It is proposed to construct a 10Kℓ package plant for the treatment of sewage generated at the lodge. The main process used in the package plant is a standard activated sludge system, where the biochemical oxygen

demand is broken down using air and bacteria, which grow in this medium. The bacteria grow naturally, and no additional bio-chemicals have to be added in the process. Effluent will be produced to align with water quality Limits as specified in the National Water Act. The treated effluent will be used to irrigate natural vegetation around the Lodge. The plant will be installed below ground. Sludge will be stored in the anaerobic zone and will be removed by an external services provider every 2 – 3 months if inflow remains at high levels. In practice sewage inflow will vary and duration for sludge generation will be lengthy.

3.1.5 General waste

General waste generated on site at the accommodation facility will be segregated at source and will be removed frequently off-site by an approved waste management contractor. Household and solid waste collection is centralised at a location alongside the kitchen area where waste containers are provided. Waste from bedrooms will be deposited by occupants of the rooms into municipal type refuse bins which are conveniently located at all bedroom clusters and refuse collection and disposal will be done by facilities management staff. An external service provider will service and empty the containers and dispose of the waste at an approved municipal waste disposal site.

3.2 Environmental related permits required

Triggered listed activities in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) 2014 Environmental Impact Assessment (EIA) Regulations (as amended in 2017) is shown in Table 3 below. Activities in Listing 1 and 3 are triggered by the proposed development, and therefore a Basic Assessment environmental authorisation process is followed.

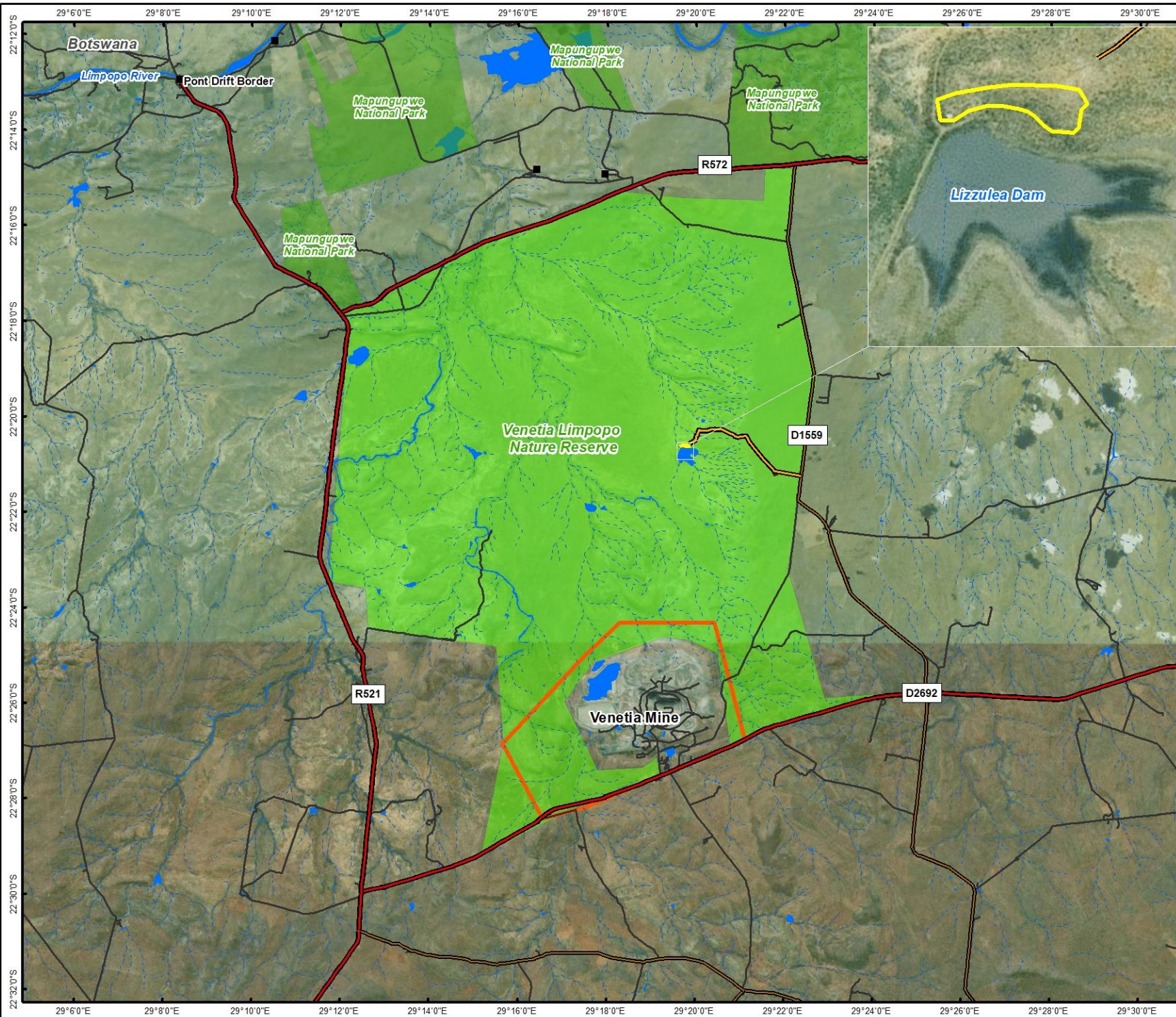
Table 3: Triggered listed activities for the VLNR Lodge

List and activity number	Listed activity	Description of activity
Listing 1, Activity 12 (ii)	The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) <u>infrastructure or structures with a physical footprint of 100 square metres or more;</u> where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) <u>if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;-</u>	The proposed lodge will be partly located within 32m of a watercourse (Setoka River) and dam (Lizzulea Dam).
Listing 1, Activity 19	The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m ³ from a watercourse;	Earthworks for lodge development near river/dam, development of a bird hide at Lizzulea Dam. Continual maintenance activities of the Lizzulea Dam wall and spillway.
Listing 1, Activity 27	The clearance of an area of 1 ha or more, but less than 20ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or	Clearance of indigenous vegetation for development of the lodge (~1.8 ha).

List and activity number	Listed activity	Description of activity
	(ii) maintenance purposes undertaken in accordance with a maintenance management plan.	
Listing 3, Activity 6	The development of resorts, lodges, hotels, tourism or hospitality facilities that sleep 15 people or more.	Development of a lodge to sleep a maximum of 24 guests and 4 service staff.

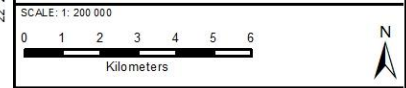
In addition, a Water Use Licence/General Authorisation Application will be submitted in terms of the National Water Act (Act No. 36 of 1998) (NWA) as the following Section 21 water uses are triggered:

- (a) taking water from a water resource (abstraction of water from borehole)
- (c) and (i) impeding or diverting the flow of water in a watercourse, altering the bed, banks, course or characteristics of a watercourse (development of the lodge within 500m from a seep zone which created an artificial wetland area downstream from the Lizzulea Dam and development within 100m horizontal distance from the edge of the water course)
- (e) engaging in a controlled activity (irrigation with wastewater)



Legend

- Venetia Mine
- Lodge area
- VLNR Lodge Access Road
- Main Road
- Secondary Road
- Other Road
- Perennial River
- Non-Perennial River
- Hydrological Areas
- National Park
- Venetia Limpopo Nature Reserve



TITLE:
VLNR Lodge Locality Map

CLIENT:
De Beers Consolidated Mines (Pty) Ltd

DATE: October 2020		PROJECT: VENETIA MINE	
DRAWN: THURLOW MAPPING		APPROVED: KP	
MAP: Venetia_Lodge_Locality_Map.mxd	REV: 0		

Alta van Dyk Environmental Consultants cc (2011/059764/23)
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 Cel: 061 403 2462

Projection: Transverse Mercator CM: 29 Datum: WGS 84
 Source: Chief Directorate National Geo-Spatial Information,
 DWA - NGA Geosites Inset: ESRI Data and Maps

SIZE:
A4

3.3 Sensitive areas

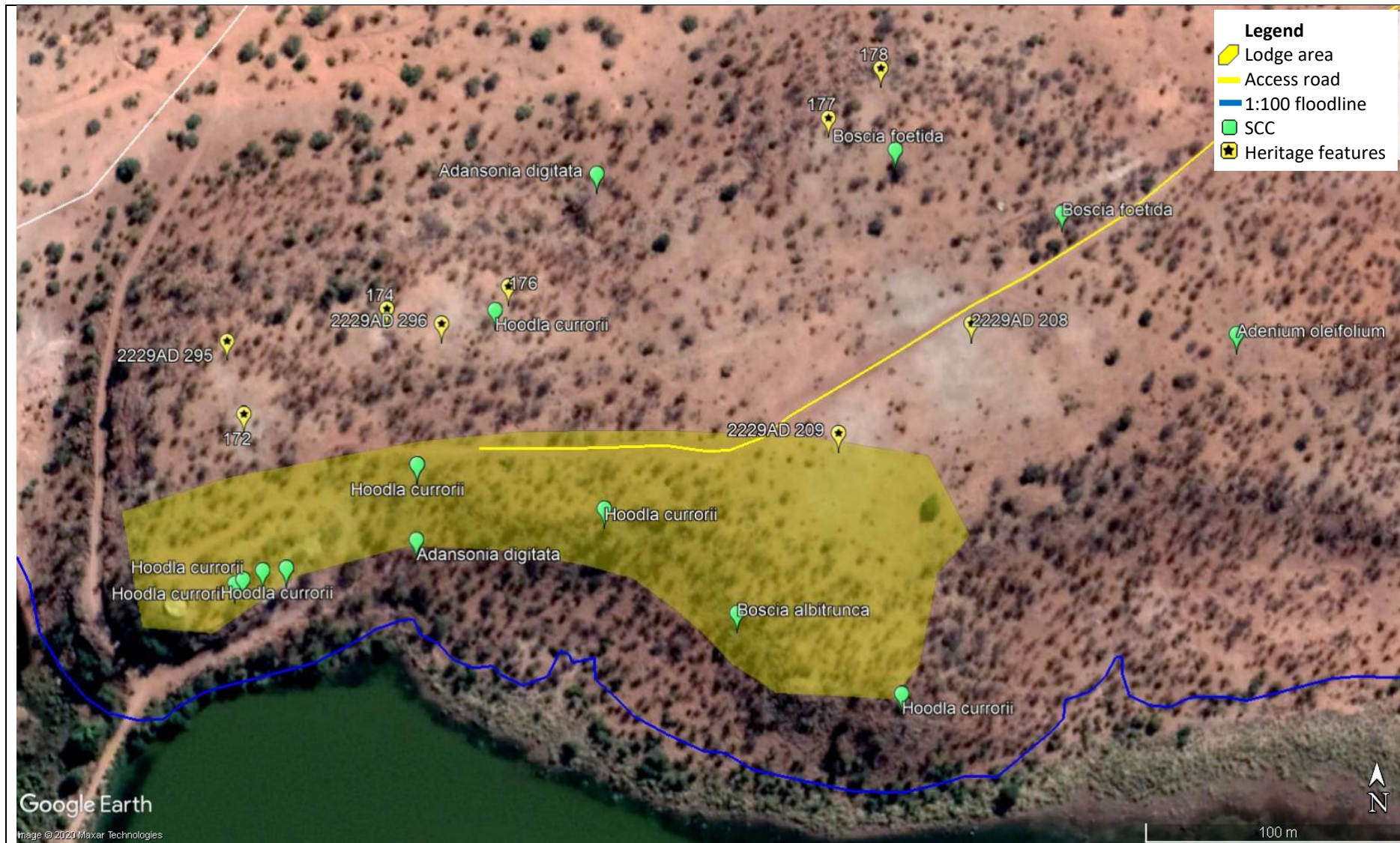
During the environmental authorisation process, several specialist studies were undertaken including biodiversity, surface and groundwater and heritage. During these studies, several features were identified that needs to be avoided, or permits obtained for mitigation. Table 4 and Table 5 lists the plant Species of Conservation Concern (SCC) and the heritage features that were observed during fieldwork respectively. The SCC and heritage features in relation to the project area are shown in Figure 2.

Table 4: Plants Species of Conservation Concern

Latin name	Latitude	Longitude
<i>Adansonia digitata</i>	22°20'33.01"S	29°19'45.79"E
	22°20'37.37"S	29°19'43.47"E
<i>Adenium oleifolium</i>	22°20'34.92"S	29°19'54.04"E
<i>Boscia foetida</i>	22°20'32.74"S	29°19'49.63"E
	22°20'33.48"S	29°19'51.78"E
<i>Boscia albitrunca</i>	22°20'38.25"S	29°19'47.60"E
<i>Combretum imberbe</i>	22°20'22.72"S	29°20'1.46"E
<i>Hoodla currorii</i> subsp. <i>lugardii</i>	22°20'34.64"S	29°19'44.49"E
	22°20'36.47"S	29°19'43.50"E
	22°20'37.00"S	29°19'45.89"E
	22°20'39.24"S	29°19'49.75"E
	22°20'37.71"S	29°19'41.78"E
	22°20'37.74"S	29°19'41.47"E
	22°20'37.85"S	29°19'41.21"E
22°20'37.90"S	29°19'41.10"E	

Table 5: Heritage features

Label	Latitude	Longitude	Description
172	22° 20' 35.8727" S	29° 19' 41.2176" E	Grey area, possibly the southern extent of Site 2229AD 295.
2229AD 295	22° 20' 35.0000" S	29° 19' 41.0000" E	Grey area (possibly ash) no diagnostic ceramics. Various LSA artefacts.
174	22° 20' 34.6201" S	29° 19' 43.0860" E	Grey area (possibly ash) no diagnostic ceramics. various LSA artefacts.
2229AD 296	22° 20' 34.8000" S	29° 19' 43.8000" E	Grey area (possibly ash) with TK2 pottery and few LSA artefacts.
176	22° 20' 34.3573" S	29° 19' 44.6593" E	Bone and Ostrich Eggshell (OES) fragments, tang of spear or arrow.
177	22° 20' 32.3628" S	29° 19' 48.7740" E	Grey area, no diagnostic ceramics. few LSA artefacts.
178	22° 20' 31.7617" S	29° 19' 49.4472" E	Stone enclosure.
2229AD 208	22° 20' 34.8000" S	29° 19' 50.6000" E	Leokwe site with vitrified dung. Requires mitigation.
2229AD 209	22° 20' 36.1000" S	29° 19' 48.9000" E	Leokwe site with vitrified dung. Requires mitigation.



VENETIA LIMPOPO NATURE RESERVE LODGE
SENSITIVE FEATURES

Figure 2

Figure 2: Sensitive features around the proposed VLNR Lodge (HCAC 2020, TBC 2020, ESS 2021)

4 ROLES AND RESPONSIBILITIES

The roles and responsibilities indicate which team member(s) are responsible for implementation of the identified mitigation measures, management plan and monitoring. The following parties will have roles and responsibilities in the implementation of this EMPr.

- Applicant (De Beers);
- Construction Contractor;
- Lodge Operator; and
- VLNR Reserve Manager

The roles and responsibilities of each party is described in the sections below.

4.1 Applicant

De Beers is the applicant and will therefore be the entity monitoring the implementation of the EMPr and compliance with the authorisation. The following roles and responsibilities are assigned to the applicant:

- Ensure compliance with the conditions in the EMPr and environmental authorisation during all phases of the project;
- Ensure that contractors and operators undertake to adhere to all the provisions of the EMPr;
- Ensure that environmental monitoring takes place;
- Ensure that independent environmental audits are undertaken;
- Ensure that all monitoring and audit reports are submitted to the competent authority.

4.2 Construction Phase

4.2.1 Construction Contractor

During the construction phase, the construction contractor will:

- Be responsible to have the EMPr available on site at all times;
- Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr; and
- Ensure that all problems identified during environmental inspections, are addressed and rectified as soon as reasonably possible.

4.2.2 VLNR Reserve Manager

The responsibilities of the VLNR Reserve Manager during all phases of the project are as follows:

- Inspections/audits of environmental protection requirements as per the EMPr;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results; and
- Assistance with the preparation of environmental monitoring reporting.

4.3 Operational Phase

4.3.1 VLNR Lodge Operator

During the operational phase, the day-to-day operator of the lodge will:

- Be familiar with the contents and commitments documented in the EMPr;
- Will adhere to the management obligations as part of the VLNR Reserve Management aspects; and
- Ensure that all problems identified during inspections, are addressed, and rectified as soon as reasonably possible.

4.3.2 VLNR Reserve Manager

The responsibilities of the VLNR Reserve Manager are as follows:

- Be responsible for the management of the Reserve inclusive of the lodge development as per the requirements of the VLNR Management Plan;
- Implement VLNR Management policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders
- Planning of and carrying out environmental training programs for employees and contractors
- Obtaining and maintaining all necessary environmental permits in liaison with the legal manager
- Management of the environmental related components of the grievance mechanism

5 MITIGATION AND/OR MANAGEMENT MEASURES

A variety of potential impacts are associated with the construction activities for this project. These impacts can be categorised as general construction related impacts as well as construction impacts specifically related to this site. General best practice rules to construction should be followed at all times. In addition to this the specific mitigation measures and recommendations as highlighted by the BAR and various specialists for this specific site is highlighted below.

5.1 Construction related impacts

During the construction phase of the project, the following possible impacts may occur:

- Vegetation clearance and the destruction of sensitive and protected plant species due to the development of the laydown areas as well as the areas for the development of the accommodation units and associated infrastructure such as the storeroom, offices, and the sewerage package treatment plant.
- Soil compaction due to vehicular movement.
- Management of stormwater against steep slopes where vegetation has been cleared and soils are susceptible to erosion.
- Management of sewage generated by the construction crew through portable toilet facilities.
- Construction water requirements in support of potable water for the construction crews as well as water to be used for the mixing of concrete on site.
- Management of general and hazardous waste generated through the construction activities i.e., food and packaging waste, paints, building rubble.
- Spillages and leaks from construction equipment i.e. vehicles and machinery, storage and use of lubricants, oils and chemicals.
- Impacts on archaeological sensitive areas due to vegetation clearance and construction related activities.
- Establishment of alien and invasive plant species not previously present in the area due to soil and vegetation disturbance.
- Use of the potable supply borehole as a source of water to support the construction related activities.

Mitigation measures to be implemented during the construction phase is presented in Table 6.

Table 6: Mitigation measures to be implemented during the CONSTRUCTION PHASE of the VLNR Lodge

CONSTRUCTION PHASE							
Activity that may cause an impact	Environmental/Social aspect	Management outcome	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible person
Abstraction groundwater from supply borehole	Surface groundwater and	Minimise the potential for ground and surface water pollution Conservation of water	Impacts on groundwater volumes due to groundwater abstraction from the water supply borehole	Medium (-)	Low (-)	Abstract and monitor the use of groundwater from the potable supply borehole during the construction phase as per the requirement of the Water Use Licence/General Authorisation.	VLNR Reserve Manager
			Impacts on surface water volumes due to groundwater abstraction from the water supply borehole	Low (-)	Low (-)		
Construction of VLNR Lodge	Surface groundwater and	Minimise the potential for ground and surface water pollution Conservation of water	Impacts on groundwater quality due to construction activities	Medium (-)	Low (-)	Monitor the quality of the groundwater used for potable purposes as per the requirement of the Water Use Licence/General Authorisation.	VLNR Reserve Manager
						Ensure the safe storage of chemicals, hydrocarbons, and other pollutants.	Construction Contractor
						No servicing of vehicles by the construction contractor may take place on site.	Construction Contractor
						Develop and implement a leak/spill procedure for all possible areas of leaks/spillages.	Construction Contractor
						The construction contractor must ensure that spill kits are provided for on site for spill clearing.	Construction Contractor
						The construction contractor must immediately clear spills and remediated the area.	Construction Contractor
			The construction contractor must provide adequate portable toilet facilities for construction crews that are located outside of ecologically sensitive areas.	Construction Contractor			
			Impacts on groundwater volume due to surface construction of infrastructure	Low (-)	Low (-)	Abstract and monitor the use of groundwater from the potable supply borehole during the construction phase as per the requirement of the Water Use Licence/General Authorisation.	VLNR Reserve Manager
Impacts on surface water quality due to poor quality seepage from the pollution source areas	Low (-)	Low (-)	The construction contractor must provide for proper maintenance of construction vehicles off-site.	Construction Contractor			
			The construction contractor must provide for safe storage of chemicals and other possible pollution sources in an adequately manner.	Construction Contractor			
			To protect the surface water resource from siltation and the soils from erosion, the construction contractor must implement appropriate stormwater management measures where required (steep slopes).	Construction Contractor			
Construction of VLNR Lodge	Soils	Conservation of soils a resource	Loss of soils due to compaction and erosion	Medium (-)	Low (-)	Any topsoil that is removed during construction must be appropriately removed and stored to use for landscaping and stormwater protection measures.	Construction Contractor
						To protect the surface water resource from siltation and the soils from erosion, the construction contractor must implement appropriate stormwater management measures where required (steep slopes).	Construction Contractor
						Post construction any compacted areas are to be ripped to loosen the soil structure where necessary, to assist with rehabilitation.	Construction Contractor
						To prevent additional soil compaction and disturbance the existing roads must be used as far as possible.	Construction Contractor

CONSTRUCTION PHASE							
Activity that may cause an impact	Environmental/Social aspect	Management outcome	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible person
						Erosion mitigation strategies and proper stormwater management must be considered to limit erosion within the development footprint area.	Construction Contractor
						All exposed areas to be rehabilitated after construction is complete. Rehabilitation of the disturbed areas in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.	Construction Contractor
						Progressive rehabilitation through landscaping will enable topsoil to be returned more rapidly, thus ensuring vegetation re-growth through natural successions due to the recruitment of the existing seedbank.	Construction Contractor
						All large rocks and stones removed for foundations must not be stockpiled but rather used for landscaping purposes; stones may be used to construct footpaths or assist at areas where erosion may occur.	Construction Contractor
						The construction contractor must prevent any spills from occurring. Machines must be parked within hard park areas or dedicated storage areas and must be checked daily for fluid leaks. Construction contractors must have spill kits available to address any unlikely spillages.	Construction Contractor
						The construction contractor must provide for adequate ablution facilities for construction crews that are located outside of ecologically sensitive areas.	Construction Contractor
Construction of VLNR Lodge: Vegetation clearing	Biodiversity	Limit the disturbance and destruction of vegetation, fauna and habitat Protection of SCC	Destruction, fragmentation and degradation of habitats, ecosystems and loss of CBA-1.	Medium – High (-)	Low (-)	All areas to be developed must be clearly demarcated so that during the construction phase, only the demarcated areas are impacted upon and to prevent movement of construction workers into sensitive surrounding environments, i.e. Limpopo Ridge Bushveld habitat.	Construction Contractor
						Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further.	Construction Contractor
						Clearing of vegetation should be minimized and avoided where possible.	Construction Contractor
						All construction/operational vehicles and access must make use of the existing roads.	Construction Contractor
						Access (footpaths and roads) within and around the lodge areas need to be strictly controlled in order to prevent the degradation of the surrounding habitats. Footpaths and roads need to be monitored for litter and erosion depending on the amount of traffic. The creation of new footpaths must be limited.	VLNR Reserve Manager/ Construction Contractor
						No construction materials may be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded.	Construction Contractor
						The construction laydown area will be located within the lodge development footprint area.	Construction Contractor

CONSTRUCTION PHASE							
Activity that may cause an impact	Environmental/Social aspect	Management outcome	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible person
						The electric fencing must avoid destroying or affecting any natural vegetation. The fence should rather follow a path where the least trees need to be destroyed.	VLNR Reserve Manager/ Construction Contractor
Construction of VLNR Lodge: Vegetation clearing	Biodiversity	Protection of SCC	Loss of protected plant and tree species	Medium – High (-)	Low (-)	Prior to the construction phase a suitably qualified person should identify all protected plants, point out SCC and mark these clearly.	VLNR Reserve Manager/ Construction Contractor
						All individuals of the nationally protected trees or protected plants that was observed needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. This permit must be applied for timely prior to the construction commencement. Preferably, the trees/plants can be relocated within the property without a permit or otherwise left unharmed.	Construction Contractor
						High visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the construction contractor's environmental awareness program. Tree tags can be put up to assist with the identification and education.	Construction Contractor
Construction of VLNR Lodge: Vegetation clearing	Biodiversity	Limit the disturbance and destruction of vegetation, fauna and habitat Protection of SCC	Spread and/or establishment of alien and/or invasive species	Medium (-)	Low (-)	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Construction Contractor
						The construction contractor must follow the existing Alien Management Plan as per the De Beers Ecology Division, Overarching VLNR Management Plan.	Construction Contractor
						It should be brought under the attention of the construction contractor that it is an offence for any staff to take/bring any plant species into/out of any portion of the project areas. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Construction Contractor
Construction related activities at the VLNR Lodge	Biodiversity	Waste management	Introduction of nuisance vectors (pests) such as flies, rodents and baboons	Low (-)	Low (-)	The construction contractor must ensure the correct handling, storage, operation and removal of general waste generated on the construction site.	Construction Contractor
						The construction contractor must remove general waste generated frequently as to prevent the development of a breeding habitat for nuisance pests such as flies and attracting rodents and baboons.	Construction Contractor
Construction of the VLNR Lodge	Heritage	Protect and preserve heritage findings	Impact on Archaeological Resource - Iron Age sites	Medium (-)	Low (-)	The Construction Contractor must develop and implement of a heritage site development plan for the project.	Construction Contractor
						The existing access road to the site must be used to minimise further impacts.	Construction Contractor/ VLNR Reserve Manager
						Heritage sites identified in proximity of the development area must be preserved in-situ. Should this not be possible with final layout and design, the Construction Contractor	VLNR Reserve Manager/

CONSTRUCTION PHASE							
Activity that may cause an impact	Environmental/ Social aspect	Management outcome	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible person
						must apply for a Section 35 permit (recorded sites 172, 2229AD 295, 174, 2229AD 296, 176, 177, 178, 2229AD 208, 2229AD 209)	Construction Contractor
						The VLNR Manager is responsible to ensure compliance with the heritage site development plan.	VLNR Reserve Manager
						Implementation of a chance find procedure for the project (archaeology and palaeontology).	Construction Contractor
Construction related activities at the VLNR Lodge	Noise	Minimise the generation of noise	General rise in ambient noise levels	Medium (-)	Low (-)	The construction contractor must ensure a high level of equipment maintenance, especially intake and exhaust mufflers as to minimise any noise impacts.	Construction Contractor
Construction related activities at the VLNR Lodge	Air quality	Minimise atmospheric emissions and dust generation	Increased dust fallout	Low (-)	Low (-)	The construction contractor must apply dust suppressants to gravel roads used for the duration of the construction period.	Construction Contractor
						Dust reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of roads and exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.	Construction Contractor
						The construction contractor must set speed limits to 30 km/h to minimise the creation of fugitive dust within the project boundary.	Construction Contractor
Development of the VLNR Lodge	Social	Maximise employment opportunities and social benefits	Benefits resulting from employment and income opportunities created by the construction of the lodge	Low (+)	Medium (+)	The construction contractor must develop a clear and concise employment policy prioritising local employment.	Construction Contractor
						The construction contractor must employ local workers if qualified applicants with the appropriate skills are available.	Construction Contractor
						The construction contractor must as far as practical purchase goods and services at a local level if available.	Construction Contractor

5.2 Operational related impacts

During the Operational Phase, the management of the lodge will fall under the responsibility of De Beers Ecology as part of the VLNR Reserve Management.

All identified possible impacts for the operational phase, will be managed in terms of the VLNR Reserve Management Plan.

During the operational phase of the lodge, the impacts will be limited to the management of the following aspects:

- The sustainable use and maintenance of the potable supply borehole as per the requirements of the Water Use Licence/General Authorisation.
- The operation and maintenance of the sewage package plant and the safe disposal of sewage sludge (when required).
- The storage, safe removal and management of general waste generated by the guests i.e., papers, plastics, tins etc as well as food and general waste generated in the kitchen areas.

Mitigation measures to be implemented during the operational phase is presented in Table 8.

Table 7: Mitigation measures to be implemented during the OPERATIONAL PHASE of the VLNR Lodge

OPERATIONAL PHASE							
Activity that may cause an impact	Environmental/Social aspect	Management outcome	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible person
Abstraction groundwater from supply borehole	Surface and groundwater	Minimise the potential for ground and surface water pollution Conservation of water	Impacts on groundwater volumes due to groundwater abstraction from the water supply borehole	Medium (-)	Medium (-)	Abstract and monitor the use of groundwater from the potable supply borehole during the operational phase as per the requirements of the Water Use Licence/General Authorisation.	VLNR Reserve Manager
			Impacts on surface water volumes due to groundwater abstraction from the water supply borehole	Low (-)	Low (-)		
Operation of VLNR Lodge	Surface and groundwater	Minimise the potential for ground and surface water pollution Conservation of water	Impacts on groundwater quality due to operational activities	Medium – High (-)	Low (-)	Monitor the quality of the groundwater used for potable purposes as per the requirement of the Water Use Licence/General Authorisation.	VLNR Reserve Manager
						No servicing of vehicles may take place at the VLNR Lodge.	VLNR Lodge Operator
						Ensure the safe storage of chemicals, hydrocarbons, and other pollutants.	VLNR Lodge Operator
						Remove sludge from package plant as required. Sludge to be removed by a vacuum truck and disposed of at a registered waste water treatment works.	VLNR Lodge Operator
			Impacts on surface quality due to poor quality seepage from the pollution source areas	Low (-)	Low (-)	Ensure the safe storage of chemicals, hydrocarbons, and other pollutants.	VLNR Lodge Operator
						To protect the surface water resource from siltation and the soils from erosion, the VLNR Reserve Manager must maintain the appropriate stormwater management measures where required (steep slopes).	VLNR Reserve Manager
Operation of VLNR Lodge	Soils	Conservation of soils a resource	Loss of soils due to erosion from uncontrolled surface water run off at lodge.	Medium (-)	Low (-)	To protect the surface water resource from siltation and the soils from erosion, the VLNR Reserve Manager must maintain appropriate stormwater management measures where required (steep slopes).	VLNR Reserve Manager
Operation of VLNR Lodge	Biodiversity	Limit the disturbance and destruction of vegetation, fauna and habitat Protection of SCC	Spread of alien and/or invasive species	Medium (-)	Low (-)	Follow existing alien management plan as per the De Beers Ecology Division, Overarching VLNR Management Plan.	VLNR Reserve Manager
			The conservation of the VLNR through the Lodge establishment and anticipated enhancement of environmental support and awareness	Medium (+)	Medium – High (+)	Implement Environmental Awareness Program.	VLNR Reserve Manager
			Introduction of nuisance vectors (pests) such as flies, rodents and baboons	Low (-)	Low (-)	Ensure the correct handling, storage, and operation of general waste as per the De Beers Ecology Division Waste Management Procedure.	VLNR Reserve Manager
Operation of VLNR Lodge	Heritage	Protect and preserve heritage findings	Impact on Archaeological Resource - Iron Age sites	Low (-)	Low (-)	The VLNR Reserve Manager is responsible to ensure compliance with the heritage site development plan.	VLNR Reserve Manager
Operation of VLNR Lodge	Social	Maximise employment opportunities and social benefits	Benefits resulting from employment and income opportunities created by the construction of the lodge	Low (+)	Low (+)	Employ local workers if qualified applicants with the appropriate skills are available.	VLNR Lodge Operator
						Purchase goods and services at a local level if available.	VLNR Lodge Operator

6 MANAGEMENT PLANS

The following management plans are detailed in the sections below:

- Heritage chance find procedure;
- Paleontological chance find procedure;
- Waste management plan;
- Fire management plan; and
- Alien vegetation management plan.

6.1 Heritage Chance Find Procedure

The possibility of the occurrence of subsurface archaeological finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefor chance find procedures should be put in place as part of the EMPr. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the South African Heritage Resource Agency (SAHRA).

6.2 Paleontological Chance Find Procedure

The following procedure is only required if fossils are seen on the surface and when excavations/drilling commence.

- When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the mining activities will not be interrupted.
- Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. This information will be built into the training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.

- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished then no further monitoring is required.

6.3 Construction Camp Management

The following management measures will be implemented at the construction camp/laydown area:

- The construction laydown area will be located within the lodge development footprint area, in order that no additional areas are disturbed.
- Demarcate the construction camp/laydown area.
- Adequate portable ablution facilities for construction crews will be provided by the Construction Contractor and will be located outside of ecologically sensitive areas.
- No servicing of vehicles by the construction contractor may take place at the construction camp/laydown area.
- All vehicles must make use of the existing roads.
- No uncontrolled discharges from the construction camp shall be permitted.
- Correct storage, handling and operation of the waste handling, management and storage area and laydown areas.

6.4 Waste Management Plan

As per the De Beers Ecology Division Waste Management Procedure. Refer to Annexure B.

The following waste management measures will be implemented:

- Waste management must be a priority and all waste must be collected and stored effectively.
- Monitoring of litter, spills, fuels, chemicals and human waste in and around the project area.
- A minimum of one toilet must be provided per 10 persons during construction. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.
- The Contractor/Operator should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.
- Where a registered disposal facility is not available close to the project area, the Contractor/Operator shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned or buried on site without the necessary approvals.
- General waste generated shall be removed on a frequent basis to prevent the development of a breeding habitat for nuisance pests such as flies, and attracting rodents and baboons.

6.5 Fire Management Plan

As per De Beers Ecology Division Fire Fighting Policy and Procedure. Refer to Annexure C.

The firefighting management plan includes the following:

- Management procedures for controlling and putting out of natural fires, mostly started by lighting;

- Preparation of fire breaks to be prepared (disc in sand and slash in rocky terrain) at the end of the summer rainy season, namely from mid-May to August; and
- Procedures for firefighting equipment that need to be checked and tested are aligned with the firefighting policy and procedure.

6.6 Alien Vegetation Management Plan

As per De Beers Ecology Division Overarching Reserve Management Plan. Refer to Annexure D.

The VLNR Reserve Manager must ensure that no alien invasive species are introduced to the reserve including areas in and around the proposed Lodge. The overall objective is to remove all existing alien invasive species on the VLNR. The following principles are taken into consideration for the establishment of an alien vegetation control plan:

- The extent of infestation – lighter infestations can easily be controlled, but have the potential to get out of control if the correct measures are not taken. It is therefore recommended that areas with lighter infestations should be tackled first;
- The origin of the infestation- It is advisable to start at the highest point and work downwards;
- The third principle is that control plans may not succeed the first time. One or more follow up may be required; and
- Lastly, the control methods must take into consideration other plant species, especially the indigenous plant species that occur in the same area, the soil and animals.

7 MONITORING

7.1 General environmental monitoring

A monitoring programme will be implemented for the duration of the construction of the VLNR Lodge. This programme will include (but is not limited to):

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impact on the lodge area;
- Monitoring of the spread of alien invasive species around the site;
- Monitoring of stormwater management structures and the effectiveness thereof; and
- Ensuring that re-vegetation is taking place at rehabilitated construction areas.
- Groundwater monitoring will be undertaken as per the requirements of the Water Use Licence/General Authorisation.

8 ENVIRONMENTAL AWARENESS

Environmental awareness is an essential part of the implementation of the EMPr during the construction and operational phases of the project. The purpose of environmental awareness is to make contractors and employees mindful of the environmental sensitivities around the site, the potential environmental impacts as well as the mitigation measures that need to be implemented.

8.1 Environmental awareness training

Environmental awareness training must be implemented during the construction and operational phases of the lodge development. The Construction Contractor will be responsible for compiling the material required for the training, and should include, as a minimum, the following:

- Environmental legal requirements and obligations;
- Environmental sensitive areas;
- Details regarding plant Species of Conservation Concern, and the procedures to be followed should these be encountered;
- Heritage features and the associated chance find procedure should any archaeological finds be made;
- Details of the waste management procedures
- Emergency procedures;
- Relevant mitigation measures to be carried out as listed in the EMPr

All personnel, contractors to undergo environmental awareness training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of protected species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.

In addition, environmental awareness should also be provided to guests visiting the lodge.

8.2 Basic Rules of Conduct

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid. NOTE: ALL new site personnel must attend an environmental awareness/induction presentation.

DO:

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind.
- Report all fuel or oil spills immediately and stop the spill from continuing.
- Store hazardous materials in a lockable bunded area
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence).
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any “HOT WORK” is undertaken e.g. welding, grinding, gas cutting etc.

- Prevent excessive dust and noise.

DO NOT:

- Do not litter - report dirty or full facilities, i.e. full dustbins and dirty or blocked chemical toilets.
- Do not make any fires.
- Do not enter any fenced off or demarcated areas.
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses.
- Do not litter or leave food lying around.
- Do not feed the animals.

9 COMPLIANCE WITH THE EMPR

9.1 Site inspections

During the construction phase, Construction Contractor must appoint a suitably qualified person to undertake weekly visual site inspections supported by photographic evidence. The weekly visual inspection findings must be collated into a monthly compliance report to report on the compliance of the construction phase mitigation measures. The monthly site inspection reports should cover the following:

- routine observations of behaviours and practices;
- noting of unusual events, incidents and accidents (natural and human triggered);
- brief statement whether or not conditions of the EMP are being met; and where it is reportable to authorities;
- possible reasons why conditions are not being met; and
- Corrective action plans.

The report should be submitted to the VLNR Manager and Construction Contractor. Copies of the inspection reports should be kept on site.

9.2 Internal EMP Performance Assessment

During the construction phase, a formal EMP Performance Assessment as per the NEMA EIA Regulations must be undertaken by the VLNR Manager once during the construction period and once when construction has been completed prior to the site being handed over to the Lodge Operator. This report will be approved/signed-off by both the VLNR Manager and Construction Contractor in support of close-out of the construction phase.

9.3 External EMP Performance Assessment

After the construction phase, an external EMP Performance Assessment must be undertaken by an independent Environmental Assessment Practitioner to assess the effectiveness of mitigation measures identified in the EMP and to formally document the close-out of the construction phase. The report must be submitted to the VLNR Manager for review, and the final report must be submitted to the competent authority.

9.4 Incident Reporting

An environmental incident is an unwanted event that has an actual or potential (near-hit) negative impact on the environment, affecting the quality of air, land or water, fauna or flora, and / or causing stakeholder concern. A causal link must be able to be made between an operational activity and the event. Environmental Incidents is monitored to establish the following:

- Which repeat incidents occur;
- Has the incident been investigated and the root cause been identified;
- Effectiveness of implementation of preventative and corrective actions; and
- To monitor trends to check the effectiveness of the mitigation measures.

Table 8: Incident register

Name of person reporting the incident	Information on the incident	Date of incident identified	Actions taken as to address the incident	Date of rectification	Signature

9.5 Emergency Procedures

The purpose of this procedure is to:

- document the mechanism by which potential emergency situations and accidents will be identified during the construction phase that can have an impact on the environment; and
- Provide guidelines on the response to actual emergency situations and accidents to prevent or mitigate associated environmental impacts that may occur.

An environmental emergency situation or accident is an unexpected, sudden occurrence with the potential to endanger people or seriously damage the environment, either immediately or with a delayed effect.

Potential emergencies shall be identified and response plans shall be developed for all identified emergencies. These include the following:

- how potential emergency situations and accidents will be identified;
- a guideline for developing emergency preparedness and response procedures, for use by sections on the mine to address section-specific emergencies, stating how to respond to potential emergencies that might have an impact on the environment;
- the process to be followed in the case where an emergency situation or accident occurs;
- when potential emergency situations or accidents and their associated procedures will be reviewed; and
- The frequency at which the procedures shall be tested.

10 ANNEXURES

ANNEXURE A: CURRICULUM VITAE OF THE EAP

***ANNEXURE B: DE BEERS ECOLOGY DIVISION WASTE MANAGEMENT
PROCEDURE***

***ANNEXURE C: DE BEERS ECOLOGY DIVISION FIRE FIGHTING POLICY
AND PROCEDURE***

***ANNEXURE D: DE BEERS ECOLOGY DIVISION OVERARCHING RESERVE
MANAGEMENT PLAN***