

PART E: CONCLUSIONS AND RECOMMENDATIONS

Part E of this report comprises one chapter providing conclusions and recommendations to the EIA:

- **Chapter 16 – Conclusions and recommendations:** Provides conclusions to the EIA through an overall summary of the significance of key potential impacts associated with the proposed works, including physical toll plazas, along the road sections of the proposed toll highway. Conclusions to the comparative assessment of alternative route alignments and toll plaza locations brought forward for further investigation in this phase of the EIA process are also provided. Recommendations are then made in terms of mitigation, enhancement and management measures applicable to the further planning, design, construction and operation of the proposed project (if approved).

CHAPTER 16 CONCLUSIONS AND RECOMMENDATIONS

This chapter provides conclusions to the EIA through providing a summary of the significance of key potential impacts associated with the construction and operational phases of the proposed works, including physical toll plazas, along the various road sections of the proposed toll highway. A summary is also provided of the comparative assessment of the alternative route alignments (Section 16.3) and alternative toll plaza locations (Section 16.4) considered in the relevant road sections. Conclusions on the evaluation of the overall ecological, social and economic sustainability of the proposed project are also provided. Recommendations are then made in terms of mitigation, enhancement and management measures applicable to the further planning, design, construction and operation of the proposed project (if approved).

16.1 INTRODUCTION

The Scoping Study phase of this EIA process resulted in the identification of numerous issues and concerns relating to the proposed N2 Wild Coast Toll Highway. The issues and concerns which were to be addressed in the Impact Assessment phase of the EIA process were comprehensively described in Chapter 8 of the FSR. These related to potential biophysical, social and economic impacts which could result from the construction and operational phases of the proposed project. The findings of 13 specialist studies on these potential impacts are integrated and synthesised in this report.

The Scoping Study included consideration of various alternatives, namely the “do nothing” alternative, alternative route alignments and alternative positions for certain proposed mainline toll plazas. The following alternatives were considered in the Scoping Study:

- Upgrading the existing N2 between Mthatha and Port Shepstone in relation to the “do nothing” alternative;
- Upgrading the existing R61 between Mthatha and Port Shepstone in relation to the “do nothing” alternative;
- Gallagher route between Mthatha and Port Shepstone in relation to the “do nothing” alternative; and
- Alternative greenfields routes between Lusikisiki and the Mthamvuna River, as follows:
 - SANRAL’s preferred alignment;
 - The Inland Mzamba route;
 - The coastal route;
 - The SDI route;
 - The WESSA route; and
 - The Coastal Mzamba route.

In addition, a number of localised alternative route alignments were considered in the FSR, as follows:

- Upgrading the existing R61 between Ndwalane and Ntafufu River via the Pondoland Bridge; and
- Site-specific alternative route alignments in the greenfields sections of the proposed route, i.e. between Ndwalane and the Ntafufu River and between Lusikisiki and the Mthamvuna River.

The FSR provided a comparative analysis of the environmental, technical, financial and economic implications of the alternative route alignments, as appropriate, and indicated which ones would be carried forward for assessment in the Impact Assessment phase of this EIA. The following alternatives were considered “feasible” and were taken forward for further investigation and assessment in the Impact Assessment phase of the EIA:

- The “do nothing” alternative;
- SANRAL’s preferred alignment between Lusikisiki and the Mthamvuna River;
- The Coastal Mzamba route between Lusikisiki and the Mthamvuna River;
- Alternative mainline toll plaza positions to SANRAL’s preferred Ndwalane and Mthentu mainline toll plazas; and
- The site-specific alternative route alignments in the greenfields sections of the proposed project, i.e. in the sections between Ndwalane and Ntafufu and between Lusikisiki and the Mthamvuna River, as follows:
 - for the proposed alignment between Ndwalane and the Mzimvubu River;
 - for the proposed alignment in the vicinity of Ntafufu village and the Ntafufu River;
 - for the proposed alignment across the Msikaba River;
 - for the proposed alignment across the Mthentu River; and
 - for the proposed alignment across the Mnyameni River.

The potential implications of the “do nothing” alternative were used mainly as a “base case” against which the potential impacts of the proposed project and the other identified feasible alternatives were measured. The various alternatives considered in the Impact Assessment phase of the EIA are addressed, as appropriate, in Parts C and D of this report, and are summarised in Sections 16.3 and 16.4 below.

16.2 CONCLUSIONS: ASSESSMENT OF ROAD SECTIONS

16.2.1 GONUBIE INTERCHANGE TO NGOBOZI

As mentioned in Sections 4.2.1 and 7.1, all proposed construction activities between the Gonubie Interchange and Ngobozi would take place within the existing road reserve, with the exception of the proposed Komga Interchange and the mainline toll plaza at Ngobozi. Table 16.1 provides an overall summary of the significance of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works along this road section.

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **MEDIUM** significance in relation to the following:

- Impacts associated with water quality changes in estuaries during the operational phase;
- Impacts associated with graves; and
- Visual impacts associated with the proposed Ngobozi mainline toll plaza.

Key residual positive impacts

The following key residual positive impacts of **POSITIVE HIGH** significance are anticipated:

- Social impacts associated with increased employment opportunities during the construction phase;
- Social impacts associated with improved livestock safety; and
- Tourism impacts associated with an increase in the number of tourism products.

Key residual positive impacts of **POSITIVE MEDIUM** or **POSITIVE MEDIUM-HIGH** significance are anticipated in relation to the following:

- Social impacts associated with increased employment opportunities during the operational phase;
- Social impacts associated with improved safety for vehicle road users;
- Tourism impacts associated with an increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route;
- Planning/development impacts associated with the nodal point at Mooiplaas; and
- Planning/development impacts associated with the proposed Komga Interchange.

Table 16.1: Overall summary of key potential impacts associated with the proposed works between the Gonubie Interchange and Ngobozi [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation/enhancement measures were identified]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Ngobozi mainline toll plaza and widening of road	Increased run-off and drainage, soil erosion, silt loads and sedimentation during construction and operation	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
Upgrading of intersections			
FAUNA			
Operational phase of proposed toll highway	Impacts associated with increased fire risk	Medium	LOW
	Impacts associated with chemical pollution	Medium	LOW
	Impacts associated with noise and light pollution	Medium	LOW
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Construction and operation of the proposed toll highway, in particular river crossings	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion (due to loss of riparian vegetation) and drying out of localised catchments (due to diversion away from these catchments)	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW
WETLANDS			
Hard surfaces associated with the proposed upgrading and widening of the road	Impacts associated with diversion of flow by hard surfaces	Medium	LOW
	Impacts associated with change in vegetation community type	Medium	LOW
	Physical change to wetland areas	Medium	LOW
ESTUARIES			
Proposed upgrading and rehabilitation	Impacts associated with sedimentation	Medium	LOW
Potential oil, grease and fuel spillages in the river catchments	Impacts associated with water quality changes	Medium	LOW / MEDIUM

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	<i>Low-medium+</i>	<i>MEDIUM+ /HIGH+</i>
	Impacts associated with improved safety for vehicle road users	<i>Medium+</i>	<i>MEDIUM+</i>
	Impacts associated with reduction of access points	<i>Medium</i>	<i>LOW-MEDIUM</i>
	Impacts associated with increased risk of HIV/AIDS and STDs	<i>Medium</i>	<i>LOW-MEDIUM</i>
	Impacts associated with traffic delays	<i>Medium</i>	<i>LOW</i>
	Impacts associated with increased taxi-related tension	<i>Medium-high</i>	<i>LOW-MEDIUM</i>
	Impacts associated with improved livestock safety	<i>High+</i>	<i>HIGH+</i>
	Impacts associated with negative influences on existing family networks and social structures	<i>Medium</i>	<i>LOW-MEDIUM</i>
TOURISM			
Construction and operation of the proposed toll highway	Impacts associated with increase in the number of tourism products	<i>Medium+</i>	<i>HIGH+</i>
	Impacts associated with increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route	<i>Medium+</i>	<i>MEDIUM-HIGH+</i>
CULTURAL AND HISTORICAL HERITAGE			
Construction of the proposed toll highway	Impacts associated with graves	<i>High</i>	<i>MEDIUM</i>
VISUAL			
Ngobozi mainline toll plaza	Visual impacts	<i>High</i>	<i>MEDIUM</i>
PLANNING/DEVELOPMENT			
Operation of the proposed toll highway	Impacts associated with the nodal point at Mooiplaas	<i>Medium+</i>	<i>MEDIUM+</i>
	Impacts associated with the proposed Komga Interchange	<i>Medium+</i>	<i>MEDIUM+</i>

16.2.2 NGOBOZI TO MTHATHA (NGQELENI)

As mentioned in Sections 4.2.2 and 8.1, the proposed works along this section of the proposed toll highway would generally involve upgrading and widening within the existing road reserve, except for the proposed interchanges, intersection upgrades, safety and access upgrades in Butterworth and Dutywa and the mainline toll plaza near the Candu River. Table 16.2 provides an overall summary of the significance of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works between Ngobozi and Mthatha (Ngqeleni).

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **HIGH** significance in relation to social impacts associated with reduction of access points onto the road.

The following key residual negative impacts of **MEDIUM** significance are anticipated:

- Impacts associated with water quality changes in estuaries during the operational phase;
- Resettlement of affected households;
- Rural severance effects;
- Urban severance effects;
- Impacts associated with graves;
- Visual impacts associated with the proposed Candu mainline toll plaza; and
- Planning/development implications for Butterworth and Dutywa.

Key residual positive impacts

The following key residual positive impacts of **POSITIVE HIGH** significance are anticipated:

- Social impacts associated with increased employment opportunities during the construction phase;
- Social impacts associated with improved safety for vehicle road users;
- Social impacts associated with improved traffic flow;
- Social impacts associated with improved livestock safety; and
- Tourism impacts associated with an increase in the number of tourism products.

Key residual positive impacts of **POSITIVE MEDIUM** or **POSITIVE MEDIUM-HIGH** significance are anticipated in relation to the following:

- Social impacts associated with increased employment opportunities during the operational phase;
- Tourism impacts associated with an increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route;
- Planning/development impacts associated with nodal points at Qunu and Viedgesville; and
- Planning/development implications for Mthatha.

Table 16.2: Overall summary of key potential impacts associated with the proposed works between Ngobozi and Mthatha (Ngqeleni) [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation/enhancement measures were identified]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Candu mainline toll plaza	Increased run-off and drainage, soil erosion, silt loads and sedimentation during construction and operation	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
Upgrading of intersections			
Widening of road	Loss of habitat	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during construction and operation	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
New carriageway bridges at the Mthatha and Corana rivers	Loss of habitat	Medium	LOW
	Fragmentation of habitat	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
	Disruption of the flow of nutrients and materials	Medium	LOW
FAUNA			
Operation of proposed toll highway	Impacts associated with increased fire risk	Medium	LOW
	Impacts associated with chemical pollution	Medium	LOW
	Impacts associated with noise and light pollution	Medium	LOW
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Construction and operation of the proposed toll highway, in particular river crossings	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion (due to loss of riparian vegetation) and drying out of localised catchments (due to diversion away from these catchments)	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
WETLANDS			
Hard surfaces associated with the proposed upgrading and widening of the road	Impacts associated with diversion of flow by hard surfaces	Medium	LOW
	Impacts associated with change in vegetation community type	Medium	LOW
	Physical change to wetland areas	Medium	LOW
ESTUARIES			
Proposed upgrading and rehabilitation	Impacts associated with sedimentation	Medium	LOW
Potential oil, grease and fuel spillages in the river catchments	Impacts associated with water quality changes	Medium	LOW / MEDIUM
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	Low-medium+	MEDIUM+/HIGH+
	Impacts associated with improved safety for vehicle road users	High+	HIGH+
	Impacts associated with reduction of access points	Very high	HIGH
	Impacts associated with increased risk of HIV/AIDS and STDs	Medium	LOW-MEDIUM
	Impacts associated with traffic delays	Medium	LOW
	Impacts associated with increased taxi-related tension	Medium-high	LOW-MEDIUM
	Impacts associated with improved traffic flow	High+	HIGH+
	Impacts associated with improved livestock safety	High+	HIGH+
	Impacts associated with loss of use of the existing road reserve	Medium	LOW
	Impacts associated with resettlement of affected households	High	MEDIUM
	Impacts associated with loss of grazing and arable land of displaced households	Medium	LOW
	Impacts associated with rural severance effects	Medium/High	LOW/MEDIUM
	Impacts associated with urban severance effects	High	MEDIUM
	Impacts associated with uncontrolled secondary development	Medium	LOW
Impacts associated with negative influences on existing family networks and social structures	Medium	LOW-MEDIUM	
TOURISM			
Construction and operation of the proposed toll highway	Impacts associated with increase in the number of tourism products	Medium+	HIGH+
	Impacts associated with increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route	Medium+	MEDIUM-HIGH+
CULTURAL AND HISTORICAL HERITAGE			
Construction of the proposed toll highway	Impacts associated with graves	High	MEDIUM

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHAMNCEMENT
VISUAL			
Candu mainline toll plaza	Visual impacts	High	MEDIUM
PLANNING/DEVELOPMENT			
Operation of the proposed toll highway	Impacts associated with the proposed Ndabakazi Interchange	Medium (Neutral)	LOW+
	Implications for Butterworth	High	MEDIUM
	Implications for Dutywa	High	MEDIUM
	Implications for Mthatha	High	MEDIUM+
	Impacts associated with nodal points at Qunu and Viedgesville	Medium+	MEDIUM+

16.2.3 MTHATHA (NGQELENI) TO NDWALANE

The proposed works along this section of the proposed toll highway, as described in Sections 4.2.3 and 9.1, would generally take place within the existing road reserve, except for short sections requiring widening, intersection upgrades, vehicular overpasses and interchanges. Measures to stabilise cuts and fills may also require additional land outside the existing road reserve. Table 16.3 provides an overall summary of the significance of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works between Mthatha (Ngqeleni) and Ndwalane.

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **MEDIUM** significance in relation to the following:

- Disruption of faunal movement during the operational phase;
- Faunal impacts associated with noise and light pollution;
- Impacts associated with water quality changes in estuaries during the operational phase;
- Social impacts associated with resettlement of affected households;
- Rural severance effects;
- Negative influences on existing family networks and social structures;
- Tourism impacts associated with increased access to environmentally sensitive areas; and
- Impacts associated with graves.

Key residual positive impacts

The following key residual positive impacts of **POSITIVE HIGH** significance are anticipated:

- Social impacts associated with increased employment opportunities during the construction and operational phase;
- Social impacts associated with improved safety for vehicle road users;
- Social impacts associated with improved livestock safety; and
- Tourism impacts associated with an increase in the number of tourism products.

Key residual positive impacts of **POSITIVE MEDIUM** or **POSITIVE MEDIUM-HIGH** significance are anticipated in relation to the following:

- Social impacts associated with improvement in transport provision;
- Tourism impacts associated with an increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route; and
- Planning/development implications for the Thombo area.

Table 16.3: Overall summary of key potential impacts associated with the proposed works between Mthatha (Ngqeleni) and Ndwalane [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation/enhancement measures were identified]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Upgrading of intersections	Invasion by alien weeds and invader plants	Medium	LOW
Widening of road	Loss of habitat	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during construction and operation	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
Bridge widening at Mngazi River	Loss of habitat	Medium	LOW
	Fragmentation of habitat	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
	Disruption of the flow of nutrients and materials	Medium	LOW
FAUNA			
Operation of the proposed toll highway	Disruption of faunal movement	Medium	(MEDIUM)
	Impacts associated with invasion of alien species	Medium	LOW
	Impacts associated with increased fire risk	Medium	LOW
	Impacts associated with chemical pollution	Medium	LOW
	Impacts associated with noise and light pollution	Medium	(MEDIUM)
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Construction and operation of the proposed toll highway, in particular river crossings	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion (due to loss of riparian vegetation) and drying out of localised catchments (due to diversion away from these catchments)	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW
WETLANDS			

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
Proposed upgrading and widening of the road	Physical change to wetland areas	Medium	LOW
ESTUARIES			
Proposed upgrading and rehabilitation and operation of the road	Impacts associated with sedimentation	Medium	LOW
	Impacts associated with water quality changes	Medium	LOW / MEDIUM
	Impacts associated with improved access	Very high	HIGH
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	Medium+/High+	HIGH+
	Impacts associated with improved safety for vehicle road users	High+	(HIGH+)
	Increased safety hazards for pedestrians	Medium	LOW
	Impacts associated with increased risk of HIV/AIDS and STDs	Medium	LOW-MEDIUM
	Increased crime	Medium	LOW
	Impacts associated with traffic delays	Medium	LOW
	Increased taxi-related tension	Medium	LOW
	Impacts associated with improved livestock safety	High+	(HIGH+)
	Impacts associated with loss of use of the existing road reserve	Medium	LOW
	Impacts associated with resettlement of affected households	High	MEDIUM
	Impacts associated with rural severance effects	Medium/High	LOW/MEDIUM
	Impacts associated with uncontrolled secondary development	Medium	LOW
	Impacts associated with improvement in transport provision	Medium+	(MEDIUM+)
Impacts associated with negative influences on existing family networks and social structures	Medium-high	MEDIUM	
TOURISM			
Construction and operation of the proposed toll highway	Impacts associated with increase in the number of tourism products	Medium+	HIGH+
	Impacts associated with increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route	Medium+	MEDIUM-HIGH+
	Impacts associated with increased access to environmentally sensitive areas	Medium	(MEDIUM)
CULTURAL AND HISTORICAL HERITAGE			
Construction of the proposed toll highway	Impacts associated with graves	High	MEDIUM
PLANNING/DEVELOPMENT			
Operation of the proposed toll highway	Impacts associated with nodes along the existing R61	Medium (Neutral)	LOW+
	Implications for the Thombo area	Medium+	MEDIUM+

16.2.4 NDWALANE TO NTAUFUFU RIVER

This section of the proposed toll highway, as described in Sections 4.2.4 and 10.1, would involve the construction of a new “greenfields” road to national road standards between Ndwalane and Ntafufu. The proposed new road would divert from the existing R61 approximately 10 km inland of Port St Johns and would bypass the existing Mzimvubu Pondoland Bridge. The proposed new road would comprise a two-lane single carriageway highway, with climbing lanes where required and a minimum design speed of 100 to 120 km/h. The width of the road would generally be a minimum of 12.4 m (2x3.7 m lanes and 2x2.5 m paved shoulders) within a road reserve of 80 m. The proposed new road includes the construction of a major high-level bridge crossing over the Mzimvubu River, a conventional bridge over the Ntafufu River and interchanges at Ndwalane and Ntafufu. Table 16.4 provides an overall summary of the significance of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works between Ndwalane and the Ntafufu River.

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **HIGH** significance in relation to the following:

- Faunal impacts associated with loss of sensitive habitats during construction;
- Impacts on estuaries associated with improved access; and
- Noise impacts associated with operation of the proposed toll highway.

The following key residual negative impacts of **MEDIUM** significance are anticipated:

- Vegetation and flora impacts associated with loss of habitat, loss of biodiversity and fragmentation of habitat;
- Vegetation and flora impacts associated with increased accessibility of remote habitats;
- Vegetation and flora impacts associated with reduction in resilience/stability of ecosystems;
- Faunal impacts associated with loss of faunal diversity and loss of Species of Special Concern;
- Disruption of faunal movement during the operational phase;
- Faunal impacts associated with chemical pollution;
- Faunal impacts associated with noise and light pollution;
- Impacts associated with water quality changes in estuaries during the operational phase;
- Social impacts associated with increased safety hazards for pedestrians and traffic;
- Social impacts associated with loss of use of the existing road reserve;
- Rural severance effects;
- Negative influences on existing family networks and social structures;
- Tourism impacts associated with increased access to environmentally sensitive areas;
- Impacts associated with graves; and
- Visual impacts associated with the proposed new bridges.

Key residual positive impacts

The following key residual positive impacts of **POSITIVE HIGH** significance are anticipated:

- Social impacts associated with increased employment opportunities;
- Social impacts associated with improved safety for vehicle road users;
- Social impacts associated with improved livestock safety; and
- Tourism impacts associated with an increase in the number of tourism products.

Key residual positive impacts of **POSITIVE MEDIUM** or **POSITIVE MEDIUM-HIGH** significance are anticipated in relation to the following:

- Social impacts associated with improvement in transport provision; and
- Tourism impacts associated with an increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route.

Table 16.4: Overall summary of key potential impacts associated with the proposed works between Ndwalane and the Ntafufu River [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation measures were identified; mitigation measures in () indicate recommendations considered not effective in reducing the significance of potential impacts]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Proposed new road (along alternative alignments 1e and 2f – SANRAL preferred routes) with interchanges at Ndwalane and Ntafufu	Loss of habitat	High	MEDIUM
	Loss of biodiversity	Medium	(MEDIUM)
	Fragmentation of habitat	High	MEDIUM
	Loss of species of special concern	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Increased accessibility of remote habitats during the operational phase	Medium	(MEDIUM)
	Reduction in resilience/stability of ecosystems	Medium	(MEDIUM)
Ndwalane mainline and ramp toll plazas			
Ndwalane mainline and ramp toll plazas	Loss of habitat	Medium	(MEDIUM)
	Loss of biodiversity	Medium	LOW
	Loss of species of special concern	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
Proposed high-level bridge over the Mzimvubu River			
Proposed high-level bridge over the Mzimvubu River	Loss of habitat	Medium	LOW
	Fragmentation of habitat	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Disruption of the flow of nutrients and materials during construction	Medium	LOW
FAUNA			
Proposed new road (along alternative alignments 1e and 2f – SANRAL preferred routes), new bridges and interchanges at Ndwalane and Ntafufu	Loss of sensitive faunal habitats	High	(HIGH)
	Loss of faunal diversity	Medium	(MEDIUM)
	Loss of species of special concern	Medium	(MEDIUM)
	Impacts on the Cape Griffon Vulture	Medium	LOW
	Disruption to faunal movement	Medium	(MEDIUM)
	Impacts associated with invasion of alien fauna	Medium	LOW

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
	Impacts associated with increased fire risk	Medium	LOW
	Impacts associated with chemical pollution	Medium	(MEDIUM)
	Impacts associated with noise and light pollution	Medium	(MEDIUM)
	Impacts associated with ecosystem disruption	Medium	LOW
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Proposed new road, in particular river crossings	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion (due to loss of riparian vegetation) and drying out of localised catchments (due to diversion away from these catchments)	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW
RIVERS			
Construction and operation of the proposed bridges	Impacts associated with change in channel structure and loss of instream habitat	Medium/High	LOW
	Risk of surface and groundwater pollution	Medium	LOW
	Changes in ecosystem structure and function, and loss of biodiversity	Medium	LOW/LOW-MEDIUM
WETLANDS			
Construction and operation of the proposed greenfields section	Impacts associated with risk of surface and groundwater pollution	Medium/High	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow by hard surfaces	Medium	LOW
	Change in vegetation community type	Medium/High	LOW
	Physical change to wetland areas	Medium	LOW
ESTUARIES			
Construction and operation of the proposed greenfields section	Impacts associated with sedimentation	Medium	LOW
	Impacts associated with water quality changes	Medium	LOW/MEDIUM
	Impacts associated with improved access	Very high	HIGH
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	Medium+/High+	HIGH+
	Impacts associated with improved safety for vehicle road users	High+	(HIGH+)
	Increased safety hazards for pedestrians and traffic	Medium/High	LOW/MEDIUM

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
	Impacts associated with increased risk of HIV/AIDS and STDs	Medium	LOW-MEDIUM
	Increased crime	Medium	LOW
	Increased taxi-related tension and violence	Medium	LOW
	Impacts associated with improved livestock safety	High+	(HIGH+)
	Impacts associated with loss of use of the existing road reserve	Medium	(MEDIUM)
	Impacts associated with rural severance effects	Medium/High	LOW/MEDIUM
	Impacts associated with uncontrolled secondary development	Medium-high	LOW
	Impacts associated with improvement in transport provision	Medium+	(MEDIUM+)
	Impacts associated with negative influences on existing family networks and social structures	Medium-high	MEDIUM
TOURISM			
Operation of the proposed toll highway	Impacts associated with increase in the number of tourism products	Medium+	HIGH+
	Impacts associated with increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route	Medium+	MEDIUM-HIGH+
	Impacts associated with increased access to environmentally sensitive areas	Medium	(MEDIUM)
CULTURAL AND HISTORICAL HERITAGE			
Construction and operation of the proposed greenfields section	Impacts associated with graves	High	MEDIUM
	Archaeological sites	Medium-high	LOW-MEDIUM
NOISE			
Construction and operation of the proposed greenfields section	Noise impacts	Medium/Very high	LOW/HIGH
Proposed Ndwalane mainline and ramp toll plazas		Medium	NONE/LOW
VISUAL			
Proposed Ndwalane mainline toll plaza	Visual impacts	Medium	LOW-MEDIUM
Mzimvubu and Ntafufu River bridges		Medium	(MEDIUM)
PLANNING/DEVELOPMENT			
Operation of the proposed toll highway	Implications for the Ntafufu area	Medium	MEDIUM (NEUTRAL)

16.2.5 NTAFUFU RIVER TO LUSIKISIKI (MAGWA INTERSECTION)

The proposed works along this section of the proposed toll highway, as described in Sections 4.2.5 and 11.1, would generally involve upgrading and widening within the existing road reserve, except for the proposed Lusikisiki Interchange and safety features such as over- and underpasses. Table 16.5 provides an overall summary of the significance of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works between the Ntafufu River and Lusikisiki (Magwa Intersection).

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **HIGH** significance in relation to impacts on estuaries as a result of improved access.

The following key residual negative impacts of **MEDIUM** significance are anticipated:

- Loss of faunal diversity;
- Invasion of faunal species;
- Impacts associated with water quality changes in estuaries during the operational phase;
- Social impacts associated with an increased risk of HIV/AIDS;
- Social impacts associated with construction-related traffic delays;
- Resettlement of affected households;
- Rural severance effects;
- Negative influences on existing family networks and social structures;
- Tourism impacts associated with increased access to environmentally sensitive areas; and
- Impacts associated with graves.

Key residual positive impacts

The following key residual positive impacts of **POSITIVE HIGH** significance are anticipated:

- Social impacts associated with increased employment opportunities during the construction and operational phase;
- Social impacts associated with improved safety for vehicle road users;
- Social impacts associated with improved livestock safety; and
- Tourism impacts associated with an increase in the number of tourism products.

Key residual positive impacts of **POSITIVE MEDIUM** or **POSITIVE MEDIUM-HIGH** significance are anticipated in relation to the following:

- Social impacts associated with improvement in transport provision;
- Tourism impacts associated with an increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route; and
- Planning/development implications for the Mbotyi tourism node.

Table 16.5: Overall summary of key potential impacts associated with the proposed works between the Ntafufu River and Lusikisiki (Magwa Intersection) [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation/enhancement measures were identified]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Construction of Lusikisiki Interchange and upgrading of intersections	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants	Medium	LOW
Widening and re-alignment of road	Loss of habitat	Medium	LOW
	Loss of species of special concern	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during operation	Medium	LOW
	Invasion by alien weeds and invader plants during construction and operation	Medium	LOW
	Disruption of the flow of nutrients and materials during construction	Medium	VERY LOW
Widening of Mzintlava River bridge	Loss of habitat	Medium	LOW
	Fragmentation of habitat	Medium	LOW
	Invasion by alien weeds and invader plants during construction and operation	Medium	LOW
	Disruption of the flow of nutrients and materials during construction	Medium	LOW
FAUNA			
Upgrading and widening of the existing R61 and operation of proposed toll highway	Loss of faunal diversity	Medium	(MEDIUM)
	Disruption of faunal movement	Medium	LOW
	Impacts associated with invasion of alien species	Medium	(MEDIUM)
	Impacts associated with increased fire risk	Medium	LOW
	Impacts associated with chemical pollution	Medium	LOW
	Impacts associated with noise and light pollution	Medium	LOW
	Impacts associated with ecosystem disruption	Medium	LOW
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Upgrading and widening of the existing R61 and operation of proposed toll highway	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion (due to loss of riparian vegetation) and drying out of localised catchments (due to diversion away from these catchments)	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW
WETLANDS			
Construction and operational phases of the proposed toll highway	Impacts associated with diversion of flow by hard surfaces	Medium	LOW
	Change in vegetation community type	Medium	LOW
	Physical change to wetland areas	Medium	LOW
ESTUARIES			
Construction and operational phases of the proposed toll highway	Impacts associated with sedimentation	Medium	LOW
	Impacts associated with water quality changes	Medium	LOW/MEDIUM
	Impacts associated with improved access	Very high	HIGH
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	Medium+/High+	HIGH+
	Impacts associated with improved safety for vehicle road users	High+	(HIGH+)
	Increased safety hazards for pedestrians and traffic	Medium	LOW
	Impacts associated with increased risk of HIV/AIDS and STDs	Medium/High	LOW/MEDIUM
	Increased crime	Medium	LOW
	Impacts associated with construction-related traffic delays	Medium-high/Medium	MEDIUM/LOW
	Increased taxi-related tension and violence	Medium	LOW
	Impacts associated with improved livestock safety	High+	(HIGH+)
	Impacts associated with loss of use of the existing road reserve	Medium	LOW
	Impacts associated with resettlement of affected households	High	MEDIUM
	Impacts associated with rural severance effects	Medium/High	LOW/MEDIUM
	Impacts associated with uncontrolled secondary development	Medium-high	LOW
	Impacts associated with improvement in transport provision	Medium+	(MEDIUM+)
Impacts associated with negative influences on existing family networks and social structures	Medium-high	MEDIUM	
TOURISM			
Operation of the proposed toll highway	Impacts associated with increase in the number of tourism products	Medium+	HIGH+
	Impacts associated with increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route	Medium+	MEDIUM-HIGH+
	Impacts associated with increased access to environmentally sensitive areas	Medium	(MEDIUM)

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
CULTURAL AND HISTORICAL HERITAGE			
Construction and operation of the proposed toll highway	Impacts associated with graves	High	MEDIUM
NOISE			
Traffic on the four-lane undivided through the outskirts of Lusikisiki	Noise impacts	Low/High/Very high	NEGLIGIBLE/LOW
PLANNING/DEVELOPMENT			
Operation of the proposed toll highway	Implications for the Mbotyi tourism node	<i>Medium+</i>	<i>MEDIUM+</i>

16.2.6 LUSIKISIKI (MAGWA INTERSECTION) TO MTHAMVUNA RIVER

The proposed works along this section of the proposed toll highway, as described in Sections 4.2.6 and 12.1, would involve the construction of a new “greenfields” road to national standards (as per description provided in Section 12.1). A number of deeply incised gorges and minor streams would be crossed. The gorges, some in the order of 200 m to 300 m deep, include the Msikaba, Mthentu, Mnyameni and Mzamba River gorges. Table 16.6 provides an overall summary of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works between Lusikisiki (Magwa Intersection) and the Mthamvuna River.

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **HIGH** significance in relation to the following:

- Faunal impacts associated with loss of sensitive habitats during construction;
- Impacts on estuaries associated with improved access; and
- Noise impacts associated with operation of the proposed toll highway.

The following key residual negative impacts of **MEDIUM** significance are anticipated:

- Vegetation and flora impacts associated with loss of habitat, loss of biodiversity and fragmentation of habitat;
- Vegetation and flora impacts associated with increased accessibility of remote habitats;
- Vegetation and flora impacts associated with reduction in resilience/stability of ecosystems;
- Faunal impacts associated with loss of faunal diversity and loss of Species of Special Concern;
- Disruption of faunal movement during the operational phase;
- Faunal impacts associated with chemical pollution;
- Faunal impacts associated with noise and light pollution;
- Impacts associated with water quality changes in estuaries during the operational phase;
- Social impacts associated with increased safety hazards for pedestrians and traffic;
- Social impacts associated with loss of use of the existing road reserve;
- Rural severance effects;
- Negative influences on existing family networks and social structures;
- Tourism impacts associated with increased access to environmentally sensitive areas;
- Impacts associated with graves; and
- Visual impacts associated with the proposed new bridges.

Key residual positive impacts

The following key residual positive impacts of **POSITIVE HIGH** significance are anticipated:

- Social impacts associated with increased employment opportunities;
- Social impacts associated with improved safety for vehicle road users;
- Social impacts associated with improved livestock safety; and
- Tourism impacts associated with an increase in the number of tourism products.

Key residual positive impacts of **POSITIVE MEDIUM** or **POSITIVE MEDIUM-HIGH** significance are anticipated in relation to the following:

- Social impacts associated with improvement in transport provision; and
- Tourism impacts associated with an increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route.

Table 16.6: Overall summary of key potential impacts associated with the proposed works between Lusikisiki (Magwa Intersection) and the Mthamvuna River [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation/enhancement measures were identified]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Proposed new road (along alternative alignments 5g4, 9e and 10c – SANRAL preferred routes) without bridges, toll plaza, etc.	Loss of habitat	Very high	HIGH
	Loss of biodiversity	Medium	(MEDIUM)
	Fragmentation of habitat	High	(HIGH)
	Loss of species of special concern	High	MEDIUM
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Strip/ribbon/secondary development during operational phase	High	(HIGH)
	Increased accessibility of remote habitats during the operational phase	High	(HIGH)
	Reduction in resilience/stability of ecosystems	Medium	(MEDIUM)
Proposed high-level bridge over the Msikaba River (along alternative alignment 5g4 – SANRAL preferred route)	Loss of habitat	Medium	(MEDIUM)
	Loss of biodiversity	Medium	(MEDIUM)
	Fragmentation of habitat	Medium	(MEDIUM)
	Loss of species of special concern	High	MEDIUM
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	High	LOW
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Increased accessibility of remote habitats during the operational phase	High	(HIGH)
	Reduction in resilience/stability of ecosystems	Medium	LOW
Proposed high-level bridge over the Mthentu River (along alternative alignment 9e – SANRAL preferred route)	Loss of habitat	High	MEDIUM
	Loss of biodiversity	High	MEDIUM
	Fragmentation of habitat	High	MEDIUM
	Loss of species of special concern	High	MEDIUM
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	High	LOW
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Increased accessibility of remote habitats during the operational phase	High	(HIGH)
	Reduction in resilience/stability of ecosystems	Medium	LOW

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
Proposed high-level bridge over the Kwadlambu River (along the SANRAL preferred route)	Loss of habitat	High	MEDIUM
	Loss of biodiversity	Medium	LOW
	Fragmentation of habitat	High	MEDIUM
	Loss of species of special concern	High	MEDIUM
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	High	MEDIUM
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Reduction in resilience/stability of ecosystems	High	MEDIUM
	Disruption of the flow of nutrients and materials during construction	High	MEDIUM
Proposed high-level bridge over the Mnyameni (along alternative alignment 10c – SANRAL preferred route), Kulumbe, Mpahlane and Mzamba rivers	Loss of habitat	Medium	(MEDIUM)
	Loss of biodiversity	Medium	(MEDIUM)
	Fragmentation of habitat	Medium	(MEDIUM)
	Loss of species of special concern	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	High	MEDIUM
	Invasion by alien weeds and invader plants during the operational phase	High	LOW
	Reduction in resilience/stability of ecosystems	Medium	LOW
Proposed intersections with district roads (along the SANRAL preferred route), Mtentu mainline toll plaza and R61 Interchange	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	Medium	LOW
	Strip/ribbon/secondary development during operational phase	Medium	(MEDIUM)
	Reduction in resilience/stability of ecosystems during the operational phase	Medium	LOW
	Disruption of the flow of nutrients and materials during the operational phase	Medium	LOW
FAUNA			
Proposed new road (along alternative alignments 5g4, 9e and 10c – SANRAL preferred routes)	Loss of sensitive faunal habitats	Medium	LOW
	Loss of faunal diversity	Medium	(MEDIUM)
	Loss of species of special concern	Medium	(MEDIUM)
	Impacts on the Cape Griffon Vulture	High	MEDIUM
	Disruption to faunal movement	Medium	(MEDIUM)
	Impacts associated with invasion of alien faunal species	Medium	LOW
	Impacts associated with increased fire risk	Medium	(MEDIUM)
	Impacts associated with chemical pollution	Medium	(MEDIUM)
Impacts associated with noise and light pollution	Medium	(MEDIUM)	

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
	Impacts associated with ecosystem disruption	Medium	LOW
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Proposed new road, in particular river crossings	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion (due to loss of riparian vegetation) and drying out of localised catchments (due to diversion away from these catchments)	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW
RIVERS			
Construction and operation of the proposed bridges	Impacts associated with change in channel structure and loss of instream habitat	High	LOW
	Risk of surface and groundwater pollution	Medium/High	LOW
	Changes in ecosystem structure and function, and loss of biodiversity	Medium/High	LOW
WETLANDS			
Construction and operation of the proposed greenfields section	Impacts associated with increased surface run-off	Medium/High	LOW/MEDIUM
	Impacts associated with risk of surface and groundwater pollution	Medium/High	LOW/MEDIUM
	Impacts associated with reduction in permeable surfaces	High	LOW
	Impacts associated with diversion of flow by hard surfaces	Medium	LOW
	Impacts associated with change in vegetation community type	Medium	LOW
	Physical change to wetland areas	Medium	LOW
ESTUARIES			
Construction and operation of the proposed greenfields section	Impacts associated with sedimentation	Medium	LOW
	Impacts associated with water quality changes	Medium	LOW/MEDIUM
	Impacts associated with improved access	Very high	HIGH
SOILS, LAND USE AND AGRICULTURE			
Construction and operation of the proposed toll highway	Impacts associated with improved regional access	High+	(HIGH+)
	Impacts associated with improved extension services	Medium+	(MEDIUM+)
	Impacts associated with improved access to production credit	Medium+	(MEDIUM+)

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	<i>Medium+/High+</i>	<i>HIGH+</i>
	Impacts associated with improved safety for vehicle road users	<i>High+</i>	<i>(HIGH+)</i>
	Increased safety hazards for pedestrians and traffic	<i>High/Very high</i>	MEDIUM
	Impacts associated with increased risk of HIV/AIDS and STDs	Medium/High	LOW/MEDIUM
	Increased crime	Medium	LOW
	Increased taxi-related tension and violence	Medium	LOW
	Impacts associated with resettlement of affected households	High	MEDIUM
	Impacts associated with rural severance effects	Medium/High	LOW/MEDIUM
	Impacts associated with uncontrolled secondary development	Medium-high	LOW
	Impacts associated with improvement in transport provision	<i>Medium-high+</i>	<i>(MEDIUM-HIGH+)</i>
Impacts associated with negative influences on existing family networks and social structures	Medium-high	MEDIUM	
TOURISM			
Operation of the proposed toll highway	Impacts associated with increase in the number of tourism products	<i>Medium+</i>	<i>HIGH+</i>
	Impacts associated with increase in growth in transit tourists on a KZN/Eastern Cape/Western Cape route	<i>Medium+</i>	<i>MEDIUM-HIGH+</i>
	Impacts associated with increased access to environmentally sensitive areas	High	(HIGH)
CULTURAL AND HISTORICAL HERITAGE			
Construction and operation of the proposed greenfields section	Impacts associated with places to which oral traditions are attached or which are associated with living heritage	High	(HIGH)
	Impacts associated with landscapes and natural features	High	(HIGH)
	Impacts associated with graves	High	MEDIUM
	Archaeological sites	Medium-high	LOW-MEDIUM
NOISE			
Construction and operation of the proposed greenfields section	Noise impacts	Low to Very high	LOW TO HIGH
VISUAL			
Impacts associated with the proposed new road (Mateku Waterfall area) and the Mthentu mainline toll plaza	Visual impacts	High	MEDIUM
Impacts associated with the proposed Msikaba and Mthentu River bridges		High	MEDIUM-HIGH

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
Impacts associated with the proposed Kwadlambu, Mnyameni, Kulumbe, Mpahlane and Mzamba River bridges		Medium	(MEDIUM)
PLANNING/DEVELOPMENT			
Construction and operation of the proposed toll highway	Land claims	Medium	(MEDIUM)
	Ribbon development	High	(HIGH)

16.2.7 MTHAMVUNA RIVER TO ISIPINGO INTERCHANGE

The proposed works along this section of the proposed toll highway, as described in Sections 4.2.7 and 13.1, would generally involve upgrading and widening within the existing road reserve, except for the proposed Adams Road Interchange and the proposed mainline toll plazas at Park Rynie and Isipingo. Table 16.7 provides an overall summary of the significance of key potential impacts (without and with mitigation/enhancement) that would result from the proposed works between the Mthamvuna River and the Isipingo Interchange.

The assessment has identified the following key residual negative and positive impacts:

Key residual negative impacts

It is anticipated that the proposed works along this road section would result in key residual negative impacts of **MEDIUM** significance in relation to the following:

- Faunal impacts associated with noise and light pollution;
- Impacts associated with water quality changes in estuaries during the operational phase;
- Social impacts associated with construction-related traffic delays; and
- Impacts associated with anticipated increased traffic volumes and the proposed Isipingo Toll Plaza in the Prospecton area.

Key residual positive impacts

Key residual positive impacts of **POSITIVE HIGH** significance are anticipated in relation to social impacts associated with increased employment opportunities during the construction and operational phase.

Applicable noise mitigation associated with the proposed Adams Road ramp toll plazas and the proposed additional lanes between the Amanzimtoti River bridge and the Isipingo Interchange would need to be determined and incorporated at the detailed design stage, with due regard to cost implications of each alternative and/or combined noise mitigation procedure.

Table 16.7: Overall summary of key potential impacts associated with the proposed works between the Mthamvuna River and the Isipingo Interchange [ratings are negative unless indicated otherwise; ratings in () indicate impacts where no applicable/feasible mitigation/enhancement measures were identified]

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
VEGETATION AND FLORA			
Widening of roads	Loss of habitat	Medium	LOW
	Loss of biodiversity	Medium	LOW
	Loss of species of special concern	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	Medium	LOW
Widening of Amanzimtoti River bridge	Loss of habitat	Medium	LOW
	Fragmentation of habitat	Medium	LOW
	Increased run-off and drainage, soil erosion, silt loads and sedimentation during the operational phase	Medium	LOW
	Invasion by alien weeds and invader plants during the operational phase	Medium	LOW
	Disruption of the flow of nutrients and materials during construction	Medium	LOW
FAUNA			
Upgrading and widening of the existing N2 and operation of proposed toll highway	Impacts associated invasion of alien faunal species	Medium	LOW
	Impacts associated with increased fire risk	Medium	LOW
	Impacts associated with chemical pollution	Medium	LOW
	Impacts associated with noise and light pollution	Medium	(MEDIUM)
AQUATIC ECOSYSTEMS			
RIPARIAN AND INSTREAM VEGETATION			
Construction and operation of the proposed toll highway, in particular river crossings	Destruction of riparian vegetation and loss of sensitive habitats during construction	High	LOW
	Increased surface run-off velocities leading to risk of erosion and drying out of localised catchments	Medium	LOW
	Impacts associated with risk of surface and groundwater pollution during construction	Medium	LOW
	Impacts associated with reduction in permeable surfaces	Medium	LOW
	Impacts associated with diversion of flow from hard surfaces	Medium	LOW
	Change in vegetation community type as a result of introducing exotic plant species during construction	Medium	LOW

ENVIRONMENTAL ASPECT / PROPOSED WORKS	POTENTIAL IMPACT	IMPACT SIGNIFICANCE	
		WITHOUT MITIGATION / ENHANCEMENT	WITH MITIGATION / ENHANCEMENT
ESTUARIES			
Construction and operation of the proposed toll highway	Impacts associated with sedimentation	Medium	LOW
	Impacts associated with water quality changes	Medium	LOW/(MEDIUM)
SOCIAL			
Construction and operation of the proposed toll highway	Impacts associated with increased employment opportunities	Medium+	HIGH+
	Increased safety hazards for pedestrians and traffic	Medium	LOW
	Impacts associated with increased risk of HIV/AIDS and STDs	Medium	LOW-MEDIUM
	Increased crime	Medium	LOW
	Impacts associated with construction-related traffic delays	Medium	(MEDIUM)
	Increased taxi-related tension	Medium	LOW
NOISE			
Impacts associated with the proposed Pennington ramp toll plazas	Noise impacts	High	LOW-MEDIUM
Impacts associated with the proposed Park Rynie mainline and ramp toll plazas		Medium	NONE/LOW
Impacts associated with the proposed Adams Road ramp toll plazas		High	*
Impacts associated with the proposed additional lanes		Very high	*
AIR QUALITY			
Impacts associated with anticipated increased traffic volumes and the proposed Isipingo Toll Plaza in the Prospecton area	Air quality impacts	Medium	(MEDIUM)
VISUAL			
Impacts associated with the proposed Park Rynie and Isipingo mainline toll plazas	Visual impacts	Medium	LOW-MEDIUM

* To be determined during detailed design

16.3 CONCLUSIONS: COMPARATIVE ASSESSMENT OF ALTERNATIVE ALIGNMENTS

16.3.1 COMPARATIVE ASSESSMENT OF ALTERNATIVE 1B VERSUS THE SANRAL PREFERRED ROUTE BETWEEN NDWALANE AND THE MZIMVUBU RIVER

A summary of potential residual impacts of Alternative 1b versus the SANRAL preferred route (Alternative 1e) is provided in Table 16.8.

Table 16.8: Summary comparative assessment of potential residual impacts of the site-specific alternative routes between Ndwalane and the Mzimvubu River

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	SANRAL PREFERRED ROUTE	ALTERNATIVE 1B
VEGETATION AND FLORA		
Overall impacts on vegetation and flora as a result of disruption of the flow of nutrients and materials, loss of habitat, loss of biodiversity, reduction in resilience/stability of ecosystems, etc.)	LOW TO MEDIUM	MEDIUM
FAUNA		
Loss of sensitive faunal habitat	HIGH	MEDIUM
AQUATIC ECOSYSTEMS		
Overall impacts on riparian and instream vegetation	LOW	LOW
Overall impacts on rivers and wetlands	LOW TO LOW-MEDIUM	LOW TO LOW-MEDIUM
Overall impacts on estuaries	LOW TO HIGH	LOW TO HIGH
SOILS, LAND USE AND AGRICULTURE		
Overall impacts on soils, land use and agriculture	LOW	HIGH
SOCIAL		
Overall social impacts (severance effects, loss of arable land etc.)	MEDIUM	MEDIUM
CULTURAL AND HISTORICAL HERITAGE		
Overall cultural and historical heritage impacts (graves, archaeological sites etc.)	LOW TO MEDIUM	LOW TO MEDIUM
NOISE		
Noise impacts	LOW / HIGH	LOW

The following conclusions are drawn:

Alternative 1b would present major advantages over the SANRAL preferred route in terms of limiting potential impacts on sensitive faunal habitats and potential noise impacts to nearest residences. However, this route would result in significant impacts on prime riparian irrigation land and good quality (true) forests at the location (interchange) where the route would divert from the existing R61. It is anticipated that both routes would, however, result in residual indirect impacts of **HIGH** significance due to increased recreational and development-related pressures which would be exerted on sensitive estuaries in the region due to improved access. Thus, consideration of the overall environmental implications of the two site-specific alternative routes does not reveal a clearly favoured route option. SANRAL has indicated that the construction of a major road in the floodplain of a river would not be preferable from a practical, strategic and technical perspective since the road would have to be raised to clear the 1:100 year flood line.

16.3.2 COMPARATIVE ASSESSMENT OF ALTERNATIVE 2A VERSUS THE SANRAL PREFERRED ROUTE IN THE VICINITY OF NTAUFUFU VILLAGE AND THE NTAUFUFU RIVER

A summary of potential residual impacts of Alternative 2a versus the SANRAL preferred route (Alternative 2f) is provided in Table 16.9.

Table 16.9: Summary comparative assessment of potential residual impacts of the site-specific alternative alignments in the vicinity of Ntafufu Village and the Ntafufu River

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	SANRAL PREFERRED ROUTE	ALTERNATIVE 2A
VEGETATION AND FLORA		
Overall impacts on vegetation and flora (as a result of loss of habitat, increased run-off and drainage, soil erosion, silt loads and sedimentation, etc.)	NEGLECTIBLE TO LOW	NONE TO LOW
FAUNA		
Overall impacts on fauna (habitats, ecosystems etc.)	LOW TO MEDIUM	LOW TO MEDIUM
AQUATIC ECOSYSTEMS		
Overall impacts on riparian and instream vegetation	LOW	LOW
Overall impacts on rivers and wetlands	LOW TO LOW-MEDIUM	LOW TO LOW-MEDIUM
Overall impacts on estuaries	LOW TO HIGH	LOW TO HIGH
SOILS, LAND USE AND AGRICULTURE		
Overall impacts on soils, land use and agriculture	LOW	NONE
SOCIAL		
Overall social impacts (severance effects, loss of arable land etc.)	LOW	MEDIUM
CULTURAL AND HISTORICAL HERITAGE		
Overall cultural and historical heritage impacts (graves, archaeological sites, etc.)	LOW TO MEDIUM	LOW TO MEDIUM
NOISE		
Noise impacts	MEDIUM	MEDIUM

The following conclusions are drawn:

It is considered that the key factor to be considered in determining a preferred route in the Ntafufu area would be the potential impacts on the two local Ntafufu schools, providing that adequate compensation/replacement of the affected irrigation scheme and school playing fields adjacent to the river occurs. In this regard, the SANRAL preferred route (Alternative 2f) is considered more favourable, due solely to the additional threat Alternative 2a would pose to the Ntafufu Senior Secondary School.

16.3.3 COMPARATIVE ASSESSMENT OF ALTERNATIVES 5E AND 5G VERSUS THE SANRAL PREFERRED ROUTE ACROSS THE MSIKABA RIVER

A summary of the potential residual impacts, where applicable, of Alternatives 5e and 5g versus the SANRAL preferred route (Alternative 5g4) is provided in Table 16.10.

Table 16.10: Summary comparative assessment of potential residual impacts, where applicable, of the site-specific alternative alignments across the Msikaba River

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS		
	SANRAL PREFERRED ROUTE	ALTERNATIVE 5E	ALTERNATIVE 5G
VEGETATION AND FLORA			
Loss of habitat and increased accessibility of remote areas	HIGH	HIGH	HIGH
Loss of biodiversity	HIGH	HIGH	MEDIUM
Fragmentation of habitat, loss of species of special concern, increased runoff and drainage, soils erosion, silt loads and sedimentation, strip/ribbon/secondary development, reduction in resilience/stability of ecosystems and disruption of the flow of nutrients and materials	MEDIUM	MEDIUM	MEDIUM
Invasion by weeds and invasive alien plants and vehicular pollution of soil, air or water	LOW	LOW	LOW
Pollution at construction camps and increased risk of veld fires	VERY LOW	VERY LOW	VERY LOW
FAUNA			
Overall impacts on fauna (via loss of habitats, loss of faunal diversity, ecosystem disruption, etc.)	LOW TO MEDIUM	LOW TO MEDIUM-HIGH	LOW TO MEDIUM
AQUATIC ECOSYSTEMS			
Overall impacts on riparian and instream vegetation	LOW	LOW	LOW
Overall impacts on riverine environments	LOW	LOW	LOW
Overall impacts on wetlands	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM
Overall impacts on estuaries	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM
SOILS, LAND USE AND AGRICULTURE			
Overall impacts on soils, land use and agriculture	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM
SOCIAL			
Overall social impacts (severance effects, loss of arable land etc.)	LOW TO HIGH+	LOW TO HIGH+	LOW TO HIGH+
CULTURAL AND HISTORICAL HERITAGE			
Overall cultural and historical heritage impacts (graves, archaeological sites)	LOW-MEDIUM TO MEDIUM	LOW-MEDIUM TO MEDIUM	LOW-MEDIUM TO MEDIUM
NOISE			
Overall noise impacts	LOW TO HIGH	LOW TO HIGH	LOW TO HIGH

The following conclusions are drawn:

Alternative 5e is considered the least favourable route alignment from vegetation/flora and faunal perspectives since it would result in most severe impacts on forests and faunal habitat, including disturbance to Lanner Falcon nests on the cliffs at the Mateku Waterfall, and would pose the greatest potential risk of erosion. While Alternative 5g would be marginally favoured over the SANRAL preferred route (Alternative 5g4) from a botanical point of view, it is less favoured in terms of potential noise impacts. Thus, consideration of the overall implications of Alternatives 5g and 5g4 does not reveal a clearly favoured route option. It should be noted, however, that Alternative 5g and the SANRAL preferred route would both result in potential residual impacts of **HIGH** significance in terms of loss of habitat, increased accessibility of remote areas and noise impacts.

16.3.4 COMPARATIVE ASSESSMENT OF ALTERNATIVE 9D5 VERSUS THE SANRAL PREFERRED ROUTE ACROSS THE MTHENTU RIVER

A summary of the potential residual impacts, where applicable, of Alternative 9d5 versus the SANRAL preferred route (Alternative 9e) is provided in Table 16.11

Table 16.11: Summary comparative assessment of potential residual impacts, where applicable, of Alternative 9d5 versus the SANRAL preferred route across the Mthentu River

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	SANRAL PREFERRED ROUTE	ALTERNATIVE 9D5
VEGETATION AND FLORA		
Loss of habitat and biodiversity	HIGH	HIGH
Fragmentation of habitat, loss of species of special concern, increased runoff and drainage, soils erosion, silt loads and sedimentation, strip/ribbon/secondary development, increased accessibility of remote areas and reduction in the resilience/stability of ecosystems	MEDIUM	MEDIUM
Invasion by weeds and invasive alien plants, vehicular pollution of soil, air or water and disruption of the flow of nutrients and materials	LOW	LOW
Pollution at construction camps and increased risk of veld fires	VERY LOW	VERY LOW
FAUNA		
Overall faunal impacts	LOW TO MEDIUM	LOW TO MEDIUM
AQUATIC ECOSYSTEMS		
Overall impacts on riparian and instream vegetation	LOW	LOW
Overall impacts on riverine environments	LOW	LOW
Overall impacts on wetlands	LOW TO MEDIUM	LOW TO MEDIUM
Overall impacts on estuaries	LOW TO MEDIUM	LOW TO MEDIUM
SOILS, LAND USE AND AGRICULTURE		
Overall impacts on soils, land use and agriculture	LOW TO MEDIUM	LOW TO MEDIUM
SOCIAL		
Overall social impacts (severance effects, loss of arable land, etc.)	LOW TO HIGH+	LOW TO HIGH+
CULTURAL AND HISTORICAL HERITAGE		
Overall cultural and historical heritage impacts (graves, archaeological sites)	LOW-MEDIUM TO MEDIUM	LOW-MEDIUM TO MEDIUM
NOISE		
Noise impacts	LOW TO HIGH	LOW TO HIGH

The following conclusions are drawn:

The assessment (refer to Section 12.3.3) indicates that the SANRAL preferred route would be favoured in terms of fauna, soils, land use and agriculture and social aspects, although potential residual impacts of the two alignments are the same. Neither alignment is considered more favourable from botanical and cultural/historical heritage perspectives. In terms of potential noise impacts, certain sections of both routes are considered more suitable than the other. Thus, on balance, the SANRAL preferred route (Alternative 9e) is considered more favourable. It should be noted, however, that potential residual impacts of **HIGH** significance are anticipated in terms of loss of habitat, loss of biodiversity and noise impacts.

16.3.5 COMPARATIVE ASSESSMENT OF THE COASTAL MZAMBA ROUTE VERSUS THE SANRAL PREFERRED ROUTE BETWEEN LUSIKISIKI (MTHENTU RIVER) AND THE MTHAMVUNA RIVER

A summary of potential residual impacts, where applicable, of the Coastal Mzamba route versus the SANRAL preferred route between Lusikisiki and the Mthamvuna River is provided in Table 16.12. Since the two routes would follow the same route up to the Mthentu River crossing, the comparative assessment focuses on the section between the Mthentu and Mthamvuna rivers.

Table 16.12: Summary comparative assessment of potential residual impacts, where applicable, of the Coastal Mzamba versus the SANRAL preferred route

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	SANRAL PREFERRED ROUTE	COASTAL MZAMBA ROUTE
VEGETATION AND FLORA		
Loss and fragmentation of habitat	LOW	HIGH
Increased runoff and drainage, soils erosion, silt loads and sedimentation, reduction in resilience/stability of ecosystems and disruption of the flow of nutrients	LOW	MEDIUM
Strip/ribbon/secondary development and increased access to remote habitats	MEDIUM	MEDIUM
Loss of biodiversity, loss of species of special concern, invasion by weeds and invasive alien plants and vehicular pollution of soil, air or water	LOW	LOW
Pollution at construction camps and increased risk of veld fires	VERY LOW	VERY LOW
FAUNA		
Overall faunal impacts	LOW TO MEDIUM	LOW TO MEDIUM
AQUATIC ECOSYSTEMS		
Overall impacts on riparian and instream vegetation	LOW	LOW
Overall impacts on riverine environments	LOW	LOW
Overall impacts on wetlands	LOW TO MEDIUM	LOW TO MEDIUM
Overall impacts on estuaries (sedimentation, water quality changes and improved access)	LOW TO HIGH	LOW TO HIGH
Overall impacts on estuaries (water quantity)	NONE	HIGH
SOILS, LAND USE AND AGRICULTURE		
Overall impacts on soils, land use and agriculture (improved regional access, improved extension services and improved access to production credit)	<i>MEDIUM+ TO HIGH+</i>	<i>MEDIUM+ TO HIGH+</i>
SOCIAL		
Overall social impacts (employment, severance effects, etc.)	LOW TO <i>HIGH+</i>	LOW TO <i>HIGH+</i>
CULTURAL AND HISTORICAL HERITAGE		
Overall cultural and historical heritage impacts	LOW-MEDIUM TO HIGH	LOW-MEDIUM TO HIGH
NOISE		
Noise impacts	LOW TO HIGH	LOW TO HIGH
VISUAL		
Visual impacts (between Mthentu and Mthamvuna rivers)	LOW	LOW
PLANNING/DEVELOPMENT		
Overall impacts	MEDIUM TO HIGH	MEDIUM TO HIGH

The following conclusions are drawn:

The Coastal Mzamba route would offer a number of advantages over the SANRAL preferred route between the Mthentu and Mthamvuna rivers, in particular relating to its compatibility with the Wild Coast SDF's proposed Land Use Management Areas and lower potential social and visual impacts. Also, should uncontrolled ribbon development or attraction of settlements take place along the SANRAL

preferred route, this would affect a greater proportion of the planned area for the proposed Wild Coast/Pondoland National Park and identified “nature tourism” zones.

In many other respects, especially in terms of direct, indirect and cumulative biophysical impacts associated with the presence of numerous source wetland areas, the Coastal Mzamba route is considered less favourable than the SANRAL preferred route. Key differences in this regard relate to loss and fragmentation of habitat and water quantity impacts on the (indirectly) affected estuaries.

Thus, the key factor to consider in selecting a preferred route is whether the relative importance attached to compatibility with the Wild Coast SDF’s Land Use Management Areas and the additional area (4 %) of the proposed Park that would be incorporated east of the Coastal Mzamba route outweighs the likely direct, indirect and cumulative impacts on aquatic ecosystems that would be associated with this route. In terms of economic aspects, the economic specialist study calculated the Present Worth of Cost of the Coastal Mzamba route (R 1,597.91 million) to be marginally higher than the SANRAL preferred route (R 1,587.59 million). Thus, from an economic (and technical - primarily associated with construction of a major road through numerous wetland areas) perspective the Coastal Mzamba route would be less favourable. However, irrespective of the selected route, it should be ensured that political and institutional will and capacity is developed to undertake pro-active and structured development planning, review and/or development of detailed Land Use Management Systems and liaison between Traditional Authorities and Municipalities with regard to allocation of land according to a common vision for ecologically sustainable development, if the proposed project is approved.

16.3.6 COMPARATIVE ASSESSMENT OF ALTERNATIVES 10A AND 10E VERSUS THE SANRAL PREFERRED ROUTE ACROSS THE MNYAMENI RIVER

A summary of the potential residual impacts, where applicable, of Alternatives 10a and 10e versus the SANRAL preferred route (Alternative 10c) is provided in Table 16.13.

Table 16.13: Summary comparative assessment of potential residual impacts of Alternatives 10a and 10e versus the SANRAL preferred route across the Mnyameni River

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS		
	SANRAL PREFERRED ROUTE	ALTERNATIVE 10A	ALTERNATIVE 10E
VEGETATION AND FLORA			
Loss of habitat	MEDIUM	HIGH	HIGH
Loss of biodiversity and fragmentation of habitat	MEDIUM	HIGH	MEDIUM
Loss of species of special concern, increased runoff and drainage, soils erosion, silt loads and sedimentation, strip/ribbon/secondary development, increased accessibility of remote areas and reduction in resilience/stability of ecosystems	MEDIUM	MEDIUM	MEDIUM
Invasion by weeds and invasive alien plants, vehicular pollution of soil, air or water and disruption of the flow of nutrients and materials	LOW	LOW	LOW
Pollution at construction camps and increased risk of veld fires	VERY LOW	VERY LOW	VERY LOW
FAUNA			
Overall impacts on fauna (via loss of habitats, loss of faunal diversity, ecosystem disruption, etc.)	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM
AQUATIC ECOSYSTEMS			
Overall impacts on riparian and instream vegetation	LOW	LOW	LOW
Overall impacts on riverine environments	LOW	LOW	LOW
Overall impacts on wetlands	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS		
	SANRAL PREFERRED ROUTE	ALTERNATIVE 10A	ALTERNATIVE 10E
Overall impacts on estuaries	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM
SOILS, LAND USE AND AGRICULTURE			
Overall impacts on soils, land use and agriculture	LOW TO MEDIUM	LOW TO MEDIUM	LOW TO MEDIUM
SOCIAL			
Overall social impacts (severance effects, loss of arable land, etc.)	LOW TO HIGH+	LOW TO HIGH+	LOW TO HIGH+
CULTURAL AND HISTORICAL HERITAGE			
Overall cultural and historical heritage impacts (graves, archaeological sites)	LOW-MEDIUM TO MEDIUM	LOW-MEDIUM TO MEDIUM	LOW-MEDIUM TO HIGH
NOISE			
Noise impacts	LOW TO HIGH	LOW TO HIGH	LOW TO HIGH

The following conclusions are drawn:

The key differences between the various alternative route alignments across the Mnyameni River relate to potential impacts associated with loss of habitat, loss of biodiversity, fragmentation of habitat and cultural and historical heritage. Since the SANRAL preferred route would generally result in lower impacts than Alternatives 10a and 10e it is considered the most favourable alignment. It should be noted, however, that potential residual impacts of **HIGH** significance are anticipated in terms of potential noise impacts, irrespective of the selected route.

16.4 CONCLUSIONS: COMPARATIVE ASSESSMENT OF ALTERNATIVE MAINLINE TOLL PLAZA LOCATIONS

16.4.1 ALTERNATIVE NDWALANE MAINLINE TOLL PLAZA LOCATION VERSUS THE SANRAL PREFERRED NDWALANE LOCATION

A summary of potential residual impacts, where applicable, of the Alternative Ndwalane mainline toll plaza location versus SANRAL's preferred Ndwalane mainline toll plaza location is provided in Table 16.14.

Table 16.14: Summary comparative assessment of potential residual impacts, where applicable, of the Alternative Ndwalane Toll Plaza versus SANRAL's proposed Ndwalane Toll Plaza

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	PROPOSED NDWALANE TOLL PLAZA	ALTERNATIVE NDWALANE TOLL PLAZA
VEGETATION AND FLORA		
Loss of habitat	MEDIUM	LOW
Fragmentation of habitat; loss of species of special concern	LOW	-
Loss of biodiversity; increased runoff and drainage, soils erosion, silt loads and sedimentation; invasion by weeds and invasive alien plants	LOW	LOW
Pollution at construction camps and increased risk of veld fires	VERY LOW	VERY LOW
FAUNA		
Overall faunal impacts	LOW	LOW
AQUATIC ECOSYSTEMS		
Overall impacts on aquatic ecosystems	LOW	LOW
SOCIAL		

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	PROPOSED NDWALANE TOLL PLAZA	ALTERNATIVE NDWALANE TOLL PLAZA
Uncontrolled secondary development	LOW	LOW
NOISE		
Noise impacts	NONE/LOW	NEGLIGIBLE/LOW
VISUAL		
Visual impacts	LOW-MEDIUM	LOW

The following conclusions are drawn:

The Alternative Ndwalane mainline toll plaza would, overall, be more favourable than SANRAL's preferred Ndwalane mainline toll plaza location in terms of potential impacts relating to vegetation and flora, aquatic ecosystems and visual aspects. Moreover, the SANRAL preferred location would result in key potential residual impacts associated with potential loss of habitat.

16.4.2 ALTERNATIVE MTHENTU MAINLINE TOLL PLAZA LOCATION VERSUS THE SANRAL PREFERRED MTHENTU LOCATION

A summary of potential residual impacts, where applicable, of the Alternative Mthentu mainline toll plaza location versus SANRAL'S preferred Mthentu mainline toll plaza location is provided in Table 16.15.

Table 16.15: Summary comparative assessment of potential residual impacts, where applicable, of the Alternative Mthentu Toll Plaza versus the proposed Mthentu Toll Plaza

ISSUE / IMPACT	SIGNIFICANCE OF POTENTIAL RESIDUAL IMPACTS	
	PROPOSED MTHENTU TOLL PLAZA	ALTERNATIVE MTHENTU TOLL PLAZA
VEGETATION AND FLORA		
Strip/ribbon/secondary development	MEDIUM	MEDIUM
Loss of habitat and biodiversity, increased runoff and drainage, soils erosion, silt loads and sedimentation, invasion by weeds and invasive alien plants, reduction in the resilience/stability of ecosystems and disruption of the flow of nutrients and materials	LOW	LOW
Pollution at construction camps and increased risk of veld fires	VERY LOW	VERY LOW
FAUNA		
Overall faunal impacts	VERY LOW	VERY LOW
AQUATIC ECOSYSTEMS		
Overall impacts on aquatic ecosystems	LOW	LOW
SOILS, LAND USE AND AGRICULTURE		
Overall impacts on soils, land use and agriculture	LOW	LOW
CULTURAL AND HISTORICAL HERITAGE		
Overall cultural and historical heritage impacts (graves, archaeological sites)	LOW-MEDIUM	LOW-MEDIUM
NOISE		
Noise impacts	LOW	LOW
VISUAL		
Visual impacts	MEDIUM	LOW-MEDIUM

The following conclusions are drawn:

Table 16.15 indicates that the key difference between the two alternative mainline plaza locations relates to potential residual visual impacts. The Alternative Mthentu Toll Plaza location is considered more favourable as it would result in lower potential visual impacts. Also, although the significance ratings for potential residual impacts on aquatic ecosystems are the same, it is considered that the Alternative

Mthentu mainline toll plaza location would be preferred since it would avoid the risk of any potential negative impacts on larger wetland habitats. Key potential residual impacts on vegetation and flora are anticipated in terms of possible strip/ribbon/secondary development, irrespective of the selected mainline toll plaza location.

16.5 CONCLUSIONS: PROJECT-SCALE AND TOLL FUNDING-RELATED ISSUES

16.5.1 VEGETATION AND FLORA

Vegetation and flora

Overall impacts on the Pondoland Centre of Endemism

It is clear from published information on the PCE that it has a high conservation/biodiversity value and that it has been identified as having high conservation priority. Any impact that reduces the overall area of the PCE, reduces the ecological integrity of the area or would result in losses of key biodiversity components is potentially serious.

The assessment has shown that the proposed new road would result in residual impacts of **HIGH** significance in terms of loss of habitat, fragmentation of habitat, strip/ribbon/secondary development and increased accessibility of remote habitats.

An analysis of the impacts associated with a reduction in the opportunity to undertake effective conservation, biodiversity conservation planning or establish conservation areas in the region indicates that the SANRAL preferred alignment potentially reduces the core area of the proposed park to 88% of its planned area while the Coastal Mzamba alignment would result in this included proportion becoming almost 92% of the desired area.

Thus it is concluded that the proposed new road would result in potential impacts that would affect the overall conservation/ecosystem/biodiversity value of the PCE (and proposed Wild Coast/Pondoland National Park).

Ecological sustainability

The development of the proposed new road could potentially lead to some *loss of biological diversity*. It is unlikely to lead to a change in conservation status of any species but may lead to a change in conservation status (from Vulnerable to Endangered) of a vegetation type (Pondoland-Ugu Sandstone Coastal Sourveld).

The proposed new road may threaten some local scale *ecological process*. At a regional scale the proposed new road is thought to present a barrier that may result in dispersal and migration processes in a coastal-inland direction being affected, but is unlikely to affect regional scale movement of water or nutrients through the landscape.

There is a risk of *exceeding thresholds* at a local scale (primarily loss of habitat due to direct and indirect impacts), but these can be controlled by the implementation of mitigation measures (assuming management commitment and effective monitoring and reporting). There is less risk of exceeding thresholds at a regional scale, except for the overall loss of habitat due to direct and indirect impacts - the loss of habitat within Pondoland-Ugu Sandstone Coastal Sourveld could lead to a change in conservation status from Vulnerable to Endangered, which indicates that the threshold beyond which ecosystem processes and patterns can be maintained is being approached.

At a local scale, the road may *threaten some key ecological process* linked to life support systems, but this effect dissipates quickly with distance from the road and is unlikely to be important at a regional scale.

Pondoland grasslands are potentially at risk from the proposed new road and its associated impacts. The potential threat of the proposed new road to *protected, important, unique, sensitive, irreplaceable areas* is therefore potentially significant in the absence of effective conservation management of the area.

The proposed road cannot be considered potentially responsible for *exacerbating human-induced climate change*.

The proposed road would lead to the direct loss of areas of grassland in greenfields areas as well as some forest, which is considered by definition to be *irreversible loss of natural capital*. Due to the highly sensitive nature of the PCE as a whole, any loss of habitat may be considered to be incremental reduction in the ecological viability of the area. The proposed new road may therefore be considered to lead to irreversible loss of natural capital that is potentially significant.

It is considered unlikely that there are any *impacts that are unknown or uncertain* although there is some uncertainty about impacts in the study area due to social factors in the absence of the proposed project taking place.

It is considered very difficult to attribute *substantial negative cumulative impacts* to the presence of the proposed new road rather than current trends within the PCE area. It is estimated that the proposed new road and its potential secondary impacts (including possible strip/ribbon/nodal development) could lead to sufficient loss of habitat to result in Pondoland-Ugu Coastal Sourveld being re-categorised as an Endangered vegetation type. It is likely that other proposed projects in the area would further exacerbate this loss of habitat and make it more likely that habitat loss would lead to re-categorisation of the vegetation type.

In conclusion, on the basis of the above criteria, the proposed new road is considered not ecologically sustainable. However, if secondary impacts can be controlled and conservation measures can be put in place to effectively protect core components of the PCE then the assessment of five of these criteria may be reversed/become insignificant and the proposed project could then be considered to be ecologically sustainable.

16.5.2 AQUATIC ECOSYSTEMS

Although the systems within the study area were found to be largely in a natural condition, current land use practices, sand winning, poor secondary roads and bridges, and alien plant infestations have impacted on the status of the aquatic environment. In the interests of pro-active environmental management, future developments should thus not result in further degradation. Areas of particular concern are the greenfields routes, where the majority of the headwaters already require some form of rehabilitation due to the impacts mentioned above. Rivers that presently require rehabilitation would include, amongst others, the Mzimvubu, Kwadlambu and Mnyameni rivers, but concerted effort to eradicate all alien plants throughout the entire study area would be required.

With implementation of suitable mitigation and proactive management most of the impacts related directly to the proposed toll highway could be managed. SANRAL should take as many precautions to manage and monitor all phases of the development and should form part of any forum to manage the region.

16.5.3 SOCIAL

The upgrading of the route between Gonubie Interchange and Mthatha would likely vastly improve the safety of this section of road and could lead to a reduction in serious road accidents. Death and severe injury are amongst the most severe of negative social impacts and that any significant progress in reducing injury and death would have a high and positive social impact.

Along the section between Mthatha and the Mthamvuna River, despite the anticipated negative impacts associated with development in greenfields areas, the overwhelming opinions of people consulted was a need for greater access into the area. Reasons given for this varied from a need to ease the burden of travel into and out of the area, providing better access to health and other services and the creation of jobs.

One of the significant issues identified is the potential negative impacts of tolling the existing section of road between Port Shepstone and the Isipingo Interchange. This issue relates to the availability of alternative routes, travel options, economics and the political reasons for tolling.

Although not entirely within the control of SANRAL, the matter of capacity amongst the various role players along the route is also of concern. Consequently, if the project were to proceed, it would be important for all authorities to consider the need to coordinate their efforts towards making the project a success.

Overall, it is considered that the potential social benefits of the proposed project, as assessed along the entire route, and if enhanced as recommended, would outweigh the potential negative impacts, and that the proposed project would be of social benefit on a national basis as well as being beneficial for both the Eastern Cape and KwaZulu-Natal provinces.

In order to minimise the anticipated negative impacts and enhance potential benefits, it is recommended that key policies and plans (such as resettlement, employment, skills development, community empowerment, etc.) be developed to effectively manage key social issues associated with the proposed project. It is also recommended that a social monitoring and evaluation programme be developed for the construction phase of the proposed project.

16.5.4 TRAFFIC DIVERSION

It is apparent from the capacity analysis that the N2 between Prospecton and Moss Kolnik is running close to or exceeding capacity in the so-called design hour (the 30th highest hourly volume of the year), while the R102 is currently still operating at acceptable levels of service.

The highly probable impact of traffic diversion on the N2 Prospecton-Southbroom section is assessed to be of **medium** and **high** intensity and significance during the construction and operational phases, respectively. Implementation of the mitigation measures would reduce the traffic diversion impact to **LOW** significance during the construction and operational phases.

16.5.5 NOISE

The existing day-time noise rating level of 74 dBA on residential land flanking Kingsway, Umbogintwini, is exceptionally high - exceeding the acceptable outdoor day-time noise rating level in a suburban district (with little road traffic) by 24 dB and in an urban residential district by 19 dB. Based on the ADT values the predicted increase in the day-time noise rating level over the subsequent 10 and 15 years would be

barely significant, with or without tolling of the existing N2. However, any increase would exacerbate an already unacceptably high exposure to road traffic noise on residential land in this suburb. The existing, and potential future noise impact along on the alternative R102 at Umbogintwini (without and with tolling of the existing N2) is assessed to be of **VERY HIGH** intensity and significance. In this instance, inadequate planning has resulted in a situation whereby technical noise mitigation alternatives cannot be practically implemented.

16.5.6 AIR QUALITY

It is predicted that potential localised air quality impacts on the R102 and R620 alternative routes would be of **LOW-MEDIUM** intensity and significance without and with mitigation. It is considered unlikely that the significance of the potential impact could be reduced. However, it is recommended that discussions be held with the local municipalities, in particular the eThekweni Municipality, to address the long-term plans for air quality management in the relevant areas.

16.5.7 TOURISM

Impacts on bypassed towns on the existing N2

Towns along the existing N2 between Mthatha and Port Shepstone include Qumbu, Mount Frere, Mount Ayliff, Kokstad and Harding. These towns rely primarily on transit along the existing N2 section. Most of the towns on the existing N2 section are undeveloped as tourism destinations. However, Kokstad and Harding have become stop-over destinations. The potential negative tourism impacts on bypassed towns on the existing N2 are deemed to be of **MEDIUM** intensity and significance without and with mitigation. It is considered that tourism promotion along the existing N2 could change the potential negative impact to neutral status.

High-volume tourism versus eco-tourism

The tourism specialist believes that there is room for more intensive tourism developments on the Wild Coast as well as eco-tourism enterprise. This is seen to be particularly the case if the proposed Wild Coast/Pondoland National Park plans go ahead, but with the number of nature reserves in the area it is considered that eco-tourism will be viable with or without the proposed Park.

16.5.8 ECONOMIC

Overall economic sustainability

The economic analysis indicates that the proposed project, given the various assumptions (of which the most critical were those related to the value of time and the traffic growth rate), would definitely be economically justified, with an IRR of 15.4 %. The proposed project is also considered to be financially viable, with an IRR of 10.4 %. In the financial analysis it was assumed that the toll income would be 75 % of the total savings in road user costs.

The freeway section between Winklespruit and Isipingo Interchange would, similarly, be economically justified, with an IRR of 37.9 %.

In addition to being justified from a micro-economic viewpoint, the project's "very good" one-off income-multiplier effect and significant recurring non-user benefits would support the macro-economic objectives of (1) full employment, (2) economic growth, (3) price stability, and (4) equitable distribution of income. On aggregate it is considered that the proposed project would make a significant contribution to the primary macro-economic goal of improving the wealth of the Eastern Cape and KwaZulu-Natal provinces. In view of

the fact that these benefits would not be diverted or transferred from other provinces, but be generated locally, the average annual net macro-economic gain of R 2,612 million would also accrue to the country as a whole (i.e. the road would be instrumental that South Africa's national product increases by R 2,612 million annually).

16.6 OVERALL KEY RESIDUAL IMPACTS OF THE PROPOSED PROJECT

The identified overall key residual positive and negative impacts are set out below:

16.6.1 OVERALL KEY RESIDUAL POSITIVE IMPACTS

The following overall key residual positive impacts would result from the proposed project:

- a) The proposed toll highway should benefit all users along the entire length of the road if the principle that “the toll fee is less than the road user benefits” is applied. Benefits include (1) reductions in road user costs (where road user costs comprise vehicle operating costs plus travel time cost plus accident cost) and/or road user revenue increases as a result of new road usage. The largest portion of the benefits to road users would accrue in the Eastern cape because this would be where the major distance saving would occur and most new business would be created. The economic analysis indicates that the proposed project, given the various assumptions (of which the most critical were those related to the value of time and the traffic growth rate), would definitely be economically justified, with an IRR of 15.4 %. The proposed project is also considered to be financially viable, with an IRR of 10.4 %. In the financial analysis it was assumed that the toll income would be 75 % of the total savings in road user costs;
- b) The proposed additional lanes along the freeway section between Winklespruit and Isipingo Interchange would, similarly, be economically justified, with an IRR of 37.9 %;
- c) The regional income-multiplier effect would increase the present (2007) value of the investment amount of R 4,309 million to an eventual once-off regional gross income of R 17,884 million. After deduction of this investment amount, the net increase in one-off regional income is expected to equal R 13,575 million;
- d) Once the road is in operation regional economic income would be accelerated on a recurring basis. The following economic sectors in the Eastern Cape and KwaZulu-Natal would enjoy increased income: (1) agriculture; (2) forestry; (3) manufacturing; (4) construction (i.e. property development); (5) finance and real estate; and (6) trade, tourism and catering. The estimated present (2007) value of this additional income is approximately R 15,829 million;
- e) The present (2007) value of the net regional developmental economic benefits that implementation and use of the proposed toll highway would yield is the total of the net regional income-multiplier effect of R 13,575 million, and the present value of accelerated business income of R 15,829 million. These add up to R 29,404 million. Over the 30-year analysis period of the road at a real discount rate of eight percent this value is equivalent to additional domestic income of R 2,612 million per annum;
- f) Although the proposed new link between Mthatha and Port Edward would attract traffic from the existing N2 route, the newly generated traffic benefits on the proposed new road would by far exceed any reduction of business on the existing road section. (It is estimated that traffic generation in the first year of operation would translate into an economic benefit of over R 500 million in the

Eastern Cape Province and KwaZulu-Natal. Of this, approximately R 150 million would accrue to existing and new business between Mthatha, Port St Johns and Port Edward);

- g) Approximately 6 800 project-related jobs would be generated annually during the construction phase. There is a high probability to generate up to 21 300 indirect or non-project-related jobs annually during this phase, resulting in a total employment creation of 28 100 jobs annually during construction. This would have a positive economic impact on a regional level in the short term;
- h) During the service period of the road there is the potential to generate approximately 900 directly road-related permanent (sustainable) jobs annually. Usage and operation of the road would generate approximately 18 000 indirect job opportunities per annum, resulting in an average employment creation of 18 900 jobs annually during the service period of the road;
- i) The proposed toll highway would result in an increase in the number of tourism products in the study area due to an expected increase in growth in overnight tourists;
- j) It is anticipated that the proposed project would result in improved livestock safety on the Eastern Cape sections of the existing N2 and R61, that would be incorporated into the proposed toll highway, which are characterised by significant safety hazards associated with the presence of livestock on the road, providing fencing is kept intact; and
- k) The proposed toll highway would significantly improve safety for vehicle road users along the existing N2 through the former Transkei, which has been identified as amongst the most accident-prone roads in the country.

16.6.2 OVERALL KEY RESIDUAL NEGATIVE IMPACTS

The following overall key residual negative impacts would result from the proposed project:

- a) Reduction of access points along the section between Ngobozi and Mthatha would result in high numbers of users having to walk or drive greater distances to access the proposed toll highway and/or to get to their destinations. This would also have cumulative impacts on time and effort invested in other productive and domestic activities;
- b) The habitats which occur between Ndwalane and the Ntafufu River, such as the forest and thicket patches, are considered sensitive faunal habitats due to their isolated and fragmented nature. The proposed toll highway would bisect and thus increase the fragmentation of these habitats. It is recommended that SANRAL engages the regional conservation authorities to assist in the formal protection of comparable habitats elsewhere in the Pondoland region, if the proposed project is approved;
- c) It is anticipated that increased recreational and development-related pressures would be exerted on important and sensitive estuaries in the region as a result of the improved access to the region. These would result in significant negative impacts on the ecological functioning and aesthetics of the estuaries;
- d) The proposed new road would be located between 10 m and 250 m from numerous dwellings in the section from Ndwalane to the Ntafufu River. A noise barrier would have little effect due to the residences generally being at a higher elevation than the proposed new road while a low-noise road surface would only reduce the intensity of the noise at the nearest residences to 60 dBA;

- e) The construction of the proposed greenfields section between Lusikisiki and the Mthamvuna River would result in significant loss of habitat, including habitat associated with the Pondoland-Ugu Sandstone Coastal Sourveld vegetation (Vulnerable). This vegetation type forms one of the two primary habitats constituting the PCE. Approximately 0.3 % of the remaining extent of this vegetation type would be lost directly as a result of construction of the proposed new road;
- f) The proposed toll highway would result in fragmentation of habitat between the Mthentu and the Mthamvuna rivers. Vegetation and flora could be significantly impacted by way of impaired gene flow within fragmented populations and creation of edges. However, the area between the Mthentu and Mthamvuna rivers also suffers from the greatest degree of transformation and degradation due to cultivation;
- g) Using the precautionary approach and assuming that there would be no limitation to development along the coast due to increased accessibility of these areas as a result of the proposed new road, there would be a risk of significant loss (approximately 9.6 % of the remaining extent) of Pondoland-Ugu Sandstone Coastal Sourveld due to strip/ribbon/secondary development;
- h) The proposed new road and bridges over the Msikaba and Mthentu rivers would probably make previously inaccessible areas more accessible, especially for the removal of medicinal products and other species for which there may be horticultural interest. The current rates of harvesting of medicinal plants have already led to the depletion of many species near existing settlements;
- i) The proposed new road in the greenfields section between Lusikisiki and the Mthamvuna River would affect the ability of communities to continue utilising places and resources associated with the oral traditions and living heritage within the Amadiba Tribal Authority area. Also, the entire area may be considered as an integral part of an ethnographic landscape that has evolved over the last 1 000 years and would be significantly affected by the proposed new road;
- j) It is expected that the day-time noise rating level at residential dwellings located within 50 m of the proposed new road between Lusikisiki and the Mthamvuna River would be in excess of 65 dBA. In terms of the Noise Control Regulations noise mitigation would be required in order to ensure that the noise rating level does not exceed 65 dBA at any of the affected residential dwellings;
- k) It is likely that ribbon/strip/secondary development would gradually occur alongside the proposed new road between Lusikisiki and the Mthamvuna River. This would place a strain on Municipalities as a result of growing demands for new infrastructure and social services in these areas. As a consequence, large public-funded investments along the existing major routes may need to be re-prioritised to meet demands in the new areas, and competition for resources and delivery may occur;
- l) Significant negative impacts on the volume/capacity ratio on the R102 and, consequently, the level of service and quality of travel are predicted if full toll tariffs were charged at the mainline toll plazas in KwaZulu-Natal; and
- m) The existing day-time noise rating level of 74 dBA on residential land flanking Kingsway, Umbogintwini, is exceptionally high. Based on the ADT values the predicted increase in the day-time noise rating level over the next 10 and 15 years would be barely significant, with or without tolling of the existing N2. However, any increase would exacerbate an already unacceptably high exposure to road traffic noise on residential land in this suburb.

16.7 RECOMMENDATIONS

This section provides recommendations for further required investigations and sets out the recommended mitigation/enhancement and monitoring measures that should be implemented during the further planning and design, construction and operational phases of the proposed project, if authorised.

16.7.1 FURTHER INVESTIGATIONS

- a) The potential noise impacts, and relevant noise mitigation measures, associated with the proposed Adams Road ramp toll plazas and proposed additional lanes between the Amanzimtoti River and Prospecton should be determined and incorporated during the detailed design stage; and
- b) A heritage practitioner should be appointed to (1) complete an assessment of the final alignment chosen for the proposed toll highway, as well as the locations of new access roads, construction camps and all other infrastructure; and (2) to undertake an oral history recording project within the Amadiba Tribal Authority Area in order to capture all significant places to which oral traditions are attached or which are associated with living heritage in order to inform the final design of the proposed new road.

16.7.2 GENERAL RECOMMENDATIONS

- a) The management of all site preparation and construction activities should be undertaken by way of the compilation of a comprehensive Construction EMP;
- b) Effective implementation and management of the Construction EMP should be ensured by appointment of a suitably qualified and experienced ECO; and
- c) Recommendations applicable to the post-construction phase should be incorporated in an Operational EMP, including provision for ongoing monitoring and management.

16.7.3 VEGETATION AND FLORA

- a) Off-site mitigation, e.g. facilitation of the conservation of an equivalent-sized area of grassland or forest elsewhere for which the future conservation can be guaranteed;
- b) Post-construction commitment to monitoring and management of biodiversity should be ensured;
- c) Relevant biodiversity management requirements must be incorporated into contract specifications. Contract specification clauses should be reviewed (and preferably prepared) by someone with the appropriate biological skills and knowledge;
- d) Where practical, roadside landscaping and revegetation should attempt to use locally indigenous species;
- e) Preparation and implementation of a Vegetation and Flora Management Plan, including a Revegetation Plan;
- f) Preparation and implementation of a Weed Management Plan as part of the Vegetation and Flora Management Plan;
- g) Retention of indigenous species where possible along the alignment;
- h) On-site seed collection and transplanting of indigenous plant species should be implemented and included in revegetation works. These works should be started early to establish a source of plants for regeneration;
- i) Cleared indigenous vegetation should be chopped and mulched for use in revegetation works;
- j) Any revegetation works should be undertaken by qualified and experienced personnel;

- k) Identification and temporary fencing of areas of vegetation to be retained during construction activities;
- l) Clearing should be minimised and restricted to the area required for road construction purposes only and disturbance to adjacent vegetation communities and/or remnant trees within the corridor should be strictly controlled. This planning can take place during the design phase of the project;
- m) It is important to ensure that contractors are made aware of the environmental issues and associated risks prior to commencement of construction work. Biodiversity aspects that need to be included in the induction process include:
 - Extent of no-go zones
 - Areas of significant vegetation and habitat
 - Potential of discovery of additional populations of sensitive species and what to do in this event
- n) Potential biodiversity risks that need to be addressed in the EMP include:
 - Appropriate locating of stockpiles, site offices and infrastructure, to limit damage to sensitive vegetation
 - Weed control to avoid spread of weeds due to failure to appropriately identify and control weeds
 - Site protection measures for vegetation and flora
- o) All necessary permits must be obtained prior to construction, e.g. for removal of flora or protected species;
- p) Protection of habitat through implementation of erosion and sediment control measures. For example, drainage of road runoff through grassy channels, as an erosion and sediment control measure, greatly reduces toxic solid- and heavy-metal concentrations. Dense vegetation also increases soil infiltration and storage and reduces the erosion effects of runoff water;
- q) Lobbying for the implementation of an effective conservation plan for the Pondoland area will provide impetus for the development of conservation areas that will protect key components of the PCE. This will reduce the significance of potential secondary impacts on these areas due to the proposed road; and
- r) Ongoing monitoring should take place during the construction phase in order to assess the success of mitigation measures. This may be done at different levels of detail, e.g. visual assessments, sampling, monitoring of alien plants, etc.

16.7.4 FAUNA

- a) Ensure vegetation in road reserve is kept short by way of regular maintenance;
- b) Rest stops and other associated structures should not be situated adjacent to sensitive habitats (forests or wetlands);
- c) Restrict and control the use of herbicides in the road reserve and at toll plazas;
- d) Associated structures (interchanges etc.) should not be situated adjacent to sensitive habitats;
- e) Storm water outlets, particularly from toll plazas, should not drain directly into natural wetlands;
- f) Monitor the number of road mortalities and disturbance; install under-road culverts for breeding toads;
- g) Associated power and telephone lines should be installed at the extreme edge of the road reserve and incorporate bird deflectors where they cross major river gorges;
- h) Active culling programmes of problem animals by conservation authorities should be promoted;
- i) Joint action with regional conservation authorities should be explored to assist in the formal protection of comparable forest and grassland habitats elsewhere in the Pondoland region, particularly in association with the proposed Wild Coast/Pondoland National Park;
- j) Ensure mitigation measures for potential direct impacts (e.g. habitat loss) are implemented successfully;

- k) Activities associated with construction, access roads, borrow pits and cut-fill construction should avoid sensitive habitats;
- l) Natural drainage should be maintained, and the silt loads into rivers, streams and wetlands must be carefully managed and monitored and stay within acceptable limits;
- m) Road reserves should be maintained in order to function as effective fire breaks;
- n) Underpasses should be large enough to allow maintenance of water flow and soil hydrodynamics, and to serve as migratory paths for small animals; and
- o) Avoid disturbances to the breeding colonies of the Cape Griffon Vulture - air and road traffic should observe the maximum possible exclusion zone around the Msikaba colony – helicopter and fixed wing flights down the gorge from the Msikaba bridge should be banned, or maintain a maximum height of 1 000 m; access to breeding ledges by humans (other than registered researchers) and feral dogs must be prohibited; all cables across the major river gorges should have suitable bird diverters installed – the most suitable type and spacing should be determined in consultation with experts – dead or injured birds discovered below bridge crossing points should be identified and recorded and communicated to the Vulture Study Group; no borrow pits or associated requirements should be sited in the vulture exclusion zone; blasting operations should be restricted to the day, and should avoid the egg-laying season (March-July); off-set the loss of carcasses (associated with reduced livestock mortalities from the fenced road) and foraging habitat – supplementary feeding with vulture restaurants may be required – consult the Vulture Study Group in this regard.

16.7.5 AQUATIC ECOSYSTEMS

- a) The Construction EMP should include detailed mitigation measures to be undertaken to avoid excessive sediment loads and other contaminants in rivers;
- b) Ensure that no flows are altered and it is assumed that the SANRAL Drainage Manual stipulations will be implemented, i.e. flows would not be diverted or impounded by the physical structure of the road;
- c) Where possible, bridges must span the entire width of the channel and floodplain so as to avoid disturbance to the riparian zones of rivers;
- d) Pillars, columns or bridge buttresses should not be placed in instream or in riparian zones, if possible. The disturbance of instream channels and riparian zones during bridge construction must be minimized. The number and width of pillars, vertical columns and buttresses placed within the river channel and floodplain should be minimised;
- e) Physical structures, which could later alter hydrological regimes, should not be placed in the vicinity of any wetlands;
- f) Adequate drainage must be included in road design so as to ensure effective drainage of wetland areas;
- g) Stormwater drainage from the road surface should be deviated from wetlands and drainage areas. The use of Reno mattresses and Armourflex is recommended for the diversion of stormwater from entering wetlands or streams directly;
- h) The velocity of water that may reach wetlands should be slowed before it is intercepted by virgin soils using a siltation and erosion control structure, which abuts with natural bedrock. The plans and specification for this structure should be forwarded to the relevant stakeholders such as Working for Wetlands and local municipalities;
- i) Emergency plans must be in place in case of spillages onto road surfaces and/or into river and wetland systems;
- j) The oil traps incorporated into the design of toll plazas should be serviced on a monthly basis, especially before the summer rainfall period;
- k) Erosion control measures should be monitored to ensure their effectiveness. Silt traps and culverts should be regularly maintained and cleared so as to ensure effective drainage;

- l) Local people should be employed to act as litter patrols on a weekly or daily basis if necessary during the operational phase, to ensure that pollution (solid waste) is reduced at all times; and
- m) Rehabilitation of slopes must be carried out (e.g. particularly where bridge-building will take place in river gorges) so as to ensure the recovery of established drainage patterns.

16.7.6 SOILS, LAND USE AND AGRICULTURE

- a) The position of over- and underpasses should be further discussed with affected farmers;
- b) Maximise the positive impact of the proposed toll road through facilitating the development of markets and producers co-operatives for such commodities as sugarcane, timber, maize and livestock. It is suggested that SANRAL could make it the task of their socio-economic team to facilitate discussion between leaders in commerce, agricultural officers and leaders of the community towards reopening discussion and planning towards developing sugar and timber industries in Pondoland;
- c) Farmers should be warned before blasting is to occur to be able to save poultry in communal broiler houses from suffocation by corralling them into smaller groups. Loss of production is however inevitable and compensation the only option. Mitigation should aim at minimising losses. Future poultry houses should not be built within 500 m of the proposed toll road especially where there are steep down-hills where the possibility of vehicle backfiring increases;
- d) Topsoil should be stockpiled separately from subsoil. Stockpiles should not be higher than 2 m to avoid compaction. Stockpiled soil should be seeded to maintain biological activity and to keep alien invader species from establishing on it and seeding it. Care must be taken not to allow heavy traffic over the soil;
- e) The road must be fenced to safeguard both traffic and livestock. Grass within the road reserve should be mown/cut each year where possible to help prevent the spread of fires; and
- f) Liaise with government extension services to determine how to assist with aiding the extension workers perform their work efficiently.

16.7.7 SOCIAL

Design and Construction

- a) The Social Impact Assessment must be taken forward into a Social Management Plan. The social management plan should set out the process and criteria for mitigation of negative social impacts and a monitoring regime;
- b) It is strongly recommended that as many employment opportunities as is practical are reserved for local people. In particular the developer should;
 - Where possible use labour-intensive methods of construction.
 - Develop a community labour agreement with targets for employment and for progression.
 - Go beyond the bare minimum wage rate and invest in local staff – quality is dependent upon well-motivated staff
 - Actively work towards facilitating access to Basic Skills Training.
- c) It is recommended that the developer generate a policy for small, medium and micro-enterprises and that the various policies and provisions developed by the Department of Trade and Industry be adhered to. Contractors must be aware of these provisions and adhere to them;
- d) The recommendations of the noise and vibrations specialists must be complied with;
- e) The recommendations of the archeological and cultural management study must be followed;
- f) The Developer and Contractor must follow the mitigation measures suggested by in the visual impact report;
- g) During construction the recommendations of the air pollution specialists must be complied with;

- h) During construction the road is to be fenced. Fencing is to be inspected weekly and maintained properly by the Contractors;
- i) The Contractor should, in consultation with local HIV/AIDS organisations and government structures, design and implement an HIV/AIDS and STD awareness and prevention campaign;
- j) The Contractor should make HIV/AIDS and STD awareness and prevention programmes a condition of contract for all suppliers and sub-contractors;
- k) The Contractor should provide an adequate supply of free condoms to all workers;
- l) A voluntary counselling and testing programme should be introduced during the construction phase and continued during operations;
- m) The Contractor should undertake a HIV/AIDS and STD prevalence survey amongst all workers on a regular basis;
- n) The Contractor should establish liaison structures with local police to monitor changes during the construction phase and where necessary additional security should be provided;
- o) Resettlement must be conducted in terms of international best practice and accompanied by a comprehensive resettlement action plan;
- p) The Developer must design and provide crossing points that are sufficiently distributed so as to replace and/or mimic those internal routes currently used by the communities and their livestock;
- q) Where it could be demonstrated that the introduction of the toll road had been directly responsible for the creation of sub economic farming units then the Developer should expropriate the units in their entirety providing adequate compensation; and
- r) The Developer must design adequate numbers of strategically placed access points allowing ingress and egress to the road.

Operation

- a) The road is to be fenced. Fencing is to be inspected weekly and maintained properly by the Operator.
- b) The Operator is to ensure that signs, which should be graphic and in the vernacular, are erected on all boundary fences warning against entering the road reserve.
- c) It is imperative that a safety based public awareness programmes should be developed by the Operator.
- d) The Operator should enter into negotiations with taxi associations well in advance of implementation of toll fees;
- e) The Operator should ensure that either sufficient discounts are in place such that no particular local user is significantly penalised;
- f) In particular the Operator should introduce discounts for public transport providers;
- g) As part of a social responsibility programme the grass in the reserve could be bailed and made available to the communities. This may help reduce the risk of fence cutting/damage and the hazard posed by unattended cattle grazing in the reserve and crossing the road;
- h) The Operator should actively engage with the local authorities to ensure that no unplanned nodes develop; and
- i) During operation the recommendations of the air pollution specialists must be complied with.

16.7.8 TOURISM

- a) Tourism promotion and tourism product marketing should be undertaken in partnership with relevant authorities and stakeholders;
- b) Tourism and hospitality-related skills should be promoted as part of the overall skills development programme;
- c) Access to coastal destinations could be improved through the improvement of secondary routes. Signage to destinations off the route should be improved as well;

- d) Impacts on environmentally sensitive areas should be minimised in order to sustain eco-tourism;
- e) Mitigation measures recommended for other specialist studies, such as vegetation and flora and visual, should be implemented; and
- f) Public participation with tourism stakeholders should be maintained particularly where valuable resources such as waterfalls may be affected.

16.7.9 CULTURAL AND HISTORICAL HERITAGE

- a) Compile a protocol to be followed by the contractors in the event that any heritage resources are discovered during the construction activities;
- b) Develop and conduct training courses for all relevant personnel to enable them to participate effectively in heritage resource management; and
- c) Undertake regular monitoring as construction activities proceed.

16.7.10 NOISE

- a) Implement noise mitigation measures along the relevant sections of the route and at the various toll plaza locations identified in the noise specialist report in order to reduce the day-time noise rating level to at least comply with the legal limit of 65 dBA on all residential or other noise sensitive land. This could involve the use of a low-noise porous road surface and/or the erection of noise barriers close to the edge of the road;
- b) It has been emphasised that compliance with the legal limit could still result in the intensity of noise large areas of land still being high. It is thus recommended that adequate noise mitigation procedures be implemented to ensure a day-time noise rating level of 55 dBA not be exceeded on residential and other noise-sensitive land; and
- c) For construction of the proposed new roads in rural areas it is recommended that machinery with the lowest noise emission be used and that a well planned and co-ordinated “fast track” procedure is implemented to complete the total construction process in any area in the shortest possible time.

16.7.11 AIR QUALITY

It is recommended that discussions be held with the eThekweni Municipality Health Department to address the long-term plans for air quality management in the area;

Toll plazas

- a) Sites where favourable meteorological dispersion prevails should be considered in finalising the location of toll plazas. The factors to consider are relatively elevated flat areas, avoiding valley sites and areas where the general wind flow is impeded by topography;
- b) Toll plazas should not be located in the immediate vicinity of areas where people live and carry out their daily business (e.g. homes, schools, shops, etc.);
- c) Emphasis should be placed on optimising the traffic flow through the toll plazas and that vehicle idling times are limited to a minimum, particularly at peak times;
- d) An occupational health study should be conducted to assess the impact on workers' health. This study may also assess design specifications for the toll booths to isolate the occupants as far as possible from the ambient environment; and
- e) Air quality in toll booths should be monitored for a period of time taking into account diurnal and seasonal traffic volumes.

Dust suppression

- a) Remove only limited vegetation to accommodate construction activities;
- b) Ensure unpaved site roads and access roads remain sufficiently moist throughout the construction period to suppress dust. Water can be used as a wetting or binding agent on the unpaved roads;
- c) Implement traffic control measures to limit vehicle-entrained dust from unpaved roads e.g. by limiting vehicle speeds and by restricting traffic volumes; and
- d) Re-vegetate verges and cuttings once all of the construction is completed, and when the lay down area/construction camp is vacated.

It is recommended that an Air Quality Management Plan be included in the Construction EMP.

16.7.12 VISUAL

- a) The route alignment should be adjusted out of the Mateku Waterfall viewshed and moved further east beyond the low ridge east of the proposed route;
- b) The disturbance footprint of bridges should be limited to the absolute minimum across valley bottoms and the disturbed areas should be rehabilitated immediately;
- c) Bridges should be designed with appropriate, high aesthetical design criteria;
- d) A tourist viewing point should be incorporated into the road design where visitors can stop and view from strategic points at the Msikaba and Mthentu River bridges;
- e) A landscape architect should be appointed during the design phase to integrate the project components with the surrounding landscape in order to ensure that the project blends in physically and aesthetically with the environment;
- f) Detailed specifications for effective rehabilitation of the construction area and road reserves should be included in the contract documentation so that the tasks can be costed and monitored for compliance;
- g) Colour variations on toll plazas should be considered to reduce their scale. Both horizontal and vertical colour differences should be used in a manner that would help to visually break up the large roof and side surfaces;
- h) The heights from which floodlights are fixed should be reduced and identify zones of high and low lighting requirements with the focus of the lights being inward, rather than outward;
- i) A Landscape Development Plan should be developed timeously for all toll plazas and interchanges;
- j) Screening berms should be constructed to limit the visual impact of toll plazas; and
- k) The detailed visual requirements should be monitored during construction.

16.7.13 TRAFFIC DIVERSION

- a) During construction it should be ensured that the same number of lanes on multi-lane sections are available during peak periods as are currently available;
- b) Introduce a system to allow local users on the N2 Prospecton-Winklespruit, Winklespruit-Hibberdene and Hibberdene-Southbroom sections to pay toll tariffs directly related to the distance of the toll section that is used (i.e. a local user discount linked to the use of electronic toll tags);
- c) Visitors could be included in the local user discount scheme as well by creating closed Electronic Toll Collection systems on the N2 Prospecton-Winklespruit and Winklespruit-Hibberdene sections and, ideally, also on the Hibberdene-Southbroom section; and
- d) The latter option can only be implemented if a decision were made, in future, that the upgraded freeways of the Durban metropolitan area would be tolled by means of Open Road Tolling.

16.7.14 PLANNING/DEVELOPMENT

- a) It should be ensured that proposed intersection upgrading accommodated planned land uses at identified nodes;
- b) Bypasses, with proper intersection to allow traffic to enter and leave the CBD, should be constructed at Butterworth, Dutywa and Mthatha;
- c) Interchanges should be considered at the Libode and Ngqeleni intersections;
- d) Consultation with the Regional Land Claims Commissioner's office and land claimants should be undertaken regarding the resolution of applicable land claims; and
- e) Ribbon development should be curtailed by way of pro-active and structured development planning following proper planning principles.

16.7.15 ECONOMIC

- a) Discounts should be negotiated where road users in the vicinity of toll plazas who would use the road for a distance shorter than that for which the fee is calculated, would be impacted negatively; and
- b) The majority of vulnerable people use bus and taxi transport and special rates for these types of vehicles should be considered.

16.7.16 GENERIC CONSTRUCTION-RELATED MITIGATION

All construction materials including fuels and oil should be stored in a demarcated area that is contained within a berm to avoid spread of any contamination. Cement and plaster should only be mixed within mixing trays. Washing and cleaning of equipment should also be done within a bermed area, in order to trap any cement or plaster and avoid excessive soil erosion. These sites must be rehabilitated prior to commencing the operational phase. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any river channel.

Vegetation stripping should occur in parallel with the progress of road construction to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Large stands of Palmiet should be avoided during the construction phase and viable populations should remain *in situ* to allow for the possible recovery of these stands. Only selected plant species must be used in the re-vegetation process.

Construction should as far as possible not occur within any wetlands, thus resulting in their alteration or removal. This includes assessing the possible changes to wetland conditions, hydrological regimes, etc. on wetland function when selecting sites for borrow pits. The construction of a surface stormwater drainage system during the construction phase must be done in a manner that would protect the quality and quantity of the downstream system. The use of swales, which could then be grassed for the operational phase, is recommended as the swales would attenuate run-off water. The purpose of the retention swales is to ensure that stormwater containing silt and other sediments will settle out (commonly accepted sound environmental practice). It is expected that seepage, evaporation and overflow will occur in the swale retention areas ensuring that the water released off-site is of a better quality.