Application for Environmental Authorization for Proposed Safari Lodge near Malelane Gate, Kruger National Park Mpumalanga

DEA Reference: 14/12/16/3/3/1/1280

APPENDIX G IMPACT ASSESSMENT TABLES

Compiled by:

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On behalf of:

Malelane Safari Resort Investments (Pty) Ltd.

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1. ASSESSMENT CRITERIA

The impacts anticipated to occur as a result of the proposed development are assessed/ evaluated to determine their significance. The following assessment criteria are used:

Extent (how far the impact extends):

- **(1) Very low:** within the site only
- **(2) Low:** within the local neighbourhoods
- **(3) Medium:** within the region
- **(4) High:** Nationally
- **(5) Very high:** Internationally

Duration (the timeframe over which the effects of the impact will be felt):

- **(1) Very short:** 0-2 years
- **(2) Short:** 3-5 years
- **(3) Medium:** 5-15 years
- **(4) Long:** >15 years
- **(5) Permanent**

Magnitude (the severity or size of the impact):

- (**0) None**
- **(2) Minor**
- **(4) Low**
- **(6) Moderate**
- **(8) High**
- **(10) Very High**

Probability (the likelihood of the impact actually occurring):

- **(1) Very improbable:** Less than 20% sure of the likelihood of an impact occurring
- **(2) Improbable:** 20-40% sure of the likelihood of an impact occurring
- **(3) Probable:** 40-60% sure of the likelihood of an impact occurring
- **(4) Highly probable:** 60-80% sure of the likelihood of that impact occurring
- **(5) Definite:** More than 80% sure of the likelihood of that impact occurring

The **significance** of the potential visual impact is determined by the sum of the individual scores for extent, duration and magnitude multiplied by the **probability** of the impact occurring i.e. **significance = (extent + duration + magnitude) x probability.**

The significance rating scale is interpreted as follows:

- **(2-12) Negligible**: Impact would be of a very low order. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit.

- **(13-30) Low:** Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.

- **(31-56) Moderate**: Impact would be real but not substantial. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts, other means of achieving these benefits would be about equal in time, cost, and effort.

- **(57-90) High**: Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.

- **(91-100) Very High:** Of the highest order possible. In the case of negative impacts, there would be no possible mitigation and / or remedial activity and in the case of positive impacts, there is no real alternative to achieving the benefit.

2. ENVIRONMENTAL IMPACT ASSESSMENT

The tables that follow detail the assessment of the significance of anticipated environmental impact during the entire project life cycle according to the impact assessment criteria. The findings of the various specialists appointed as part of the BAR process have informed the impact assessment below. These impacts been supplemented with additional impacts as deemed appropriate by the EAP.

2.1 Impacts that may result from the Planning and Design Phase

Planning and design phase impacts refer to those impacts that may be mitigated through planning decisions. In this respect, the potential impacts are articulated as '**risks**' rather than '**impacts**', because in reality, no impact occurs on the ground at all during the planning phase. The rationale behind this approach is to demonstrate the mitigating effect of environmentally responsible and appropriate planning and design during this phase.

Potential impacts:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	**Significance**	**Proposed mitigation:**	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	**Significance**
ALTERNATIVE A1 (PREFERRED ALTERNATIVE)											
Direct Impacts											
Ground water											
None.						•					
Hydrology (surface water)											
Risk to ecological function of the riparian habitat along the Crocodile and Timfenheni Rivers due to the placement of structures and infrastructure within the habitat/ buffer zones.	2	4	8	4	**56 M**	• Planning and compliance, including ground water, surface water and storm water management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).	2	4	4	3	**30 L**
Risk to hydrological function (quality and fluctuation properties) along the Crocodile and Timfenheni River due to activity and disturbance within the watercourse.	2	5	8	4	**60 H**		2	5	6	3	**39 M**
Soil											

Erosion risk to soils due to increased hard surface and associated increase in storm water runoff.	1	4	8	4	**52 M**	• Planning and compliance, including ground water, surface water, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).	1	4	4	2	**18 L**
Risk to sensitive (sodic) soils due to the placement of structures and infrastructure and clearance of vegetation.	1	4	8	3	**39 M**		1	4	4	2	**18 L**
Air											
None.						•					
Biodiversity (Flora)											
Risk to Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to the placement of structures and infrastructure and the realignment of the S114.	3	4	8	4	**60 H**	• Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).	3	4	4	3	**33 M**
Risk to sensitive habitats, specifically riparian zones due to the placement of structures and infrastructure.	3	4	8	4	**60 H**		3	4	4	3	**33 M**
Risk to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea* due to the placement of structures and infrastructure within the habitat and/ or within the demarcated buffer zones.	3	5	8	4	**64 H**		3	5	4	3	**36 M**
Biodiversity (Fauna)											
Risk to Schrubland and Woodland faunal habitat, which has a high significance for fauna species conservation and habitat fragmentation due to removal and alteration of the existing habitat and the development of structures, infrastructure and the realignment of the S114.	1	4	8	4	**52 M**	• Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).	1	4	4	3	**27 L**
Risk to Pel's Fishing-owl and Saddle-billed Storks breeding/nesting areas downstream from the proposed development site.	2	4	10	3	**48 M**		2	4	6	2	**24 L**
Risk to microhabitat, such as, rocky outcrops and dead tree stumps which are of particular importance to scorpions.	1	4	6	4	**44 M**		1	4	4	3	**27 L**

Land Use & Agricultural Potential												
None.						•						
Heritage												
None.						•						
Visual												
Risk to visual quality of the surrounding area and sense of place due to the development of structures and infrastructure at the Lodge and Park-and-Ride sites within an otherwise natural environment.	3	4	8	4	**60 H**	• Development footprint planning as per the EMPr (section 7.2). • Visual environment planning as per the EMPR (section 7.3).	3	4	4	3	**33 M**
Risk of lighting impact at night due to the operation of the Lodge and the Park-and-Ride after hours, as well as, the lighting impact of vehicles travelling at night.	3	4	8	4	**60 H**		3	4	4	3	**33 M**
Risk of glare from high-tech and reflective materials used for solar panels at the Lodge site.	3	4	10	4	**68 H**		3	4	4	4	**44 M**
Socio-economics												
None.						•						
Municipal services & traffic												
None.						•						
Indirect Impacts												
None												
Cumulative Impacts												
Biodiversity (Flora)												
Cumulative loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness. This will result in the overall reduction of Granite Lowveld vegetation.	3	4	8	4	**60 H**	• Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).	3	4	4	3	**33 M**
Cumulative loss of sensitive habitats, specifically riparian zones. This will result in the overall reduction of riverine vegetation.	3	4	8	4	**60 H**		3	4	4	3	**33 M**
Cumulative reduction of Red data species and protected trees. I.e. Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum	3	5	8	4	**64 H**		3	5	4	3	**36 M**

imberbe and Philenoptera violace. This will result in the overall loss of these species.											
Biodiversity (Fauna)											
Cumulative loss of Woodland and Shrubland faunal habitat, particularly relating to Pel's fishing-owl and the Saddle-billed Stork.	2	4	10	3	**48 M**	• Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).	2	4	6	2	**24 L**
Cumulative loss of microhabitat, such as, rocky outcrops and dead tree stumps which are of particular importance to scorpions.	1	4	6	4	**44 M**		1	4	4	3	**27 L**

ALTERNATIVE A2 (LAYOUT)											
Direct Impacts											
Ground water											
None.						•					
Hydrology (surface water)											
Risk to ecological function of the riparian habitat along the Crocodile and Timfenheni Rivers due to the placement of structures and infrastructure within the habitat/ buffer zones. Increased impact is expected due to the construction of permanent brick and mortar structures as opposed to lighter footprint tented structures.	2	4	10	4	**64 H**	• As per Alternative 1	2	4	6	3	**36 M**
Risk to hydrological function (quality and fluctuation properties) along the Crocodile and Timfenheni River due to activity and disturbance within the watercourse.	2	5	8	4	**60 H**	• As per Alternative 1	2	5	6	3	**39 M**
Soil											
Erosion risk to soils due to increased hard surface and associated increase in storm water runoff.	1	4	8	4	**52 M**	• As per Alternative 1	1	4	4	2	**18 L**
Risk to sensitive (sodic) soils due to the placement of structures and infrastructure and clearance of	1	4	8	4	**52 M**		1	4	6	4	**44 M**

vegetation. Increased impact is expected due to road and services infrastructure traversing buffer zones.												
Air												
None.						•						
Biodiversity (flora)												
Risk to Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to the placement of structures and infrastructure and the realignment of the S114.	3	4	8	4	**60 H**	• As per Alternative 1	3	4	4	3	**33 M**
Risk to sensitive habitats, specifically riparian zones due to the placement of structures and infrastructure. Increased impact is expected due to the construction of permanent brick and mortar structures as opposed to lighter footprint tented structures.	3	4	10	4	**68 H**	• As per Alternative 1	3	4	6	3	**39 M**
Risk to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea* due to the placement of structures and infrastructure within the habitat and/ or within the demarcated buffer zones. Increased impact is expected due to road and services infrastructure traversing buffer zones.	3	5	8	5	**80 H**	• As per Alternative 1	3	5	8	4	**64 H**
Biodiversity (Fauna)												
As per Alternative 1						• As per Alternative 1						
Land use and Agricultural potential												
None.						•						
Heritage												

None.						•					
Visual											
Risk to visual quality of the surrounding area and sense of place due to the development of structures and infrastructure at the Lodge and Park-and-Ride sites within an otherwise natural environment. Increased impact is expected due to the construction of permanent brick and mortar structures, which are more visually apparent than the lighter footprint tented structures.	3	4	10	4	**68 H**	• As per Alternative 1	3	4	6	3	**39 M**
Risk of lighting impact at night due to the operation of the Lodge and the Park-and-Ride after hours, as well as, the lighting impact of vehicles travelling at night.	3	4	8	4	**60 H**		3	4	4	3	**33 M**
Risk of glare from high-tech and reflective materials used for solar panels at the Lodge site.	3	4	10	4	**68 H**		3	4	4	4	**44 M**
Socio-economics											
None.						•					
Services and traffic											
None.						•					
Indirect Impacts											
None						•					
Cumulative Impacts											
Biodiversity (Flora)											
Cumulative loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness. This will result in the overall reduction of Granite Lowveld vegetation.	3	4	8	4	**60 H**	• As per Alternative 1	3	4	4	3	**33 M**
Cumulative loss of sensitive habitats, specifically riparian zones. This will result in the overall reduction of riverine vegetation. Increased impact is expected due to the	3	4	10	4	**68 H**		3	4	6	3	**39 M**

construction of permanent brick and mortar structures as opposed to lighter footprint tented structures.											
Cumulative reduction of Red data species and protected trees. I.e. Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violace. This will result in the overall loss of these species. Increased impact is expected due to road and services infrastructure traversing buffer zones.	3	5	8	5	**80 H**		3	5	8	4	**64 H**
Biodiversity (Fauna)											
As per Alternative 1						• As per Alternative 1					

ALTERNATIVE A3 (TECHNOLOGY)											
Direct Impacts											
Ground water											
None.						•					
Hydrology (surface water)											
Risk to ecological function of the riparian habitat along the Crocodile and Timfenheni Rivers due to the placement of structures and infrastructure within the habitat/ buffer zones. Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	2	4	10	4	**64 H**	• As per Alternative 1	2	4	8	4	**56 M**
Risk to hydrological function (quality and fluctuation properties) along the Crocodile and Timfenheni River due to activity and disturbance within the watercourse.	2	5	10	4	**68 H**		2	5	8	3	**45 M**

Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.											
Soil											
As per Alternative 1						• As per Alternative 1					
Air											
None.						•					
Biodiversity (Flora)											
Risk to Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to the placement of structures and infrastructure and the realignment of the S114.	3	4	8	4	**60 H**	• As per Alternative 1	3	4	4	3	**33 M**
Risk to sensitive habitats, specifically riparian zones due to the placement of structures and infrastructure. Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	3	4	10	4	**68 H**		3	4	8	4	**60 H**
Risk to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea* due to the placement of structures and infrastructure within the habitat and/ or within the demarcated buffer zones.	3	5	8	4	**64 H**		3	5	4	3	**36 M**
Biodiversity (Fauna)											
As per Alternative 1						• As per Alternative 1					
Land use and Agricultural potential											
None.						•					
Heritage											
None.						•					
Visual											
As per Alternative 1						• As per Alternative 1					

Socio economics												
None.						•						
Services & traffic												
None.						•						
Indirect Impacts												
None												
Cumulative Impacts												
Biodiversity (Flora)												
Cumulative loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness. This will result in the overall reduction of Granite Lowveld vegetation.	3	4	8	4	**60 H**	• As per Alternative 1	3	4	4	3	**33 M**	
Cumulative loss of sensitive habitats, specifically riparian zones. This will result in the overall reduction of riverine vegetation. Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	3	4	10	4	**68 H**		3	4	8	4	**60 H**	
Cumulative reduction of Red data species and protected trees. I.e. Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violace. This will result in the overall loss of these species.	3	5	8	4	**64 H**		3	5	4	3	**36 M**	
Biodiversity (Fauna)												
As per Alternative 1						• As per Alternative 1						

NO-PROJECT ALTERNATIVE												
Direct Impacts												
None.						●						
Indirect Impacts												
None.						●						
Cumulative Impacts												
None.						●						

2.2 Impacts that may result from the Construction Phase

Construction phase impacts refer to those impacts that may be mitigated through sound construction management.

Potential impacts:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance	Proposed mitigation:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance
ALTERNATIVE A1 (PREFERRED ALTERNATIVE)											
Direct Impacts											
Ground water											
Depletion of ground water due to overuse and waste during construction activities	3	2	6	3	**33 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Vehicles and equipment management as per the EMPr (section 8.7).	3	2	4	2	**18 L**
Pollution and contamination of ground water due to: • Surface runoff • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Hydrocarbon and fuel leaks and spills	3	2	8	3	**39 M**		3	2	4	2	**18 L**
Hydrology (surface water)											
Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile and Timfenheni Rivers due to: • Clearing and destruction of riparian and wetland vegetation • Loss of fringing vegetation and erosion of	1	2	6	4	**36 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads and protection of the riparian system as per the EMPr (section 8.2)	1	2	4	3	**18 L**

denuded areas • Invasion by alien invasive trees and plants • Alteration in natural fire regimes • Shading of natural vegetation						• Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching and borrow pits as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff, visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).					
Pollution and contamination of surface water of the Crocodile and Timfenheni Rivers due to: • Unmanaged runoff of grey water, cement slurry and wash water. • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills	3	1	6	3	**30 L**		3	1	4	2	**16 L**
Disturbance and loss of hydrological function (quality and fluctuation properties) of the Crocodile and Timfenheni Rivers particularly at the new River crossing due to: • Impeded and / or redirected flow due to activity within the water course • Uncontrolled discharges into the water resource (storm water) • Alteration of surface characteristics (roughness) due to activity within the water course • Removal of stabilising vegetation • Sedimentation and siltation from erosion	2	5	8	4	**60 H**		2	5	4	3	**33 M**
Soil											
Soil contamination and pollution due to: • Unmanaged surface runoff (grey water, cement slurry and wash water) • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste.	1	2	4	4	**28 L**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and	1	2	2	2	**10 N**

• Hydrocarbon and fuel leaks and spills						hazardous material as per the EMPr (section 8.3).					
Soil erosion by wind and rain due to: • The removal of stabilising vegetation • Soil compaction by movement of construction vehicles, equipment and activities • Decrease in water infiltration and an increase of water runoff in construction areas • Disturbance of sensitive (sodic) soils • Bank destabilisation due to construction of river crossings	1	4	6	3	**33 M**	• Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching, borrow pits as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Rehabilitation as per the EMPr (section 8.10).	1	4	4	2	**18 L**
Air											
Air pollution due emissions from construction vehicles and equipment.	3	1	4	4	**32 M**	• Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching, borrow pits as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).	3	1	4	3	**24 L**
Dust liberated by general construction activities and movement of construction vehicles.	2	1	6	4	**36 M**		2	1	4	3	**21 L**
Smoke from open fires used by site staff for heating and cooking as well as from uncontrolled fires.	2	1	6	3	**27 L**		2	1	4	2	**14 L**
Biodiversity (Flora)											
Removal of invader alien species found in the riparian zones located along the banks of the Crocodile and Timfenheni Rivers (positive impact).	1	1	4	3	**18 L**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of the riparian system as per the EMPr (section 8.2)	1	1	4	5	**30 L**
Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to:	1	4	4	5	**45 M**		1	4	2	5	**35 M**

• Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Hydrocarbon and fuel leaks and spills • Litter and other inert construction waste						• Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching, borrow pits as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).					
Disturbance of sensitive habitats, specifically riparian zones due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills	1	4	8	4	**52 M**		1	4	8	2	**26 L**
Destruction and damage to Red data species and protected trees. (i.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp*. *Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea)* due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles	1	5	8	4	**56 M**		1	5	4	3	**30 L**
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas due to: • Unmanaged cleared and disturbed areas, as well as, stockpiles • Unrehabilitated areas cleared and disturbed during construction • Construction vehicles operating on other sites	2	4	8	4	**56 M**		2	4	8	2	**28 L**

and carrying material and seed onto site The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape. Bush encroachment is the process, which transforms grassy vegetation into a woody species-dominated one. This is recognised as a very serious problem throughout Sub-Saharan Africa, as it means that large areas of grazing lands are lost (or reduced in capacity), and it transforms habitats and reduces species diversity.											
Biodiversity (Fauna)											
Loss of faunal habitat for threatened or near-threatened fauna species particularly Woodland and Shrubland along the Timhenfeni River. Avifauna are most at risk, such as Pel's fishing-owl and the Saddle billed-stork whose breeding, foraging and roosting habitats could be destroyed and the birds displaced due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Construction dust • Construction material, litter and other inert construction waste	2	4	8	4	**56 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, protection of the riparian system and protection of fauna as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Erosion control, including excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).	2	4	6	2	**24 L**
Loss of general faunal habitat and ecological connectivity.	3	4	8	5	**75 H**		3	4	6	4	**52 M**
Destruction and loss of micro habitats of invertebrates due to:	1	4	8	5	**65 H**		1	4	6	4	**44 M**

• Removal of topsoil, rocks and decaying logs • Removal of flora • Excavation of foundations • Excavation of trenches for services												
Introduction and invasion of alien ant species of microhabitats of indigenous invertebrates with a resultant loss of indigenous diversity.	1	5	6	3	**36 M**		1	1	2	3	**12 N**
Disturbance to local fauna, particularly the vulnerable Pel's Fishing-owl, vulnerable White-backed Night heron and the endangered Saddle-billed Stork, as well as, temporary changes in their distribution and abundance due to: • Presence of construction personnel and increased activity on site • Noise due to construction activities • Removal of habitat • Construction dust	2	2	6	3	**30 L**		2	2	6	2	**20 L**
Mortality of fauna due to: • Dangerous trenches and excavations • Persecution and extermination • Solvent, paints and chemical spills (poisoning) • Construction material, litter and other inert construction waste (suffocation) • Collisions with construction vehicles	2	1	10	3	**39 M**		2	1	4	2	**14 L**
Poaching and snaring of fauna on site and in the greater Kruger National Park by construction staff.	2	1	10	3	**39 L**		2	1	6	1	**9 N**
Increased opportunity for smuggling of poached items out of the KNP due to regular presence of large construction vehicles.	3	1	10	3	**42 M**		3	1	6	2	**20 L**
Land Use & Agricultural Potential												
None.						•						
Heritage												

Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction.	1	5	6	2	**24 L**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, access roads and protection of cultural heritage as per the EMPr (section 8.2)	1	5	2	1	**8 N**
Visual											
Visual impact of construction, lighting and dust due to the realignment of the S114 road on KNP tourists using internal roads owing to the presence of construction equipment, camps and workers.	2	1	8	4	**44 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching, borrow pits as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff, visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).	2	1	4	3	**21 L**
Visual impact of construction, lighting and dust due to the construction of the Park and Ride facility on KNP tourists, as well as, adjacent tourism developments. The construction of the Park and Ride facility will change the existing features and quality of the landscape. The presence of construction equipment, camps, workers, bush clearing and earthworkers will contribute to this.	3	1	8	5	**60 H**		3	1	6	4	**40 M**
Visual impact of construction, lighting and dust due to the construction of the proposed safari lodge on KNP tourists, as well as, the presence of construction equipment, camps and workers.	2	1	8	4	**44 M**		2	1	4	3	**21 L**
Socio-economics											
Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.). (positive impact)	*3*	*1*	*4*	*2*	***16 L***	• Socio-economic planning as per the EMPR (section 7.4). • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including accommodation and access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the	*3*	*1*	*4*	*3*	***24 L***
Creation of short-term employment and business opportunities and the opportunity for skills development and on-site training. (Positive impact).	*2*	*1*	*6*	*3*	***27 L***		*3*	*1*	*6*	*4*	***40 M***

Jobs and employment opportunities will be created, with a percentage being low and semi-skilled.						EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9).					
Noise, dust and safety impacts and disturbance to KNP tourists and adjacent tourism development due to general construction activities and movement of construction vehicles	2	2	6	4	**40 M**		2	1	2	3	**15 L**
An increase in construction workers and associated increase in social problems for the community, including: • An increase in alcohol and drug use; • An increase in crime levels; • An increase in teenage and unwanted pregnancies; • An increase in prostitution; • An increase in sexually transmitted diseases (STDs). • An increase in vandalism.	3	1	4	3	**24 L**		2	1	4	3	**21 L**
Increase in casual workers and associated increase in poaching.	1	1	8	4	**40 M**		1	1	2	4	**16 L**
Increased risk of veld fires due to the presence of construction workers on site.	3	1	10	4	**56 M**		2	1	4	3	**24 L**
Services & traffic											
Increase in traffic on the S114 and on other internal KNP roads due to construction vehicles.	2	1	6	4	**36 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8).	2	1	4	3	**21 L**
Increase in the number and frequency of construction vehicles accessing the site and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.	2	2	6	4	**40 M**		2	1	2	3	**15 L**
Increased traffic pressure and congestion at Malelane Gate.	2	1	6	4	**36 M**		2	1	4	4	**28 L**
Indirect Impacts											
Biodiversity (Flora)											

Loss of floral biodiversity, Red data species and protected trees due to increased incidence of veld fires	3	1	6	3	**30 L**	• As above	3	1	4	2	**16 L**
Biodiversity (Fauna)											
Loss of faunal biodiversity such as Pel's fishing-owl and Saddle-billed stork due to increased incidence of veld fires	3	1	8	3	**36 M**	• As above	3	1	6	2	**20 L**
Socio-economics											
Loss of property and threat to human life due to increased incidence of veld fires	3	1	6	3	**30 L**	• As above	3	1	4	2	**16 L**
Traffic and services											
Degradation of local roads due to the increase in the numbers of heavy vehicles.	2	1	6	4	**36 M**	• As above	2	1	4	3	**21 L**
Cumulative Impacts											
Biodiversity (Flora)											
Cumulative loss of Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness.	3	4	4	3	**33 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of the riparian system as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching, borrow pits as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).	3	4	2	3	**27 L**
Cumulative loss of ecological function of sensitive habitats, specifically riparian zones.	3	4	8	3	**45 M**		3	4	6	2	**26 L**
Cumulative reduction and damage to Red data species and protected trees (i.e. Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea).	3	5	8	4	**64 H**		3	5	4	3	**36 M**

Biodiversity (Fauna)											
Cumulative loss of faunal habitat, particularly the sensitive riparian woodland habitat and shrubland.	2	4	8	3	**42 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, protection of the riparian system and protection of fauna as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Erosion control, including excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).	2	4	6	2	**20 L**
Socio-economics											
Community upliftment and the opportunity to up-grade and improve skills levels in the area. (positive impact)	*3*	*1*	*2*	*2*	***12 N***	• Socio-economic planning as per the EMPR (section 7.4). • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including accommodation and access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9).	*3*	*1*	*4*	*3*	***24 L***
Services & traffic											
Cumulative increase in traffic and the resultant noise, dust, and safety impacts on other road users,	3	1	6	4	**40 M**	• Pre-construction planning, including planning and preparation as per the EMPr (section 8.1)	3	1	4	2	**16 L**

residents of the local community and adjacent tourism developments.						• Site establishment, including access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8).						

ALTERNATIVE A2 (LAYOUT)												
Direct Impacts												
Ground Water												
As per Alternative 1						• As per Alternative 1						
Hydrology (surface water)												
Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile and Timfenheni Rivers due to: • Clearing and destruction of riparian and wetland vegetation • Loss of fringing vegetation and erosion of denuded areas • Invasion by alien invasive trees and plants • Alteration in natural fire regimes • Shading of natural vegetation Increased impact is expected due to the more invasive nature and longer duration of brick and mortar construction.	2	2	8	4	**48 M**	• As per Alternative 1	2	2	6	3	**30 L**
Pollution and contamination of surface water of the Crocodile and Timfenheni Rivers due to: • Unmanaged runoff of grey water, cement slurry and wash water. • Unmanaged sewage discharge, leaks and spills	3	1	8	3	**36 M**	• As per Alternative 1	3	1	6	2	**20 L**

• Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills Increased impact is expected due to the more invasive nature and longer duration of brick and mortar construction.											
Disturbance and loss of hydrological function (quality and fluctuation properties) of the Crocodile and Timfenheni Rivers particularly at the new River crossing due to: • Impeded and / or redirected flow due to activity within the water course • Uncontrolled discharges into the water resource (storm water) • Alteration of surface characteristics (roughness) due to activity within the water course) • Removal of stabilising vegetation • Sedimentation and siltation from erosion	1	4	10	4	**60 H**	• As per Alternative 1	1	4	6	3	**33 M**
Soil											
Soil contamination and pollution due to: • Unmanaged surface runoff (grey water, cement slurry and wash water) • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills	1	2	4	4	**28 L**	• As per Alternative 1	1	2	2	2	**10 N**
Soil erosion by wind and rain due to: • The removal of stabilising vegetation • Soil compaction by movement of construction vehicles, equipment and activities	1	4	10	4	**60 M**	• As per Alternative 1	1	4	8	3	**39 M**

• Decrease in water infiltration and an increase of water runoff in construction areas • Disturbance of sensitive (sodic) soils • Bank destabilisation due to construction of river crossings Increased impact is expected due to construction of road and services infrastructure within buffer zones.												
Air												
As per Alternative 1						• As per Alternative 1						
Biodiversity (flora)												
Removal of invader alien species found in the riparian zones located along the banks of the Crocodile and Timfenheni Rivers (positive impact).	1	1	4	3	**18 L**	• As per Alternative 1	1	1	4	5	**30 L**
Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Hydrocarbon and fuel leaks and spills • Litter and other inert construction waste	1	4	4	5	**45 M**	• As per Alternative 1	1	4	2	5	**35 M**
Disturbance of sensitive habitats, specifically riparian zones due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste.	1	4	10	4	**60 H**	• As per Alternative 1	1	4	10	3	**45 M**

• Hydrocarbon and fuel leaks and spills Increased impact is expected due to the more invasive nature and longer duration of brick and mortar construction.											
Destruction and damage to Red data species and protected trees. i.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea* due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles Increased impact is expected due to construction of road and services infrastructure within buffer zones.	1	5	10	4	**64 H**	• As per Alternative 1	1	5	8	4	**56 M**
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas due to: • Unmanaged cleared and disturbed areas, as well as, stockpiles • Unrehabilitated areas cleared and disturbed during construction • Construction vehicles operating on other sites and carrying material and seed onto site The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape. Bush encroachment is the process, which transforms grassy vegetation into a woody species-	2	4	8	4	**56 M**	• As per Alternative 1	2	4	8	2	**28 L**

dominated one. This is recognised as a very serious problem throughout Sub-Saharan Africa, as it means that large areas of grazing lands are lost (or reduced in capacity), and it transforms habitats and reduces species diversity.											
Biodiversity (fauna)											
Loss of faunal habitat for threatened or near-threatened fauna species particularly Woodland and Shrubland along the Timhenfeni River. Avifauna are most at risk, such as Pel's fishing-owl and the Saddle billed-stork whose breeding, foraging and roosting habitats could be destroyed and the birds displaced due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Construction dust • Construction material, litter and other inert construction waste	2	4	8	4	**56 M**	• As per Alternative 1	2	4	6	2	**24 L**
Loss of general faunal habitat and ecological connectivity.	3	4	8	5	**75 H**		3	4	6	4	**52 M**
Destruction and loss of micro habitats of invertebrates due to: • Removal of topsoil, rocks and decaying logs. • Removal of flora. • Excavation of foundations. • Excavation of trenches for services.	1	4	8	5	**65 H**		1	4	6	4	**44 M**
Introduction and invasion of alien ant species of microhabitats of indigenous invertebrates with a resultant loss of indigenous diversity.	1	5	6	3	**36 M**		1	1	2	3	**12 N**
Disturbance to local fauna, particularly the vulnerable Pel's Fishing-owl, vulnerable White-	2	2	8	4	**48 M**		2	2	6	3	**30 L**

backed Night heron and the endangered Saddle-billed Stork, as well as, temporary changes in their distribution and abundance due to: • Presence of construction personnel and increased activity on site • Noise due to construction activities • Removal of habitat • Construction dust Increased impact is expected due to the more invasive nature and longer duration of brick and mortar construction.												
Mortality of fauna due to: • Dangerous trenches and excavations • Persecution and extermination • Solvent, paints and chemical spills (poisoning) • Construction material, litter and other inert construction waste (suffocation) • Collisions with construction vehicles Increased impact is expected due to the more invasive nature and longer duration of brick and mortar construction.	2	2	10	3	**42 M**		2	2	4	2	**16 L**
Poaching and snaring of fauna on site and in the greater Kruger National Park by construction staff.	2	1	10	3	**39 L**		2	1	6	1	**9 N**
Increased opportunity for smuggling of poached items out of the KNP due to regular presence of large construction vehicles	2	2	10	3	**42 M**		2	2	6	2	**20 L**
Land use and Agricultural Potential												
None.						•						
Heritage												
As per Alternative 1						• As per Alternative 1						

Visual												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As for Alternative 1						• As per Alternative 1						
Services and Traffic												
As for Alternative 1						• As per Alternative 1						
Indirect Impacts												
Biodiversity (Flora)												
As per Alternative 1						• As per Alternative 1						
Biodiversity (Fauna)												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As per Alternative 1						• As per Alternative 1						
Traffic and services												
As per Alternative 1						• As per Alternative 1						
Cumulative Impacts												
Biodiversity (Flora)												
Cumulative loss of Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness.	3	4	4	3	**33 M**	• As per Alternative 1	3	4	2	3	**27 L**	
Cumulative loss of ecological function of sensitive habitats, specifically riparian zones. Increased impact is expected due to the more invasive nature and longer duration of brick and mortar construction.	3	4	10	3	**51 M**		3	4	8	2	**30 L**	
Cumulative reduction and damage to Red data species and protected trees (i.e. Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea). Increased impact is expected due to construction of road and services infrastructure within buffer zones.	3	5	10	4	**72 H**		3	5	8	3	**48 M**	

Biodiversity (Fauna)												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As per Alternative 1						• As per Alternative 1						
Services & traffic												
As per Alternative 1						• As per Alternative 1						

ALTERNATIVE A3 (TECHNOLOGY)												
Direct Impacts												
Ground water												
As per Alternative 1.						• As per Alternative 1						
Hydrology (surface water)												
Disturbance and loss to ecological function of the riparian habitat along the Crocodile and Timfenheni Rivers due to: • Clearing and destruction of riparian and wetland vegetation • Loss of fringing vegetation and erosion of denuded areas • Invasion by alien invasive trees and plants • Alteration in natural fire regimes • Shading of natural vegetation Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	1	2	8	4	**44 M**	• As per Alternative 1	1	2	6	3	**27 L**	
Pollution and contamination of surface water of the Crocodile and Timfenheni Rivers due to: • Unmanaged runoff of grey water, cement slurry and wash water. • Unmanaged sewage discharge, leaks and spills	3	1	8	3	**36 M**		3	1	6	3	**30 L**	

• Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.											
Disturbance and loss of hydrological function (quality and fluctuation properties) of the Crocodile and Timfenheni Rivers, particularly at the new River crossing and the Eskom cable crossing due to: • Impeded and / or redirected flow due to activity within the water course • Uncontrolled discharges into the water resource (storm water) • Alteration of surface characteristics (roughness) due to activity within the water course • Removal of stabilising vegetation • Sedimentation and siltation from erosion Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	2	5	10	4	**68 H**		2	5	8	3	**45 M**
Soil											
Soil contamination and pollution due to: • Unmanaged surface runoff (grey water, cement slurry and wash water) • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills	1	2	4	4	**28 L**	• As per Alternative 1	1	2	2	2	**10 N**

Soil erosion by wind and rain due to: • The removal of stabilising vegetation • Soil compaction by movement of construction vehicles, equipment and activities • Decrease in water infiltration and an increase of water runoff in construction areas • Disturbance of sensitive (sodic) soils • Bank destabilisation due to construction of river crossings Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River. The removal of stabilizing vegetation along the eastern and western banks of the Crocodile River could lead to bank destabilization.	1	4	8	4	**52 M**		1	4	6	3	**33 M**
Air											
As per Alternative 1						• As per Alternative 1					
Biodiversity (Flora)											
Removal of invader alien species found in the riparian zones located along the banks of the Crocodile and Timfenheni Rivers (positive impact).	1	1	4	3	**18 L**	•	1	1	4	5	**30 L**
Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Hydrocarbon and fuel leaks and spills • Litter and other inert construction waste	1	4	4	5	**45 M**	•	1	4	2	5	**35 M**
Disturbance of sensitive habitats, specifically	1	4	10	4	**60**	• As per Alternative 1	1	4	8	3	**39**

riparian zones due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.					**H**						**M**
Destruction and damage to Red data species and protected trees. i.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp*. *Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea* due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles	1	5	8	4	**56 M**		1	5	4	3	**30 L**
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas due to: • Unmanaged cleared and disturbed areas, as well as, stockpiles • Unrehabilitated areas cleared and disturbed during construction • Construction vehicles operating on other sites and carrying material and seed onto site The invasive potential of the area is relatively low.	2	4	8	4	**56 M**		2	4	8	2	**28 L**

However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape. Bush encroachment is the process, which transforms grassy vegetation into a woody species-dominated one. This is recognised as a very serious problem throughout Sub-Saharan Africa, as it means that large areas of grazing lands are lost (or reduced in capacity), and it transforms habitats and reduces species diversity.											
Biodiversity (Fauna)											
Loss of faunal habitat for threatened or near-threatened fauna species particularly Woodland and Shrubland along the Timhenfeni River. Avifauna are most at risk, such as Pel's fishing-owl and the Saddle billed-stork whose breeding, foraging and roosting habitats could be destroyed and the birds displaced due to: • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Construction dust • Construction material, litter and other inert construction waste Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	2	4	10	4	**64 M**	• As per Alternative 1	2	4	8	3	**42 M**
Loss of general faunal habitat and ecological connectivity.	3	4	8	5	**75 H**		3	4	6	4	**52 M**
Destruction and loss of micro habitats of invertebrates due to:	1	4	8	5	**65 H**		1	4	6	4	**44 M**

• Removal of topsoil, rocks and decaying logs. • Removal of flora. • Excavation of foundations. • Excavation of trenches for services.												
Introduction and invasion of alien ant species of microhabitats of indigenous invertebrates with a resultant loss of indigenous diversity.	1	5	6	3	**36 M**		1	1	2	3	**12 N**
Disturbance to local fauna, particularly the vulnerable Pel's Fishing-owl, vulnerable White-backed Night heron and the endangered Saddle-billed Stork, as well as, temporary changes in their distribution and abundance due to: • Presence of construction personnel and increased activity on site • Noise due to construction activities • Removal of habitat • Construction dust Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	2	2	8	4	**48 M**		2	2	6	3	**30 L**
Mortality of fauna due to: • Dangerous trenches and excavations • Persecution and extermination • Solvent, paints and chemical spills (poisoning) • Construction material, litter and other inert construction waste (suffocation) • Collisions with construction vehicles Increased impact is expected due to the installation of the Eskom power cable under the Crocodile	2	1	10	4	**52 M**		2	1	6	3	**27 L**

River.												
Poaching and snaring of fauna on site and in the greater Kruger National Park by construction staff.	2	1	10	3	**39 L**		2	1	6	1	**9 N**
Increased opportunity for smuggling of poached items out of the KNP due to regular presence of large construction vehicles.	3	1	10	3	**42 M**		3	1	6	2	**20 L**
Land use and Agricultural potential												
None.						•						
Heritage												
As per Alternative 1						• As per Alternative 1						
Visual												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As per Alternative 1						• As per Alternative 1						
Municipal services and traffic												
As per Alternative 1						• As per Alternative 1						
Indirect Impacts												
Biodiversity (Flora)												
As per Alternative 1						• As per Alternative 1						
Biodiversity (Fauna)												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As per Alternative 1						• As per Alternative 1						
Traffic and services												
As per Alternative 1						• As per Alternative 1						
Cumulative Impacts												
Biodiversity (Flora)												
Cumulative loss of Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness.	3	4	4	3	**33 M**	• As per Alternative 1	3	4	2	3	**27 L**
Cumulative loss of ecological function of sensitive habitats, specifically riparian zones. Increased impact is expected due to the installation	3	4	8	4	**60 H**		3	4	8	3	**45 M**

of the Eskom power cable under the Crocodile River.											
Cumulative reduction and damage to Red data species and protected trees (i.e. Adenium swazicum, Crinum stuhlmannii, Aloe spicata and Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe and Philenoptera violacea).	3	5	8	4	**64 H**		3	5	4	3	**36 M**
Biodiversity (Fauna)											
Cumulative loss of faunal habitat, particularly the sensitive riparian woodland habitat and shrubland. Increased impact is expected due to the installation of the Eskom power cable under the Crocodile River.	3	4	10	3	**51 M**	• As per Alternative 1	3	4	8	2	**30 L**
Socio-economics											
As per Alternative 1						• As per Alternative 1					
Services & traffic											
As per Alternative 1						• As per Alternative 1					

NO-PROJECT ALTERNATIVE											
Direct Impacts											
None						•					
Indirect Impacts											
None.						•					
Cumulative Impacts											
None.						•					

2.3 Impacts that may result from the Operational Phase

Operational phase impacts refer to those impacts that may be mitigated through effective and efficient operating procedures.

Potential impacts:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance	Proposed mitigation:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance
ALTERNATIVE A1 (PREFERRED ALTERNATIVE)											
Direct Impacts											
Ground water											
Depletion of ground water resources due to over use and waste during operation.	3	4	4	3	**33 M**	• Biodiversity management, including access roads and resource management as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) • Erosion control as per the EMPr (section 9.3) • Socio economic management, including staff management as per the EMPR (section 9.5) • Vehicles and equipment management as per the EMPr (section 9.4)	3	4	2	2	**18 L**
Pollution and contamination of ground water due to: • Unmanaged storm water runoff • Unmanaged sewage discharge • Sewage leaks and spills • Herbicides, pesticides and fertilisers • Discharge and spill of solvents, paints, chemicals and cleaning products • Discharge and spill of hydrocarbons and fuel	3	4	6	3	**39 M**		3	4	4	2	**22 L**
Hydrology (surface water)											
Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile and Timfenheni Rivers due to: • Encroachment of alien invasive species • Uncontrolled vegetation clearing and access by	1	4	8	3	**39 M**	• Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid, liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2)	1	4	4	2	**18 L**

staff and guests						• Erosion control as per the EMPr (section 9.3)						
Pollution and contamination of surface water due to: • Unmanaged storm water runoff • Litter and uncontrolled waste • Sewage leaks and spills • Herbicides, pesticides and fertilisers • Discharge and spill of solvents, paints, chemicals and cleaning products • Discharge and spill of hydrocarbons and fuel	2	4	6	3	**36 M**	• Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPR (section 9.5) • Fire management as per the EMPR (section 9.6)	2	4	4	2	**20 L**
Disturbance and loss of hydrological function (quality and fluctuation properties) along the Crocodile and Timfenheni Rivers due to: • Uncontrolled discharges into the water resource (storm water) • Alteration of surface characteristics (roughness) due to activity within the water course (uncontrolled access by staff and guests) • Removal of stabilising vegetation (uncontrolled clearing and access by staff and guests) • Sedimentation and siltation from erosion	1	4	8	3	**39 M**		1	4	4	2	**18 L**
Soil												
Soil contamination and pollution due to: • Unmanaged storm water runoff • Litter and uncontrolled waste • Sewage leaks and spills • Herbicides, pesticides and fertilisers • Discharge and spill of solvents, paints, chemicals and cleaning products • Discharge and spill of hydrocarbons and fuel	1	4	8	3	**39 M**	• Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4)	1	4	4	2	**18 L**
Soil erosion due to:	1	4	8	3	**39 M**	• Socio economic management, including staff management as per the EMPR (section 9.5)	1	4	4	2	**18 L**

• Soil compaction by uncontrolled movement of staff and guests (especially vehicles) • Runoff over exposed or cleared areas that have failed to rehabilitate. • Disturbance of sensitive (sodic) soils by uncontrolled movement of staff and guests (especially vehicles)											
Air											
Air pollution by emissions from increased numbers of game drive vehicles and the shuttle from the Park and Ride Facility.	3	4	4	3	**33 M**	• Socio economic management, including staff management and 24-hour access management as per the EMPR (section 9.5)	3	4	4	3	**33 M**
Biodiversity (Flora)											
Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to: • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste	1	4	6	3	**33 M**	• Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPR (section 9.5) • Fire management as per the EMPR (section 9.6)	1	4	4	2	**18 L**
Disturbance of sensitive habitats, specifically riparian zones due to: • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste	1	4	6	3	**33 M**		1	4	4	2	**18 L**
Destruction and damage to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata* and *Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe* and *Philenoptera violacea* due to uncontrolled vegetation clearing and access by staff and guests.	1	5	6	3	**36 M**		1	5	4	2	**20 L**

Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful. Colonisation and re-emergence of exotic vegetation / alien species and bush encroachment into disturbed soils and poorly rehabilitated areas. Alien invasive species tend to out-compete indigenous, slower growing species and could also result in unsuccessful rehabilitation. The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape.	2	4	8	3	**42 M**		2	4	6	2	**24 L**
Biodiversity (Fauna)											
Loss of faunal habitat due to: • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste	1	4	6	3	**33 M**	• Biodiversity management, including access roads, resource management, protection of flora, alien plant control and protection of fauna as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPR (section 9.5) • Fire management as per the EMPR (section 9.6)	1	4	4	2	**18 L**
Faunal disturbances, displacement of taxa and changes in distribution and abundance due to: • Uncontrolled vegetation clearing and access by staff and guests • General operations (activities) of the facility • Noise from guests, staff and vehicles • Night drives • Perimeter safety fences	1	4	6	3	**33 M**		1	4	4	2	**18 L**
Introduction and invasion of alien ant species of microhabitats of indigenous invertebrates and	2	5	6	3	**39 M**		2	5	2	2	**18 L**

resultant loss of diversity.											
Disruption and disorientation of nocturnal invertebrates and avifauna owing to the illumination of the proposed lodge and park and ride facility. Possible collision with infrastructure is also a possibility with avifauna that become disorientated.	2	4	4	4	**40 M**		2	4	2	4	**32 M**
Mortality of fauna due to: • Persecution and extermination • Solvents, paints, chemicals and cleaning products (poisoning) • Litter and waste (suffocation) • Night-time collisions along the S114 due to the shuttle between the lodge and the park and ride • Collision with buildings (avifauna)	3	4	4	4	**44 M**		3	4	4	2	**22 L**
Poaching and snaring of faunal species by staff.	2	4	6	2	**24 L**		2	4	6	1	**12 N**
Land Use & Agricultural Potential											
None.						•					
Heritage											
None.						•					
Visual											
Visual Impact of the lodge structures and infrastructure on KNP tourists using internal roads. It should be noted that the newly aligned S114 and the S121 routes are the only tourist routes that pass near the site. The screening capacity of the vegetation is regarded sufficient in limiting the visibility of the lodge and its infrastructure from views on these routes.	2	4	4	3	**30 L**	• Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPR (section 9.5)	2	4	4	2	**20 L**
Visual Impact of the park and ride structures and infrastructure on KNP tourists using internal roads.	2	4	4	3	**30 L**		2	4	4	2	**20 L**
Visual impact of the realigned S114 on KNP tourists using internal roads.	2	4	2	1	**8 N**		2	4	2	1	**8 N**

It should be noted that the realignment of the S114 road will form part of the existing road network and will not be regarded as different by the observers utilising it.												
Visual Impact of the lodge structures and infrastructure on adjacent tourism developments.	2	4	2	3	**24 L**		2	4	2	2	**16 L**
Visual Impact of the park and ride structures and infrastructure on adjacent tourism developments. Visitors to Pestana Kruger Lodge and Leopard Creek Estate may experience partial views of the roof of the Welcome Centre. The larger trees on the riverbank and the dense bushes surrounding the facility will screen the other infrastructure.	2	4	6	3	**36 M**		2	4	6	2	**24 L**
Visual Impact of lighting of the lodge on adjacent tourism developments.	2	4	4	2	**20 L**		2	4	4	1	**18 L**
Visual Impact of lighting of the park and ride on adjacent tourism developments	2	4	6	4	**48 M**		2	4	4	2	**20 L**
Visual Impact of shuttle vehicle lights operating at night between the lodge and the park and ride.	2	4	8	4	**56 M**		2	4	4	3	**30 L**
Visual impact of solar panels mounted on the lodge on KNP tourists and adjacent tourism developments	2	4	6	3	**36 M**		2	4	4	2	**20 L**
Socio-economics												
Stimulation of the local economy, especially the local service delivery industry (accommodation, catering, cleaning, transport, security etc.). (positive impact)	*3*	*4*	*4*	*2*	***22 L***	• Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPR (section 9.5)	*3*	*4*	*4*	*3*	***33 M***
Generation of funds to contribute to the management of the KNP (positive impact)	*1*	*4*	*2*	*2*	***14 L***		*1*	*4*	*4*	*3*	***27 L***
Creation of long term employment and business opportunities as well as opportunities for skills development and transfer (positive impact)	*3*	*4*	*6*	*4*	***52 M***		*3*	*4*	*8*	*4*	***60 H***
Creation of opportunities for local SMME's (positive impact)	*2*	*4*	*6*	*3*	***36 M***		*3*	*4*	*6*	*4*	***52 M***

Financial beneficiation of local shareholders through the establishment of a Community Trust, which will increase over time (positive impact)	*2*	*4*	*4*	*3*	***30 L***		*3*	*4*	*4*	*4*	***44 M***
Creation of a destination that appeals to the tastes and preferences of a new or broader tourist market and exposes them to nature and heritage (positive impact)	*3*	*4*	*6*	*3*	***39 M***		*4*	*4*	*6*	*4*	***56 M***
Impact on existing tourist operations, especially in terms of competition.	3	4	2	3	**27 L**		3	4	2	3	**27 L**
Impacts associated with the 24-hour access to the KNP including: • increased rhino poaching, • increased incidence of road kills, • impact on noctural movements and migratory patterns of fauna, • noise and light impacts at the Park-and-Ride and along access roads • a precedent for 24 access into the Kruger National Park.	3	4	8	4	**60 H**		1	4	2	4	**28 L**
Impact on adjacent land uses and activities particularly with regard to the sugar cane fields.	2	4	2	3	**24 L**		2	4	2	3	**24 L**
Service and traffic											
Operational cost of running services and infrastructure, specifically electricity (positive impact). *Operational cost is expected to be minimal in the long term as a result of off-grid design.*	*1*	*4*	*2*	*4*	***28 L***	• Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPR (section 9.5)	*1*	*4*	*2*	*4*	***28 L***
Increase in traffic on the S114 and on other internal KNP roads due to increased visitor numbers.	2	4	6	5	**60 H**		2	4	4	3	**30 L**
Increase in the number and frequency of vehicles accessing the site, and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism	3	4	6	4	**52 M**		3	4	4	2	**22 L**

developments.											
Increased traffic pressure and congestion at Malelane Gate.	1	4	6	4	**44 M**		1	4	4	3	**27 L**
Indirect Impacts											
Visual											
Visual impact of the proposed development of the Malelane Safari Lodge on the sense of place and visual character of the region.	3	4	8	4	**60 H**	• Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPR (section 9.5)	1	4	2	4	**28 L**
Visual impact of additional development on the perceived ecotourism value of internal KNP roads and adjacent tourism developments.	2	4	6	3	**36 M**		2	4	4	2	**20 L**
Cumulative Impacts											
Biodiversity (Flora)											
Cumulative loss of Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness.	3	4	6	3	**39 M**	• Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPR (section 9.5) • Fire management as per the EMPR (section 9.6)	3	4	4	2	**22 L**
Cumulative disturbance of sensitive habitats, specifically riparian zones	3	4	6	3	**39 M**		3	4	4	2	**22 L**
Cumulative reduction and damage to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata* and *Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe* and *Philenoptera violacea.*	3	5	6	3	**42 M**		3	5	6	2	**28 L**
Visual											
The accumulation of built forms and within an otherwise natural environment.	3	4	8	4	**60 H**	• Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPr (section 9.5)	3	4	4	2	**22 L**
Socio-economics											
Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area (positive	*3*	*4*	*2*	*2*	***18 L***	• Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPr (section 9.5)	*3*	*4*	*4*	*3*	***33 M***

impact)											
Promotion of social and economic development in the local communities and improvement in the overall well being of the community (positive impact)	*3*	*4*	*2*	*2*	***18 L***		*3*	*4*	*2*	*3*	***27 L***
Cumulative impacts associated with the 24-hour access to the KNP including: • increased rhino poaching, • increased incidence of road kills, • impact on noctural movements and migratory patterns of fauna, • a precedent for 24 access into the Kruger National Park.	3	4	8	4	**60 H**		1	4	2	4	**28 L**
Services and traffic											
Cumulative increase in traffic on the S114 and on other internal KNP roads due to increased visitor numbers.	3	4	6	3	**39 L**	• Planning and compliance, including waste management as per the EMPr (section 7.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Socio economic management, including staff management, 24-hour access management and visual impact management as per the EMPr (section 9.5)	3	4	6	2	**26 L**
Cumulative increase in the number and frequency of vehicles accessing the site, and the resultant noise, dust, and safety impacts for other road users, adjacent tourism development and residents of the local communities.	3	4	4	3	**33 L**		3	4	4	2	**22 L**
Waste disposal practices will have an accumulative effect on the local landfill site's capacity to absorb waste.	3	4	6	4	**52 M**		3	4	4	3	**33 M**

ALTERNATIVE A2 (LAYOUT)											
Direct Impacts											
Ground water											
As per Alternative 1						• As per Alternative 1					
Hydrology (surface water)											
As per Alternative 1						• As per Alternative 1					
Soil											

Soil contamination and pollution due to: • Unmanaged storm water runoff • Litter and uncontrolled waste • Sewage leaks and spills • Herbicides, pesticides and fertilisers • Discharge and spill of solvents, paints, chemicals and cleaning products • Discharge and spill of hydrocarbons and fuel	1	4	8	3	**39 M**	• As per Alternative 1	1	4	4	2	**18 L**
Soil erosion due to: • Soil compaction by uncontrolled movement of staff and guests (especially vehicles) • Runoff over exposed or cleared areas that have failed to rehabilitate. • Disturbance of sensitive (sodic) soils by uncontrolled movement of staff and guests (especially vehicles) Increased impact is expected due to presence of road and services infrastructure within buffer zones, and associated storm water risks.	1	4	10	4	**60 H**		1	4	8	3	**39 M**
Air											
As per Alternative 1						• As per Alternative 1					
Biodiversity (Flora)											
Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness due to: • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste	1	4	6	3	**33 M**	• Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the	1	4	4	2	**18 L**
Disturbance of sensitive habitats, specifically	1	4	6	3	**33**		1	4	4	2	**18**

riparian zones due to: • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste					**M**	EMPr (section 9.4) • Socio economic management, including staff management as per the EMPR (section 9.5) • Fire management as per the EMPR (section 9.6)					**L**
Destruction and damage to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata* and *Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe* and *Philenoptera violacea* due to uncontrolled vegetation clearing and access by staff and guests. Increased impact is expected due to presence of road and services infrastructure within buffer zones, and associated storm water risks.	1	5	8	3	**42 M**		1	5	8	2	**28 L**
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful. Colonisation and re-emergence of exotic vegetation / alien species and bush encroachment into disturbed soils and poorly rehabilitated areas. Alien invasive species tend to out-compete indigenous, slower growing species and could also result in unsuccessful rehabilitation. The invasive potential of the area is relatively low. However, the lack of adequate rehabilitation will allow alien invasive plant species to colonise disturbed areas and lead to a species poor transformed landscape.	2	4	8	3	**42 M**		2	4	6	2	**24 L**
Biodiversity (Fauna)											

As per Alternative 1						• As per Alternative 1						
Land use and agriculture potential												
None.						•						
Heritage												
None.						•						
Visual												
Visual Impact of the lodge structures and infrastructure on KNP tourists using internal roads It should be noted that the newly aligned S114 and the S121 routes are the only tourist routes that pass near the site. The screening capacity of the vegetation is regarded sufficient in limiting the visibility of the lodge and its infrastructure from views on these routes. Increased impact is expected due to the greater visual prominence of brick and mortar structures.	2	4	6	3	**36 M**	• As per Alternative 1	2	4	6	2	**24 L**
Visual Impact of the park and ride structures and infrastructure on KNP tourists using internal roads.	2	4	4	3	**30 L**		2	4	4	2	**20 L**
Visual impact of the realigned S114 on KNP tourists using internal roads. It should be noted that the realignment of the S114 road will form part of the existing road network and will not be regarded as different by the observers utilising it.	2	4	2	1	**8 N**		2	4	2	1	**8 N**
Visual Impact of the lodge structures and infrastructure on adjacent tourism developments. Increased impact is expected due to the greater visual prominence of brick and mortar structures.	2	4	4	3	**30 L**		2	4	4	2	**20 L**
Visual Impact of the park and ride structures and infrastructure on adjacent tourism developments.	2	4	6	3	**36 M**		2	4	6	2	**24 L**
Visual Impact of lighting of the lodge on adjacent tourism developments.	2	4	4	2	**20 L**		2	4	4	1	**18 L**

Visual Impact of lighting of the park and ride on adjacent tourism developments	2	4	6	4	**48 M**		2	4	4	2	**20 L**
Visual Impact of shuttle vehicle lights operating at night between the lodge and the park and ride.	2	4	8	4	**56 M**		2	4	4	3	**30 L**
Visual impact of solar panels mounted on the lodge on KNP tourists and adjacent tourism developments	2	4	6	3	**36 M**		2	4	4	2	**20 L**
Socio-economics											
As per Alternative 1						• As per Alternative 1					
Services and traffic											
As per Alternative 1						• As per Alternative 1					
Indirect Impacts											
Visual											
As per Alternative 1						• As per Alternative 1					
Cumulative Impacts											
Biodiversity (Flora)											
Cumulative loss of Loss of Granite Lowveld vegetation classified as vulnerable and associated loss of species richness.	3	4	6	3	**39 M**	• Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPR (section 9.5) • Fire management as per the EMPR (section 9.6)	3	4	4	2	**22 L**
Cumulative disturbance of sensitive habitats, specifically riparian zones	3	4	6	3	**39 M**		3	4	4	2	**22 L**
Cumulative reduction and damage to Red data species and protected trees. I.e. *Adenium swazicum, Crinum stuhlmannii, Aloe spicata* and *Crinum sp. Sclerocarya birrea subsp. cafra, Combretum imberbe* and *Philenoptera violacea.* Increased impact is expected due to presence of road and services infrastructure within buffer zones, and associated storm water risks.	3	5	8	3	**48 M**		3	5	8	2	**32 M**
Visual											
As per Alternative 1						• As per Alternative 1					
Socio-economics											
As per Alternative 1						• As per Alternative 1					
Services and traffic											

As per Alternative 1						• As per Alternative 1						

ALTERNATIVE A3 (TECHNOLOGY)												
Direct Impacts												
Ground water												
As per Alternative 1						• As per Alternative 1						
Hydrology (surface water)												
As per Alternative 1						• As per Alternative 1						
Soil												
As per Alternative 1						• As per Alternative 1						
Air												
As per Alternative 1						• As per Alternative 1						
Biodiversity (Flora)												
As per Alternative 1						• As per Alternative 1						
Biodiversity (Fauna)												
As per Alternative 1						• As per Alternative 1						
Land use and agriculture potential												
None.						•						
Heritage												
None.						•						
Visual												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As per Alternative 1						• As per Alternative 1						
Services and traffic												
As per Alternative 1						• As per Alternative 1						
Operational cost of running services and infrastructure, specifically electricity. Increased impact is expected due to higher operational cost in the long term as a result of complete dependence on Eskom utility	1	4	6	5	**55 M**		1	4	6	5	**55 M**	

Indirect Impacts												
Visual												
As per Alternative 1						• As per Alternative 1						
Cumulative Impacts												
Biodiversity (Flora)												
As per Alternative 1						• As per Alternative 1						
Visual												
As per Alternative 1						• As per Alternative 1						
Socio-economics												
As per Alternative 1						• As per Alternative 1						
Services and traffic												
As per Alternative 1						• As per Alternative 1						

NO-PROJECT ALTERNATIVE												
Direct Impacts												
No stimulation of the local economy, especially the local service delivery industry.	3	4	6	4	**52 M**	• None.	3	4	6	4	**52 M**	
No short term and long-term employment through skills development and on-site training.	3	4	6	4	**52 M**	• None.	3	4	6	4	**52 M**	
Indirect Impacts												
None.						•						
Cumulative Impacts												
No opportunity to up-grade and improve skill levels in the area.	3	4	6	4	**52 M**	• None.	3	4	6	4	**52 M**	

2.4 Decommissioning Phase

The decommissioning of the facility is not anticipated at this stage and, therefore, no impacts are assessed.