Impact Assessment

The assessment methods used are in accordance with the requirements of the EIA Regulations 2014 published in terms of NEMA and are considered adequate for the purposes of assessing the impacts associated with the proposed development, the basic assessment is required to provide an a description and assessment of the significance of any environmental impacts, including—
(i)cumulative impacts, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the activity; (ii)the nature of the impact; (iii)the extent and duration of the impact; (iv)the probability of the impact occurring; (v) the degree to which the impact can be reversed; (vi)the degree to which the impact may cause irreplaceable loss of resources; and (vii) the degree to which the impact can be mitigated.

Methodology utilised in the rating of significance of impacts.

The generic criteria and systematic approach used to identify, describe and assess impacts are outlined below. The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

- The **probability** (P) of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

- The **duration** (D), wherein it will be indicated whether:

    - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - Medium-term (5–15 years) – assigned a score of 3;
    - Long term (> 15 years) - assigned a score of 4; or
    - Permanent - assigned a score of 5;

- The **extent** (E), wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

- The **magnitude** (M), quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **significance** (S), which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high;

- The significance rating is calculated by the following formula:

  S (significance) = (D + E + M) x (P)

- the status, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the degree to which the impact can be mitigated.

Impacts should be identified for the construction and operational phases of the proposed development. Proposed mitigation measures should be practical and feasible such that they can be realistically implemented by the applicant.

Impacts on the vegetation and flora

Impacts on vegetation are indicated for the following developments:

- The new Shangoni Gate and Reception Area
- New bridge over Shingwedzi River
- New roads & Upgrade of existing ranger road

- Picnic site, camping site and tented camp sites

Please note: Similar impacts are anticipated during the construction phase of the development and as such some of the proposed development amenities and their alternatives have thus been grouped together in this impact assessment.

VEGETATION IMPACT: ENTRANCE GATE AND RECEPTION FACILITY

Nature: Loss of indigenous vegetation or indigenous plant species due to clearing for construction for the new Shangoni Gate and the Reception Areas. This impact table is applicable for both alternative sites for the Gate and also the Reception Area. Some, though limited, indigenous vegetation will have to be cleared at the location of the new Gate, and the Reception Area.				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Probable	3	Probable	2
Duration	Short term	2	Short term	2
Extent	Local	1	Local	1
Magnitude	Minor	2	No effect	1
Significance	**Low**	**15**	**Low (negligible)**	**8**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Probable	2	Probable	1
Duration	Permanent	5	Permanent	5

Extent	Local	1	Local	1
Magnitude	Low	4	Minor	2
Significance	**Low**	**20**	**Low (negligible)**	**8**
Status (positive or negative)	Negative		Negative	
Reversibility	Low		Low	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

VEGETATION IMPACT: BRIDGE OVER SHINGWEDZI

Nature: To construct a new bridge is a major operation that may cause some clearing of riparian vegetation. Riparian vegetation is regarded as ecologically highly sensitive, as it is associated with a river, and all rivers (wetlands) in South Africa are regarded as ecologically sensitive. This report is not a wetland assessment, and this impact addresses vegetation and flora only. The construction of the bridge may result in the loss of indigenous species, or disturbance of plant species (though the area to be cleared is local, small and isolated). The removal of vegetation will also expose soil increasing the risk of erosion of the river banks. Large trees, including protected trees, do occur scattered within the riparian zone. The investigation however indicates that removal of large trees for the construction is improbable, though not impossible, depending on the specific location of the bridge. This impact table is applicable to the alternative sites investigated. Protected tree species that may be of special concern are *Combretum imberbe* and *Philenoptera violacea.*				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5

Duration	Short-term	2	Short-term	2
Extent	Limited to Site	1	Limited to Site	1
Magnitude	Low	4	Low	3
Significance	**Medium**	**35**	**Low**	**30**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5
Duration	Permanent	5	Permanent	5
Extent	Limited to Site	1	Limited to Site	1
Magnitude	Moderate	3	Low	1
Significance	**Medium**	**45**	**Medium**	**35**
Status (positive or negative)	Negative		Negative	
Reversibility	Low		Medium	
Irreplaceable loss of resources?	Moderate		Low	
Can impacts be mitigated?	Yes			

VEGETATION IMPACT: NEW ROAD ALIGNMENT & RANGER ROAD UPGRADE

Nature: The transect of the new roads will be cleared of vegetation. This is limited to a relatively short distance in the western part of the site, from the Shangoni Gate to the Shingwedzi River, and a short distance across Mopane vegetation just after the Reception Area. This will result in the loss of indigenous species, disturbance of plant species and the fragmentation of plant communities. The removal of vegetation will also expose soil increasing the risk of erosion. The existing ranger road transect and existing S52 will be upgraded, implying widening of the existing road. The shoulder(s) of the existing roads will be cleared of vegetation. This is applicable for the major part of the study site, up to the H1-6 main road. This will result in the loss of indigenous species and disturbance of plant communities. Although limited, some large trees, including some protected tree species may be in the way of the road.

	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5
Duration	Short-term	2	Short-term	2
Extent	Limited to site of development	1	Limited to site of development	1
Magnitude	Low	4	Low	3
Significance	**Medium**	**35**	**Low**	**30**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5
Duration	Permanent	5	Permanent	5
Extent	Limited to the transect of the new road	1	Limited to transect of the new road	1
Magnitude	Moderate	7	Low	5

Significance	**High**	**65**	**Medium**	**55**
Status (positive or negative)	Negative		Negative	
Reversibility	Low		Medium	
Irreplaceable loss of resources?	Moderate		Moderate	
Can impacts be mitigated?	Yes			

Please note: Similar impact ratings have been identified by the vegetation specialist with regards to the picnic sites, tented camps & camp sites and have thus been grouped together in this vegetation assessment.

VEGETATION IMPACT: PICNIC SITES, TENTED CAMPS & CAMP SITES

Nature: The preferred and alternative sites chosen for the development of the Picnic Site, Camp Site and Tented Camp Site respectively are all located within the prominent loop in the Shingwedzi River in the western part of the site. Furthermore, all these sites are located within the flood plains along the Shingwedzi River. The soil, vegetation and plant species composition of all these sites are similar. Although this ecosystem is regarded as ecologically sensitive, the proposed development is low-profile and low impact developments that do not include permanent structures. The more permanent structures e.g. ablution blocks, staff accommodation, parking areas etc. are located in the (terrestrial) mopaneveld directly adjacent to the (riverine) flood plain. The sites should furthermore avoid intruding into riparian zone on the river banks. The soil of these flood plain areas is almost bare with a very scanty herbaceous layer. Large trees occur scattered over these areas, and some are protected tree species. The trees are needed for shading of the picnic site, camp site and tented camp site, and will not be removed.				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5
Duration	Short-term	2	Short-term	2

Extent	Limited to site	1	Limited to site	1
Magnitude	Low	2	Low	1
Significance	**Medium**	**25**	**Low**	**20**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5
Duration	Permanent	5	Permanent	5
Extent	Limited to site	1	Limited to site	1
Magnitude	Moderate	3	Low	2
Significance	**High**	**45**	**Medium**	**40**
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

FAUNA AND HABITAT IMPACT: ENTRANCE GATE, RECEPTION FACILITY, BRIDGE OVER SHINGWEDZI, PICNIC SITES, NEW ROAD ALIGNMENT & RANGER ROAD UPGRADE, TENTED CAMP (PREFERRED), CAMPING SITE (PREFERRED)

Nature: The construction and operational phase of the above will result in the negligible loss of mammal, reptile and amphibian habitats. Within the context of the park *in toto*, this impact relates to the limited destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have negligible impact on foraging and breeding ecology. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors; these will be limited to a total footprint of < 12 hectares and where loss will in any case exclude mature trees. The additional loss of habitat as result of the upgraded road will be limited to slightly wider road servitude.

The presence of vehicles and construction workers will cause disturbance to avifauna, with the movement and activities of personnel on site and the associated noise, pollution and litter all having a negative effect on birds. In addition, the presence of construction workers will increase the probability of activities such as illegal hunting of birds. The permanent presence of a larger number of people than presently occur at the site will result in greater disturbance of birds that use the area for foraging and breeding.

The minimal loss of habitat due to development can be reversed with human intervention, although the new black topped road will be more costly and will require a more intensive effort.

No irreplaceable loss of resources is anticipated.

Mitigation the impacts is standard procedure for SANParks developments.

	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Probable	3	Probable	3
Duration	Short duration	3	Sort duration	3
Extent	Site specific	1	Site specific	1
Magnitude	Minor	2	Minor	2
Significance	**Moderate**	**18**	**Moderate**	**18**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Probable	3	Probable	3
Duration	Long term	4	Long term	4
Extent	Limited to Site	1	Limited to Site	1
Magnitude	Moderate	2	Low (7)	2
Significance	**Moderate**	**21**	**Moderate**	**21**
Status (positive or negative)	Negative		Negative	
Reversibility	High		High	
Irreplaceable loss of resources?	Negligible		Negligible	

Can impacts be mitigated?	Yes

FAUNA AND HABITAT IMPACT: TENTED CAMP (ALT 1) AND CAMPING SITE (ALT 1)

Nature: The construction and operational phase of the above will result in the negligible loss of mammal, reptile and amphibian habitats. Within the context of the park in toto, this impact relates to the limited destruction/disturbance of existing vegetation by machinery and workers, impacting directly on the ecological condition of natural vegetation and habitat availability. These activities will have negligible impact on foraging and breeding ecology. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors; these will be limited to a total footprint of < 12 hectares and where loss will in any case exclude mature trees. The additional loss of habitat as result of the upgraded road will be limited to slightly wider road servitude.

The presence of vehicles and construction workers will cause disturbance to avifauna, with the movement and activities of personnel on site and the associated noise, pollution and litter all having a negative effect on birds. In addition, the presence of construction workers will increase the probability of activities such as illegal hunting of birds. The permanent presence of a larger number of people than presently occur at the site will result in greater disturbance of birds that use the area for foraging and breeding.

The minimal loss of habitat due to development can be reversed with human intervention, although the new black topped road will be more costly and will require a more intensive effort.

No irreplaceable loss of resources is anticipated.

Mitigation the impacts is standard procedure for SANParks developments.

	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Very probable	4	Probable	3
Duration	Short term	2	Short term	2
Extent	Limited to Site	1	Limited to Site	1
Magnitude	Medium	5	Low	3
Significance	**Moderate**	**32**	**Low**	**18**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Very probable	4	Probable	3
Duration	Permanent	5	Permanent	5
Extent	Limited to Local Area	2	Limited to Local Area	2

Magnitude	Low	3	Low	1
Significance	**Moderate**	**40**	**Low**	**24**
Status (positive or negative)	Negative		Negative	
Reversibility	High		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

SURFACE AND GROUND WATER IMPACTS (WATERCOURSES): ENTIRE SHANGONI GATE DEVELEOPMENT

Nature: The compaction of soil, the removal of vegetation, surfacewater redirection of water during construction activities. Changing the amount of sediment entering water resource and associated change in turbidity (increasing or decreasing the amount). Construction and operational activities will result in earthworks and soil disturbance as well as the removal of natural vegetation. This could result in the loss of topsoil, sedimentation of the watercourse and increase the turbidity of the water. Possible sources of the impacts include:

- Earthwork activities during construction
- Clearing of surface vegetation will expose the soils, which in rainy events would wash through the watercourse, causing sedimentation. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees can spread easily into these eroded soil.
- Disturbance of soil surface
- Disturbance of slopes through creation of roads and tracks adjacent to the watercourse
- Erosion (e.g. gully formation, bank collapse)

	Without mitigation	**With mitigation**
CONSTRUCTION PHASE		
Probability	Definite (5)	Probable (3)
Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (4)	Regional (4)
Magnitude	High (8)	Low (4)
Significance	**75 (high)**	**33 (moderate)**
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Medium-term (3)	Permanent (4)
Extent	Regional (4)	Limited to the local area (2)
Magnitude	Low (4)	Low (4)
Significance	**33 (moderate)**	**20 (low)**
Status (positive or negative)	Negative	Negative

Reversibility	Low	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	

ALIEN VEGETATOION PROPAGATION: ENTIRE SHANGONI GATE DEVELEOPMENT

Nature: Alien invasive plant species may encroach into disturbed areas within the entire Shangoni Gate development sites.				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Probable	3	Improbable	2
Duration	Short-term	2	Short-term	2
Extent	Limited to sites	1	Limited to sites	1
Magnitude	Moderate	5	Low	4
Significance	**Low**	**24**	**Low**	**14**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Improbable	2	Very Improbable	1
Duration	Permanent	5	Permanent	5
Extent	Limited	1	Limited	1
Magnitude	Low	2	Low	1

Significance	**Low**	**16**	**Low**	**7**
Status (positive or negative)	Negative		Negative	
Reversibility	Moderate		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

IMPACTS ON SOIL: ENTIRE SHANGONI DEVELOPMENT

Nature: Hydrocarbon spillages from construction vehicles and machinery may contaminate the soil if not properly managed. Construction activities e.g. excavation, vegetation clearing may encourage soil erosion				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Definite	5	Definite	5
Duration	Short-term	2	Short-term	2
Extent	Limited to site	1	Limited to site	1
Magnitude	Low	2	Low	1
Significance	**Medium**	**25**	**Low**	**20**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Definite	5

Duration	Permanent	5	Permanent	5
Extent	Limited to site	1	Limited to site	1
Magnitude	Moderate	3	Low	2
Significance	**High**	**45**	**Medium**	**40**
Status (positive or negative)	Negative		Negative	
Reversibility	Medium		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

VISUAL IMPACT: ENTIRE SHANGONI DEVELOPMENT

Nature: The construction activity will cause a disturbance to the existing landscape character and will impact on the site's pristine natural qualities. There will be a presence of construction equipment on the individual sites along with a workforce that is unfamiliar to the study area. Some vegetation will be removed inside the footprints of the individual structures, although it can be assumed that it will be kept to a minimum. The impact will only affect the natural character of the visual resource, but no observers will be impacted.

During operation, The presence of new infrastructure, that allows access to tourists, are unfamiliar to the site, but compatible in appearance to the rest of the KNP. It will affect the secluded sense of place and pristine natural character of the study area, although limited to the sites where the infrastructure is located. The impact will negatively affect the natural character of the visual resource. The impact on observers will be neutral as this will be their first exposure to this particular area and all the infrastructure will be familiar and similar to the park's existing infrastructure.

	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Highly probable	4	Probable	3

Duration	Short term	2	Short-term	2
Extent	Limited to site	1	Limited to site	1
Magnitude	Low	4	Minor	1
Significance	**Low**	**28**	**Low**	**15**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Probable	3	Probable	3
Duration	Long term	4	Long term	4
Extent	Limited to site	1	Limited to site	1
Magnitude	Low	4	Minor	2
Significance	**Low**	**27**	**Low**	**21**
Status (positive or negative)	Negative		Negative	
Reversibility	High		High	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

HERITAGE IMPACT: ENTIRE SHANGONI DEVELOPMENT

Nature: As all the material was identified on the surface in areas where sheet erosion is taking place, the material is viewed to have very little significance, as it is not in its original context any more. A geological site, revered by local Black people, occurs a short distance off the access road. It is known as Ribye-ra-Khubyane, with reference to a god named Khubyane. It is also referred to as Red Rock.				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Improbable	2	Improbable	2
Duration	Short term	2	Short-term	2
Extent	Limited to site	2	Limited to site	2
Magnitude	Low	4	Low	4
Significance	**Low**	**13**	**Low**	**13**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Improbable	2	Improbable	2
Duration	Long term	5	Long term	5
Extent	Limited to site	2	Limited to site	2
Magnitude	Low	4	Minor	4
Significance	**Low**	**13**	**Low**	**13**
Status (positive or negative)	Negative		Negative	
Reversibility	Partly reversible		Partly reversible	

Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	

AIR QUALITY IMPACT: ENTIRE SHANGONI DEVELOPMENT

Nature: The construction of the proposed developments will not create any objectionable odours or expose sensitive receptors to any substantial pollutant concentrations. There may be impacts on the health and safety on construction workers and the surrounding community. Dust is likely to increase during the construction phase.				
	Without mitigation		**With mitigation**	
CONSTRUCTION PHASE				
Probability	Definite	5	Highly Probable	4
Duration	Short term	2	Short-term	2
Extent	Limited to site	2	Limited to site	2
Magnitude	Low	4	Low	4
Significance	**Moderate**	**3**	**Low**	**2**
Status (positive or negative)	Negative		Negative	
OPERATIONAL PHASE				
Probability	Definite	5	Highly Probable	4
Duration	Short term	2	Short-term	2
Extent	Limited to site	2	Limited to site	2
Magnitude	Low	4	Low	4

Significance	**Moderate**	**3**	**Low**	**2**
Status (positive or negative)	Negative		Negative	
Reversibility	Irreversible		Irreversible	
Irreplaceable loss of resources?	Low		Low	
Can impacts be mitigated?	Yes			

SOCIO-ECONOMIC IMPACT: ENTIRE SHANGONI DEVELOPMENT

Nature: The envisaged total investment in construction costs for the entire Shangoni Development (incl external related developments) of approximately R43.8 million, could create an additional R86.1 million in new business sales, R19.4 million in additional GGP, as well as an additional 194 once-off employment opportunities. Total impact includes direct, indirect as well as induced effects.

If the proposed Shangoni Gate Development were not to occur, the above benefits in terms of additional business sales, GGP, employment, as well as rates and taxes payable to the local fiscus, would be lost to the local, district and provincial economies.

	Without mitigation		**With mitigation**	
CONSTRUCTION AND OPERATIONAL PHASE				
Probability	Definite	5	Highly Probable	4
Duration	Short term	2	Long-term	4
Extent	Regional	3	Regional	3
Magnitude	Moderate	5	High	8

Significance	**High**	**50**	**High**	**60**

Please note: The mitigation measures identified in the Impact Assessment are provided in Section D of the Basic Assessment Report.