ENVIRONMENTAL IMPACT ASSESSMENT

for the proposed

NATIONAL ROAD 3: KEEVERSFOnteIN TO WARDEN
(DE BEERS PASS SECTION)

DEA ref. no. 12/12/20/1992

Study on the Potential Impact of the Proposed National Road 3: Keeversfontein to Warden (De Beers Pass Section) on the Visual Environment

Specialist Report

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28 July 2011
REPORT TITLE : Specialist study on the potential impact of the proposed National Road 3: Keeversfontein to Warden (De Beers Pass Section) on the visual environment

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Menno Klapwijk has specialised for 28 years in environmental planning, construction rehabilitation and control, visual impact assessment, and landscape site design. Significant visual impact projects include: Moatize Power Plant (Mozambique), Transnet Multi-purpose Pipeline, Saldanha Steel, Mozal (Alusaf – Mozambique), Letsibogo Dam (Botswana), Blue Circle Cement Factory (East London), Phlogopite Factory (Phalaborwa), Iscor Heavy Minerals Smelter (Empangeni), many VIA's for Eskom transmission lines and substations, Mmamabula 400kV Transmission Line, Mine and Power Plant (Botswana), West Coast Combined Cycle Gas Turbine Power Plant (CCGT), De Hoop Dam and Pipeline (Sekhukuneland), Tugela Water Project (KwaZulu-Natal), Delportshoop Tower Mast (Delportshoop, Northern Cape), N3 Toll Road, Cedara (KwaZulu-Natal) to Heidelberg (Gauteng), Maputo Steel Project (Maputo, Mozambique), Ga-Pila Village (Potgietersrus, Limpopo Province) and Pom Pom Camp (Okavango, Botswana).

He has more than 100 publications and reports dealing mostly with environmental planning, environmental rehabilitations and control specification, environmental impact assessment and visual impact assessment.

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Council: Council for the Built Environment (CBE)
DECLARATION OF INDEPENDENCE

I, Menno Klapwijk, as authorised representative of Cave Klapwijk and Associates, hereby confirm my independence as a specialist and declare that neither I nor Cave Klapwijk and Associates have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Cave Klapwijk and Associates was appointed as Visual Impact Assessor in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Visual Impact Assessment for the N3: Keeversfontein to Warden (De Beers Pass Section) Environmental Impact Assessment. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

Signed…………………… Date: 28 July 2011
EXECUTIVE SUMMARY

INTRODUCTION

A new toll highway is currently being investigated by the N3 Toll Concession (Pty) Ltd on behalf of the South African National Roads Agency Limited (SANRAL) from Keeversfontein to Warden (De Beers Pass Route [DBPR]).

Cave Klapwijk and Associates have been commissioned to undertake the environmental assessment process. One of the issues that were identified was that the development could have a negative impact on the visual environment.

Menno Klapwijk was requested by Cave Klapwijk and Associates to undertake the visual impact specialist study.

The impact assessment was undertaken for only the main components of the project as per the Terms of Reference. The study excluded ancillary components such as borrow pits, quarries, laydown areas, construction camps, interchanges and ramp plazas. This study evaluated the visual impact of the DBPR and alternatives with a view to assessing its severity based on the author’s experience, expert opinion and accepted techniques.

The study assessed four main project components or component alternatives. These included the DBPR, the DBPR: Alternative A, the DBPR: Alternative C.

METHOD

In order to address the objectives of the study the following method has been used:

- Determine the setting, visual character and land use of the area surrounding the area, and the Genius Loci (sense of place). This was done in terms of:
  - Topography
  - Vegetation cover
  - Land use
  - Visibility
  - Landscape diversity
  - Landscape character

- Discussions and meetings with the specialist consultant team to identify specific aspects of the construction and development which would affect the visual quality of a setting;

- Define the extent of the affected visual environmental, the viewing distance and the critical views;
• An evaluation was made of the landscape characteristics against which impact criteria ratings were applied;

• The viewshed, the area within which the proposed project can be visible, was determined using digital 1:50 000 topographic maps with 20 m contour intervals analyzed by the Geographic Information System (GIS), algorithms available in the ArcView Software Suite.

The assessment is based on the routes, ground-truthed during a field inspection in March 2011.

**LIMITATIONS, CONSTRAINTS AND ASSUMPTIONS**

The following assumptions and limitations are applicable to this study:

• The basis for this assessment is that scenic wilderness areas form the core of eco-tourism due to the high positive aesthetic appeal;

• The assessment is based on assumed demographic data. No detailed study was done to determine accurate data on potential viewers of the project components. If necessary these studies could be undertaken during the design phase of the project;

• Determining a visual resource in absolute terms is not achievable. Evaluating a landscape’s visual quality is both complex and problematic. Various approaches have been developed but they all have one problem in common: unlike noise or air pollution, which can be measured in a relatively simple way, for the visual landscape mainly qualitative standards apply. Therefore subjectivity cannot be excluded in the assessment procedure (Lange 1994). Individually there is a great variation in the evaluation of the visual landscape based on different experiences, social level and cultural background. Exacerbating the situation is the inherent variability in natural features. Climate, season, atmospheric conditions, region, sub-region all affect the attributes that comprise the landscape. What is considered scenic to one person may not be to another (NLA, 1997);

• Localized visual perceptions of the economically depressed communities have not been tested as these may be influenced rather by the economic and job opportunities that would exist rather than the direct visual perception of the project;

• The viewshed map is computer generated and does not take into account local and minor visual interruptions in the landscape such as trees on the edge of roads, minor landforms, buildings, etc. As a result the visibility on these maps could be overstated.
The assessment does not consider the ancillary project infrastructure and components such as borrow pits, spoil dumps, construction camp sites, interchanges, ramp plazas, etc. These components will be assessed in detail during the design phase should the project be implemented;

Detailed site specific mitigation for each cut and fill slope is not provided. This will be addressed by the landscape architect during the detailed design phase of the project should it go ahead;

The 'Do Nothing' alternative was not specifically addressed as it is likely that the existing landscape will remain in its existing condition;

If the study, however, determined that the negative visual impact is of such a magnitude and significance that it will seriously influence the decision on whether or not to build, it will then be necessary to test and determine the visual perceptions of neighbouring communities. Such a study is involved, costly and time consuming.

FINDINGS

The study area traverses four distinct broad landscape types. Each has its own visual or Genius Loci (sense of place) characteristics and these have an influence of the impact the development will have on the affected landscape.

The implementation of the mitigation measures that have been recommended will go a long way towards reducing the significance of the impact. It will be necessary that a landscape architect will need to be appointed to integrate the physical and aesthetical design of the project components with the surrounding landscape during the detailed design phase of the project.

The study was assessed according to the following project component groupings:

- Alternative route alignments

**De Beers Pass Route**

The DBPR will exert a negative influence on the visual environment. This is largely due to the:

- high visibility of the route, especially across the escarpment and foot hills;
- impact on the high visual quality of the section from the top of the De Beers Pass and the Lincoln Interchange;
- the high visibility of construction and operation activity within the uniform open grassland areas of uniform visual pattern;
- the low VAC of the area due to the low and uniform visual pattern of vegetation which does not allow for the road to be visually accommodated within the landscape as a result of the high visual contrast;
the scale of the road in a scenic rural setting;
the introduction of a continuous corridor within a rural setting that will be brightly lit by vehicles throughout the night and the accompanying increase in noise that will significantly affect the sense of place;
the need to cut into the existing landform to accommodate the vertical alignment and the width of the servitude;
the overall significance of the visual impact is regarded as Medium-High (a rating of 4 on a scale of 1-5) across the escarpment, High (a rating of 5) between the top of the De Beers Pass and the Lincoln Interchange and Medium (a rating of 3) for the section from the Lincoln Interchange to Warden.

De Beers Pass Route: Alternative A

The DBPR: Alternative A will exert a negative influence on the visual environment for similar reasons to those for the DBPR. However, this route up the escarpment goes through an area with a higher VAC and thus the landform can visually accommodate the road to a greater degree. Furthermore, it traverses an area that is more disturbed by human interventions such as railway, transmission lines, towns, etc. that detract from the more undisturbed rural visual quality experience along the DBPR.

The overall significance of the visual impact is regarded as Medium - High (a rating of 4) from Keeversfontein to Van Reenen, Medium (rating of 3) from Van Reenen to Harrismith and Medium - Low (a rating of 2) from Harrismith to Warden.

De Beers Pass Route: Alternative C

Only the section from Keeversfontein to Harrismith was evaluated as the section from Harrismith to Warden is common with that for DBPR: Alternative A and has been dealt with under that section.

Alternative C follows the exact alignment of the existing N3 which in itself exerts a negative influence on the visual environment. However, the upgrade of this route will affect an area that has already been disturbed and therefore does contribute substantially to the overall negatively impacted environment as all additional disturbance is contained within this corridor.

The overall significance of the visual environment is regarded as Medium (a rating of 3) from Keeversfontein to Van Reenen and Medium - Low (rating of 2) from Van Reenen to Harrismith.

CONCLUSION

Based on the field observations and the studies herein and with the implementation of the mitigation measures, the following conclusions are made from a visual point of view:
Of the three alternatives assessed it can be concluded that although all will exert a negative impact, on balance the **DBPR: Alternative C** will exert the least significant impact on the visual environment.

**Table (i): Comparative Significance Ranking for the various alternative routes**

![Visual Impact Significance Diagram](image)

**Figure (i): Visual Impact Significance** illustrates the sections of routes with their accompanying significance ratings.
Figure (i): Visual Impact Significance
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8 **DISCUSSION AND CONCLUSIONS**

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ACRONYMS

CKA  Cave Klapwijk and Associates
SANRAL  South African National Roads Agency Limited
VAC  Visual Absorption Capacity
STUDY ON THE POTENTIAL IMPACT OF THE PROPOSED NATIONAL ROAD 3: KEEVERSFONTEIN TO WARDEN (DE BEERS PASS SECTION) ON THE VISUAL ENVIRONMENT

1 INTRODUCTION

A new toll highway is currently being investigated by the N3 Toll Concession (Pty) Ltd on behalf of the South African National Roads Agency Limited (SANRAL) from Keeversfontein to Warden (De Beers Pass Route [DBPR]).

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Menno Klapwijk was requested by Cave Klapwijk and Associates to undertake the visual impact specialist study.

2 BACKGROUND AND BRIEF

The N3 Toll Concession (Pty) Ltd (N3TC) were appointed by the South African National Roads Agency Ltd (SANRAL) as the Concessionaire responsible for the Design, Construction, Financing, Operating and Maintenance of a portion of National Route 3 from Cedara in KwaZulu Natal to the Heidelberg South Interchange in Gauteng as a Toll Highway with Developments and Associated Facilities. This 415 kilometre section of the N3 is referred to as the N3 Toll Route. The concession is for a thirty year period that commenced on 2 November 1999.

Included in the Concession Contract is the requirement to construct a new route known as the DBPR, between Keeversfontein and Warden.

N3TC obtained environmental approval by means of a Record of Decision (ROD), issued by the Department of Environmental Affairs and Tourism, on 26 March 1999, authorising the construction and upgrading of the N3 Toll Road System from Heidelberg to Cedara, comprising of the routes, (i) Cedara to Heidelberg (via Van Reenen) and (ii) Keeversfontein to Warden (DBPR). The ROD was issued subject to certain conditions.

In order to comply with these conditions, N3TC embarked on an analysis process to compare alternative alignments with the DBPR. During this process, N3TC established an alternative geometrically compliant route in the vicinity of the existing Van Reenen’s Pass, with various alternatives to re-join the DBPR at appropriate positions.
In discussion with the Department of Environmental Affairs (DEA), it was agreed that when the application for Environmental Authorisation for the DBPR was made, it should include a study of an additional alternative, referred to as Alternative A in this report.

The route alignment alternatives which are included in this VIA process are:

- DBPR (De Beers Pass Route)
- DBPR: Alternative A
- Existing N3 Upgrade: Alternative C

Refer to **Figure 1: Locality Map** showing the proposed alternative route alignments. A description of each route alignment is provided below.

This visual assessment is a specialist study to determine the visual effects of the proposed N3 De Beers Pass Section on the surrounding environment.

The primary objective of this specialist study is therefore to describe the potential impact of these structures on the visual character and sense of place of the area. This Specialist Study will have the following objectives:

- Determine the visual character of the areas along the proposed route by evaluating environmental components such as topography, current land use activities, surrounding land use activities, etc.;
- Identify elements of particular visual quality that could be affected by the proposed project;
- Describe and evaluate the specific visual impacts of the preferred individual components of the highway and associated infrastructure from critical viewpoints and view fields;
- Determine the extent of the visibility of the project from surrounding areas;
- Specific consideration should be given to the identification of requirements for further investigation;
- Recommend mitigation measures to reduce the potential visual impacts generated by the proposed project;
- The assessment should assess impacts according to the criteria and terminology as indicated by CKA,
Figure 1: Locality Map
3 STUDY APPROACH

Method

In order to address the objectives of the study the following method has been used:

- Determine the setting, visual character and land use of the area surrounding the area, and the Genius Loci (sense of place). This was done in terms of:
  - Topography
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The ‘Do Nothing’ alternative was not specifically addressed as it is likely that the existing landscape will remain in its existing condition;

If the study, however, determined that the negative visual impact is of such a magnitude and significance that it will seriously influence the decision on whether or not to build, it will then be necessary to test and determine the visual perceptions of neighbouring communities. Such a study is involved, costly and time consuming.
4 DESCRIPTION OF THE AFFECTED ENVIRONMENT

4.1 Description of the Works

The proposed project comprises of the following:

- De Beers Pass Route

This proclaimed DBPR runs from Keeversfontein (Tugela Toll Plaza) via the De Beers Pass area to Warden. The route branches off the current N3 just north of the Tugela Toll Plaza. The route reaches the top of the KwaZulu-Natal escarpment where it passes through a tunnel approximately 500m in length and then goes around the top edge of a gorge before entering the Free State. A wetland associated with the Wilge River is crossed and the alignment then runs close to the Wilge River before the road climbs to the more even plateau of the Free State Highveld. The Wilge, Meul and Cornelis Rivers are crossed before the DBPR re-joins the existing N3 just north of Warden. The total length of this route is approximately 97.7 km.

- De Beers Pass Route: Alternative A

This route up the escarpment starts just north of the Tugela Toll Plaza and runs for a short distance almost parallel to and east of the existing N3 Van Reenen’s Pass. The route then follows the landform ridges and reaches the crest of the escarpment through a saddle immediately south of Van Reenen Village. Just north of Van Reenen village an interchange will connect with the existing N3. The route continues in a north westerly direction to intersect the N3 in the Swinburne area. The route will then deviate to the north and connects with the existing N3 at an interchange before continuing across the slopes of Platberg Mountain to an interchange north of Harrismith near 42nd Hill. From this point the route will follow the existing N3 closely to Warden. The Wilge River is crossed at Swinburne and the Meul and Cornelis Rivers will be crossed at the same points they are crossed by the existing N3. The detailed design will determine to which side the existing road is widened. The total length of this route is approximately 107 km.

The proposed road will comply with SANRAL technical specifications for divided and undivided highways, as follows:

- Road reserve width: generally 80m;
- Road cross section: dual divided or undivided, with a minimum of 4 lanes, 2 lanes in each direction and surfaced shoulders. The cross section will make provision for future expansion to 6 lanes;
- Road surface details: bitumen / concrete (where necessary);
- Road median: vegetated or barrier (as the situation requires);
- Drainage infrastructure: to effectively manage discharge from the road surface and surrounding areas;
- Access Control: there will be no at-grade intersections. In the case of upgrading the existing N3, the existing at grade intersections will be closed and alternative access will be provided by means of appropriate service roads / interchange system;
- Interchanges: proposed new and upgraded interchanges are shown on the Figure 1: Locality Map.
- Bridges, viaducts under and over passes and link roads will be built where the terrain dictates their need, to provide landowners appropriate access to their properties and to interchanges.

For ancillary works associated with the construction of the road the following are required:

- Borrow pits and haul roads to supply the material for the layer works of the road;
- Quarries, crushing and screening plants and aggregate storage areas. The aggregate will be used for road pavement, asphalt and concrete mixes;
- Temporary Asphalt Plants that will supply asphalt for the road construction, and concrete batching plants for the mixing and supply of concrete for the concrete works required;
- Site offices, lay-down yards, workshops and laboratories for the Contractor's and Professional teams.

- **De Beers Pass Route: Alternative C**

The existing alignment of the National Road 3 between Keeversfontein (Tugela Plaza) and Warden will be upgraded to comply with existing National Highway Standards. The total length of this route is approximately 112 km.

- **Do-Nothing Alternative**

The existing alignment of the National Road 3 will remain exactly as it is and will be maintained to the existing National Road Standards. The total length of this route is 112 km.
4.2 Description of the Natural Physical Elements

The natural physical elements are described according to broad topographical regions (Figure 2: Landscape Types). These landscape types correlate closely with the vegetation types as described by Low and Rebelo (1996) as these types take into accent the topographical makeup of the area. The proposed Toll Highway and the alternative project components traverse four distinct landscape types and one biome.

These landscape types have been used solely for the purpose of defining the landscape components and are not intended to refer to the flora studies.
Figure 2: Landscape Types
The landscape types are:

- Moist Cool Highveld Grassland
- Moist Cold Highveld Grassland
- Wet Cold Highveld Grassland
- North-eastern Mountain Grassland

The extent of the visual impact of the project will depend on the following characteristics of the receiving environment:

- **Topography**
  
  Topography describes the landform that gives rise the physical setting.

- **Vegetation Cover**
  
  Vegetation refers to the vegetation cover in terms of visual diversity and not in terms of botanical characteristics.

- **Land Use**
  
  Land use is described in terms of the visual mix of land uses that is a function of land diversity and character.

- **Visibility**
  
  Visibility is described in terms of the areas that theoretically have direct line of sight in relation to distance the viewer is away from the object. Critical affected views are also described.

- **Landscape Diversity**
  
  Landscape diversity is a function of topography, vegetation and land use. The greater the diversity, the greater is the potential for the proposed development to blend with the surrounding landscape.

- **Landscape Character**
  
  The spirit, or sense of place, is that quality imparted by the aspects of scale, colour, texture, landform, enclosure, and in particular, the land use. According to K. Lynch (1992) ‘it is the extent to which a person can recognise or recall a place as being distinct from other places as having a vivid, or unique, or at least a particular character of its own’.

  The quality of *Genius Loci* is a function of attributes such as the scenic beauty or uniqueness and distinctive character of the built and cultural landscape.
The visual quality is the visual significance given to a landscape determined by cultural values and the landscape’s intrinsic physical properties (Smardon, et al, 1986). While many factors contribute to a landscape’s visual quality, they can ultimately be grouped under three headings: vividness, intactness and unity.

The visual quality can be categorised under relative headings such as high, medium and low visual quality for the study area. High refers to those areas that have a high aesthetic appeal such as mountains, river valleys, unspoilt coastal zones and wilderness areas. The medium areas are those that have high visual diversity, but which have already been modified by human activity comprising the aesthetic appeal such as roads, minor infrastructure and settlements. The low visual quality areas are those that are relatively highly populated and which have been heavily impacted on by human activity such as industrial and mining areas or which have a low aesthetic appeal due to a lack of landscape diversity or interest.

The study area focuses on a 10 km radius around each of the alternative route alignments.

4.2.1 De Beers Pass Route

- Topography

The route from Keeversfontein (Tugels Plaza) crosses open grassveld in an undulating landscape made up of gentle hills and valleys as it moves towards the foothills of the escarpment.

From approximately the lower Braamhoek Dam area of the Ingula Pumped Storage Scheme area the landscape rises dramatically up the escarpment to the top of the De Beers Pass.

The landscape changes immediately from the top edge of the escarpment to approximately the proposed Lincoln Interchange area where the landscape levels cut into wide long open valleys punctuated on the edges by towering blocks of sandstone mountains such as Nelson’s Kop, Tandjiesberg and Verkykerskop.

The route from approximately the proposed Lincoln Interchange to Warden is gently rolling to flat with wide open vistas.

Implications for the Project

The rising landscape from Keeversfontein to the top of the De Beers Pass enables this proposed road to be highly visible for extended distances to the east and south-east. The lack of a diverse vegetation
cover limits the opportunity to blend the road visually with the landscape and will leave the line visually exposed.

The landscape from the top of the escarpment to the Lincoln Interchange assists in limiting the visual exposure of the road due to the rising landforms either side of the route where visibility is generally reduced to 2.5 - 5.0 km.

The open and flatter landscape and the higher viewpoints from the Verkykerskop area and around Warden increase the visual extent of the proposed roads from the Lincoln Interchange to Warden. The low vegetation height does not assist in screening the proposed road nor does it assist in blending the road with the landscape.

- **Vegetation Cover**

  The vegetation for almost the entire length of the route consists of low grasslands. Patches of savannah occur near the Tugela Plaza area.

  The Grassveld landscape types are generally open, uniform in texture and start resulting in a visually open landscape.

**Implications for the Project**

The uniformly textured vegetation of the Open Grassland landscape types will visually contrast significantly with the road making it more visible in the landscape.

- **Visibility**

  The visibility of the road will vary along the length of the proposed route. The visibility is most extensive in the south-east where the route crosses the escarpment and its foothills. Views extend up to 20 km to the east and south (Figure 3: De Beers Pass Route: Viewshed).

  The visibility is contained within the valleys from the top of the De Beers Pass to the Lincoln Interchange by the surrounding rising landforms and valley slopes and limits views to approximately 2.5 - 5.0 km. Intermittent views are possible up to 15 km away from the higher landforms.

  The visibility of the road from approximately the Lincoln Interchange to Warden is more extensive within this landscape due to the lack of topographical screening features. Visibility is most extensive in the Verkykerskop area where views extend to 17 km and around Warden where views extend to 10-15 km intermittently.
Figure 3: De Beers Pass Route: Viewshed

Critical views are from the intersection roads such as the N3, S772, S692 and towns such as Warden and Verkykerskop. Critical views are
also those contained in the highly scenic area from the Lincoln Interchange to the bottom of the De Beers Pass as well as the existing farmsteads such as Pitchers Rust.

**Implications for the Project**

Visibility varies in intensity and extent depending on the landscape through which the route traverses. Visibility is more significant within the valleys between the top of De Beers Pass and the Lincoln Interchange than the section from the Lincoln Interchange to Warden due to the high scenic value.

Certain establishments such as Pitchers Rust rely on the aesthetic and visual environment and are in close proximity to the proposed route.

- **Landscape Diversity**

  Landscape diversity along this route alignment is primarily based on the topographical features as the vegetation, namely grasslands, is relatively uniform in texture and height.

  The zone that exhibits the highest diversity is that within the Wet Cold Highveld Grassland (*Figure 2*) as the landscape exhibits a greater degree of horizontal and vertical scale than does the rest of the line.

  Notwithstanding this variation in diversity, the general landscape exhibits a low diversity even though the escarpment displays patches of wooded / forest areas and the Verkykerskop / Warden area is a mix of arable and pastural farming.

**Implications for the Project**

The higher the visual diversity, the greater is the opportunity to visually blend the road with the environment as these will more readily accept visual change or any structure placed within them. The higher the diversity, the higher the Visual Absorption Capacity (VAC) or the ability of the environment to accept visual change.

The lack of visual diversity within this Grassveld landscape biome will result in a low VAC and will in turn result in any large scale structure to be highly visible due to the lack of screening and the high visual contrast. The escarpment slope and foothills displays a slightly higher visual diversity due to the more diverse topography and the odd patches of bushveld, especially lower down and the forested patches along the river courses and steep mountain valleys. However, this still does not provide sufficient diversity to raise the VAC to moderate for this area.
• **Landscape Character**

The escarpment and foothills exhibits a well-defined and vivid sense of spatial definition with a high scenic quality due to the combination of low gentle valleys, open grasslands and the massive and imposing mountain backdrop of the Drakensberg (*Figure 4: Relative Visual Quality Sensitivity*). The character of the landscape can be regarded as rural agriculture predominantly stock grazing.

The upper valley exhibits a highly defined and vivid sense of space and place and is regarded as having a high aesthetic value and being very scenic. This is due to the dramatic and striking mountains that protrude on the valley edges, the enclosed nature of the valley which creates a scale to which one can relate, the open grasslands and wetlands which in patches exhibits almost wilderness quality due to the very sparse population and few scattered farmsteads.

From the S772 / Lincoln Interchange towards Warden the character changes to where the scenic quality reduces due to the lack of landscape diversity in that the mountains have disappeared and the landscape is open and punctuated by some minor rivers and rolling hills.

**Implications for the Project**

The introduction of a highway road through much of this area will significantly alter and compromise the very high scenic and visual quality of the area, especially the upper valley section that currently is relatively little visually and aesthetically altered by human intrusion.

Tourist-based enterprises that rely on the high scenic quality as the basis for their business will be impacted. The introduction of the road will restrict further such enterprises from being developed.

**4.2.2 De Beers Pass Route: Alternative A**

• **Topography**

The topography that the route from Keeverfontein to the village of Van Reenen at the top of the escarpment crosses is similar to that of the DBPR as the alignment traverses a similar landscape type. The lower section follows a valley that is visually relatively undisturbed, with the exception of a 400 kV transmission line that cuts across it, until it joins, up at midslope, the existing railway line at Brakwal Station.
Figure 4: Relative Visual Quality Sensitivity
It then follows a north-western rising alignment that skirts the existing Transnet Fuel Pump Station until it reached the top of the escarpment immediately south-east of Van Reenen.

The route from Van Reenen to Harrismith roughly follows the existing N3 Road. The landscape changes immediately from the dramatic rising escarpment to fairly gentle rolling hills and valleys until reaching the imposing Platkop Mountain at Harrismith where the route follows the upper terrace of the Platkop foothills between the mountain and the town.

Once past Platkop the landscape changes to a more flatter and undulating landscape with wide open vistas and a lack of topographical definition, except on the visual periphery.

**Implications for the Project**

As with the DBPR, the rising landscape of the escarpment results in the proposed road along this route to be highly visible for extended distances. Massive road structures such as the bridges, cuts and fills and the proposed viaduct will be dominant in the landscape. This western section of the escarpment presents more landscape relief and the road generally meanders with the landform rather than simply cutting across it. This assists in sympathetically fitting the road to the landscape to a certain extent.

The open rolling topography from Van Reenen to Harrismith is not as contoured by valley slopes as is the DBPR and views are thus more extensive. Raising the road alignment to the upper terrace above Harrismith could make the road visually prominent and interrupt the foothill profile of the Platkop Mountain.

The open and flatter landscape of the Section A Route following the existing N3 from Harrismith to Warden does not allow for much visual screening.

- **Vegetation Cover**

  The vegetation of the escarpment is largely grassveld, but there are patches of the Natal Central Bushveld that encroach on the lower footslopes of the berg. There are large patches of black wattle encroachment that creates some vegetation diversity.

  The vegetation from Van Reenen to Harrismith is generally grassland with the odd patches of trees and wattles.
The vegetation from Harrismith to Warden has been modified by arable agriculture, mainly mealies.

**Implications for the Project**

As with the DBPR the open uniformly textural grasslands will contrast with the proposed road along this route. This will be slightly tempered in the escarpment area where the vegetation is more varied and diverse due to the added mix of bushveld and wattle trees.

The more scenic area of the route co-inside with the Wet Cold Highveld Grassland and the North-Eastern Mountain Grassland and as a result sensitive planning and design need to be adopted through this area.

- **Visibility**

Visibility of the Alternative A Route is generally more extensive than that of the DBPR. However, due to the topographical relief, the escarpment area is slightly less extensive extending not much beyond 5 km (Figure 5: De Beers Pass: Alternative A: Viewshed).

The visibility between Van Reenen and Harrismith becomes more extensive, especially in the Swinburne area.

The visibility of the section from Harrismith to Warden is the most extensive due to the lack of topographical features that can contain the view, these views in patches up to 15 – 20 km.

Critical viewpoints are from the N3 where the route follows the same alignment or where it is in close proximity of the S772, the village of Van Reenen, Montrose and Swinburne, farmsteads, re-fueling zones such as the Ultra Cities and the towns of Harrismith and Warden.

**Implications for the Project**

Visibility is more restricted and contained from Keeversfontein to Harrismith than from Harrismith to Warden which is, to a certain extent, fortunate as the more contained section falls within the more scenic section of the route.

Many of the critical views will not be significantly impacted as these are already impacted by the existing N3. Others such as the area between Harrismith and Platberg and some of the establishments that rely on the scenic visual environment such as those along the escarpment near Van Reenen will be more negatively impacted as the proposed road could compromise the high aesthetic integrity of these areas.
Figure 5: De Beers Pass Route: Viewshed
Landscape Diversity

Landscape diversity varies along the route and is largely a function of landform and vegetation cover.

The escarpment zone can be regarded as having a moderate landscape diversity as the topography is varied in the form of valleys, foothills, massive mountain blocks and edges as well as a mix of vegetation cover such as grassland and patches of darker green tree cover.

The section from Van Reenen to Harrismith is less diverse due to the short and uniform grassland although the topography is relatively diverse.

The section with the least landscape diversity is that from Harrismith to Warden due to the relatively flat, open topography arable farmlands and grasslands.

Implications for the Project

Only the areas with a higher landscape diversity will accept more readily any visual change placed upon them. The escarpment area with a moderate landscape diversity will be able to absorb to a certain extent some of the potential visual change or modification to the landscape by the proposed road.

The rest of the route exhibits a low landscape diversity and in conjunction with the low uniform grassland will result in a low VAC which implies that any large or extensive structure placed on the landscape will be highly visible due to the visual contrast and lack of visual screening.

Landscape Character

As with the DBPR, the escarpment and foothills exhibit a well-defined and vivid sense of place resulting in a zone of high scenic quality. Although the area is scenic, it is less scenic than the escarpment section of the DBPR, notwithstanding the Ingula Pumped Storage Scheme.

The section through which Alternative A passes, has been modified over the years by developments such as the railway line and the stations, existing access roads, transmission lines, Transnet Pipeline Pump Station, black wattle encroachment, a very prominent communication tower, gulley erosions, and is within the viewshed of the
existing N3. Recently a new Transnet pipeline was installed that has left a visual scar.

Similarly the section from the top of the escarpment (Van Reenen) to Harrismith is scenic, but it is less than that of the upper section of the DBPR due to human interventions and developments such as the close proximity of the N3, railway and transmission lines, villages, petrol stations and restaurants, motels, etc.

The section from Harrismith to Warden the scenic quality reduces and the sense of place is less well defined due to the lack of visual diversity. Again this section has a more pronounced rural agricultural quality due to the mix of patches of cleared arable lands and grasslands used for grazing.

**Implications for the Project**

The introduction of a new highway road will negatively alter the existing landscape character due to the large scale nature of the proposed development and especially on the establishments that rely on the aesthetic environment and have not yet been visually impacted by existing developments. However, the significance when compared to that of the DBPR is less due to most of the proposed route already negatively altered by the existing developments.

**4.2.3 De Beers Pass Route: Alternative C**

- **Topography**

  The topography through which Alternative C traverses is very similar to that for Alternative A as Alternative C follows the exact alignment of the existing N3 from Keeversfontein to north-west of Harrismith where the existing N3 and Alternative A join up.

  The existing N3 up Van Reenen’s Pass lies to the south of Alternative A. The route follows the ridge of the slopes presenting the existing road in a very exposed and visible position.

  The section from the top of Van Reenen’s Pass to Harrismith is very similar to Alternative A as these routes run closely together and at times share the same alignment. The route follows the lower lying footslopes and valley to the south-west of the Platberg rather than the higher lying upper terrace.
Implications for the Project

The existing road is highly visible, especially along the Van Reenen’s Pass due to its position in the landscape. The road through Harrismith is relatively screened by the local landforms.

- Vegetation Cover

Most of the existing route is through grasslands, except from the base of the Van Reenen’s Plass to Keeversfontein where pockets of the Natal Central Bushveld occur. This route is less encroached by black wattle as is Alternative A.

Implications for the Project

The vegetation covert does not provide any significant screening and due to the monotonous uniformity of the grassland presents Alternative C in contrast with the surrounding landscape.

- Visibility

The visibility of the road from Keeversfontein to the top of the Van Reenen’s Pass is extensive to the south and east due to the exposed position on the ridge edges of the rising landform. Views extend up to 10 km in patches, but generally no more than 5 km (Figure 6: De Beers Pass Route: Alternative C: Viewshed).

The visibility from Van Reenen to Harrismith is more confined and restricted generally to 2.5 - 5.0 km. This includes the section through the town, but it becomes more extensive as the route rises up the pass behind the Wimpy / Engen complex on the northern side of the town.

Critical views are the establishments along the existing road such as the Zandspruit farm stall, farmsteads, the Pyramid Motel, Van Reenen, Montrose and Swinburne, accommodation facilities such as Lala Nathi and the town of Harrismith.

Implications for the Project

Visibility is high between Keeversfontein and the top of the Van Reenen’s Pass and is reduced substantially from the village of Van Reenen to Harrismith. The high diversity of Harrismith and the local topography helps to significantly screen much of the road as it passes through the town.
Figure 6: De Beers Pass Route: Alternative C: Viewshed
• **Landscape Diversity**

As with Alternative A the diversity along this route varies. The escarpment section has a low to moderate landscape diversity due largely to the diverse topography. The section from Van Reenen to the outskirts of Harrismith has a low landscape diversity while the section through the town has what can be regarded as a moderate to high landscape diversity as a result of the mix of varied landforms, treed landscape and high mix of building forms.

**Implications for the Project**

The section through Harrismith will more readily accept visual change than the rest of the route or any of the other alignments. Route Alternative C, as a whole, will be able to accept visual change more than any of the other alignments due to the fact that this alignment has already been visually modified by a similar structure.

• **Landscape Character**

Most of this alignment is very similar in character as Alternative A for the section form Keeversfontein to the edge of Harrismith.

The main difference is the section through Harrismith where the alignment traverses a totally urban environment. The rest of the route is aligned through rural countryside that has been modified by human intrusion such as rail, small towns and service stations, farmsteads and agriculture.

**Implications for the Project**

The upgrade of this road will have the least impact on the landscape character of the three alternatives considered as this alignment is already the most modified.

### 4.2.4 Interchanges

Several interchanges have been proposed for the various alternative routes. Although the area that these interchanges will occupy is wider than the width of the road, it is considered that these should not have a material additional or alternative impact to the road at where these interchanges intersect. It is therefore considered that the impact of the interchanges will have the same visual impact as the road will exert on the environment.
The landscape diversity surrounding the proposed location is considered low due to the open ploughed fields and grasslands used for stock grazing. The landscape character is considered to be rural agriculture with the intrusion of the existing N3 and road bridges and selected views of Warden.

It is considered that the significance of the toll plaza during the day is low as this structure does not dominate the local setting. It is the night scene (Figure 8: Impact of lighting at night) that raises the intensity of the impact considerably. However, the significance of the light intrusion impact at night by the plaza is considered low to moderate as an unlit night scene in this locality is not considered a priority as no land use or enterprise in the close vicinity relies on the aesthetic environment and especially not at night. Furthermore, this impact will, over time, be diluted by the future electrification of the local settlement to the south-east as it expands.

5 IDENTIFICATION OF POTENTIAL RISK SOURCES

Various risk sources for the visual impact have been identified for the construction and operation phases and can be classified as both negative and positive. The following general risks are associated with the visual intrusion in the landscape.

5.1 Risk Sources

5.1.1 Construction Phase

It is anticipated that the major risk source during construction would be:

Negative Risk Sources

- Excessive clearing and stripping of topsoil for site offices, construction camps, servitudes and temporary access roads;
- The relatively random and disorganised lay down of building materials, vehicles and offices;
- Cut and fill slopes of access roads become highly visible if not re-vegetated and shaped to blend in with the existing topography;
- The extent and intensity of the security and construction lighting at night;
- Dust from construction activities;
- Open and un-rehabilitated landscape scarring;
- Uncontrolled exploitation of borrow pits and quarries without compliance to environmental controls related to aesthetic rehabilitation;
- Location and layout of construction workers camp if located in proximity of works area; and
Figure 8: Impact of Lighting at Night
- High seed bank of alien species in the topsoil can lead to the uncontrolled spread of exotic invader plant species along the edge of the road. This could create a vegetated strip that is visually contrary to the surrounding landscape.

Positive Risk Sources
- Image of construction activity could lead to a perceived view of progress and benefit to the community.

5.1.2 Operational Phase

It is anticipated that the major risk source during operation would be:

Negative Risk Sources
- Areas and /or specific sites of high aesthetic value may be disfigured by the introduction of a highway within the viewshed resulting in a permanent change to the existing visual quality of visually sensitive areas;
- Constant disruption of rural night ambience by vehicle lights;
- The compromising of views from or the alteration of the ambience of natural areas;
- Site engineering, such as cuts and fills, could remain aesthetically incompatible with the surrounding landscape if mitigation measures are not implemented. Edges may not blend in with the landscape or cut slopes may be too steep to be adequately re-vegetated;
- Need to keep road reserves clear of vegetation will result in visual scarring;
- New access roads leave permanent visual scarring;
- The degradation of areas of particular visual character, such as ridges, valleys and drainage ways if the project components are placed too close by;
- Cumulative impact of additional traffic will affect the sense of place.

Positive Risk Sources
- New routes could present and promote existing high quality visual attributes of an area not normally exposed to the general public;
- The presentation of a very scenic landscape such as the Nelson’s Kop and Tandjiesberg area or the huge and impressive bridge structures such as the viaduct bridges to the road users. This scenic experience has previously been limited to persons who specifically have travelled the area;
- The development could be the visual affirmation of progress and prosperity for the region. Localised visual perceptions of the economically depressed communities of the population have not been tested as these may be influenced rather by the economic and job opportunities that could exist rather than the direct visual perception of the project.

6 THE VISUAL ASSESSMENT

6.1 The Visual Analysis

This section describes the aspects which have been considered in order to determine the intensity of the visual impact on the area. The criteria includes the area from which the project can be seen (the viewshed), the viewing distance, the capacity of the landscape to visually absorb structures and forms placed upon it (the visual absorption capacity), and the appearance of the project from important or critical viewpoints.

A broad scan was undertaken to obtain a quick impression of the visual quality and sensitivity of the entire study area (Figure 4) in order that the project alternatives and components can be assessed relative to each other.

6.1.1 The Viewshed

The viewshed is a topographically defined area which includes all possible observation sites from which the project will be visible. The boundary of the viewshed, which connects high points in the landscape, is the boundary of possible visual impact (Alonso, et al, 1986). Local variations in topography and man-made structures would cause local obstruction of views. The viewshed, based on the GIS assessment and fieldwork, extends for the main part varies from 1 km to greater than 20 km in several areas (Figures 3, 5, 6 and 7).

6.1.2 The Viewing Distance

The visual impact of an object in the landscape diminishes at an exponential rate as the distance between the observer and the object increases (Hull and Bishop, 1988).

Thus, the visual impact at 1000 metres would be approximately a quarter of the impact as viewed from 500 metres. Consequently, at 2000 metres, it would be one sixteenth of the impact at 500 metres. The view of the project components would appear so small from a distance of 5000 metres or more that the visual impact at this distance is insignificant. On the other hand the visual impact of the project components from a distance of 500 metres or less would be at its maximum (Figure 9).
6.1.3 **Critical Views**

Views identified as being critical have been discussed under Section 4.2. These have been overlaid on the viewshed to determine the extent of these within the viewing zones radiating out from the project components. In summary the critical views are:

**De Beers Pass Route**

Critical views are those from the intersecting roads such as the N3, S772, the S692, Warden and at a distance Verkykerskop. Critical views are also those contained in the high visual quality sensitivity zone from approximately the base of the De Beers Pass to the proposed Lincoln Interchange. Existing farmsteads and establishments that rely on the aesthetic environmental such as Pitchers Rust are included.

**De Beers Pass Route: Alternative A**

Critical views are those that can be experienced from major roads such as the existing N3 where the route follows the same alignment or in close proximity, the S772, the village of Van Reenen, Montrose and Swinburne, Harrismith, Warden, farmsteads, overnight accommodation such as Lala Nathi and the Ultracity type re-fueling and restaurant stops.

**De Beers Pass Route: Alternative C**

Critical views are those from the establishments along the existing N3 such as the Zandspruit farm stall, the Pyramid Motel, overnight accommodation such as Lala Nathi, villages and settlements such as Van Reenen, Montrose and Swinburne and the town of Harrismith.

6.1.4 **The Visual Absorption Capacity**

The Visual Absorption Capacity (VAC) is a measure of the landscape’s ability to visually accept / accommodate or embrace a development. Areas which have a high visual absorption capacity are able to easily accept objects so that their visual impact is less noticeable. Conversely areas with low visual absorption capacity will suffer a higher visual impact from structures imposed on them. In this case the VAC has been defined as a function of three factors.

The VAC was determined, based on the author’s field experience, taking the following into account:
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- Slope
- Visual pattern (landscape texture) with regard to vegetation and structures
- Vegetation height

**Table 1: Visual Absorption Factors and their Numerical Values**

<table>
<thead>
<tr>
<th>VAC Factor</th>
<th>Categories</th>
<th>Range</th>
<th>Numerical Value</th>
<th>VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope</td>
<td></td>
<td>0-3 %</td>
<td>3 Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-6 %</td>
<td>2 Moderate</td>
<td>1 High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 6 %</td>
<td>1 High</td>
<td></td>
</tr>
<tr>
<td>Vegetation Height</td>
<td>Range</td>
<td>&lt; 1 m</td>
<td>3 Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numerical Value VAC</td>
<td>1-6 m</td>
<td>2 Moderate</td>
<td>1 High</td>
</tr>
<tr>
<td>Visual Pattern</td>
<td>Description</td>
<td>Uniform</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numerical Value VAC</td>
<td>6 m</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

It is therefore concluded that the VAC of the following can be regarded as:

**De Beers Pass Route**

- Keeversfontein to the top of De Beers Pass
  
  Moderately Low due to the uniform open grassland and diverse relief of the escarpment topography;

- Top of De Beers Pass to Lincoln Interchange
  
  Low due to open valley and uniform open grasslands;

- Lincoln Interchange to Warden
  
  Low due to flatter open landscape and open grassland mixed with arable lands.

**De Beers Pass Route: Alternative A**

- Keeversfontein to the top of Van Reenen’s Pass
**Moderate** due to diverse escarpment topography and mix of grassland and interspersed with treed patches;

- Van Reenen’s Pass to Harrismith
  **Low** due to open valleys and low open grasslands;

- Harrismith to Warden
  **Low** due to flatter open landscape and open grasslands mixed with arable land.

**De Beers Pass Route: Alternative C**

- Keeversfontein to the top of Van Reenen’s Pass
  **Moderate - Low** due to the uniform open grasslands and diverse relief of the escarpment topography;

- Van Reenen’s Pass to Harrismith
  **Low** due to open valleys and low open grasslands.

This implies that the areas with a **Low** VAC are inherently unable to visually accommodate or accept the visual change made by the proposed road. The areas with a **Moderate** VAC would only moderately be able to accept the visual change by naturally providing amelioration by blending the road with the landscape.

### 6.1.5 Evaluation Criteria

The visual impact assessment has been evaluated against the following standard criteria:

**Table 2: Impact Criteria Assessment and Rating Scales**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating Scales</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nature</strong></td>
<td></td>
<td><strong>Positive</strong>  This is an evaluation of the type of effect the construction, operation and management of the proposed development would have on the affected environment.</td>
</tr>
<tr>
<td></td>
<td><strong>Negative</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Neutral</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Extent</strong></td>
<td><strong>Low</strong></td>
<td>Site-specific, affects only the development footprint.</td>
</tr>
<tr>
<td>Criteria</td>
<td>Rating Scales</td>
<td>Notes</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Local (limited to the site and its immediate surroundings, including the surrounding towns and settlements within a 10 km radius).</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Regional (beyond a 10 km radius) to national.</td>
</tr>
<tr>
<td>Duration</td>
<td>Low</td>
<td>0-4 years (i.e. duration of construction phase).</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>5-10 years.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>More than 10 years to permanent.</td>
</tr>
<tr>
<td>Intensity</td>
<td>Low</td>
<td>Where the impact affects the environment in such a way that natural, cultural and social functions and processes are minimally affected.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; and valued, important, sensitive or vulnerable systems or communities are negatively affected.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Where natural, cultural or social functions and processes are altered to the extent that the impact will temporarily or permanently cease; and valued, important, sensitive or vulnerable systems or communities are substantially affected.</td>
</tr>
<tr>
<td>Potential for impact on irreplaceable resources</td>
<td>Low</td>
<td>No irreplaceable resources will be impacted.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Resources that will be impacted can be replaced, with effort.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>There is no potential for replacing a particular vulnerable resource that will be impacted.</td>
</tr>
<tr>
<td>Consequence (a combination of extent, duration, intensity and the potential for impact on irreplaceable resources)</td>
<td>Low</td>
<td>A combination of any of the following: - Intensity, duration, extent and impact on irreplaceable resources are all rated low. - Intensity is low and up to two of the other criteria are rated medium. - Intensity is medium and all three other criteria are rated low.</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>Intensity is medium and at least two of the other criteria are rated medium.</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Intensity and impact on irreplaceable resources are all rated high.</td>
</tr>
</tbody>
</table>
The visual impact will, however, vary when evaluated against the criteria of intensity of visual impact and the significance of the impact.

An example is the situation where a project component such as a toll plaza or bridge is located within a fairly narrow undisturbed valley between two rising landforms. The visual impact’s intensity is low since it cannot be seen from surrounding areas. The component has the hillsides as a backdrop and therefore blends into the valley texture. The significance, however, is high within the context of the scenic value of the pristine valley because the sense of place and the character of the valley are severely compromised.

The converse is also true in that a high visual intensity impact can have a low significance. The visual impact assessment will therefore be based on the criteria of intensity and significance relative to land use and the nearness to important viewpoints.

Table 3: Visual Assessment Criteria - Intensity Rating

<table>
<thead>
<tr>
<th>Visual Assessment Criteria</th>
<th>Intensity Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

The visual impact is rated high, with any combination of extent and duration. Intensity is rated high, with all of the other criteria being rated medium or higher.

Probability (the likelihood of the impact occurring)

<table>
<thead>
<tr>
<th>Probability</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>It is highly unlikely or less than 50 % likely that an impact will occur.</td>
<td>It is between 50 and 70 % certain that the impact will occur.</td>
<td>It is more than 75 % certain that the impact will occur or it is definite that the impact will occur.</td>
</tr>
</tbody>
</table>

Significance (all impacts including potential cumulative impacts)

<table>
<thead>
<tr>
<th>Significance</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
</table>
### Visual Assessment Criteria - Significance Rating

<table>
<thead>
<tr>
<th>Visual Assessment Criteria</th>
<th>Significance Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Visibility from existing development</td>
<td>Particularly</td>
</tr>
</tbody>
</table>

### Visual Assessment Criteria - Intensity Rating

<table>
<thead>
<tr>
<th>Visual Assessment Criteria</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visibility from critical viewpoints</td>
<td>Highly visible within 1 km</td>
<td>Partially visible due to viewpoints approximately 2 km from the proposed development</td>
<td>Low visibility due to viewpoints approximately 3 km or more from the proposed development</td>
</tr>
<tr>
<td>Visibility from general surrounding landscape</td>
<td>Not obscured by natural landform</td>
<td>Partially obscured by landform</td>
<td>Mostly obscured by surrounding landform</td>
</tr>
<tr>
<td>Visual intrusion on landscape character and sense of place</td>
<td>Dominates sense of place</td>
<td>Partially influences sense of place</td>
<td>Has little effect on sense of place</td>
</tr>
<tr>
<td>Visual association with existing infrastructure development</td>
<td>Existing development is easily visible from proposed development (within 2 km)</td>
<td>Existing development is partially visible from proposed development (&gt;2-&lt;5 km)</td>
<td>Existing development is barely noticeable (&gt;6 km) from the proposed development</td>
</tr>
<tr>
<td>Visibility from homesteads, conservation areas, local communities, villages and towns</td>
<td>Highly visible. Dominates view within 500 - 1 000 m</td>
<td>Visible but does not dominate view within range 1 000 - 2 500 m</td>
<td>Visible but are not obviously noticeable in the view &gt; 2 500 m</td>
</tr>
<tr>
<td>Visual Assessment Criteria</td>
<td>Significance Rating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>viewpoints</td>
<td>interferes with scenic views from viewpoints</td>
<td>interferes with scenic views from viewpoints</td>
<td>too far from the viewpoints to interfere with scenic views</td>
</tr>
<tr>
<td>Visibility from general surrounding landscape</td>
<td>Compromises particularly scenic distant views of the landscapes</td>
<td>Particularly noticeable in scenic landscapes</td>
<td>Hardly noticeable in scenic landscapes</td>
</tr>
<tr>
<td>Visual intrusion on landscape character and sense of place</td>
<td>Compromises proclaimed conservation nature reserves and wilderness areas is within 500 - 1 000 m of a natural feature e.g. pans, mountains</td>
<td>Compromises particularly scenic landscape features e.g. coastal edge, undisturbed valleys; within 1 000 - 2 500 m</td>
<td>Compromises built up areas which exhibit an industrial character; is less visible, homestead greater than 2 500 m away</td>
</tr>
<tr>
<td>Visual association with existing infrastructure development</td>
<td>Where the development is within 200 m from existing infrastructure development</td>
<td>Where the development is within 1 000 m from existing infrastructure development</td>
<td>Where the development is further than 2 500 km from existing development. The visual intrusion is not associated with the other development</td>
</tr>
<tr>
<td>Visibility from homesteads, conservation areas, local communities, villages and towns</td>
<td>Where the visibility of the development interferes with the way of life such as a tourism enterprise and/or obstructs scenic distant views by being within 500 - 1 000 m of the</td>
<td>Where the visibility of the development interferes with the way of life such as a tourism enterprise and/or obstructs scenic distant views by being within 1 000 - 2 500 m</td>
<td>Where the visibility of the development interferes with the way of life such as a tourism enterprise and/or obstructs scenic distant views by being within 2 500 m and</td>
</tr>
</tbody>
</table>
### Visual Assessment Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Significance Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>community</td>
</tr>
</tbody>
</table>

### Table 5: Visual Assessment Criteria - Intensity Rating

(This is the criteria against which the impact is assessed and is not the impact assessment)

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>HIGH</th>
<th>MEDIUM</th>
<th>LOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visibility</td>
<td>Very visible from many places beyond 5 000 m zone</td>
<td>Visible from within the 5 000 m zone but partially obscured by intervening objects.</td>
<td>Only partly visible within the 5 000 m zone and beyond due to screening by intervening objects.</td>
</tr>
<tr>
<td>2. Genius Loci / Sense of Place</td>
<td>A particularly definite place with an almost tangible dominant ambience or theme.</td>
<td>A place which projects a loosely defined theme or ambience.</td>
<td>A place having little or no ambience with which it can be associated.</td>
</tr>
<tr>
<td>3. Visual Quality</td>
<td>A very attractive setting with great variation and interest but no clutter.</td>
<td>A setting which has some aesthetic and visual merit.</td>
<td>A setting which has little aesthetic value.</td>
</tr>
<tr>
<td>4. Visible Social Structures</td>
<td>Housing and/or other structures as a dominant visual element.</td>
<td>Housing and/or other structures as a partial visual element.</td>
<td>Housing and/or other structures as a minor visual element.</td>
</tr>
<tr>
<td>5. Surrounding Landscape</td>
<td>Ideally suits or matches the proposed development.</td>
<td>Can accommodate the proposed development without appearing</td>
<td>Cannot accommodate proposed development without it appearing totally</td>
</tr>
<tr>
<td>Compatibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRITERIA</td>
<td>HIGH</td>
<td>MEDIUM</td>
<td>LOW</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>totally out of place.</td>
<td>out of place visually.</td>
<td></td>
</tr>
<tr>
<td>6. Character</td>
<td>The site or surrounding area exhibits a definite character.</td>
<td>The site or surrounding area exhibits some character.</td>
<td>The site or surrounding area exhibits little or no character.</td>
</tr>
<tr>
<td>7. Scale</td>
<td>A landscape which has horizontal and vertical elements in high contrast to the human scale.</td>
<td>A landscape with some horizontal and vertical elements in some contrast to the human scale.</td>
<td>Where vertical variation is limited and most elements are related to the human and horizontal scale.</td>
</tr>
<tr>
<td>8. Visual Absorption Capacity (VAC)</td>
<td>The ability of the landscape to easily accept visually a particular development because of its diverse landform, vegetation and texture.</td>
<td>The ability of the landscape to less easily accepts visually a particular development because of a less diverse landform, texture and vegetation.</td>
<td>The ability of the landscape not to visually accept a proposed development because of a uniform texture, flat slope and limited vegetation cover.</td>
</tr>
<tr>
<td>9. View Distance</td>
<td>If uninterrupted view distances to the site are &gt; 5 km.</td>
<td>If uninterrupted view distances are &lt; 5 km but &gt; 2.5 km.</td>
<td>If uninterrupted view distances are &gt; 500 m and &lt; 2 500 m.</td>
</tr>
<tr>
<td>10. Critical Views</td>
<td>Views of the project are to be seen by many people passing on main roads and from prominent areas i.e. towns / urban areas / settlements, game farms,</td>
<td>Some views of the project from surrounding towns / urban areas / settlements, main roads and game farms / lodges / conservation areas, naturally</td>
<td>Limited views to the project from towns / urban areas / settlements, main roads and game farms / lodges / conservation areas, naturally scenic areas.</td>
</tr>
</tbody>
</table>
6.1.6 **Cumulative Impacts**

Visual impacts have been assessed in terms of the impact the development will have on the visual environment. Visual assessment is a component of the human aesthetics and is considered part of a suite of social impacts such as noise and sense of place which together may result in a higher cumulative impact than if it were read in isolation. This study assesses only the visual impacts.

As the proposed DBPR traverses a “greenfields” area, there is no cumulative impact as it is not adding to an existing national road network through this study area. It can, conversely, be argued that there is a cumulative impact of 100% as the proposed DBPR is entirely a new development of which there previously was not one.

As the DBPR: Alternative A for a large part of the route follows closely on existing highway, the cumulative impact increases. This increase cannot be measured empirically. However, it can be assumed that, as visual impacts reduce exponentially with distance, conversely doubling the size and volume of a development may increase the impact exponentially.

Notwithstanding the increase in cumulative impact, it is often preferable to place new structures, such as roads or transmission lines alongside existing such structures in the belief that the impact on a corridor is less that if the same impact was exerted on an area that has not previously been impacted upon.

6.2 **The Visual Impact**

The visual impact of the project in the landscape is a function of many factors or criteria (Table 6). The value ratings assigned to Table 5 refer to the impact a development could have on the visual elements that have been assessed. The impact ratings in Table 5 are assessed in terms of visual attributes and are represented in Tables 6 and 7. Some of the factors are measurable such as viewing distance, the visual absorption capacity of the surrounding landscape, and the scale of the surrounding environment and landform. Other factors are subjective viewpoints, which are extremely

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>HIGH</th>
<th>MEDIUM</th>
<th>LOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>guest farms / lodges, hiking corridors, conservation areas, naturally scenic areas.</td>
<td>scenic areas.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
difficult to consistently categorise the opinion of the community. Studies in the USA have shown that professionals and environmental groups view modification of the natural landscape more negatively than other groups (McCool, et al 1986).

The critical appraisal of the visual impact of the project and associated works on the landscape is presented from the viewpoint of the informed citizen and professional. To the more economically depressed communities surrounding the proposed project, it may well be that they do not, or will not, object to the visual intrusion in their immediate environment. It may be that they welcome it since they could perceive it as a symbol of prosperity and personal advancement opportunity.

6.2.1 The View Distance

The visual impact of the project and associated structures will reduce exponentially as the viewer moves further away from the proposed structures (Hull and Bishop, 1988).

The project components will exert a high visual impact within the 1 000 m zone. The viewshed analysis (Figures 3, 5, 6 and 7) has indicated that the components of the proposed development will be visible beyond the 10 000 m zone. However, due to topography visibility for the most part is restricted to 5-8 km within only patches extending beyond 10 km.

De Beers Pass Route

The DBPR has a viewshed that varies from less than 2.5 km to up to 20 km in patches in the vicinity of the eastern escarpment area. The viewing distance is limited and restricted to 2.5 - 5.0 km within the narrower valleys between the top of the escarpment and the Lincoln Interchange area from where all the way to Warden the view distance opens up to 15 km intermittently.

De Beers Pass Route: Alternative A

The view distance along this alignment is more extensive than the DBPR due to the more open and unrestricted relief. Although the view distance of the route from Keeversfontein up to the top of the escarpment is restricted to less than 15 km, the rest of the route extends to up to 20 km in south-west of the Harrismith area. Distances around Warden are up to 15 km in patches extending up to 18 km in the Verkykerskap area.

De Beers Pass Route: Alternative C

The viewshed generated from the existing alignment of the N3 along the Van Reenen’s Pass section extends intermittently up to 10 km, but is generally
contained by topography within a 5 km zone. The views are more extensive to the south-west than those of Alternative A, but less extensive to the north and north-east. View distances from the section between Van Reenen and Harrismith are less extensive than that from Alternative A and are contained within a 2.5 – 5.0 km zone.

6.2.2 Critical Viewpoints

Critical views were determined during the field trips and from the 1:50 000 topographical maps and are discussed under Visibility for each alignment (See also Sections 6.1 The Visual Analysis and 6.2.1 The View Distance).

Critical viewpoints are those areas from where most viewers would be exposed to the impact such as from public areas that rely on the aesthetic environment such as guest lodges, guest farms, game farms and nature reserves.

6.2.3 Extent

The visual impact for construction of all project components will occur on a local scale due to the localized extent of the development. However, the visual impact for the operational phase will extend as far as it can be seen, which can be up to 15 - 20 km and beyond either side, and for the full length of the route which crosses two provinces and therefore is at a regional scale. Due to the diminishing visibility, as a result of distance, the project components will exert an impact on a local rather than regional scale and should be regarded as medium.

The viewshed analysis suggests that theoretically some of the project components can at times be seen for over 15 - 20 km. Due to the exponential decrease in visibility, the visibility of these components should be insignificant beyond 10 km.

- Roads

The visual impact for construction of the project components will occur on a local scale due to the localised extent of the development. However, the visual impact for the operational phase for all assessed alignments will extend as far as it can be seen, which can be up to 15 - 20 km.

The fact that the majority of the viewers, many of whom could be tourists, are in transit and are not viewing from a static or stationary viewpoint, implies that the viewer carries the visual impact effect with him or her beyond the physical visible confines. Views of and from the highway are extensive. Some views are uninterrupted for more than 15 - 20 km.
6.2.4 **Duration**

The duration of the impact during construction will be short term due to the relatively short construction period and the rehabilitation of the disturbed areas.

The duration of the impact during the operational phase will be permanent, in other words greater than 10 years and beyond the anticipated lifetime of the project, with the impact terminating only after a possible decommissioning of the project.

6.2.5 **Intensity or Severity**

The intensity of the visual impact during construction and operation will be high within the 500 – 1 000 m zone wherever the project components intrude in the critical viewpoints.

**De Beers Pass Route**

- Keeversfontein to the top of De Beers Pass
  
The intensity can be regarded as **Medium - High** (a rating of 4 on a scale of 1-5) for both construction and operation due to the steep diverse landform and the medium VAC.

- De Beers Pass to Lincoln Interchange
  
The intensity of the impact can be regarded as **High** (a rating of 5) due to the scale of the development and high visibility within the uniform grasslands and low VAC of this highly scenic valley.

- Lincoln Interchange to Warden
  
The intensity of the impact can be regarded as **Medium** (a rating of 3) due to the open exposed landscape.

**De Beers Pass Route: Alternative A**

- Keeversfontein to the top of Van Reenen’s Pass
The intensity can be regarded as **Medium** (a rating of 3) for both construction and operation due to the diverse landform, partially diverse vegetation and the moderate VAC.

- **Van Reenen’s Pass to Harrismith**

  The intensity of the impact can be regarded as **Medium - High** due to the uniform and open grasslands and low VAC (a rating of 4).

- **Harrismith to Warden**

  The intensity of the impact can be regarded as **Medium** (a rating of 3) due to the open exposed landscape and low vegetation cover.

**De Beers Pass Route: Alternative C**

- **Keeversfontein to the top Van Reenen’s Pass**

  The intensity of the impact can be regarded as **Medium - Low** (a rating of 2) due to the diverse landscape, existing road infrastructure and VAC.

- **Van Reenen’s Pass to Harrismith**

  The intensity of the impact can be regarded as **Medium** (a rating of 3) due to the uniform and open landscape and low VAC.

**6.2.6 Frequency of Occurrence**

The frequency of occurrence of the impact is continuous while it remains visible, i.e. 24 hours. The project will also be visible at night due to the lights from vehicles travelling along the route and the highly lit interchanges.

**6.2.7 The Probability of Occurrence**

The construction and operational impact described is probable and can be regarded as medium. It must be recognized, however, that much of this assessment is subjective and that it is not possible to empirically state that the impact will occur.

**6.2.8 Reversibility**

**De Beers Pass Route**

- **Keeversfontein to the top of De Beers Pass**
The impact on reversibility is regarded as having a **High - Medium** rating due to the fact that the grasslands and landforms that provide the scenic value to the landscape cannot be recreated, restored or rehabilitated to the original form after the landform has been altered by significant construction such as cuts and fills.

- **De Beers Pass to Lincoln Interchange**
  
  The impact on reversibility is regarded as **High - Medium** for the same reasons as for Keeversfontein to the top of De Beers Pass.

- **Lincoln Interchange to Warden**
  
  The impact on reversibility is regarded as **Low** due to the fact that the affected arable lands could be converted back as can be the grasslands visually as the cuts and fills will not be as significant through this relatively flat stretch of the route.

**De Beers Pass Route: Alternative A**

- **Keeversfontein to the top of Van Reenen’s Pass**
  
  The impact on reversibility is regarded as having a **High - Medium** rating due to the significant alterations to the landform that cannot be replaced.

- **Van Reenen’s Pass to Harrismith**
  
  The impact on reversibility is regarded as having a **Medium** rating due to the significant alterations the landform that cannot be restored, especially between Swinburne and the northern edge of Harrismith.

- **Harrismith to Warden**
  
  The impact on reversibility is regarded as being **Low** due to the relatively minimal alterations to the landform by road cuttings and fill embankments.

**De Beers Pass Route: Alternative C**

- **Keeversfontein to the top Van Reenen’s Pass**
The impact on reversibility is regarded as having a **High - Medium** rating due to the significant alterations to the landform that cannot be replaced / restored such as the major cuts and fills.

- **Van Reenen’s Pass to Harrismith**

  The impact on reversibility is regarded as being **Medium** due to the significant alterations to the landform that cannot be replaced / restored.

### 6.2.9 Irreplaceable Loss of Resources

**De Beers Pass Route**

- **Keeversfontein to the top of De Beers Pass**

  The impact is regarded as **High**.

- **De Beers Pass to Lincoln Interchange**

  The impact is regarded as **High**.

- **Lincoln Interchange to Warden**

  The impact is regarded as **Medium**.

**De Beers Pass Route: Alternative A**

- **Keeversfontein to the top of Van Reenen’s Pass**

  The impact is regarded as **High**.

- **Van Reenen’s Pass to Harrismith**

  The impact is regarded as **High**.

- **Harrismith to Warden**

  The impact is regarded as **Low**.

**De Beers Pass Route: Alternative C**

- **Keeversfontein to the top Van Reenen’s Pass**
The impact is regarded as Low.

- Van Reenen’s Pass to Harrismith
  The impact is regarded as Low.

6.2.10 Consequence

**De Beers Pass Route**

- Keeversfontein to the top of De Beers Pass
  The consequence is regarded as High.

- De Beers Pass to Lincoln Interchange
  The consequence is regarded as High due to the high intensity and impact on irreplaceable resources.

- Lincoln Interchange to Warden
  The consequence is regarded as Medium.

**De Beers Pass Route: Alternative A**

- Keeversfontein to the top of Van Reenen’s Pass
  The consequence is regarded as High.

- Van Reenen’s Pass to Harrismith
  The consequence is regarded as High.

- Harrismith to Warden
  The consequence is regarded as Low.

**De Beers Pass Route: Alternative C**

- Keeversfontein to the top Van Reenen’s Pass
  The consequence is regarded as High.

- Van Reenen’s Pass to Harrismith
  The consequence is regarded as High.
6.2.11 Significance

De Beers Pass Route

- Keeversfontein to the top of De Beers Pass
  The significance of the impact is considered to be Medium - High.
- De Beers Pass to Lincoln Interchange
  The significance is considered to be High.
- Lincoln Interchange to Warden
  The significance is considered to be Medium - Low.

De Beers Pass Route: Alternative A

- Keeversfontein to the top of Van Reenen’s Pass
  The significance is considered to be Medium - High.
- Van Reenen’s Pass to Harrismith
  The significance of the impact is considered to be Medium.
- Harrismith to Warden
  The significance is considered to be Low.

De Beers Pass Route: Alternative C

- Keeversfontein to the top Van Reenen’s Pass
  The significance is considered to be Medium.
- Van Reenen’s Pass to Harrismith
  The significance is considered to be Medium - Low.

6.2.12 Nature of the Impact

The impact status is considered negative for the construction and operational phases.
6.2.13 *Degree of Confidence in Predictions*

The confidence is considered to be medium as the level of judgement is based generally on common sense, general knowledge, the author’s field experience and the inherently subjective nature of this type of assessment.

6.2.14 *Legislation*

There are no specific legal requirements nor is there any direct reference to the visual environment in the legislation. General legislation pertaining to the environment is contained in the National Environmental Management Act (NEMA) (Act No. 107 of 1998) as well as the National Heritage Resources Act No. 25, 1999 and the associated provincial regulations provide legislative protection for listed or proclaimed site, such as urban conservation areas, nature reserves and proclaimed scenic routes.

The National Environmental Management Principles as contained in NEMA require that sustainable developments require the following considerations (amongst others):

2(4)(ii) that pollution and degradation of the environment are avoided, or, that where they cannot be altogether avoided, are minimised and remedied; and

2(4)(iii) that the disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied.

The National Heritage Resources Act refers, under Part 1 General Principles, to the National Estate:

3.(2)(d) Landscapes and natural features of cultural significance

Visual pollution is controlled to a limited extent, by the Advertising on Roads and Ribbons Act (Act No. 21 of 1940) which deals mainly with signage on public roads.

The Protected Areas Act (NEMA) (Act 57 of 2003, Section 17) is also intended to protect natural landscapes

The Western Cape DEA&DP have produced ‘A Guideline for Involving Visual and Aesthetic Specialists in EIA Processes’

6.2.15 *Ability to Adapt*

The affected receptors are the residents of the scattered settlements, urban areas along the routes and existing tourists that currently use the area. Their ability to adapt is a response to their livelihood, economic activity and sense of well-being. The impact on the affected receptor’s ability to adapt is
considered low (-) wherever the surrounding land use has no inherent high scenic qualities that can be utilised for future tourism.
<table>
<thead>
<tr>
<th>Impact</th>
<th>Management Measures</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Frequency</th>
<th>Probability</th>
<th>Reversibility</th>
<th>Irreplaceable loss of Resources</th>
<th>Consequence</th>
<th>Significance</th>
<th>Nature of Impact</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aesthetics</td>
<td>Without management</td>
<td>Local (Medium)</td>
<td>Long term (High)</td>
<td>Keeversfontein - DBP</td>
<td>Medium - High</td>
<td>High</td>
<td>High - Medium</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Negative</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DBP - Lincoln Interchange</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium - Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lincoln Interchange - Warden</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
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Table 6.1: Assessment of potential visual impacts associated with the proposed De Beers Pass Route
## Table 6.2: Assessment of potential visual impacts associated with the proposed De Beers Pass Route: Alternative A

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Table 6.3: Assessment of potential visual impacts associated with the proposed De Beers Pass Route: Alternative C

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Table 7.1: Site Evaluation:  De Beers Pass Route

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Table 7.2: Site Evaluation:  De Beers Pass Route: Alternative A

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Table 7.3: Site Evaluation:  De Beers Pass Route: Alternative C

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7  RECOMMENDED GENERAL MITIGATION / MANAGEMENT MEASURES

7.1  Road Alignment

7.1.1  *Earthworks and Landscaping*

The visual impact during construction will be highly significant and little can be done about reducing the effect since the works cannot be screened nor can it be moved to more visually suitable positions.

It will be important that a landscape architect be appointed during the design phase of the project to integrate the project components with the surrounding landscape to ensure that the project blends in physically and aesthetically with the environment.

The mitigation measures during operation will need to focus on effective rehabilitation of the construction area and road reserves and blending the road edges with the existing landscape form. These specifications must be explicit and detailed and included in the contract documentation (Environmental Management Plan) so that the tasks can be costed and monitored for compliance and result.

Attention must be given to provide the road user and tourist the opportunity to optimise the visual attributes of the scenic landscape. This can be achieved by opening up vistas where cuttings may have blocked the views and by providing stop over points for travellers to appreciate and experience the views or landscape features.

Sculpturing or shaping the cut and fill slopes to angles and forms that are reflected in the adjacent landscape can reduce the visual impact. By blending the edges with the existing landforms, the visual impression made is that the project component has followed the natural shape of the landscape, rather than been ‘engineered’ through the landscape.

All road cutting top edges need to be rounded off to remove the engineered knife edge that visually contrasts with the existing landform. The base of fill slopes should likewise be rounded off.

For access / service roads and servitudes avoid straight edges and corridors. These lines should complement the landscape through which they pass (Litton, 1980).

Special attention should be focussed on the width of servitude actually required for the construction and operational phases. There is a tendency to make these servitudes wider than necessary and access roads built to a higher engineering specification than required.
Clearing of the full servitude should be avoided. If vegetation stripping is required, then vegetation stripping should be done in a manner where the edges are organic (non-geometric) or curvilinear rather than straight or sharp edged as viewers tend to form positive visual impressions such as “gentleness” and “delicacy” and tend to object to negative visual impressions such as “rough”, “rugged” or “violent” (Ribe, 1989). When disturbances in the landscape are viewed from a distance, those with irregular lines, rather than straight lines, appear to blend in with the natural configuration and lines in the landscape (Schaefer, 1967).

It is essential that all cut and fill slopes, as well as all areas disturbed by construction activity, are suitably topsoiled and vegetated as soon as is possible after final shaping. The progressive rehabilitation measures will allow the maximum growth period before the completion of the project.

All areas affected by the construction works will need to be rehabilitated and re-vegetated. This includes the areas beyond the works area such as temporary access roads, construction campsites, workers campsites, borrow pits, laydown areas, etc.

The special conditions of contract must include for the stripping and stockpiling of topsoil from the construction areas for later re-use. Topsoil is considered to be at least the top 300 mm of the natural soil surface and includes grass, roots and organic matter. The areas to be cleared of topsoil should be all areas that will be covered by structures, roads and construction camps. The presence of degraded and disused roads and areas left over after development that are not rehabilitated, could present a high perceptual visual impact. These areas should be topsoiled and re-vegetated.

The rehabilitation and stabilisation of vegetation of all rehabilitated areas, buffer strips and new landforms must be done as soon as the forms are complete. The monitoring and management of the vegetation programme is important to ensure that problems (erosion, die back, and lack of grass cover) are identified early so that corrective measures can be taken.

General roadside rehabilitation landscaping shall reflect the existing surrounding landscape.

8 DISCUSSION AND CONCLUSIONS

The impact assessment was undertaken for only the main components of the project as per the Terms of Reference. The study excluded ancillary components such as borrow pits, quarries, lay-down areas, construction camps, interchanges and ramp plazas. This study evaluated the visual impact of the DBPR and alternatives with a view to assessing its severity based on the author's experience, expert opinion and accepted techniques.
The study assessed four main project components or component alternatives. These included the DBPR, the DBPR: Alternative A, the DBPR: Alternative C.

The description of the visual impacts of the phases of construction and decommissioning are not considered as significant visual impacts since the period of activity is of relatively short duration and of a primary impact (localized, of short duration and easily mitigated at the end of the phase). The fact that disturbed areas, e.g. camps / lay-down areas will be rehabilitated also reduces the impacts of these phases.

It is the operational phase that presents the most significant long term visual impact. This is due primarily to the scale and form of the proposed development. Visibility reduces exponentially the further the viewer is from the proposed development.

Tables 3, 4 and 5, Visual Assessment Intensity and Significance Criteria Ratings, rates each criteria from high, medium to low according to the specific characteristics of that criteria. Tables 6.1 - 6.4, Assessment of Potential Visual Impacts, summarises the impacts for the construction, operation and decommissioning phases. Table 7.1 - 7.4, Site Evaluation, lists for each criteria the visual criteria rating and the visual impact of the component on these criteria.

8.1 Evaluation of the Project

8.1.1 Routes

- De Beers Pass Route

The DBPR will exert a negative influence on the visual environment. This is largely due to the:

- high visibility of the route, especially across the escarpment and foot hills;
- impact on the high visual quality of the section from the top of the De Beers Pass and the Lincoln Interchange;
- the high visibility of construction and operation activity within the uniform open grassland areas of uniform visual pattern;
- the low VAC of the area due to the low and uniform visual pattern of vegetation which does not allow for the road to be visually accommodated within the landscape as a result of the high visual contrast;
- the scale of the road in a scenic rural setting;
- the introduction of a continuous corridor within a rural setting that will be brightly lit by vehicles throughout the night and the
accompanying increase in noise that will significantly affect the sense of place;
- the need to cut into the existing landform to accommodate the vertical alignment and the width of the servitude;
- the overall significance of the visual impact is regarded as Medium-High (a rating of 4 on a scale of 1-5) across the escarpment, High (a rating of 5) between the top of the De Beers Pass and the Lincoln Interchange and Medium (a rating of 3) for the section from the Lincoln Interchange to Warden.

• De Beers Pass Route: Alternative A

The DBPR: Alternative A will exert a negative influence on the visual environment for similar reasons to those for the DBPR. However, this route up the escarpment goes through an area with a higher VAC and thus the landform can visually accommodate the road to a greater degree. Furthermore, it traverses an area that is more disturbed by human interventions such as railway, transmission lines, towns, etc. that detract from the more undisturbed rural visual quality experience along the DBPR.

The overall significance of the visual impact is regarded as Medium-High (a rating of 4) from Keeversfontein to Van Reenen, Medium (rating of 3) from Van Reenen to Harrismith and Medium-Low (a rating of 2) from Harrismith to Warden.

• De Beers Pass Route: Alternative C

Only the section from Keeversfontein to Harrismith was evaluated as the section from Harrismith to Warden is common with that for DBPR: Alternative A and has been dealt with under that section.

Alternative C follows the exact alignment of the existing N3 which in itself exerts a negative influence on the visual environment. However, the upgrade of this route will affect an area that has already been disturbed and therefore does contribute substantially to the overall negatively impacted environment as all additional disturbance is contained within this corridor.

The overall significance of the visual environment is regarded as Medium (a rating of 3) from Keeversfontein to Van Reenen and Medium-Low (rating of 2) from Van Reenen to Harrismith.

8.2 Conclusions

Based on the field observations and the studies herein and with the implementation of the mitigation measures, the following conclusions are made from a visual point of view:
Of the three alternatives assessed it can be concluded that although all will exert a negative impact, on balance the **DBPR: Alternative C** will exert the least significant impact on the visual environment. The BDPR from the De Beers Pass to the Lincoln Interchange has a high significance rating (a rating of 5 in a scale of 1 – 5) and it is therefore recommended that it should not be considered or authorised.

**Table 8: Comparative Significance Ranking for the various alternative routes and the toll plaza**
Figure 8: Visual Impact Significance illustrates the sections of routes with their accompanying significance ratings.
PHOTOS

DE BEERS PASS
Photo 1: Start of routes DBP and Alternative A at Tugela Plaza looking north towards escarpment

Photo 2: DBP Route viewed north towards DBP from railway service Road 1
Photo 3: Looking north-east up DBP at point of road crossing with existing DBP

Photo 4: Looking south-west down DBP at point of road crossing with existing DBP
Photo 5: Looking east towards proposed southern tunnel portal near gorge with Braamhoek Dam in background

Photo 6: Braamhoek Dam
Photo 7: Point at which road emerges north of tunnel

Photo 8: DBP route viewed north-east to where route crosses Wilge River through poort
Photo 9: Nelson's Kop

Photo 10: Nelson's Kop
Photo 11: DBP route runs along foothills of Nelson's Kop

Photo 12: Nelson's Kop
Photo 13: Entrance to Pitchers Rust farm with Nelson’s Kop in background

Photo 14: Pitchers Rust farm with Nelson’s Kop in the background
Photo 15: Nelson's Kop with proposed DBP route in valley beyond foreground

Photo 16: Tandjiesberg with DBP route behind middleground rise
Photo 17: Wilge River Bridge
Photo 18: View south-east where DBP route crosses existing S922 and heading past the base of Nelson's Kop

Photo 19: View north-east with DBP route following base of mountain

Photo 20: View north where DBP route goes through gap at base of Tandjiesberg to the right of the farm Uitvlugt
Photo 21: View from Road S61 near Vaalkop towards Tandjiesberg with DBP route along base of mountain

Photo 22: View south-east at point where DBP crosses S61 from base of Tandjiesberg
Photo 23: View south north-west at point where DBP crosses S61 from base of Tandjiesberg

Photo 24: Intersection of DBP route with the S692 looking south towards Tandjiesberg
Photo 25: View south along DBP route near Lincoln Interchange

Photo 26: View north along DBP route near Lincoln Interchange
Photo 27: Verkykerskop viewed from the S772

Photo 28: DBP route at point where it crosses the S772 looking SE towards Nelson's Kop in the distance
Photo 29: View from S772 of Platberg near Harrismith

Photo 30: View south-east near along DBP Route towards Verkykerskop Warden where route links up with the existing N3
PHOTOS

ALTERNATIVE A
Photo 31: View north-east at base of Van Reenen’s Pass along Alternative A
Photo 32: View south-west at base of Van Reenen’s Pass along Alternative A

Photo 33: Alternative A Route as it moves up valley towards Brakwal Station

Photo 34: View east of Alternative A as it moves through wattle stand in background near farmstead up valley towards Brakwal Station
Photo 35: View from near Brakwal Station toward communication tower and Transnet pump station below escarpment near Van Reenen’s Pass

Photo 36: View down valley from proposed viaduct position towards Brakwal Station
Photo 37: View of proposed position of viaduct crossing railway tunnel portal west of Clove Station

Photo 38: View towards proposed viaduct to the left (east) of Clove Station
Photo 39: View down valley from east of Clove Station towards Brakwal Station following proposed alignment
Photo 40: View of Alternative A Route towards pump station and communication tower from top of tunnel portal

Photo 41: View from tunnel portal towards existing N3 Van Reenen’s Pass
Photo 42: View from tunnel portal towards existing N3 Van Reenen’s Pass
Photo 43: View of Alternative A Route down valley past pump station from near crest of escarpment

Photo 44: View north towards village of Van Reenen from top of escarpment
Photo 45: View north-west along Alternative A from Gideon just outside Van Reenen north-west towards Harrismith
Photo 46: View under railway bridge with Alternative A Route in middleground with existing N3 in far background (see white truck)

Photo 47: Point where Alternative A is closest to railway line north of Van Reenen’s looking towards Swinburne and Harismith
Photo 48: View south-east along Alternative A Route towards Van Reenen

Photo 49: View west towards Swinburn and Harrismith
Photo 50: View west towards the Platberg from south-east of Swinburn
Photo 51: Point where the Alternative A and the existing N3 converge near Swinburne

Photo 52: Point where Alternative A straightens away from N3 s-bends looking towards Harrismith
Photo 53  Point at which Alternative A deviates east away from existing N3 near barn structure

Photo 54: Barn which is in path of Alternative A
Photo 55: View south-east from entrance to Botanical Gardens towards Alternative A and blockhouse following base of the Platberg in the background
Photo 56: Alternative A follows upper terrance at base of Platkop foothills looking from north-east near blockhouse to north-west

Photo 57: Alternative A follows upper terrance at base of Platkop foothills looking north-west from entrance to Botanical Gardens
Photo 58: View south-east from point where Alternative A leaves the foothills of the Platberg and crosses the R722 before joining up with the existing N3
Photo 59: View from R722 to where Alternative A joins the N3 looking north-west

Photo 60: View along existing N3 towards Harrismith
Photo 61: View towards Warden along existing N3
PHOTOS

ALTERNATIVE C
Photo 62: Looking south-east towards Tugela Plaza on N3

Photo 63: View of N3 towards Tugela Plaza from Ladysith flyover bridge
Photo 64: View towards DBPR from Ladysmith Bridge over the N3

Photo 65: View north-west towards Berg and Shashagazane River in valley bottom
Photo 66: Base of Van Reenen’s Pass

Photo 67: Zandspruit Farm Stall
Photo 68: View west up Van Reenen’s Pass

Photo 69: Looking south-east down the pass
Photo 70: Typical VAC of the pass landscape

Photo 71: South-east entrance to Van Reenen Village
Photo 72: View north-west towards the Platberg from Van Reenen

Photo 73: Montrose and Swinburne
Photo 74: View south-east through Harrismith

Photo 75: View north-west as the N3 skirts the Wimpy complex
Photo 76: View over Harrismith from the top of the pass looking south

Photo 77: View south-east over Harrismith with the N3 in the middleground
Photo 78: View south-east along the existing N3 between Warden and Harrismith

Photo 79: N3 as it bypasses Warden to the west
ADDENDUM

VISUAL IMPACT ASSESSMENT PER SECTION FOR EACH ROUTE ALTERNATIVE INCLUDING THE DE BEERS PASS ROUTE DEVIATIONS
ENVIRONMENTAL IMPACT ASSESSMENT

for the proposed

NATIONAL ROAD 3: KEEVERSFONTEIN TO WARDEN
(DE BEERS PASS SECTION)

DEA ref. no. 12/12/20/1992

Study on the Potential Impact of the Proposed National Road 3: Keeversfontein to Warden (De Beers Pass Section) on the Visual Environment

ADDENDUM

VISUAL IMPACT ASSESSMENT PER SECTION FOR EACH ROUTE ALTERNATIVE INCLUDING THE DE BEERS PASS ROUTE DEVIATIONS

Specialist Report

Prepared for

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Prepared by

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P.O Box 11651
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0028

On behalf of

SOUTH AFRICAN NATIONAL ROADS AGENCY (SOC) PTY LTD

25 June 2013
PROPOONENT

The N3 Toll Concession (PTY) LTD is the project proponent who has commissioned this EIA. Contact details are as follows:

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<th>Proponent:</th>
<th>South African National Roads Agency (Pty) LTD</th>
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<td>Ms Mpathi Makoa</td>
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ENVIRONMENTAL ASSESSMENT PRACTITIONER

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<tr>
<th>Consultant:</th>
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INDEPENDENT VISUAL SPECIALIST

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Menno Klapwijk has specialised for 30 years in environmental planning, construction rehabilitation and control, visual impact assessment, and landscape site design. Significant visual impact projects include: Sani Pass Upgrade, Moatize Power Plant (Mozambique), Transnet Multi-purpose Pipeline, Saldanha Steel, Mozal (Alusaf – Mozambique), Letsibogo Dam (Botswana), Blue Circle Cement Factory (East London), Phlogopite Factory (Phalaborwa), Iscor Heavy Minerals Smelter (Empangeni), many VIA’s for Eskom transmission lines and substations, Mmamabula 400kV Transmission Line, Mine and Power Plant (Botswana), West Coast Combined Cycle Gas Turbine Power Plant (CCGT), De Hoop Dam and Pipeline (Sekhukuneland), Tugela Water Project (KwaZulu-Natal), Delportshoop Tower Mast (Delportshoop, Northern Cape), N3 Toll Road, Cedara (KwaZulu-Natal) to Heidelberg (Gauteng), Maputo Steel Project (Maputo, Mazambique), Ga-Pila Village (Potgietersrus, Limpopo Province) and Pom Pom Camp (Okavango, Botswana).

He has more than 100 publications and reports dealing mostly with environmental planning, environmental rehabilitations and control specification, environmental impact assessment and visual impact assessment.

1983: B.Sc (Land Arch), Texas A & M
1986: Environmental Impact Assessment, Graduate School of Business, UCT
Registered: South African Council for Landscape Architecture Practitioners (SACLAP)
Member: Institute of Landscape Architects of South Africa (ILASA)
Member: American Society of Landscape Architects (ASLA)
Member: International Association of Impact Assessors (SA)
Council: Council for the Built Environment (CBE)
DECLARATION OF INDEPENDENCE

I, Menno Klapwijk, as authorised representative of Cave Klapwijk and Associates, hereby confirm my independence as a specialist and declare that neither I nor Cave Klapwijk and Associates have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Cave Klapwijk and Associates was appointed as Visual Impact Assessor in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Visual Impact Assessment for the N3: Keeversfontein to Warden (De Beers Pass Section) Environmental Impact Assessment. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

Signed……………………..  Date: 25 June 2013
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ACRONYMS

CKA        Cave Klapwijk and Associates
SANRAL    South African National Roads Agency Limited
VAC        Visual Absorption Capacity
ADDENDUM
VISUAL IMPACT ASSESSMENT PER
SECTION FOR EACH ROUTE ALTERNATIVE INCLUDING
THE DE BEERS PASS ROUTE DEVIATIONS

‘Impact Assessment per section for each Route Alternative’

9 INTRODUCTION

A new toll highway is currently being investigated by the South African National Roads Agency Limited (SANRAL) from Keeversfontein to Warden (De Beers Pass Route [DBPR]).

Cave Klapwijk and Associates have been commissioned to undertake the environmental assessment process. One of the issues that were identified was that the development could have a negative impact on the visual environment.

Deviations along the De Beers Pass Route have been proposed as environmental mitigation options.

Menno Klapwijk was requested by Cave Klapwijk and Associates to undertake the visual impact specialist study.

10 BACKGROUND AND BRIEF

The EIA process has identified deviations to avoid sensitive areas associated with the De Beers Pass (DBP) Route. Specialists have assessed and submitted written comment on three deviations, now referred to as 1, 2 and 3, which have been included in the DEIAR.

Since then, a fourth deviation has been identified and preliminary engineering studies have shown this to be reasonable and feasible.

However, environmental assessments of this deviation have still to be carried out and will form part of these Terms of Reference (TOR) for the revision of the Draft Specialist Reports.

Further to the specialist studies already completed for the Draft Environmental Impact Assessment Report (DEIAR), it is now necessary to modify the structure of these reports to present the assessment findings, impact mitigation and significance, for defined sections along each Route.
Alternative. This report restructure will identify the sensitivity to change of each section, thereby enabling the identification of the measures necessary to reduce the identified impacts for each section. An accurate estimate of the costs of mitigation for each route section will result.

These TOR for the restructuring of the Specialist Reports and assessment of the DBPR Deviation 4 are supplementary to those provided to specialists in early 2011 and, therefore, form part of the consolidated TOR for Specialist Studies and Reports for the National Road 3 Keeversfontein to Warden (De Beers Pass Section) EIA.

The route alignment alternatives and deviations which are included are:

- DBPR (De Beers Pass Route)
- DBPR with Deviations 1, 2, 3 and 4
- DBPR: Alternative A
- DBPR: Alternative C (Existing N3 Upgrade)
- Do Nothing (Existing N3 – without improvements and capacity upgrades)

Refer to Figure 1: Locality Map showing the proposed alternative route alignments. A description of each route alignment is provided below.

The De Beers Pass with Deviations includes the following deviations

- Klip River Deviation
- Gorge Deviation (Deviation 4 Option3A)
- Wilge River Deviation 1 and 2
- Alex Pan Deviation 1 and 2
- Lincoln Pan Deviation
- Buckland Downs Deviation

The route sections are as follows:

<table>
<thead>
<tr>
<th>Route Alternative</th>
<th>Section 1</th>
<th>Section 2</th>
<th>Section 3</th>
<th>Section 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBPR</td>
<td>Keeversfontein to KZN border</td>
<td>KZN border to Tandjiesberg</td>
<td>Tandjiesberg to Lincoln IC</td>
<td>Lincoln IC to Warden</td>
</tr>
<tr>
<td>DBPR with Deviations</td>
<td>Keeversfontein to KZN border (gorge deviation Dev 4 &amp; Klip River Dev 1)</td>
<td>KZN border to Tandjiesberg (Wilge R Dev 2 and Alex Pan Dev 3)</td>
<td>Tandjiesberg to Lincoln IC</td>
<td>Lincoln IC to Warden (Lincoln Pan and Buckland Downs Deviations)</td>
</tr>
<tr>
<td>Alternative A</td>
<td>Keeversfontein to Van Reenen</td>
<td>Van Reenen to Swinburne</td>
<td>Swinburne to 42&lt;sup&gt;nd&lt;/sup&gt; Hill</td>
<td>42&lt;sup&gt;nd&lt;/sup&gt; Hill to Warden</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------------</td>
<td>------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Alternative C</td>
<td>Keeversfontein to Van Reenen</td>
<td>Van Reenen to Swinburne</td>
<td>Swinburne to 42&lt;sup&gt;nd&lt;/sup&gt; Hill</td>
<td>42&lt;sup&gt;nd&lt;/sup&gt; Hill to Warden</td>
</tr>
<tr>
<td>Do Nothing. (Existing N3)</td>
<td>Keeversfontein to Van Reenen</td>
<td>Van Reenen to Swinburne</td>
<td>Swinburne to 42&lt;sup&gt;nd&lt;/sup&gt; Hill</td>
<td>42&lt;sup&gt;nd&lt;/sup&gt; Hill to Warden</td>
</tr>
</tbody>
</table>
Figure 1: Locality Map
11 STUDY APPROACH

Method

In order to address the objectives of the study the same method has been used as was done for the main VIA report route alternatives:

- Determine the setting, visual character and land use of the area surrounding the area, and the Genius Loci (sense of place). This was done in terms of:
  - Topography
  - Vegetation cover
  - Land use
  - Visibility
  - Landscape diversity
  - Landscape character

- Discussions and meetings with the specialist consultant team to identify specific aspects of the construction and development which would affect the visual quality of a setting;

- Define the extent of the affected visual environmental, the viewing distance and the critical views;

- An evaluation was made of the landscape characteristics against which impact criteria ratings were applied;

- The viewshed, the area within which the proposed project can be visible, was determined using digital 1:50 000 topographic maps with 20 m contour intervals analyzed by the Geographic Information System (GIS), algorithms available in the ArcView Software Suite. No additional viewshed generation was done for the deviations as the existing viewshed for the Be Beers Pass route was still appropriate.

The original assessment is based on the routes, ground-truthed during a field inspection in March 2011. The deviations were assessed in April 2013.

Limitations, Constraints and Assumptions

The following assumptions and limitations are applicable to this study:

- The basis for this assessment is that scenic wilderness areas form the core of eco-tourism due to the high positive aesthetic appeal;

- The assessment is based on assumed demographic data. No detailed study was done to determine accurate data on potential viewers of the project components. If necessary these studies could be undertaken during the design phase of the project;

- Determining a visual resource in absolute terms is not achievable. Evaluating a landscape’s visual quality is both complex and problematic. Various approaches have been developed but they all have one problem in common: unlike noise or air pollution, which can be measured in a relatively simple way, for the visual landscape mainly qualitative standards apply. Therefore subjectivity cannot be excluded.
in the assessment procedure (Lange 1994). Individually there is a great variation in the evaluation of the visual landscape based on different experiences, social level and cultural background. Exacerbating the situation is the inherent variability in natural features. Climate, season, atmospheric conditions, region, sub-region all affect the attributes that comprise the landscape. What is considered scenic to one person may not be to another (NLA, 1997);

- Localized visual perceptions of the economically depressed communities have not been tested as these may be influenced rather by the economic and job opportunities that would exist rather than the direct visual perception of the project;
- The viewshed map is computer generated and does not take into account local and minor visual interruptions in the landscape such as trees on the edge of roads, minor landforms, buildings, etc. As a result the visibility on these maps could be overstated.
- The assessment does not consider the ancillary project infrastructure and components such as borrow pits, construction camp sites, asphalt plants, etc. These components will be assessed in detail during the design phase when their locations are established;
- Detailed site specific mitigation for each cut and fill slope is not provided. This will be addressed by the landscape architect during the detailed design phase of the project should it go ahead;
- The ‘Do Nothing’ alternative was not specifically addressed as it is likely that the existing landscape will remain in its existing condition;

If the study, however, determined that the negative visual impact is of such a magnitude and significance that it will seriously influence the decision on whether or not to build, it will then be necessary to test and determine the visual perceptions of neighbouring communities. Such a study is involved, costly and time consuming.

12 DESCRIPTION OF THE AFFECTED ENVIRONMENT

12.1 Description of the Natural Physical Elements
Figure 2: Landscape Types

The natural physical elements are described according to broad topographical regions (Figure 2: Landscape Types). These landscape
types correlate closely with the vegetation types as described by Low and Rebelo (1996) as these types take into accent the topographical makeup of the area. The proposed DBPR and the alternative project components including the deviations, traverse four distinct landscape types and one biome.

These landscape types have been used solely for the purpose of defining the landscape components and are not intended to refer to the flora studies.

The landscape types within the Grassland Biome are:

- Moist Cool Highveld Grassland
- Moist Cold Highveld Grassland
- Wet Cold Highveld Grassland
- North-eastern Mountain Grassland

The Grassland landscape types are generally open, uniform in texture and result in a visually open landscape.

12.2 Discussion of the Deviations

12.2.1 Klip River Deviation

This deviation has been recommended as a mitigation measure to reduce the impact on the river meanders and the associated wetlands. This deviation occurs within the same landscape and viewshed as the DBPR. The deviation occurs across the floodplain of the Klip River within a wide open valley with the landform rising steadily northwards.

The visibility within the valley is open and unrestricted. The landscape type is North-eastern Mountain Grassland and is the same as for the DBPR. The uniformly textured vegetation of the Open Grassland landscape types will visually contrast significantly with the road making it more visible in the landscape.
12.2.2 Gorge Deviation (Deviation 4 Option 3A & 3A-2)

The gorge deviation has been proposed, amongst other reasons, to avoid aligning the DBPR close to the edge of a scenic gorge and waterfall which has high scenic value crossing the wide Klip River wetland. The proposed alignment is further west through an enclosed valley with a relatively visually intact viewshed.

Once again the visibility along this route is open and unrestricted. The rising landscape from Keeversfontein to the top of the De Beers Pass enables this proposed deviation road to be highly visible for extended distances to the east and south-east. The lack of a diverse vegetation cover limits the opportunity to blend the road visually with the landscape and will leave the line visually exposed.

The upper reaches, before the crest of the berg, is used as a ‘getaway’ retreat lodge for the landowner and guests and is about 400m from the road. A farmstead is within 700m of the road. Although none of these will look directly on the road the sense of place will be negatively impacted. The only major visual intrusion is a 400 kV transmission line that follows a similar alignment.

The proposed deviation enters a tunnel near the crest of the escarpment and exits on the north side of the ridge. The route continues following the existing road on the same alignment as Deviation 2 Option 2 and crosses the Pitchers Rest farm to the southwest reducing the visual impact on Nelson's
Kop when viewed from the farmstead. However, the deviation still remains approximately 350m from the farmstead and is in full view in westward views.

**Figure 4: Gorge Deviation (Deviation 4 Option 3)**

Again the landscape type is North-eastern Mountain Grassland and is the same as for the DBPR. The uniformly textured vegetation of the Open Grassland landscape types will visually contrast significantly with the road making it more visible in the landscape.

### 12.2.3 Wilge River Deviation 1 and 2

The Wilge Deviations have been proposed the move the road off and away from the Wilge River floodplain and associated wetlands. The road is re-aligned further southwest of the DBPR. Deviation 2 is approximately 250m away while Deviation 1 is approximately 1.6km further southwest of the original alignment. Deviation 1 still runs along the lower reaches of the valley while Deviation runs further upslope which will result in excessive cut and fill slopes. At all times the iconic Nelson’ Kop mountain forms a dramatic backdrop which is a main feature in the sense of place along this section of the route. Both options link up with the DBPR close to Pitchers Rest and do not relieve the visual impact of the DBPR on the farmstead.
12.2.4 Alex Pan Deviation 1 and 2

The landscape from the top of the escarpment to the Lincoln Interchange assists in limiting the visual exposure of the road due to the rising landforms either side of the route where visibility is generally reduced to 2.5 - 5.0 km. The uniformly textured vegetation of the Open Grassland landscape types will visually contrast significantly with the road making it more visible in the landscape.

The lack of visual diversity within this Grassveld landscape biome will result in a low Visual Absorption Capacity (VAC) and will in turn result in any large scale structure being highly visible due to the lack of screening and the high visual contrast

The deviations have been proposed to reduce the impact on Alex Pan, an important bird habitat. The deviations still fall within the same landscape type as the DBPR resulting in no change to the macro visual environment.

However, at the micro scale the visual impact on the farmstead west of the pan and south of the DbPR is reduced by moving Option A about 300m south compared to the DBPR being 250m north. Option B is located about 700m south of the farmstead and is off the raised plateau of Option A thereby sitting lower down in the landscape.
As with the Wilge River Deviations, the uniformly textured vegetation of the Open Grassland landscape types will visually contrast significantly with the road making it more visible in the landscape.

The lack of visual diversity within this Grassveld landscape biome will result in a low Visual Absorption Capacity (VAC) and will in turn result in any large scale structure to be highly visible due to the lack of screening and the high visual contrast.

**12.2.5 Lincoln Pan Deviation**

This deviation is so close to the existing DBPR that there was no influence on the visual environment that it was not assessed further in any detail. The north east edge of the pan remains within 50 m of the deviation servitude.

As with the Alex Pan deviations, the lack of visual diversity within this Grassveld landscape biome will result in a low Visual Absorption Capacity (VAC) and will in turn result in any large scale structure to be highly visible due to the lack of screening and the high visual contrast.
12.2.6 Buckland Downs Deviation

This deviation has been proposed to avoid the historic planted grove of trees.

The visibility of the road from approximately the Lincoln Interchange to Warden is more extensive within this landscape, in which this deviation falls, due to the lack of topographical screening features. Visibility is most extensive in the Verkykerskop area where views extend to 17 km and around Warden where views extend to 10-15 km intermittently.

As the deviation is minor there is very little change to the site conditions and the visual impact.
12.3 Visual Sensitivity

The escarpment and foothills exhibits a well-defined and vivid sense of spatial definition with a high scenic quality due to the combination of low gentle valleys, open grasslands and the massive and imposing mountain backdrop of the Drakensberg (Figure 7: Relative Visual Quality Sensitivity). The character of the landscape can be regarded as rural agriculture predominantly stock grazing.

The upper valley exhibits a highly defined and vivid sense of space and place and is regarded as having a high aesthetic value and being very scenic. This is due to the dramatic and striking mountains that protrude on the valley edges, the enclosed nature of the valley which creates a scale to which one can relate, the open grasslands and wetlands which in patches exhibits almost wilderness quality due to the very sparse population and few scattered farmsteads.

From the S772 / Lincoln Interchange towards Warden the character changes to where the scenic quality reduces due to the lack of landscape diversity in that the mountains have disappeared and the landscape is open and punctuated by some minor rivers and rolling hills.

The introduction of a highway road through much of this area will significantly alter and compromise the very high scenic and visual quality of the area,
Figure 9 Relative Visual Quality Sensitivity
especially the upper valley section that currently is relatively little visually and aesthetically altered by human intrusion.

Tourist-based enterprises that rely on the high scenic quality as the basis for their business will be impacted. The introduction of the road will restrict further such enterprises from being developed.

The deviations do little to mitigate the impact of the DBPR on the macro visual environment. The Klip River Deviation is small in scale and has no influence on the impact.

The Gorge Deviation up the escapement certainly reduces the visual impact in the visual quality of the gorge itself but brings with it a high visual impact on the new deviation alignment as this alignment has a high visual quality. The deviation 4 has less severe cuts and fills than does DBPR base case for the same section. It will therefore be less visually invasive in the landscape. However, this is only on the micro scale. When viewed for further away the visual scarring is as intense.

There is a slight reduction of impact where the deviation is aligned west of Pitchers Rest where there intrusive views onto Nelsons Kop are removed. However, this does not reduce the total impact on the broader visual environment.

12.4 Risk Sources

12.4.1 Construction Phase

It is anticipated that the major risk source during construction would be:

Negative Risk Sources

- Excessive clearing and stripping of topsoil for site offices, construction camps, servitudes and temporary access roads;
- The relatively random and disorganised lay down of building materials, vehicles and offices;
- Cut and fill slopes of access roads become highly visible if not re-vegetated and shaped to blend in with the existing topography;
- The extent and intensity of the security and construction lighting at night;
- Dust from construction activities;
- Open and un-rehabilitated landscape scarring;
- Uncontrolled exploitation of borrow pits and quarries without compliance to environmental controls related to aesthetic rehabilitation;
• Location and layout of construction workers camp if located in proximity of works area; and

• High seed bank of alien species in the topsoil can lead to the uncontrolled spread of exotic invader plant species along the edge of the road. This could create a vegetated strip that is visually contrary to the surrounding landscape.

Positive Risk Sources

• Image of construction activity could lead to a perceived view of progress and benefit to the community.

12.4.2 Operational Phase

It is anticipated that the major risk source during operation would be:

Negative Risk Sources

• Areas and/or specific sites of high aesthetic value may be disfigured by the introduction of a highway within the viewshed resulting in a permanent change to the existing visual quality of visually sensitive areas;
• Constant disruption of rural night ambience by vehicle lights;
• The compromising of views from or the alteration of the ambience of natural areas;
• Site engineering, such as cuts and fills, could remain aesthetically incompatible with the surrounding landscape if mitigation measures are not implemented. Edges may not blend in with the landscape or cut slopes may be too steep to be adequately re-vegetated;
• Need to keep road reserves clear of vegetation will result in visual scarring;
• New access roads leave permanent visual scarring;
• The degradation of areas of particular visual character, such as ridges, valleys and drainage ways if the project components are placed too close by;
• Cumulative impact of additional traffic will affect the sense of place.

Positive Risk Sources

• New routes could present and promote existing high quality visual attributes of an area not normally exposed to the general public;
• The presentation of a very scenic landscape such as the Nelson’s Kop and Tandjiesberg area or the huge and impressive bridge structures such as the viaduct bridges to the road users. This scenic experience
has previously been limited to persons who specifically have travelled the area;

- The development could be the visual affirmation of progress and prosperity for the region. Localised visual perceptions of the economically depressed communities of the population have not been tested as these may be influenced rather by the economic and job opportunities that could exist rather than the direct visual perception of the project.

12.5 Legislation

There are no specific legal requirements nor is there any direct reference to the visual environment in the legislation. General legislation pertaining to the environment is contained in the National Environmental Management Act (NEMA) (Act No. 107 of 1998) as well as the National Heritage Resources Act No. 25, 1999 and the associated provincial regulations provide legislative protection for listed or proclaimed site, such as urban conservation areas, nature reserves and proclaimed scenic routes.

The National Environmental Management Principles as contained in NEMA require that sustainable developments require the following considerations (amongst others):

2(4)(ii) that pollution and degradation of the environment are avoided, or, that where they cannot be altogether avoided, are minimised and remedied; and

2(4)(iii) that the disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied.

The National Heritage Resources Act refers, under Part 1 General Principles, to the National Estate:

3.(2)(d) Landscapes and natural features of cultural significance

Visual pollution is controlled to a limited extent, by the Advertising on Roads and Ribbons Act (Act No. 21 of 1940) which deals mainly with signage on public roads.

The Protected Areas Act (NEMA) (Act 57 of 2003, Section 17) is also intended to protect natural landscapes

The Western Cape DEA&DP have produced ‘A Guideline for Involving Visual and Aesthetic Specialists in EIA Processes’

13 THE VISUAL ASSESSMENT
### Table 1.1: Assessment of potential visual impacts associated with the proposed De Beers Pass Route

<table>
<thead>
<tr>
<th>DE BEERS PASS ROUTE</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact: Aesthetics / Sense of Place</td>
<td>See Generic Mitigation</td>
</tr>
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</table>

**Impact Description**

The Sense of Place is directly associated with the pastoral image associated with the adjacent agricultural lands, the dominant and dramatic mountains and distant vistas. The scale and form of the road will change the sense of place due to the high contrast of the road in this rural setting.

<table>
<thead>
<tr>
<th>Management Measures</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Frequency</th>
<th>Probability</th>
<th>Reversibility</th>
<th>Irreplaceable loss of Resources</th>
<th>Consequence</th>
<th>Significance</th>
<th>Nature of Impact</th>
<th>Confidence</th>
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<tbody>
<tr>
<td>Without management</td>
<td>Local</td>
<td>Long term</td>
<td>Keeversfontein - DBP</td>
<td>Medium - High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Keeversfontein - KZN Border</td>
<td>Medium - High</td>
<td>Negative</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>(Medium)</td>
<td>(High)</td>
<td>DBP - Tandjiesberg</td>
<td>High</td>
<td>High</td>
<td></td>
<td>KZN Border - Tandjiesberg</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Tandjiesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Tandjiesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lincoln Interchange - Warden</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Lincoln Interchange - Warden</td>
<td>Medium - Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With management</td>
<td>Local</td>
<td>Long term</td>
<td>Keeversfontein - DBP</td>
<td>Medium - High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Keeversfontein - KZN Border</td>
<td>Medium - High</td>
<td>Negative</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>(Medium)</td>
<td>(High)</td>
<td>DBP - Tandjiesberg</td>
<td>High</td>
<td>High</td>
<td></td>
<td>KZN Border - Tandjiesberg</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tandjiesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Tandjiesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lincoln Interchange - Warden</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Lincoln Interchange - Warden</td>
<td>Medium - Low</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cumulative Impact: As the proposed DBPR traverses a “greenfields” area, there is no cumulative impact as it is not adding to an existing national road network through this study area. It can, conversely, be argued that there is a cumulative impact of 100% as the proposed DBPR is entirely a new development of which there previously was not one.

### 13.2 Table 1.2: Assessment of potential visual impacts associated with the proposed De Beers Pass Route with Deviations

#### DE BEERS PASS ROUTE WITH DEVIATIONS

<table>
<thead>
<tr>
<th>Impact Description</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Sense of Place is directly associated with the pastoral image associated with</td>
<td>See Generic Mitigation</td>
</tr>
<tr>
<td>the adjacent agricultural lands, the dominant and dramatic mountains and distant</td>
<td></td>
</tr>
<tr>
<td>vistas. The scale and form of the road will change the sense of place due to the</td>
<td></td>
</tr>
<tr>
<td>high contrast of the road in this rural setting.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Management Measures</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Frequency</th>
<th>Probability</th>
<th>Reversibility</th>
<th>Irreplaceable loss of Resources</th>
<th>Consequence</th>
<th>Significance</th>
<th>Nature of Impact</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without management</td>
<td>Local</td>
<td>Long term (High)</td>
<td>Keeversfontein - KZN Border</td>
<td>Medium - High</td>
<td>Continuous</td>
<td>Medium</td>
<td>High - Medium</td>
<td>High</td>
<td>Keeversfontein - KZN Border</td>
<td>Medium - High</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>(Medium)</td>
<td></td>
<td>KZN Border - Tandjesberg</td>
<td>High</td>
<td></td>
<td>High</td>
<td>High</td>
<td>KZN Border - Tandjesberg</td>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tandjesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Tandjesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lincoln Interchange - Warden</td>
<td>Medium</td>
<td></td>
<td>Medium</td>
<td>Medium</td>
<td>Lincoln Interchange - Warden</td>
<td>Medium - Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With management</td>
<td>Local</td>
<td>Long term (High)</td>
<td>Keeversfontein - KZN Border</td>
<td>Medium - High</td>
<td>Continuous</td>
<td>Medium</td>
<td>High - Medium</td>
<td>High</td>
<td>Keeversfontein - DBP</td>
<td>Medium - High</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>(Medium)</td>
<td></td>
<td>KZN Border - Tandjesberg</td>
<td>High</td>
<td></td>
<td>High</td>
<td>High</td>
<td>DBP - Tandjesberg</td>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tandjesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Tandjesberg - Lincoln Interchange</td>
<td>Medium - High</td>
<td></td>
</tr>
</tbody>
</table>
#### Cumulative Impact

As the proposed De Beers Pass Route with Deviations traverses a “greenfields” area, there is no cumulative impact as it is not adding to an existing national road network through this study area. It can, conversely, be argued that there is a cumulative impact of 100% as the proposed De Beers Pass Route is entirely a new development of which there previously was not one.

### 13.3 Table 1.3: Assessment of potential visual impacts associated with the proposed De Beers Pass Route: Alternative A

<table>
<thead>
<tr>
<th>Impact Description</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Sense of Place is directly associated with the rolling grassland landscapes, the dominant and dramatic mountains and distant vistas. The scale and form of the road will change the sense of place due to the high contrast of the road in this rural setting. Sections of the route follow closely the existing N3 where the sense of place is less defined due to the landscape modification.</td>
<td>See Generic Mitigation</td>
</tr>
</tbody>
</table>

#### Impact: Aesthetics / Sense of Place

<table>
<thead>
<tr>
<th>Impact</th>
<th>Management Measures</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Frequency</th>
<th>Probability</th>
<th>Reversibility</th>
<th>Irreplaceable loss of Resources</th>
<th>Consequence</th>
<th>Significance</th>
<th>Nature of Impact</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without management</td>
<td>Local (Medium)</td>
<td>Long term (High)</td>
<td>Keeversfontein - Van Reenen’s Pass</td>
<td>Medium</td>
<td>Continuous</td>
<td>Medium - High</td>
<td>High</td>
<td>High</td>
<td>Keeversfontein - Van Reenen’s Pass</td>
<td>Medium - High</td>
<td>Negative</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Van Reenen’s Pass - 42nd Hill</td>
<td>Medium - High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>42nd Hill - Warden</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>With management</td>
<td>Local (Medium)</td>
<td>Long term (High)</td>
<td>Keeversfontein - Van Reenen’s Pass</td>
<td>Medium</td>
<td>Continuous</td>
<td>Medium - High</td>
<td>High</td>
<td>High</td>
<td>Keeversfontein - Van Reenen’s Pass</td>
<td>Medium - High</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Van Reenen’s Pass -</td>
<td>Medium - High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Menno Klapwijk
13.4 Table 1.4: Assessment of potential visual impacts associated with the proposed De Beers Pass Route: Alternative C

DE BEERS PASS ROUTE: ALTERNATIVE C

Impact: Aesthetics / Sense of Place

Impact Description
The Sense of Place is not as directly associated with the rolling grassland landscapes, the dominant and dramatic mountains and distant vistas as are the other route alternatives. Much of the route follow closely the existing N3 where the sense of place is less defined due to the landscape modification. The scale and form of the road will not as significantly change the sense of place due to the contrast of the road in this rural setting has already been modified by the existing N3.

Mitigation
See Generic Mitigation

<table>
<thead>
<tr>
<th>Impact</th>
<th>Management Measures</th>
<th>Extent</th>
<th>Duration</th>
<th>Intensity</th>
<th>Frequency</th>
<th>Probability</th>
<th>Reversibility</th>
<th>Irreplaceable loss of Resources</th>
<th>Consequence</th>
<th>Significance</th>
<th>Nature of Impact</th>
<th>Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aesthetics / sense of place</td>
<td>Without management</td>
<td>Local (Medium)</td>
<td>Long term (High)</td>
<td>Keeversfontein - Van Reenen's Pass</td>
<td>Medium - Low</td>
<td>Medium</td>
<td>Continuous</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Keeversfontein - Van Reenen's Pass</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Van Reenen's Pass - 42nd Hill</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Van Reenen's Pass - 42nd Hill</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>With management</td>
<td>Local (Medium)</td>
<td>Long term (High)</td>
<td>Keeversfontein - Van Reenen's Pass</td>
<td>Medium - Low</td>
<td>Medium</td>
<td>Continuous</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Keeversfontein - Van Reenen's Pass</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Van Reenen's Pass - 42nd Hill</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Van Reenen's Pass - 42nd Hill</td>
<td>Medium</td>
</tr>
</tbody>
</table>
Cumulative Impact: As for Alternative A, a large part of the route follows closely on the existing highway, the cumulative impact increases. However, notwithstanding the increase in cumulative impact, it is often preferable to place new structures, such as roads, alongside existing such structures in the belief that the impact on a corridor is less that if the same impact was exerted on an area that has not previously been impacted upon.
14 RECOMMENDED GENERAL MITIGATION / MANAGEMENT MEASURES

14.1 Road Alignment

14.1.1 Earthworks and Landscaping

The visual impact during construction will be highly significant and little can be done about reducing the effect since the works cannot be screened nor can it be moved to more visually suitable positions.

It will be important that a landscape architect be appointed during the design phase of the project to integrate the project components with the surrounding landscape to ensure that the project blends in physically and aesthetically with the environment.

The mitigation measures during operation will need to focus on effective rehabilitation of the construction area and road reserves and blending the road edges with the existing landscape form. These specifications must be explicit and detailed and included in the contract documentation (Environmental Management Plan) so that the tasks can be priced and monitored for compliance and result.

Attention must be given to provide the road user and tourist the opportunity to optimise the visual attributes of the scenic landscape. This can be achieved by opening up vistas where cuttings may have blocked the views and by providing stop over points for travellers to appreciate and experience the views or landscape features.

Sculpturing or shaping the cut and fill slopes to angles and forms that are reflected in the adjacent landscape can reduce the visual impact. By blending the edges with the existing landforms, the visual impression made is that the project component has followed the natural shape of the landscape, rather than been ‘engineered’ through the landscape.

All road cutting top edges need to be rounded off to remove the engineered knife edge that visually contrasts with the existing landform. The base of fill slopes should likewise be rounded off.

For access / service roads and servitudes avoid straight edges and corridors. These lines should complement the landscape through which they pass (Litton, 1980).

Special attention should be focussed on the width of servitude actually required for the construction and operational phases. There is a tendency to make these servitudes wider than necessary and access roads built to a higher engineering specification than required.
Clearing of the full servitude should be avoided. If vegetation stripping is required, then vegetation stripping should be done in a manner where the edges are organic (non-geometric) or curvilinear rather than straight or sharp edged as viewers tend to form positive visual impressions such as “gentleness” and “delicacy” and tend to object to negative visual impressions such as “rough”, “rugged” or “violent” (Ribe, 1989). When disturbances in the landscape are viewed from a distance, those with irregular lines, rather than straight lines, appear to blend in with the natural configuration and lines in the landscape (Schaefer, 1967).

It is essential that all cut and fill slopes, as well as all areas disturbed by construction activity, are suitably topsoiled and vegetated as soon as is possible after final shaping. The progressive rehabilitation measures will allow the maximum growth period before the completion of the project.

All areas affected by the construction works will need to be rehabilitated and re-vegetated. This includes the areas beyond the works area such as temporary access roads, construction campsites, workers campsites, borrow pits, laydown areas, etc.

The special conditions of contract must include for the stripping and stockpiling of topsoil from the construction areas for later re-use. Topsoil is considered to be at least the top 300 mm of the natural soil surface and includes grass, roots and organic matter. The areas to be cleared of topsoil should be all areas that will be covered by structures, roads and construction camps. The presence of degraded and disused roads and areas left over after development that are not rehabilitated, could present a high perceptual visual impact. These areas should be topsoiled and re-vegetated.

The rehabilitation and stabilisation of vegetation of all rehabilitated areas, buffer strips and new landforms must be done as soon as the forms are complete. The monitoring and management of the vegetation programme is important to ensure that problems (erosion, die back, and lack of grass cover) are identified early so that corrective measures can be taken.

General roadside rehabilitation landscaping shall reflect the existing surrounding landscape.

14.2 Monitoring and Review Programme

The rehabilitation and stabilisation by vegetation of all new landforms e.g. platform side slopes, road fill or cut slopes must be done as soon as the forms are complete. The monitoring and management of the vegetation programme is important to ensure that problems (erosion, die back, and lack of grass cover) are identified early so that corrective measures can be taken.
During construction the detailed requirements which would have been set during the design phase and incorporated in the contract documentation, must be monitored for compliance.

15 DISCUSSION AND CONCLUSIONS

The impact assessment was undertaken for only the main components of the project such as the routes as per the Terms of Reference. The study excluded ancillary components such as borrow pits, quarries, lay-down areas and construction camps. This study evaluated the visual impact of the DBPR and alternatives with a view to assessing its severity based on the author’s experience, expert opinion and accepted techniques.

The study assessed five main project components or component alternatives. These included the DBPR, the DBPR with deviations, the DBPR: Alternative A, the DBPR: Alternative C.

The description of the visual impacts of the phases of construction and decommissioning are not considered as significant visual impacts since the period of activity is of relatively short duration and of a primary impact (localized, of short duration and easily mitigated at the end of the phase). The fact that disturbed areas, e.g. camps / lay-down areas will be rehabilitated also reduces the impacts of these phases.

It is the operational phase that presents the most significant long term visual impact. This is due primarily to the scale and form of the proposed development. Visibility reduces exponentially the further the viewer is from the proposed development.

15.1 Evaluation of the Project

15.1.1 Routes

Table 1.5: Assessment of potential visual impacts per Route

<table>
<thead>
<tr>
<th>Section Description</th>
<th>No</th>
<th>DBPR</th>
<th>DBPR + Dev</th>
<th>Section Description</th>
<th>No</th>
<th>Alt A</th>
<th>Alt C</th>
</tr>
</thead>
<tbody>
<tr>
<td>KervrSFntn – KZN Border</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>KervrSFntn – Van Reenen</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>KZN Border – S922</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>Van Reenen – Swinburne S922</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Tandjiesberg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
De Beers Pass Route

The DBPR will exert a negative influence on the visual environment. This is largely due to the:

- high visibility of the route, especially across the escarpment and foot hills;
- impact on the high visual quality of the section from the top of the De Beers Pass and the Lincoln Interchange;
- the high visibility of construction and operation activity within the uniform open grassland areas of uniform visual pattern;
- the low VAC of the area due to the low and uniform visual pattern of vegetation which does not allow for the road to be visually accommodated within the landscape as a result of the high visual contrast;
- the scale of the road in a scenic rural setting;
- the introduction of a continuous corridor within a rural setting that will be brightly lit by vehicles throughout the night and the accompanying increase in noise that will significantly affect the sense of place;
- the need to cut into the existing landform to accommodate the vertical alignment and the width of the servitude;
- the overall significance of the visual impact (see table 1.6) is regarded as Medium-High (a rating of 4 on a scale of 1-5) across the escarpment (Kerversfontein to the KZN border), High (a rating of 5 between the top of the De Beers Pass (KZN border) to Tandjiesberg, Medium High from Tandjiesberg to the Lincoln
Interchange and Medium low (a rating of 2) for the section from the Lincoln Interchange to Warden.

- De Beers Pass Route with Deviations

The DBPR will exert a negative influence on the visual environment. This is largely due to the:

- high visibility of the route, especially across the escarpment and foothills;
- impact on the high visual quality of the section from the top of the De Beers Pass and the Lincoln Interchange;
- the high visibility of construction and operation activity within the uniform open grassland areas of uniform visual pattern;
- the low VAC of the area due to the low and uniform visual pattern of vegetation which does not allow for the road to be visually accommodated within the landscape as a result of the high visual contrast;
- the scale of the road in a scenic rural setting;
- the introduction of a continuous corridor within a rural setting that will be brightly lit by vehicles throughout the night and the accompanying increase in noise that will significantly affect the sense of place;
- the need to cut into the existing landform to accommodate the vertical alignment and the width of the servitude;
- the overall significance of the visual impact is regarded as Medium-High (a rating of 4 on a scale of 1-5) across the escarpment (Kerversfontein to the KZN border), High (a rating of 5 between the top of the De Beers Pass (KZN border) to Tandjiesberg, Medium High from Tandjiesberg to the Lincoln Interchange and Medium low (a rating of 2) for the section from the Lincoln Interchange to Warden.

- De Beers Pass Route: Alternative A

The DBPR: Alternative A will exert a negative influence on the visual environment for similar reasons to those for the DBPR. However, this route up the escarpment goes through an area with a higher VAC and thus the landform can visually accommodate the road to a greater degree. Furthermore, it traverses an area that is more disturbed by human interventions such as railway, transmission lines, towns, etc. that detract from the more undisturbed rural visual quality experience along the DBPR.

The overall significance of the visual impact is regarded as Medium-High (a rating of 4) from Keeversfontein to Van Reenen, Medium
(rating of 3) from Van Reenen to Harrismith (42nd Hill) and Low (a rating of 1) from Harrismith to Warden.

- De Beers Pass Route: Alternative C

Only the section from Keeversfontein to Harrismith was evaluated as the section from Harrismith to Warden is common with that for DBPR: Alternative A and has been dealt with under that section.

Alternative C follows the exact alignment of the existing N3 which in itself exerts a negative influence on the visual environment. However, the upgrade of this route will affect an area that has already been disturbed and therefore does contribute substantially to the overall negatively impacted environment as all additional disturbance is contained within this corridor.

The overall significance of the visual environment is regarded as Medium (a rating of 3) from Keeversfontein to Van Reenen (42nd Hill) and Low (rating of 1) from Van Reenen to Harrismith.

15.2 Conclusions

Based on the field observations and the studies herein and with the implementation of the mitigation measures, the following conclusions are made from a visual point of view:

The deviations to the DBPR do not significantly mitigate the visual impact on the natural environment. The deviations away from Pitchers Rest and the Alex Pan do reduce the impact on the farmsteads. However, these are minor adjustment and do not have an influence on the macro environment

Of the three alternatives assessed as well as the DBPR with the deviations, it can be concluded that although all will exert a negative impact, on balance the DBPR: Alternative C will exert the least significant impact on the visual environment. Both the BDPR and the DBPR with Deviations from the KZN Border to Tandjesberg have a high significance rating (a rating of 5 in a scale of 1 – 5) and it is therefore recommended that these should not be considered or authorised.
Table 6: Comparative Significance Ranking for the various alternative routes

Note that The DBPR and the DBPR with Deviations display the same profile – see green and yellow profile.
Figure 10: Visual Impact Significance illustrates the sections of routes with their accompanying significance ratings.
PHOTOS

DE BEERS PASS ROUTE
WITH DEVIATIONS
Photo 1: View north from railway crossing of Deviation 4 Opt 3A and Klip River Deviation
Photo 2: View south - southwest down valley below Deviation 4 Tunnel Opt 3A-2

Photo 3: View north towards Deviation 4 Tunnel Opt 3A-2
Photo 4: View south from intersection of Deviation 4 Opt 3A and Bedford Dam road with Deviation 4 Tunnel portal position on far hill
Photo 5: Possible Deviation 4 interchange near Bedford Dam turn-off

Photo 6: Possible DBPR - Ingula PSS Interchange
Photo 7: View NW towards Pitchers Rest along Deviation 4, Opt 3A and Deviation 2 Opt 2 alignment

Photo 8: Deviation 4 Opt 3 crossing from right to left over ridge behind Pitchers Rest
Photo 9: Deviations and DBPR converge in middle ground

Photo 10: Possible Tandjesberg S922 Interchange
Photo 11: Convergence of Alex Pan Deviations and DBPR with Tandjiesberg in Background
Photo 12: Looking south west towards Alex Pan Deviations

Photo 13: Entrance to Pitchers Rust farm with Nelson's Kop in background