

**VISUAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED  
RADISSON BLU SAFARI RESORT IN THE KRUGER NATIONAL  
PARK, MALELANE.**

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## **EXECUTIVE SUMMARY**

I-scape was appointed by Cradle of Malelane (Pty) Ltd to compile a Visual Impact Assessment (VIA) report for the proposed Radisson Blu Safari Resort. The project entails the construction and operation of a 240 bed hotel with a four star rating inside the Kruger National Park (KNP) as part of a Public Private Partnership (PPP) Agreement between the client, Cradle of Malelane (Pty) Ltd and the state enterprise, South African National Parks (SANParks).

A VIA is a specialist study that assesses the potential visual changes/impacts to an existing baseline setting resulting from the implementation of a proposed project. The associated visual changes could potentially impact on the character and value of the landscape and affect the views and perceptions of observers in the study area. The purpose of the study is to determine the significance of the changes/impacts and to recommend mitigation measures where the impacts are considered unacceptably negative.

The objectives will be to:

- Address the concerns that are raised during public participation events which relates to aesthetic or any visual aspects;
- Determine the impact on the observers in the study area and the landscape character due to the change in the visual characteristics of the environment; and
- Recommend mitigation measures to alleviate or reduce the anticipated impacts.

The accuracy of the VIA is greatly dependent on detailed information. At the time of the assessment the project was considered to be in an advanced concept stage and certain information was still lacking. The limited information negatively affects the confidence level with which the visual specialist conducts the study. A detailed breakdown of the limitations and assumptions are provided in the main report.

## **STUDY AREA**

The study area can shortly be described as the area affected by visual impact and usually extends beyond the boundaries of the site. Within the study area the Zone of Visual Influence (ZVI) delineates the area of anticipated visual impact. The study area has been defined as the area including the Park-and-Ride facility, the resort site and the roads connecting the two sites. From here a 5 km radius is drawn to include all areas where a significant visual exposure may occur.

The study area is renowned for its exceptionally pristine wilderness character. For nearly a century the KNP is a protected area and boasts a rich collection of fauna and flora, typical of Southern Africa. The southern part of KNP is considered the most popular tourism destination of the entire park. This can be attributed to the ease of accessibility, the concentration of visitor camps in the south and a high biodiversity.

## **VISUAL RESOURCE ASSESSMENT**

In order to have a full understanding of the study area's landscape character and its aesthetic value, a comprehensive Visual Resource Assessment is conducted and is discussed in detail in the main report. Here follows a summary:

The Visual Resource Assessment describes the value of the study area as a visual resource based on its appreciation, scenic quality and sense of place. It provides insight into the qualities of the landscape and its importance to observers.

From the assessment it becomes evident that the study area is highly appreciated for its ecological intactness and exceptional scenic qualities. The tourism industry is solely dependant on the pristine ecological and aesthetic quality of the KNP, of which the study area forms part. This enforces the value of the landscape on an international, national and regional scale.

The sense of place contributes significantly to the value of the visual resource. One's senses are heightened and the excitement almost tangible as one enters the KNP. This is surely a memorable experience.

The visual resource is regarded highly sensitive and vulnerable. Physical changes to the character of the visual resource will impact on the scenic qualities and possibly affect the sense of place. The remainder of the study will look into the impact of the proposed project on the visual resource and the observers experiencing it.

## ***PROJECT DESCRIPTION***

The project entails the construction and operation of a 240 bed hotel development inside the Recreational Opportunity Zoning (ROZ) section of the KNP Management Plan. The project also includes a Park-and-Ride facility next to the Malelane Gate from where guests will be transported via safari vehicles to the hotel complex. Realignment and upgrading of a section of the Rhenosterkoppies Road (S114) will also be required.

## ***VISUAL IMPACT ASSESSMENT***

The following typical and general visual impacts can be expected as a result of the construction and operation of the proposed project:

- The project activities or components noticeably change the existing features or qualities of the landscape;
- A project introduces new features which are uncharacteristic or in contrast with the existing character of the landscape; and/or
- A project removes or blocks aesthetic features of the landscape which subsequently affects the aesthetic value of the visual resource.

Within the study area, specific observers experience different views of their environment and therefore value it differently. They will be affected by the proposed project because of alterations to the environment/landscape or specific elements in the landscape which will influence their views.

To assess these impact the following criteria is implemented:

- The intensity of the impact;
- The sensitivity of the observer which is impacted on; and
- The exposure of the observer to the impact.

### **Critical viewing areas**

For the purpose of this assessment, the project will be divided into three distinct components; the realignment of S114, the Park-and-Ride facility and the resort development itself. The following critical viewing areas have been identified as areas/vantage points where some degree of visual exposure is expected:

- **Realignment and upgrading of S114:**
  - On the S114 and S121 routes.
- **Park-and-Ride facility:**
  - At the Malelane Gate and the approaching roads over the Crocodile River and Malelane Road;
  - From Leopard Creek Estate; and
  - From Pestana Kruger Lodge.
- **Resort development:**
  - On the S114 and S121 routes; and
  - From the sugar cane fields.

### **VISUAL IMPACTS DURING CONSTRUCTION PHASE**

Visual impacts are likely to occur during the construction phase as a result of the associated activities on the individual sites. These activities include the operation of construction equipment and the construction of the structures. Visual impacts relating to surface disturbances are often the most significant. The removal of vegetation, site preparation and large scale earthworks scar the landscape and usually results into eyesores. Dust clouds may appear on windy days as earthmoving equipment engage into construction activities. Delivery vehicles and trucks will have to make use of the local road network to get to and from the sites, thereby increasing traffic between the Malelane Gate and the resort site.



| Nature of Impact                         | Extent of Impact | Duration of Impact                                | Intensity of Impact      | Probability of Impact               | Significance of Impact   | Level of Confidence |
|--|------------------|---|--------------------------|-------------------------------------|--------------------------|---------------------|
| <b>Realignment and upgrading of S114</b> |                  |   |                          |                                     |                          |                     |
| Without mitigation                       | Local            | VR <sup>1</sup> : Short term<br>OB: Brief moments | VR: Medium<br>OB: Low    | VR: Definite<br>OB: Highly probable | VR: Medium<br>OB: Medium | High                |
| With mitigation                          | Local            | VR: Short term<br>OB: Brief moments               | VR: Medium<br>OB: Low    | VR: Definite<br>OB: Improbable      | VR: Medium<br>OB: Low    | High                |
| <b>Park-and-Ride facility</b>            |                  |   |                          |                                     |                          |                     |
| Without mitigation                       | Local            | VR: Short term<br>OB: Brief moments               | VR: High<br>OB: High     | VR: Definite<br>OB: Highly probable | VR: High<br>OB: High     | Medium              |
| With mitigation                          | Local            | VR: Short term<br>OB: Brief moments               | VR: Medium<br>OB: Medium | VR: Definite<br>OB: Probable        | VR: Medium<br>OB: Medium | Medium              |
| <b>Resort development</b>                |                  |   |                          |                                     |                          |                     |
| Without mitigation                       | Local            | VR: Short term<br>OB: Brief moments               | VR: High<br>OB: Low      | VR: Definite<br>OB: Improbable      | VR: High<br>OB: Low      | Medium              |
| With mitigation                          | Local            | VR: Short term<br>OB: Brief moments               | VR: Medium<br>OB: Low    | VR: Definite<br>OB: Improbable      | VR: Medium<br>OB: Low    | Medium              |

## VISUAL IMPACTS DURING OPERATIONAL PHASE

Visual impacts will occur as a result of the addition of new elements in the visual environment and the subsequent change in the character of the landscape. The new elements refer to the buildings and roads that are part of the project. When these changes are experienced by viewers it will impact on their views and their experience of the study area.

The visual resource has been evaluated and it was found that it has great aesthetic value and is therefore sensitive to changes to its character. Any removal of or alterations to its existing features may compromise the character of the site and may impact on the overall aesthetic value of the study area. The study area is also visited or occupied by observers that are highly sensitive towards changes in the character of the study area. Their main reason for visiting the study area is to enjoy and experience the pristine natural character. Any changes to this character will impact on the observers.

<sup>1</sup> There is a distinction made between impacts on the Visual Resource (VR) and on Observers (OB). In most of the cases the visual resource will experience major impacts on its character, but due to the high screening capacity of the landscape, observers will have limited views of these changes.

| Nature of Impact               | Extent of Impact | Duration of Impact                     | Intensity of Impact             | Probability of Impact               | Significance of Impact          | Level of Confidence |
|--------------------------------|------------------|--|---------------------------------|-------------------------------------|---------------------------------|---------------------|
| <b>New Section of the S114</b> |                  |  |                                 |                                     |                                 |                     |
| Without mitigation             | Local            | VR <sup>2</sup> : Long term<br>OB: N/A | VR: Low<br>OB: N/A              | VR: Definite<br>OB: Improbable      | VR: Low<br>OB: None             | High                |
| With mitigation                | Local            | VR: Long term<br>OB: N/A               | VR: Low<br>OB: N/A              | VR: Definite<br>OB: Improbable      | VR: Low<br>OB: None             | High                |
| <b>Park-and-Ride facility</b>  |                  |  |                                 |                                     |                                 |                     |
| Without mitigation             | Local            | VR: Long term<br>OB: Briefly, regular. | VR: Medium<br>OB: High          | VR: Definite<br>OB: Highly probable | VR: Medium<br>OB: Medium        | Medium              |
| With mitigation                | Local            | VR: Long term<br>OB: Briefly           | VR: Low<br>OB: Low              | VR: Highly probable<br>OB: Probable | VR: Low<br>OB: Low              | Medium              |
| <b>Resort development</b>      |                  |  |                                 |                                     |                                 |                     |
| Without mitigation             | Local            | VR: Long term<br>OB: Briefly           | VR: High<br>OB: Low             | VR: Definite<br>OB: Probable        | VR: High<br>OB: Low             | Medium              |
| With mitigation.               | Local            | VR: Long term<br>OB: Briefly           | VR: Medium<br>OB: Insignificant | VR: Definite<br>OB: Improbable      | VR: Medium<br>OB: Insignificant | Medium              |

## CONCLUSION

This assessment looked extensively into the visual impact of the proposed Radisson Blu Safari Resort and its different components. It was found that the proposed development will cause highly significant impacts on the visual resource mainly due to the drastic changes to the landscape character on the site where it is proposed. This is attributed to the loss in vegetation and the addition of uncharacteristic elements.

The vegetation cover proved to have a significant affect on concealing the proposed development from sensitive viewers or vantage points. At most, partial views of the Park-and-Ride facility will be visible from the Malelane Gate and from Pestana Kruger Lodge. It is highly unlikely that the resort development will be visible from tourist routes passing the site, but a part of it will be visible from the sugar cane farm. The limited visibility of the additional buildings plays a substantial role on the intensity and probability of the impact on the identified observers.

The visual specialist is confident that with the implementation of the mitigation measures the visual impact on the both the visual resource and the observers can be reduced to acceptable levels.

<sup>2</sup> There is a distinction made between impacts on the Visual Resource (VR) and on Observers (OB). In most of the cases the visual resource will experience major impacts on its character, but due to the high screening capacity of the landscape, observers will have limited views of these changes.

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## LIST OF ABBREVIATIONS

|     |                                 |
|-----|---------------------------------|
| DEM | Digital Elevation Model         |
| EIA | Environmental Impact Assessment |
| EIR | Environmental Impact Report     |
| GIS | Geographical Information System |
| KNP | Kruger National Park            |

|          |                                 |
|----------|---------------------------------|
| PPP      | Public Private Partnership      |
| SANParks | South African National Parks    |
| VAC      | Visual Absorption Capacity      |
| VIA      | Visual Impact Assessment        |
| ZMVE     | Zone of Maximum Visual Exposure |
| ZVI      | Zone of Visual Influence        |

## 1 INTRODUCTION

I-escape was appointed by Cradle of Malelane (Pty) Ltd to compile a Visual Impact Assessment (VIA) report for the proposed Radisson Blu Safari Resort. The project entails the construction and operation of a 240 bed hotel with a four star rating inside the Kruger National Park (KNP) near Malelane Gate. The project is part of a Public Private Partnership (PPP) Agreement between the client, Cradle of Malelane (Pty) Ltd and the state enterprise, South African National Parks (SANParks) (Figure 1).

A VIA is a specialist study that assesses the potential visual changes/impacts to an existing baseline setting resulting from the implementation of a proposed project. The associated visual changes could potentially impact on the character and value of the landscape and affect the views and perceptions of observers in the study area. The purpose of the study is to determine the significance of the changes/impacts and to recommend mitigation measures where the impacts are considered unacceptably negative.

## 2 OBJECTIVES AND METHODOLOGY

### 2.1 VIA OBJECTIVES

The objectives will be to:

- Address the concerns that are raised during public participation events which relates to aesthetic or any visual aspects;
- Determine the impact on the observers in the study area and the landscape character due to the change in the visual characteristics of the environment; and
- Recommend mitigation measures to alleviate or reduce the anticipated impacts.

### 2.2 VIA METHODOLOGY

The above objectives will be met through the implementation of the following methodology:

- 1) **Delineation of Study Area:** Determine the extent of the study area and its comprising features;
- 2) **Project Description:** Describe the type, scale and visual characteristics of the proposed project;
- 3) **Visual Resource Assessment:** Assess the value of the visual resource based on its aesthetical appearance and public appreciation and establish a baseline environmental condition;
- 4) **Visual Impact Assessment:** Determine the sensitivity of the receptors and assess the significance of the potential visual impacts; and
- 5) **Mitigation Measures:** Propose mitigation measures to alleviate or completely eliminate the potential impacts that are identified.

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### **3 LIMITATIONS AND ASSUMPTIONS**

This section provides a clear understanding of the limitations and assumptions that negatively affects the accuracy of the assessment and influences the confidence of the visual specialist in his professional judgement.

- A Visual Impact Assessment is not a purely objective science and often integrates qualitative evaluations based on human perceptions. It is the visual specialist's intention to utilise as much quantitative data as possible to substantiate professional judgement and to motivate subjective opinions;
- Two separate field investigations were completed during the months of February and April 2011 and the photographs used in the report portray the general character of the study area in the summer and autumn. The study area experienced good rain and the vegetation was extremely lush. In a certain sense this is considered a constraint. The winter scenario is expected to be much different and the visual penetration into the bush may be significantly further, thus increasing the Zone of Visual Influence (ZVI). This variation in ZVI between the different seasons can not be assessed in thorough due to time and budget constraints;
- During the field investigations access could not be gained into Leopard Creek Estate and Pestana Kruger Lodge to assess the visibility of the Park-and-Ride facility. The visual specialist is of the opinion that he has sufficient information to make informed assumptions regarding the visual impact on these visual receptors;
- Limited information is available regarding the construction phase. Section 7 & 8 address the construction phase and list the assumptions that were made;
- In most VIA studies it is standard procedure to make use of visibility mapping/viewshed analysis to determine the potential visibility of an object in a study area. This is achieved through a computer software package which creates a three-dimensional landscape model based on the available contour data. From here it calculates the visibility of an object based on the topographical variation in the landscape alone. This method of visibility mapping is not considered 100% accurate and disregards land cover (e.g. vegetation) in its analysis and its affect on visibility. In addition, accuracy is often compromised by the use of >20 m contour interval data. Considering the sensitivity of the project and the need for accurate quantitative data, the visual specialist did additional visibility tests by using helium weather balloons placed at the heights and the locations of various key buildings. The method and findings are further described in Appendix 1; and
- The realignment of the Rhenosterkoppies Road (S114) and the layouts of the Resort and Park-and-Ride facility changed to some degree after the visual specialist completed his field work. Due to time and budget constraints it was not possible to return to the site and to reassess the affect it would have on visibility. In order to complete the VIA certain assumptions were made and will be discussed in the applicable sections.

### **4 ALTERNATIVE SITES**

In recent years SANParks explored different avenues of generating income. One of their ventures is the expansion of the tourism trade by making various Public Private Partnership (PPP) opportunities available to reputable eco-tourism operators. The Malelane Hotel Development became available and went through a bidding process. During the bidding process, five initial sites

were identified as potential sites for such a development. The client won the bid to develop on the site known as “Site 2” (Figure 1).

As part of the Environmental Authorisation requirement, all alternative sites need to be addressed. Considering that the bid was assigned to the client based on their proposal for “Site 2”, this section will only briefly discuss the other sites and the potential issues should a similar kind of development occur on it. No designs or layouts have been prepared for the other sites, therefore making this exercise purely theoretic. The remainder of the report will focus on the impacts associated with “Site 2”.

Site 1 is located approximately 5 km from the Malelane Gate on the Malelane Road at the point where the Matjulu tributary converges with the Crocodile River. The site is fairly pristine, although remnants of demolished buildings are present. The dominant features of the site are the views onto the Matjulu tributary and the Crocodile River as well as the large trees on the river banks. Site 1 is not far from the Rhenosterkoppies Road (S114), a gravel road which is open to the public for game viewing. The S114 is across the Matjulu tributary from the site within a distance of 300 m. Although the vegetation is reasonably dense, this distance is not considered great enough to rely on the vegetation cover for absolute screening. In addition, some of the buildings are expected to exceed the height of the vegetation cover, making it visible to tourists on the S114 and possibly from Malelane Road at the Matjulu bridge-crossing. Residents/visitors at Leopard Creek Estate on the opposite side of the Crocodile River are also expected to have partial views of a development in this area. The degree of visual exposure could result in negative visual intrusions on the views of the affected viewers.

Site 3 is located on the southern side of the Malelane Gate and overlooks the Crocodile River. The vegetation is typical of the area with fairly large trees on the river banks, becoming more savannah-like further away from the river. The savannah vegetation provides limited screening for buildings higher than one storey. Tourists, entering the KNP over the bridge and residents/visitors to Pestana Kruger Lodge will have fairly clear views of a two- or more storey development situated in this area. Vegetation screening is limited which allows for partial views. The visual exposure is considered to be very high with a significant degree of visual intrusion on the views of the affected visual receptors.

Site 4 is located on the northern side of the Malelane Gate, approximately 600 m from the bridge crossing over the Crocodile River. Vegetation is relatively sparse and the site has a limited screening capacity. A development on this site will be clearly visible from Leopard Creek Estate and tourists crossing the bridge before arriving at the Malelane Gate may also have partial views of a development. The negative visual intrusion is expected to be unacceptable and very difficult to mitigate.

Site 5 is between Site 4 and the Malelane Gate, right adjacent the existing staff housing. The scenario is fairly similar to Site 4 except that the location is closer to the bridge and tourists visiting the KNP may have increased visibility of a development. This site is regarded inappropriate due to the significant visual intrusion and the difficulty to mitigate the visual impacts.

## **5 STUDY AREA**

The study area, which includes all visible elements and its social context, is considered a visual resource regardless of its current or future character. As a visual resource the study area has a certain value which will be discussed in the following section. It is important to realise that the study area is perceived by different humans who base their subjective opinions on their experience and therefore attach a varying degree of value to the visual resource. Before the value of the visual resource can be assessed the limits of the study area must be determined.

To determine the extent of the study area the scale of the project and the potential Zone of Visual Influence (ZVI) is considered. The ZVI is determined through a visibility calculation in a Geographical Information System (GIS) software package and calculates the areas which will have a direct line-of-sight to a specific project element (Refer to Appendix 1). The factors that most significantly influence the ZVI are topographic variation and land use/cover which could potentially screen the proposed project from certain viewpoints. These factors also contribute to the prevailing landscape character which establishes the context in which the project is proposed (Figure 2 - Figure 5).

The study area has been defined as the area including the Park-and-Ride facility, the resort site and the roads connecting the two sites. From here a 5 km radius is drawn to include all areas where a potential visual exposure may occur. A 5 km zone is considered more than sufficient as visibility of most objects over such a distance is greatly reduced, mostly to a negligible degree.

The study area is renowned for its exceptionally pristine wilderness character. For nearly a century the KNP is a protected area and boasts a rich collection of fauna and flora, typical of Southern Africa. The southern part of KNP is considered the most popular tourism destination of the entire park. This can be attributed to the ease of accessibility, the concentration of visitor camps in the south and a high biodiversity.

In order to have a full understanding of the study area's landscape character and its aesthetic value, a comprehensive Visual Resource Assessment is conducted in Section 6.

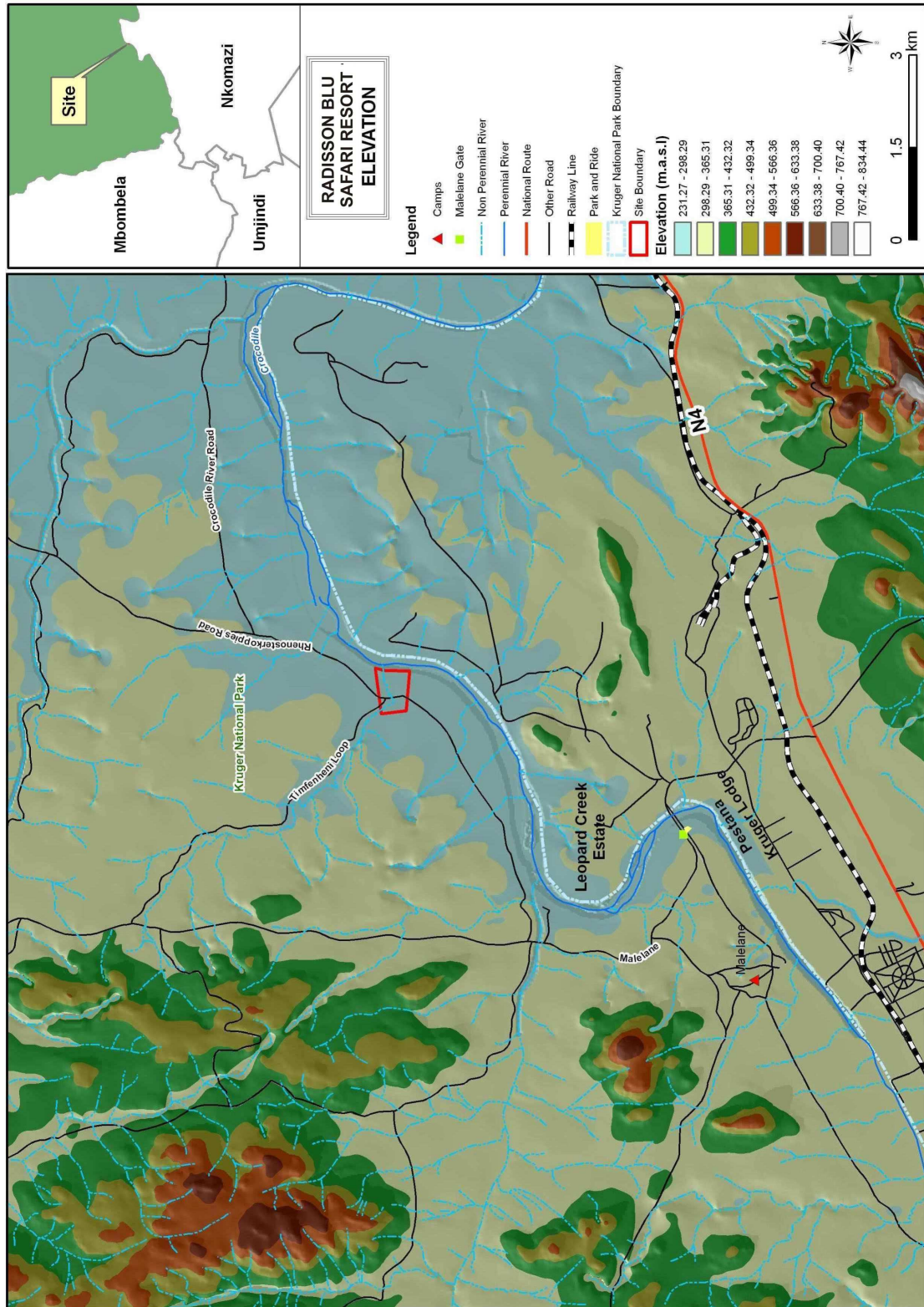


Figure 2: Elevation model





Figure 3: Photo plate 1





Figure 4: Photo plate 2

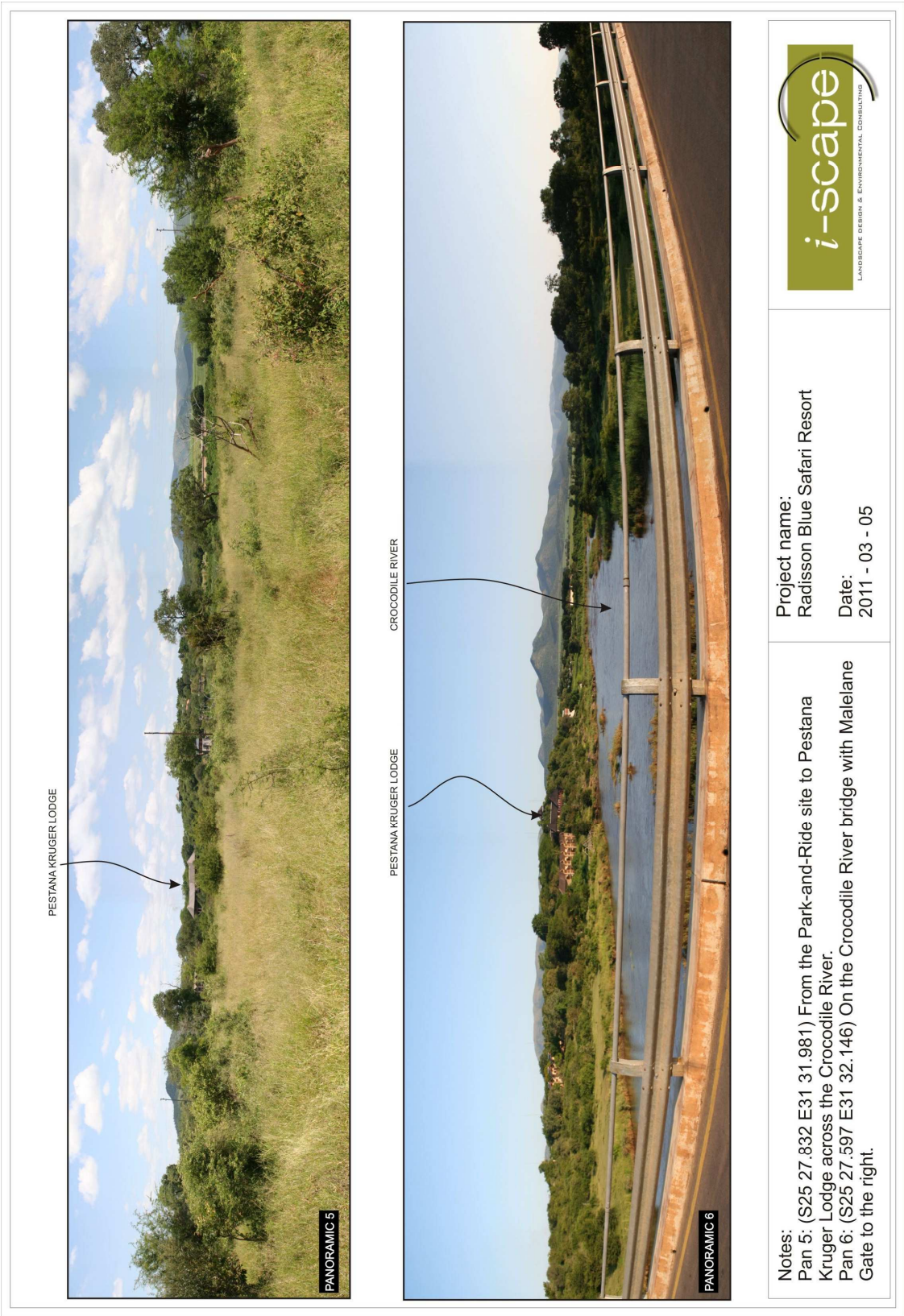


Figure 5: Photo plate 3



## **6 VISUAL RESOURCE ASSESSMENT**

### **6.1 INTRODUCTION**

Globally, pristine natural environments are severely under pressure and a very small percentage of untouched ecosystems remain. Unfortunately, it is only in the last century that the concept of conservation gained momentum which resulted in the proclamation of national parks and/or protected areas in South Africa. The Kruger National Park is one such case and since its proclamation in 1926 has become an iconic example of nature conservation and eco-tourism.

Pristine natural environments are considered finite visual resources due to the pressures of modern day development and ecosystem destruction. Similar to other natural resources, a visual resource has a value to a group of people/observers, in this case an aesthetic value. An aesthetic value is a qualitative value with an underlying social, cultural and/or ecological connotation. Aesthetic value can be further described as the degree of appreciation of the quality associated with a visual resource and refers to the sensory experience one has when exposed to the perceivable qualities of a visual resource.

The following question may be asked; “What are the factors that contribute to the value of a particular visual resource and which leads to its appreciation?” An answer lays in the concept of Visual Resource Assessment (VRA) which is derived from environmental management practices. It can be argued that the approach to assessing the value of a visual resource is rather bio-centric, implying that the aesthetic quality of a landscape is often “measured” in terms of its ecological and biological excellence. It has however been verified through empirical research that a relation does exist between a landscape’s aesthetic value and/or appreciation, and the intactness of its natural features (i.e. trees, water bodies, mountains, etc.). Further research into this matter has concluded that the value of a visual resource to a nation, a community or a specific individual can be assessed in a rather clinical manner by discussing the following parameters:

- Ecological, social and/or cultural aspects of importance;
- Scenic quality; and
- Sense of place (Genius loci).

Although other evaluation models exist, these parameters are considered adequate to gain an understanding of the value of this visual resource in which the development is proposed. The following sections will discuss and evaluate each parameter on its merits.

### **6.2 ECOLOGICAL, SOCIAL AND/OR CULTURAL IMPORTANCE**

The value of a visual resource is assessed on three different scales, namely:

- International (e.g. World Heritage Sites, Trans Frontier Parks);
- National (e.g. National Parks or designated wilderness areas, characterised by exceptional beauty); and
- Regional (e.g. Conservation areas or historic buildings bearing importance for towns or local communities).

The KNP is considered a visual resource of international, national and regional importance. Since the signing of an international treaty between South Africa, Mozambique and Zimbabwe in 2002, a

process is in place to proclaim the Greater Limpopo Trans Frontier Park and so making it the largest conservation area in Africa, joining three countries.

The KNP was the first national park to be established in South Africa. It is a showroom for biodiversity and is the most visited national park in South Africa. Approximately 1 million tourists visit the park annually and is therefore a great economic injection for the region.

The main tourist attraction is the pristine natural environment coupled with the extraordinary emotional experience brought about by the anticipation and excitement of viewing the fauna and flora in their natural habitat. Therefore, the ecological importance of the park is rated extremely high. Without the biodiversity and the wilderness character, the KNP is sure to lose its original appeal.

The KNP is also part of South Africa's natural and cultural heritage and speak of times, not so long ago, when animals freely roamed the landscape which, at such time, was sparsely colonised. A survival battle was fought; strangely it was the humans and their livestock that were under threat from free roaming carnivores. This had a profound impact on, for example village construction, lifestyles, etc. Unfortunately it is the natural environment that is threatened by over-development and exploitation in the modern era.

### **6.3 SCENIC QUALITY**

Through sensory experience we link a psychological value to a perceived landscape. The ability to perceive and mentally interpret the scene of a landscape can be understood in terms of analysing physiological and psychological processes. To explain further, from the point where the eye is stimulated by the light that enters through the cornea, the mind interprets the scene, analyses the different stimuli and arrives at a point where it can cognitively formulate an opinion about the scene that is viewed.

It is important to note that each person's psychological value will differ due to the vast differences in cultural backgrounds, historic experiences and knowledge of a specific landscape, to mention but a few<sup>3</sup>. Despite the differences in human opinions, research has indicated commonalities in perceptions with regards to scenic quality. The model used here to determine scenic quality, is derived from the Bureau of Land Management (BLM), U.S Department of the Interior. The following seven fundamental factors are evaluated:

- Landform;
- Vegetation;
- Water;
- Colour;
- Influence of adjacent scenery;
- Scarcity; and
- Cultural Modifications.

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<sup>3</sup> Research has shown that age, gender, profession, etc. also play a role in the formulation of an opinion of a landscape.

These seven factors are evaluated according to a scenic evaluation rating system adopted from the BLM. Table 1 provides a description of the seven factors in terms of a high, medium or low classification. Table 2 & Table 3 provides a score for each classification by which the **study area** and **site** are evaluated individually (the highlighted cells reflect the score for each factor). The values of the cells are added and the assessment concludes with the comparison of the final value to the following scenic quality categories:

- High = 19 or more;
- Moderate = 12 – 18; and
- Low = 11 or less.

The site is rated separately from the study area in order to reach an understanding as to what the role of the site is in contributing or detracting from the overall scenic quality of the study area.

**Table 1: Description of scenic evaluation ratings**

(Source: Bureau of Land Management)

| Key Factors                   | High  | Medium  | Low  |
|-------------------------------|---|---|--|
| Landform                      | High vertical relief as expressed in prominent cliffs, spires or massive rock outcrops. Severe surface variation or highly eroded formations. Detail features which are dominant and exceptionally striking and intriguing. | Interesting erosion patterns or variety in size and shape of landforms. Detail features which are interesting though not dominant or exceptional. | Low rolling hills, foothills or flat valley bottoms. Few or no interesting landscape features. |
| Vegetation                    | A variety of vegetation types as expressed in interesting forms, textures and patterns.   | Some variety of vegetation, but only few major types.   | Little or no variety or contrast in vegetation.  |
| Water                         | Clear and clean waterbodies, still or cascading white water, any of which are a dominant element in the landscape.  | Flowing or still but not dominant in the landscape.   | Absent, or present but not visible.  |
| Colour                        | Rich colour combinations. Variety or vivid colours. Visually appealing contrasts in the soil, rock, vegetation or water.  | Some intensity of variety in colours and contrast of the soil, rock and vegetation, but not dominant scenic elements.                             | Subtle colour variations, contrast or interest. Generally muted colour tones.                  |
| Influence of adjacent scenery | Adjacent scenery greatly enhances scenic quality.   | Adjacent scenery moderately enhances overall scenic quality.  | Adjacent scenery has little or no influence on overall scenic quality.                         |
| Scarcity                      | One of a kind, unusually memorable or very rare within the region. Consistent chance for exceptional wildlife or wildflower viewing, etc.   | Distinctive, though somewhat similar to others within the region.   | Interesting within its setting, but fairly common within the region.                           |
| Cultural modifications        | Modifications add favourable to visual variety while promoting visual harmony.  | Modifications add little or no visual variety to the area and introduce no discordant elements.   | Modifications add variety but are discordant and promote disharmony.                           |

### 6.3.1 SCENIC EVALUATION – STUDY AREA

Table 2: Scenic evaluation chart for the study area

| Key Factors                   | High      | Medium | Low |
|-------------------------------|-----------|--------|-----|
| Landform                      | 5         | 3      | 1   |
| Vegetation                    | 5         | 3      | 1   |
| Water                         | 5         | 3      | 0   |
| Colour                        | 5         | 3      | 1   |
| Influence of adjacent scenery | 5         | 3      | 0   |
| Scarcity                      | 5         | 3      | 1   |
| Cultural modifications        | 2         | 0      | -2  |
| <b>Total</b>                  | <b>28</b> |        |     |

The scenic quality of the study area is considered exceptionally high, mostly due to the pristine natural character emphasised by the presence of hills, rivers and associated vegetation which include majestic trees on the river banks. These features harmonise to create a continuous visual unit of natural beauty. As one enters the park, you become absorbed in the wilderness and the anticipation of spotting a predator or other eye-catching animals. It is surprising how tame the wild animals appear and provides the opportunity to witness their natural behaviour up close.

The Crocodile River is a geographical division between conserved and unprotected areas (Figure 3). The original character of the Crocodile River basin has been altered by agricultural activity and estate developments along the river. The resort site, inside the KNP, is free of major human interventions and a sparse road network and the occasional signage are the only elements that remind one of the developed world. Malelane Gate and the ancillary infrastructure surrounding it can be considered relatively intensely developed but are to be expected. The architectural “language” of the buildings is non-intrusive and provides the necessary gateway through which visitors enter the KNP.

The south-eastern part of the study area, outside the borders of the KNP, is predominantly sugar cane plantations with the exception of Leopard Creek Estate and Pestana Kruger Lodge (Figure 5). Dense riverine vegetation greatly limits visual connections to the developments on the fringes as one travel on the designated tourist roads inside the KNP. One subconsciously prefers not to see or remember the developments on the fringes of the KNP in order to enjoy the absolute wilderness experience.

### 6.3.2 SCENIC EVALUATION – RESORT SITE

Table 3: Scenic evaluation chart for the resort site

| Key Factors                   | High      | Medium | Low |
|-------------------------------|-----------|--------|-----|
| Landform                      | 5         | 3      | 1   |
| Vegetation                    | 5         | 3      | 1   |
| Water                         | 5         | 3      | 0   |
| Colour                        | 5         | 3      | 1   |
| Influence of adjacent scenery | 5         | 3      | 0   |
| Scarcity                      | 5         | 3      | 1   |
| Cultural modifications        | 2         | 0      | -2  |
| <b>Total</b>                  | <b>21</b> |        |     |

The resort site is an integral part of the study area. Although it is a relatively small portion of the study area, it contributes to the continuous visual unit of uninterrupted natural vegetation and wilderness on the western side of the Crocodile River. The site is however on the boundary of the KNP and the adjacency of the sugarcane fields blemishes the wilderness character to some degree. One is reminded of how vivid the division can be between development and untouched nature (Figure 3 & Figure 4).

The resort site is located at the confluence of the Crocodile River and the Timfenheni tributary, an intermittent stream. The Timfenheni tributary is mostly a dry river bed, but can have water during wet seasons. Both watercourses are lined with large trees and dense riverine bushes. The view over the meandering Crocodile River is especially scenic and animals regularly come down to the river.

The topographic relief is fairly limited compared to that of the study area. The site gently slopes down towards the Timfenheni and Crocodile River with the exception of a few parallel ridges creating slight vertical drops (Figure 2). The evenly sloped topography and dense vegetation cover, limits one's ability to have expansive views of the landscape.

Despite the negative influence of adjacent scenery, the resort site is still considered to have a high visual quality and scores a rating of 21.

## **6.4 SENSE OF PLACE**

Sense of place (*genius loci*) can simply be described as the prevailing ambience brought about through the co-existence of the elements in the landscape. It is often an emotional experience that a place brings when one is exposed to its qualities. In this definition two essential requirements for an appreciation of sense of place are identified. Firstly, it must be a person experiencing the emotion or sensation and secondly, it must be a place being experienced. (Barnard et al, 2006)

Not all places have the same significance in its sense of place. According to Prof Quek in his study of *Sense of Place in Architecture, a Discourse on Architecture and Cities*, two characteristics are common in all areas that have a significant sense of place:

- A unique identity of a place/landscape – unique features, in some cases the rarity of a feature adds a deeper dimension to the value of the feature.
- The humanity of a place/landscape – The past and present interaction between a place and people. (Barnard et al, 2006)

The prevailing sense of place in the study area is very strong and evokes a sense of tranquillity, mixed with excitement. The mere movement through the gates into the KNP is literally an emotional threshold. On the one side, one is exposed to the typical scenes of highways, residential estates and agricultural development. This sets you at ease, as it is familiar. As one crosses through the gate, a primal fear awakes in your conscious mind. The experience of absolute wilderness evokes a distant memory from when the human was just as vulnerable as a young Impala calf. From here on the intactness of an ecosystem and the symbiotic existence of fauna and flora amazes one and the excitement of game spotting grips your attention.

The KNP is a historic landscape and greets you with scenes also experienced by explorers and natives, centuries ago. The pristine natural environment and intactness of ecosystems create a picturesque landscape and one is filled with a sense of awe and respect. The exceptional qualities of the natural landscape are memorable and imprint a vivid image in the mind of a visitor.

## **6.5 CONCLUSION**

The Visual Resource Assessment describes the value of the study area as a visual resource based on its appreciation, scenic quality and sense of place. It provides insight into the qualities of the landscape and its importance to observers.

From the assessment it becomes evident that the study area is highly appreciated for its ecological intactness and exceptional scenic qualities. The tourism industry is solely dependant on the pristine ecological and aesthetic quality of the KNP, of which the study area forms part. This enforces the value of the landscape on an international, national and regional scale.

The sense of place contributes significantly to the value of the visual resource. One's senses are heightened and the excitement almost tangible as one enters the KNP. This is surely a memorable experience.

The visual resource is regarded highly sensitive and vulnerable. Physical changes to the character of the visual resource will impact on the scenic qualities and possibly affect the sense of place. The remainder of the study will look into the impact of the proposed project on the visual resource and the observers experiencing it.

## **7 PROJECT DESCRIPTION**

The project entails the construction and operation of a 240 bed hotel development inside the Recreational Opportunity Zoning (ROZ) section of the KNP Management Plan (Figure 6). The project also includes a Park-and-Ride facility next to the Malelane Gate from where guests will be transported via safari vehicles to the hotel complex (Figure 7). Realignment and upgrading of a section of the Rhenosterkoppies Road (S114) will also be required (Figure 9).

Since the initiation of the project the client prepared several layouts for the hotel complex which responded to specialist concerns. One of the issues that were raised very early in the EIA process was the visibility of the most western family rooms from the new and existing roads. Since, the client has realigned the road further away from the resort and reduced the number of family rooms along the Timfenheni tributary, as indicated in Figure 6.



Figure 6: Resort layout





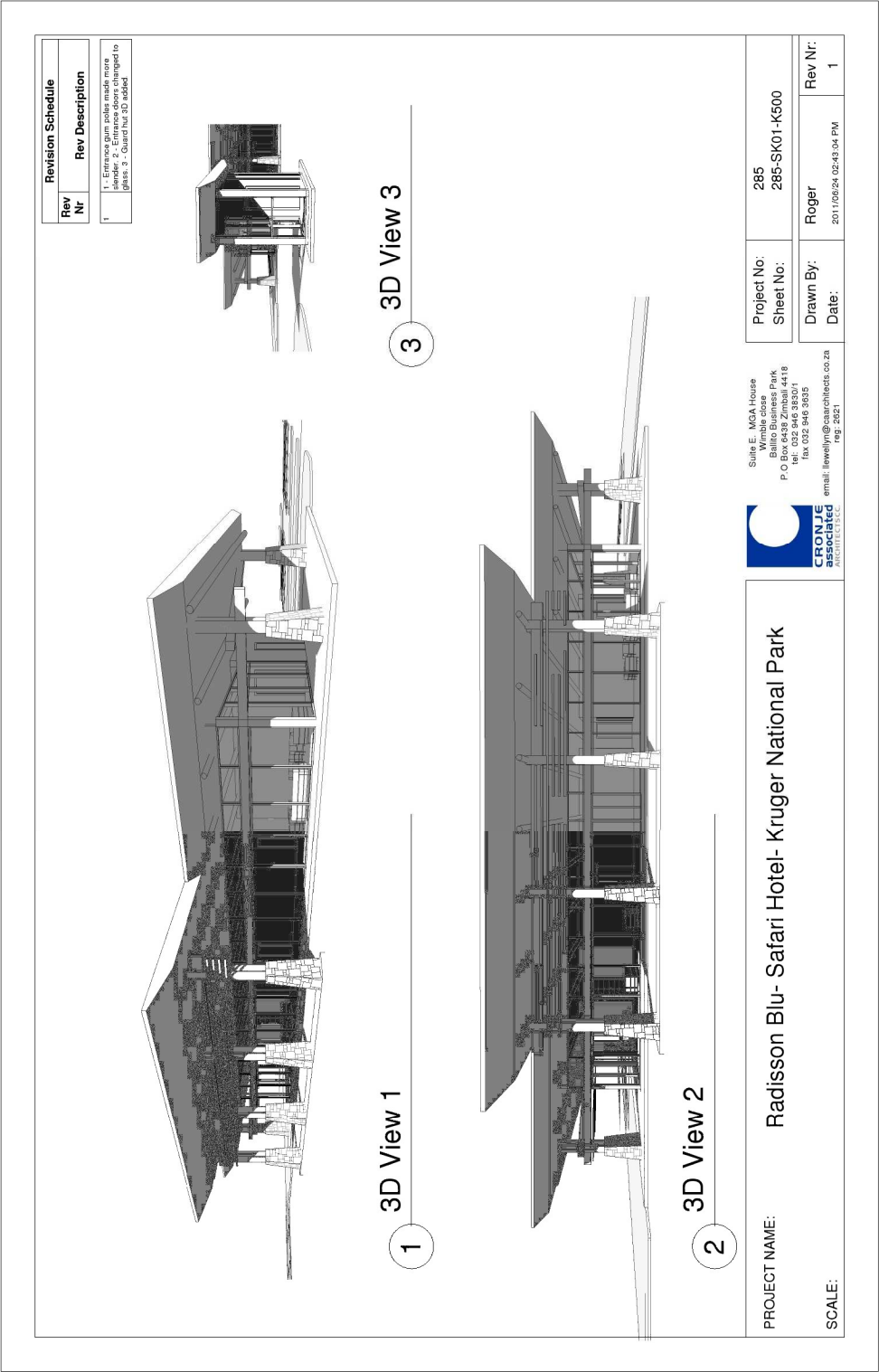
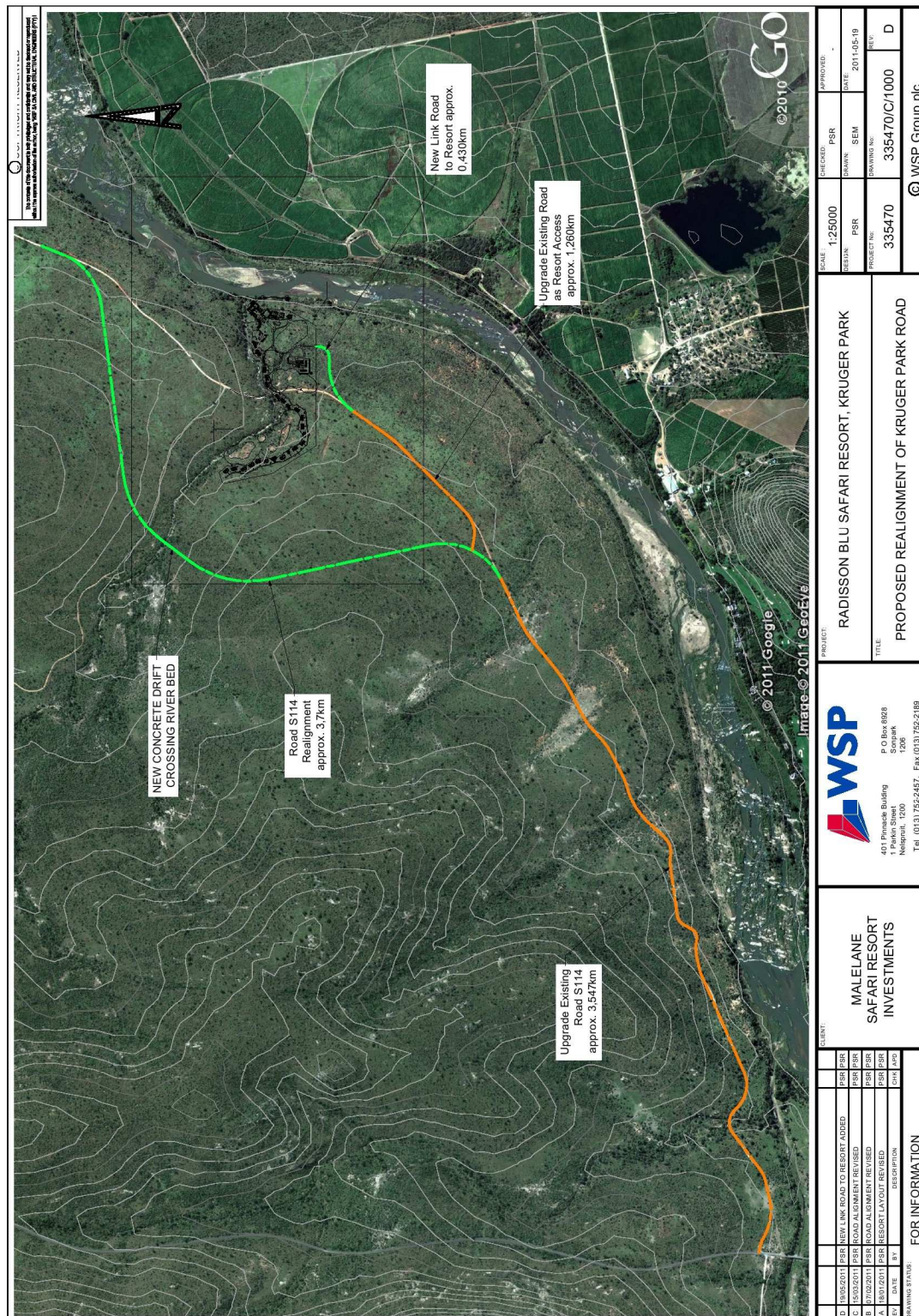


Figure 8: Park-and-Ride Facility - Perspective



Project Name: Radisson Blu Safari Resort – Kruger Park  
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**Figure 9: Road re-alignment**

## **7.1 RADISSON BLU SAFARI RESORT**

The proposed hotel development consists of various units, each with its individual function. There was a deliberate effort by the design team to move away from large, bulky buildings, typically associated with hotels, and instead propose smaller, loose-standing units. The result is a linear arrangement of hotel rooms along the Timfenheni tributary and the larger main buildings along the Crocodile River (Figure 6)<sup>4</sup>. The maximum building height will be limited to two storeys and all buildings will consist of a mono-pitch roof. None of the buildings are expected to exceed 6.5 m in height of which the main lodge building will be the highest.

The architectural style can be described as contemporary that uses materials and elements that are derived from and inspired by the context. Natural elements such as timber and stone cladding will be used extensively on the façades in combination with glass and steel. The colour palette ranges between browns and beiges typically associated with “earthy” tones. No extensive landscaping will be done and the natural vegetation will be preserved or replanted where disturbances occurred during construction.

## **7.2 PARK-AND-RIDE FACILITY**

The Park-and-Ride facility will be located south of the existing Malelane Gate just off the access road leading up to the gate. The Park-and-Ride will essentially be a parking area where guests of the Radisson Blu Safari Resort will be welcomed and will leave their vehicles and be transported to the resort complex. The facility will operate 24 hours a day and will consist of an entrance gate with security house, welcoming centre and carports for approximately 150 vehicles (Figure 7 & Figure 8).

The guard house and welcoming centre resembles the architectural style that is proposed for the resort. Glass, steel and presumably similar stone cladding with a mono-pitch roof are proposed. The carports will be simple timber structures with timber slats as roof covering. In addition, the western and southern border of the Park-and-Ride facility will feature a 1.5 m high earth berm with the purpose of screening vehicle lights. The berm will presumably be rehabilitated or landscaped to merge with the natural vegetation.

## **7.3 REALIGNMENT OF THE S114**

The existing S114 is a public gravel road teeing off from the Malelane Road and following the Crocodile River for a few kilometres. It crosses through the proposed resort site and over the Timfenheni tributary. It has been proposed to realign a section of the S114 around the hotel development. It will pass west of the site, intersecting with the Timfenheni Road (S121) and reconnect with the existing S114 approximately 1 km beyond the site. The entire length of the road will be approximately 3.7 km.

The section of the road between Malelane Road and the resort will also be upgraded which essentially entails grading and possible resurfacing. It will still remain a gravel road (Figure 9).

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<sup>4</sup> The graphics at the bottom of the layout plan are computer renditions of the proposed development and were provided by the client.

## **7.4 CONSTRUCTION PHASE**

Limited information is currently available regarding the construction processes of the project. The information that is reflected in the following paragraphs is general construction procedures, commonly associated with projects of this nature.

The following basic construction phases are expected to occur in no particular order:

- Establishment of construction camp/s;
- Survey and pegging of site and road diversion;
- Erection of a perimeter fence;
- Bulk earthworks and site levelling;
- Realignment and upgrading of the S114;
- Installation of services, roads, electricity, water, etc.;
- Construction of buildings; and
- Landscaping and/or rehabilitation.

The duration of the construction phase is unknown at this stage. The engineers have indicated that the road construction may take 3-4 months. It is assumed that the S114 realignment and upgrading will be done first, prior to construction of the rest of the project. In doing this the tourist route will be diverted around the resort construction site and will have the least impact on viewers. The construction of the resort and Park-and-Ride facility may run in parallel for an indeterminate period of time.

Whether the construction personnel will stay in temporary construction camps, is unknown at the time of this assessment. In order to consider the worst-case-scenario it is assumed that a construction village will be erected with tents, site offices and ablution facilities. A construction camp is usually a cleared and fenced area where temporary facilities are located and construction materials are stockpiled. Due to its temporary nature and practical function, aesthetic consideration is often less of a concern which could result in an unsightly terrain.

The construction phase will typically involve the operation of construction equipment and - personnel and include earthworks and the actual construction of the facilities. The initial activities will include the installation of bulk services such as roads, water, etc. The buildings begin with the laying of foundations and the construction of the general steel or column frames. Once this is in place the buildings will gradually gain form and height with the roof being the final structural addition. The finishes and interiors will be the final step before completion.

## **7.5 OPERATIONAL PHASE**

The operation of the Radisson Blu Safari Resort will include a 24 hour shuttle service for guests from the Park-and-Ride facility to the resort, guided game drives and the general management of the resort and entertainment of the guests. Furthermore, the resort provides numerous public entertainment areas such as a communal swimming pool, a wellness centre, conference facilities, etc.

These areas and facilities will be lit at night. No technical lighting information was made available to the Visual Specialist at the time of the assessment. Considering the sensitivity of the location and the restrictions that are provided in the PPP agreement (refer to Appendix 3), it can be

assumed that all outdoor lighting will be low-level lighting. This will be discussed further in Section 8.3.1 where proactive mitigation measures will be proposed.

## 8 VISUAL IMPACT ASSESSMENT

The following typical and general visual impacts can be expected as a result of the construction and operation of the proposed project:

- The project activities or components noticeably change the existing features or qualities of the landscape;
- A project introduces new features which are uncharacteristic or in contrast with the existing character of the landscape; and/or
- A project removes or blocks aesthetic features of the landscape which subsequently affects the aesthetic value of the visual resource.

To assess these impacts, the following criteria will be used:

### 8.1 CRITERIA OF ASSESSMENT

Within the study area, specific observers experience different views of their environment and therefore value it differently. They will be affected by the proposed project because of alterations to the environment/landscape or specific elements in the landscape which will influence their views.

The significance of this change/impact is a function of:

- The intensity of the impact;
- The sensitivity of the observer which is impacted on; and
- The exposure of the observer to the impact.

#### 8.1.1 INTENSITY OF IMPACT

The intensity of an impact is a measure of how severe a particular impact is considered to be. It can be described according to scale and extent, but human perceptions also play a role.

- **Scale** refers to the size of the project/development relative to the context it is situated in. For example, a four storey shopping centre in a typically residential suburb will be considered large and out of scale;
- **Extent** refers to the Zone of Visual Influence (ZVI) of the particular project/development and the coverage relative to the study area. This is determined through visibility analysis and is addressed in Appendix 1; and
- **Human perceptions** are for all practical reasons subjective, but are considered a valuable indication as to how people respond to a proposed project. Often the general acceptance or non-acceptance of a project/development will come out in Public Participation events during the EIA process. Up to date, numerous parties have highlighted their concerns regarding the proposed development. Relatively few of the concerns relate directly to the visual impact but some did raise the issue of the potential impact on the character and sense of place.

##### 8.1.1.1 Visual Absorption Capacity

The intensity of an impact is often mitigated by the inherent Visual Absorption Capacity (VAC) of the landscape to absorb changes or to screen the impacts. The VAC of a landscape refers to the



robustness of its character and its resulting ability to tolerate changes from a particular intervention without detrimental effects to its original qualities and/or values.

A landscape with a high capacity may have one or more of the following attributes:

- A high screening capacity which screens views from sensitive vantage points;
- Is often intensely developed or transformed by exploitive human activities and therefore has a low value and scenic quality as a baseline condition to start with;
- Has characteristic land uses that are compatible with the proposed project; and/or
- Has a low concentration of valued attributes or its attributes are of a low value.

On the other end of the scale, a landscape with a low capacity may:

- Be an open or exposed landscape with few topographic or surface features that can act as visual screens from sensitive vantage points;
- Comprises of land uses that are incompatible with the proposed project; and/or
- Has a very high concentration of valued attributes or its attributes are of a high value.

### 8.1.2 SENSITIVITY OF OBSERVERS

The observers in the study area can be separated in three general categories namely tourists, residents and employees. The categorisation implies that the observers in that particular category will experience and appreciate the visual resource in a fairly similar fashion and will therefore have a similar sensitivity.

The sensitivity of an observer is related to the value an observer has for the particular visual resource being impacted on. To determine viewer sensitivity a commonly used rating system is utilised. This is a generic classification of observers and enables the Visual Specialist to establish a logical and consistent viewer sensitivity rating for viewers who are involved in different activities without engaging in extensive public surveys.

**Table 4: Viewer Sensitivity**

| <b>VIEWER SENSITIVITY</b> | <b>DEFINITION</b><br>(BASED ON THE LANDSCAPE INSTITUTE, 2002 ED PP90-91)  |
|---------------------------|---|
| <b>Exceptional</b>        | Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features.  |
| <b>High</b>               | Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape;<br>Communities where the development results in changes in the landscape setting or valued views enjoyed by the community;<br>Residents with views affected by the development;<br>People generating an income from the visual resource or pristine quality of the environment. |
| <b>Moderate</b>           | People engaged in outdoor sport or recreation (other than appreciation of the landscape);<br>People commuting between work place and home or other destinations.  |
| <b>Low</b>                | People at their place of work or focussed on other work or activity;<br>Views from heavily industrialised or blighted areas.  |

Visitors/tourists are regarded as visual receptors of exceptionally high sensitivity. Their main reason for visiting KNP is to experience and enjoy the pristine natural environment and the rich



biodiversity. Also, the visitors have a very high expectation in terms of the scenic quality. Any changes to the conditions or failure to live up to their expectations, will impact on these visual receptors.

Members from the prestigious Leopard Creek Estate and Pestana Kruger Lodge are also regarded as visual receptors of exceptionally high sensitivity. The exclusive location and in particular the privilege of enjoying views into the KNP with the Crocodile River as a shared boundary, contributes to the sensitivity of the visitors/residents.

Employees of the sugar cane fields are considered to have a low sensitivity. By the nature of their work they are mainly outdoors and enjoy views into the KNP. During the site investigation it was noticed that the sugar cane plant can become a few meters high and limits one's view considerably. It is only when the fields are cleared or when travelling on the perimeter road directly adjacent the Crocodile River when you experience partial views of the KNP through the riverine vegetation.

### **8.1.3 EXPOSURE TO IMPACT**

An observer's exposure to an impact is influenced by a combination of the following aspects:

- Distance from the source of impact;
- True visibility of the project considering, screening, visual contrast and the decrease in visibility over distance (Refer to Appendix 1);
- Duration, i.e. sustained, temporary, intermittent exposure, etc; and
- Viewer incidence is a measure of determining the frequency and number of viewers viewing the potential impact. Due to a lack of quantitative data the rating is based on an arbitrary scale from high to low specifically designed for this project:
  - For a high viewer incidence to occur the development, or any part of it, should be visible to a large number of viewers or specific viewers will view it frequently;
  - A medium viewer incidence occurs if the development, or parts of it, is visible to an average number of viewers or specific viewers will view it less frequent but still often; and
  - A low viewer incidence occurs if the development, or parts of it, is visible to a limited number of viewers or specific viewers will view it seldom.

### **8.1.4 CRITICAL VIEWING AREAS**

For the purpose of this assessment, the project will be divided into three distinct components; the realignment of S114, the Park-and-Ride facility and the resort development itself. The following critical viewing areas have been identified as areas/vantage points where some degree of visual exposure is expected:

- **Realignment and upgrading of S114:**
  - On the S114 and S121 routes.
- **Park-and-Ride facility:**
  - At the Malelane Gate and the approaching roads over the Crocodile River and Malelane Road;
  - From Leopard Creek Estate; and
  - From Pestana Kruger Lodge.
- **Resort development:**

- On the S114 and S121 routes; and
- From the sugar cane fields.

## **8.2 VISUAL IMPACTS DURING CONSTRUCTION PHASE**

Visual impacts are likely to occur during the construction phase as a result of the associated activities on the individual sites. These activities include the operation of construction equipment and the construction of the structures. Visual impacts relating to surface disturbances are often the most significant. The removal of vegetation, site preparation and large scale earthworks scar the landscape and usually results into eyesores. Dust clouds may appear on windy days as earthmoving equipment engage into construction activities. Delivery vehicles and trucks will have to make use of the local road network to get to and from the sites, thereby increasing traffic between the Malelane Gate and the resort site.

A lack of detailed information does influence the confidence of the visual specialist to a degree. The following assumptions are made with respect to the construction phase:

- It is unclear at this stage if temporary construction camps will be erected inside the boundaries of the KNP. To consider the worst-case-scenario it is assumed that two construction camps will be erected; one near or on the site of the Park-and-Ride facility and the other on the site of the resort which will be involved with the construction of the road and the resort. It can also be said that construction material will be stockpiled on the construction sites.
- As mentioned in Section 7.4 it is assumed that the road realignment and upgrading will be completed first. Thereafter the Park-and-Ride facility and resort construction may take place in parallel. The following tables will discuss each component of the project along the assessment criteria set out in Section 8.1.
- The duration of the construction process is unknown but is expected to continue in excess of 24 months.

**Table 5: Assessment Criteria: Realignment and upgrading of S114**

| CRITERIA OF ASSESSMENT   |   |
|--|---|
| <b>NATURE OF IMPACT</b>  |   |
| The construction activity will noticeably change the existing features or qualities of the landscape. For the duration of the construction phase the equipment, construction camps and work force will be elements that are uncharacteristic of the visual environment. It will have a moderately significant impact on the visual resource as the length of the new road is relatively short, about 3.7 km. Due to the natural screening capacity of the landscape, limited views will be experienced by sensitive observers. The impact on observers will be medium. |   |
| <b>INTENSITY OF IMPACT</b>   |   |
| Scale  | The section to be realigned will be approximately 3.7 km. It will be a 6 m wide gravel road, similar to the other gravel roads in the area. Another 2-3 m on either side of the road will be cleared to construct open storm water channels. Ultimately a corridor of 10-12 m may be cleared.<br>The upgrading of the existing S114 involves the grading and possible resurfacing of the section between Malelane Road and the resort site. This is approximately a 3.5 km section. |
| Extent   | A great percentage of the road construction will be screened by the existing vegetation cover from sensitive viewpoints, i.e. from the existing roads. Tourists will however be able to view sections of the construction activity at intersection points along the existing S114 and the S121 as they travel on these routes. The occasional dust cloud resulting from earthworks may be visible from much further but will be brief. The impact will be                           |

|  |  |
|--|--|
|  | localised and will cause a noticeable change to the existing features and qualities of the landscape character as vegetation are removed within the road corridor.<br>The improvement of the S114 will not change the character of the road corridor but road-building equipment will be present while the upgrading is in progress. Again the impact will be localised, limited to the 3.5 km section of the road   |
| Human perceptions  | Generally, humans have a negative perception when confronted with a construction site or activity, especially in a conservation area. It is often considered an eyesore due to the significant surface disturbance and the scarring of the landscape. The occasional dust clouds that may be generated during the construction process are considered a nuisance factor when physically affected by it. Tourists driving behind a grader which is generating some dust will be most severely affected. The negative perception may be tolerated by observers when considering the improvement of the road. |
| VAC  | The VAC of the region is considered medium to high. The vegetation is typical of the area and has a savannah character with grassland mixed with trees and shrubs. For the most part the vegetation doesn't allow one to see very far into the bushes unless it opens up into a grassy patch. Generally, one's visual penetration is limited to 50 – 100 m. This may increase during the winter months when the deciduous vegetation has lost all leaves.  |
| <b>VIEWER SENSITIVITY</b>  |  |
| All tourists travelling on the local road network are considered highly sensitive.   |  |
| <b>EXPOSURE TO IMPACT</b>  |  |
| Distance to source of impact   | Tourists travelling on the S114 and S121 will be at the source of impact.  |
| True visibility  | Only a short section of the road construction will be visible at the intersection points with the S114 and S121. As the road bends the vegetation will put the remainder of the road out of sight. The upgrading activity of the S114 will be highly visible for tourists travelling on the S114 during that time. The source of impact will be the occasional dust cloud and can be mitigated fairly effectively.   |
| Duration   | Construction and upgrading of the road is expected to continue for 3 – 4 months. The exposure to the impact is expected to be fairly brief for individual tourists.  |
| Viewer incidence   | Medium during normal week days but can increase to very high during holidays and weekends.   |
| <b>MITIGATION</b>  |  |
| Do a corridor assessment prior to construction in order to identify the largest trees and densest vegetation patches. Plan road around these elements. This will limit the impact on the visual resource by retaining features in the landscape that contribute to the landscape character.<br>Always implement dust suppression methods to minimise dust.<br>Schedule the construction of the road during a period of no school holidays or long weekends.<br>Consider temporarily closing these sections of the S114 and S121 from public access. This will prevent sensitive viewers being exposed to the construction processes. |  |

**Table 6: Assessment Criteria: Construction of Park-and-Ride Facility**

| CRITERIA OF ASSESSMENT  |  |
|---|--|
| <b>NATURE OF IMPACT</b>   |  |
| The construction activity will noticeably change the existing features or qualities of the landscape. For the duration of the construction phase the equipment, construction camps and work force will be elements that are uncharacteristic of the visual environment. It will have a highly significant impact on the visual resource.<br>Viewers are also expected to experience a highly significant impact. Although the natural screening capacity of the landscape limits a percentage of their exposure, their close proximity to the source of impact and the high viewer incidence are reasons for concern. |  |
| <b>INTENSITY OF IMPACT</b>  |  |
| Scale   | The actual surface area of the Park-and-Ride is larger than the Malelane Gate complex. Most of the area will be road surface and covered parking spaces. It is only the guard house (3.7m high) and welcoming centre (7.2m high) that will be actual buildings. The other structures will be carports (2.8m high). |

|  |  |
|--|--|
| Extent   | Without any mitigation the ZVI will include the approaching roads on both sides of the Malelane Gate, including views from specific areas inside Pestana Kruger Lodge and Leopard Creek Estate. The extent of impact will be beyond the boundaries of the site but are still considered localised.   |
| Human perceptions  | Generally, humans have a negative perception when confronted with a construction site or activity especially in a conservation area. It is often considered an eyesore due to the significant surface disturbance and the untidy appearance of such a site.  |
| VAC  | The VAC of the site is considered medium. Low growing shrubs and medium sized trees are concentrated in patches adjacent and on the site and may provide partial screening from critical viewing areas. Large trees grow on the Crocodile River banks and are effective in screening views from across the river. The screening capacity increases the further one is from the site due to the decrease in visual penetration through the vegetation cover. During the winter months visual penetration may be much further due to the absence of leaves on most vegetation.   |
| <b>VIEWER SENSITIVITY</b>  |  |
| All the identified visual receptors are considered highly sensitive.   |  |
| <b>EXPOSURE TO IMPACT</b>  |  |
| Distance to source of impact   | Tourists approaching Malelane Gate will pass within a 100 m from the Park-and-Ride facility. Pestana Kruger Lodge and Leopard Creek Estate are between 500 – 600 m away from the proposed site.  |
| True visibility  | The construction of the Park-and-Ride facility will be partially visible from the mentioned viewpoints. The vegetation along the entrance road, on the river bank and surrounding the site, screens a great percentage of the site. It can be argued that true visibility becomes less the further one is from the site due to the vegetation cover screening more of the site.<br>It is doubtful if any of the viewers from Leopard Creek Estate will be able to see any of the construction activity. The occasional dust cloud may rise several meters into the air and may be more visible than the activity on ground level itself. Viewers from Pestana Kruger Lodge are closer and have less vegetation screening their view. Partial views can be expected from certain areas within Pestana Kruger Lodge. |
| Duration   | Duration of construction unknown.<br>Tourists entering and exiting through the Malelane Gate will be exposed to the construction activity for a short period, probably not more than 10-20 minutes. This period of time may increase during holiday seasons as the gate is busier.<br>Residents/visitors to Pestana Kruger Lodge and Leopard Creek Estate may stay here for several days. Although the exposure is temporary, they may experience regular views of the construction site from particular locations.  |
| Viewer incidence   | Medium viewer incidence is expected during normal week days but will increase to very high during holidays and weekends.   |
| <b>MITIGATION</b>  |  |
| <p>Do a thorough site assessment prior to construction in order to identify the largest trees and densest vegetation patches. Design the Park-and-Ride around these elements. This will limit the impact on the visual resource by retaining features in the landscape that contribute to the landscape character. This will also maintain the current screening capacity of the site. Always implement dust suppression methods to minimise dust.</p> <p>Locate construction camps and stock yards in the least visible areas. Make use of the natural screening capacity of the site by placing these facilities adjacent a dense vegetation patch with sufficient height to conceal these project components. Alternatively, the screening capacity of the site can be temporarily enhanced through the erection of a 3 m high shade cloth fence around the construction camp during construction. The colour of the shade cloth should be similar to that of the adjacent vegetation, i.e. a light brown or green.</p> <p>Construct the earth berm first. This will aid in the screening of the construction process from Pestana Kruger Lodge.</p> <p>Replant the earth berm as soon as it's constructed to cover up the bare soil and to prevent unsightly erosion of the exposed surface.</p> |  |

**Table 7: Assessment Criteria: Construction of Resort Development**

| CRITERIA OF ASSESSMENT   |   |
|--|---|
| <b>NATURE OF IMPACT</b>  |   |
| The construction activity will noticeably change the existing features or qualities of the landscape. For the duration of the construction phase the equipment, construction camps and work force will be elements that are uncharacteristic of the visual environment. It will have a highly significant impact on the visual resource but due to the natural screening capacity of the landscape, limited views will be experienced by sensitive observers. The impact on observers is considered low. |   |
| <b>INTENSITY OF IMPACT</b>   |   |
| Scale  | The surface area is approximately 14 ha. The design team deliberately moved away from the typical bulky buildings normally associated with hotels and proposed smaller loose-standing units. This is an effort to reduce the dominance of the buildings by providing ample open spaces between the units and to reduce the perceivable scale of the resort. The construction site will therefore be fragmented instead of a continuous construction site over the entire area.  |
| Extent   | During the early stages most of the construction activity will be limited to the ground level and the existing vegetation cover will provide a considerable degree of screening. As construction progresses and the buildings reach their final height, some buildings will exceed the height of the vegetation cover. Glimpses of some of the family units may be possible from the newly aligned S114 and S121 but are unlikely considering the dense vegetation cover. The buildings closest to the Crocodile River will be visible from the sugar cane plantations east of the site.  |
| Human perceptions  | Generally, humans have a negative perception when confronted with a construction site or activity especially in a conservation area. It is often considered an eyesore due to the significant surface disturbance and the untidy appearance of such a site. The occasional dust clouds that may be generated during the construction process are considered unsightly.  |
| VAC  | The site is considered to have a medium to high VAC. Large trees and dense shrubs occur along the river banks. Further away from the rivers the gently sloping plains are characterised by medium sized shrubs and open patches of grassland. The gently sloping landscape offers no elevated vantage points and one's view is often contained within the road corridor. Visual penetration into the bushes seldom exceeds 50-100 m. At most, glimpses of the construction activity may be visible from the realigned portion of the S114 and S121 but are considered unlikely.<br>It should be noted that vegetation screening may be compromised if it is cleared during the construction phase or after a veldt fire.                              |
| <b>VIEWER SENSITIVITY</b>  |   |
| Tourists are considered highly sensitive.<br>Employees at the sugar cane farm are expected to have low sensitivity.  |   |
| <b>EXPOSURE TO IMPACT</b>  |   |
| Distance to source of impact   | Tourists travelling on the new S114 and existing S121 will come closest to the construction site. At its closest point the realigned S114 will be approximately 480 m from the closest family unit. This is based on the assumption that the S114 will be completed and in use prior to construction at the resort site. The distance from the S121 at the T-junction with the S114 will be approx. 500m to the nearest unit.<br>Employees at the sugar cane farm can come within a range of 250 m.   |
| True visibility  | The VAC is considered medium to high and a large part of the construction site will be concealed from outside views as long as the construction activity is below the height of the vegetation cover. As construction progresses some structures may exceed the height of the vegetation. This will cause the larger buildings on the Crocodile River banks to be visible from the sugar cane farm. It is highly unlikely that any of the constructed buildings will be visible from the newly aligned S114 and existing S121. The distance to the source of impact is considered far enough and the screening capacity of the vegetation will be sufficient. At most occasional dust clouds may be visible or if a crane are used in some instances. |

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|--|--|
| Duration   | Duration of construction unknown.<br>Tourists may be exposed to the impact of dust clouds or construction equipment briefly as they travel past the construction site.<br>Employees at the sugar cane farm will be exposed to the impact for short periods at a time at regular intervals during the construction process. |
| Viewer incidence   | Viewer incidence is expected to be minimal or even insignificant.  |
| <b>MITIGATION</b>  |  |
| Do a site assessment prior to construction in order to identify the largest trees and densest vegetation patches. Plan resort around these elements. This will limit the impact on the visual resource by retaining features in the landscape that contribute to the landscape character and screening capacity of the site.<br>Establish limits of disturbances by clearly demarcating the construction site in order to avoid disturbances outside the site perimeter<br>Always implement dust suppression methods to minimise dust during construction.<br>Consider temporarily closing these sections of the S114 and S121 from public access. This will prevent sensitive viewers being exposed to the construction processes.<br>Do another on-site visibility test during construction to assess any possible visibility of buildings from the newly aligned S114 especially during winter. |  |

**Table 8: Summary of Visual Impact during Construction Phase**

| Nature of Impact                         | Extent of Impact | Duration of Impact                                | Intensity of Impact      | Probability of Impact               | Significance of Impact   | Level of Confidence |
|--|------------------|---|--------------------------|-------------------------------------|--------------------------|---------------------|
| <b>Realignment and upgrading of S114</b> |                  |   |                          |                                     |                          |                     |
| Without mitigation                       | Local            | VR <sup>5</sup> : Short term<br>OB: Brief moments | VR: Medium<br>OB: Low    | VR: Definite<br>OB: Highly probable | VR: Medium<br>OB: Medium | High                |
| With mitigation                          | Local            | VR: Short term<br>OB: Brief moments               | VR: Medium<br>OB: Low    | VR: Definite<br>OB: Improbable      | VR: Medium<br>OB: Low    | High                |
| <b>Park-and-Ride facility</b>            |                  |   |                          |                                     |                          |                     |
| Without mitigation                       | Local            | VR: Short term<br>OB: Brief moments               | VR: High<br>OB: High     | VR: Definite<br>OB: Highly probable | VR: High<br>OB: High     | Medium              |
| With mitigation                          | Local            | VR: Short term<br>OB: Brief moments               | VR: Medium<br>OB: Medium | VR: Definite<br>OB: Probable        | VR: Medium<br>OB: Medium | Medium              |
| <b>Resort development</b>                |                  |   |                          |                                     |                          |                     |
| Without mitigation                       | Local            | VR: Short term<br>OB: Brief moments               | VR: High<br>OB: Low      | VR: Definite<br>OB: Improbable      | VR: High<br>OB: Low      | Medium              |
| With mitigation                          | Local            | VR: Short term<br>OB: Brief moments               | VR: Medium<br>OB: Low    | VR: Definite<br>OB: Improbable      | VR: Medium<br>OB: Low    | Medium              |

### 8.3 VISUAL IMPACTS DURING OPERATIONAL PHASE

Visual impacts will occur as a result of the addition of new elements in the visual environment and the subsequent change in the character of the landscape. The new elements refer to the buildings and roads that are part of the project. When these changes are experienced by viewers it will impact on their views and their experience of the study area.

The visual resource has been evaluated and it was found that it has great aesthetic value and is therefore sensitive to changes to its character. Any removal of or alterations to its existing features may compromise the character of the site and may impact on the overall aesthetic value of the study area. The study area is also visited or occupied by observers that are highly sensitive towards changes in the character of the study area. Their main reason for visiting the study area is to enjoy and experience the pristine natural character. Any changes to this character will impact on the observers.

<sup>5</sup> There is a distinction made between impacts on the Visual Resource (VR) and on Observers (OB). In most of the cases the visual resource will experience major impacts on its character, but due to the high screening capacity of the landscape, observers will have limited views of these changes.



**Table 9: Assessment Criteria: New S114 Road**

| CRITERIA OF ASSESSMENT   |  |
|--|--|
| <b>NATURE OF IMPACT</b>  |  |
| <p>The new road will form part of the existing road network and will not be regarded as different by the observers utilising it. The upgraded section of the S114 will probably have a positive impact as the visible erosion rills will be repaired and the road will be more user-friendly. The observers will not experience any negative visual impact.</p> <p>The visual resource will lose the vegetation that is currently growing in the corridor of the proposed road. These are elements that contribute to the character of the landscape. Considering the length of the road and the relative small percentage of lost vegetation the impact on the visual resource is considered low.</p> |  |
| <b>INTENSITY OF IMPACT</b>   |  |
| Scale  | The new road will be approximately 3.7 km. It will be a 6 m wide gravel road, similar to the other gravel roads in the area. Relative to the existing road network this road is considered a minor addition.   |
| Extent   | The vegetation that is currently growing in the proposed road corridor will be removed. The extent of the impact will be limited to the road corridor only.  |
| Human perceptions  | The road will form part of the existing road network and will not be perceived as different. Therefore no negative perception will be associated.  |
| VAC  | The VAC of the region is considered medium to high. The vegetation is typical of the area and has a savannah character with grassland mixed with trees and shrubs. The new road is not expected to negatively impact on sensitive observers but instead will be regarded as part of the existing road network. |
| <b>VIEWER SENSITIVITY</b>  |  |
| All tourists travelling on the local road network are considered highly sensitive to elements that negatively influence the landscape character. A gravel road is not uncommon and will be perceived as part of the context therefore observers will be more tolerant and acceptant.   |  |
| <b>EXPOSURE TO IMPACT</b>  |  |
| Distance to source of impact   | Tourists travelling on the S114 and S121 will utilise the road and no intrusions will be caused on their views.  |
| True visibility  | Tourists travelling on the S114 and S121 will utilise the road and no intrusions will be caused on their views.  |
| Duration   | Tourists travelling on the S114 and S121 will utilise the road and no intrusions will be caused on their views.  |
| Viewer incidence   | Tourists travelling on the S114 and S121 will utilise the road and no intrusions will be caused on their views.  |
| <b>MITIGATION</b>  |  |
| Maintain the road periodically to avoid unsightly erosion.   |  |

**Table 10: Assessment Criteria: Park-and-Ride Facility**

| CRITERIA OF ASSESSMENT  |   |
|---|---|
| <b>NATURE OF IMPACT</b>   |   |
| <p>The Park-and-Ride will introduce features in the landscape that increases the dominance and surface area of the Malelane Gate complex. The architectural style of the proposed buildings will contrast with the existing architectural identity that is defined by the thatch roofs and fairly simple structures. The visual resource will experience a loss in vegetation through the introduction of additional structures in the context of the Malelane Gate complex. The impact on the visual resource is expected to be medium.</p> <p>Tourists entering the KNP through the Malelane Gate will perceive the Park-and-Ride as part of the Malelane Gate complex although it will be distinguished by its architectural identity. The significance of the visual impact is expected to be low on these observers. On the other hand, visitors to Pestana Kruger Lodge which stand on the viewing deck may experience glimpses of the welcoming centre through the trees. This is their main view and any intrusion on it is considered a highly significant impact.</p> |   |
| <b>INTENSITY OF IMPACT</b>  |   |
| Scale   | In terms of surface area the Park-and-Ride will be larger than the existing Malelane Gate complex. The welcoming centre is approximately 7.2 m high which is similar to the height of the |

|   |  |
|---|--|
|   | main entrance, but the architectural style and use of materials are contrasting. The guard house and carports will be less dominant due to their physical size.  |
| Extent  | Without any mitigation the ZVI may include the approaching roads on both sides of the Malelane Gate, including views from specific areas inside Pestana Kruger Lodge and Leopard Creek Estate.   |
| Human perceptions   | The new facility will be perceived as part of the Malelane Gate complex, but the contrasting architectural style of the welcoming centre and the general use of the facility will still cause a distinction. It can be expected that visitors to KNP will be more tolerant to additional development at the gates but viewers from Pestana Kruger Lodge will experience an intrusion on their views and will experience the Park-and-Ride facility as negative.  |
| VAC   | <p>The VAC of the site is considered medium. Low growing shrubs and medium sized trees are concentrated in patches adjacent and on the proposed site and will provide partial screening from critical viewing areas. Large trees grow on the Crocodile River banks which provide partial screening of the site from Pestana Kruger Lodge. The screening capacity increases the further one is from the site due to the decrease in visual penetration through the vegetation cover. During the winter months visual penetration may be much further due to the absence of leaves on most vegetation.</p> <p>The existing Malelane Gate and its buildings provide a status quo which makes it more acceptable to introduce other structures. The Park-and-Ride will have a compatible function but will also be used as a parking facility which is different to that of Malelane Gate.</p> |
| <b>VIEWER SENSITIVITY</b>   |  |
| All the identified visual receptors are considered highly sensitive.  |  |
| <b>EXPOSURE TO IMPACT</b>   |  |
| Distance to source of impact  | Tourists approaching Malelane Gate will pass within a 100 m from the Park-and-Ride facility. Pestana Kruger Lodge and Leopard Creek Estate are between 500 – 600 m away from the proposed site.  |
| True visibility   | <p>The vegetation along the road, on the river bank and on the site, screens a great deal of the site and only partial views are possible from Pestana Kruger Lodge and from the roads leading up to Malelane Gate. It can be assumed with certainty that viewers from Leopard Creek Estate will not be able to see the facility due to the vegetation screen.</p> <p>Due to the 24 hour operation of the facility, lighting impact is a concern. Any source of light can penetrate through the vegetation and affect viewers around the site. This is discussed separately in Section 8.3.1.1.</p>  |
| Duration  | <p>Tourists entering and exiting through the Malelane Gate will be exposed to the facility for a short period, probably not more than 10-20 minutes. This period of time may increase during holiday seasons as the gate is busier.</p> <p>Residents/visitors to Pestana Kruger Lodge may stay here for several days. Although the exposure is temporary, they may experience regular views of the facility.</p>   |
| Viewer incidence  | Medium viewer incidence is expected during normal week days but will increase to very high during holidays and weekends.   |
| <b>MITIGATION</b>   |  |
| <p>Utilise the existing VAC of the site and increase it further with additional planting. The proposed soil berm on the fringe of the facility will provide additional screening but has to be vegetated and maintained.</p> <p>Plant the berm with shrubs and trees to increase the screening capacity of the site.</p> <p>When constructing the soil berm, maintain a gradual slope and place it in an organic shape in order to avoid sharp shadow lines.</p> <p>Reconsider the architectural style and layout of the Park-and-Ride to be more compatible and integrated with the existing context. It should be designed as part of the Malelane Gate complex and not seen as a separate standing facility.</p> <p>Lower the height of the welcoming centre. This will have a significant influence on the visibility from Pestana Kruger Lodge.</p> <p>Reconsider the 24hour operation of the facility to only operate during day time hours. This will eliminate any intrusion of lights on observers caused by vehicles entering and exiting the site.</p> |  |

**Table 11: Assessment Criteria: Resort development**

| CRITERIA OF ASSESSMENT  |   |
|---|---|
| <b>NATURE OF IMPACT</b>   |   |
| The resort development will introduce elements to the site that is uncharacteristic to the study area and dramatically changes the character of the landscape on a local scale. Although the concept of a resort is not uncommon in the KNP it is the additional infrastructure, other than accommodation, and the architectural style that is distinctive. This is a result of the PPP agreement and the notion of the client to create a unique experience for their visitors. The significance of the impact on the visual resource is regarded high due to the dramatic change to its character. The visual impact on observers is expected to be low due to the limited visual exposure to highly sensitive observers. |   |
| <b>INTENSITY OF IMPACT</b>  |   |
| Scale   | The surface area of the development is approximately 14 ha. The design team deliberately moved away from the typical bulky buildings normally associated with hotels and proposed smaller loose-standing units. This is an effort to reduce the dominance of the buildings by providing ample open spaces between the units and to reduce the perceivable scale of the resort. None of the buildings are expected to exceed a height of 6.5 m.  |
| Extent  | Glimpses of some of the family units may be possible from the newly aligned S114 and S121. This is however considered unlikely due to the screening capacity of the natural vegetation. The buildings closest to the Crocodile River will be visible from the sugar cane plantations east of the site. The natural VAC of the site will reduce the visibility of the buildings from sensitive vantage points, thus containing the ZVI considerably.   |
| Human perceptions   | The presence of lodges or resorts is not an uncommon occurrence in KNP although most are well camouflaged, hidden amongst hills and vegetation. As long as this strategy is followed with all new developments the perception will most probably remain as is.<br><br>One of the issues that came out of the public participation events is the possible overuse of the southern region of the KNP. This relates to higher traffic volumes on the game routes and the sense of place being compromised due to over utilisation. The negative perception towards development in the KNP is further fuelled by conservation-centric views which favour conservation above tourist development. This is a socio-economic issue, for the lack of a better definition, and is not further addressed in this study. |
| VAC   | The site is considered to have a medium to high VAC. Large trees and dense shrubs occur along the river banks. Further away from the rivers the gently sloping plains are characterised by medium sized shrubs and open patches of grassland. The gently sloping landscape offers no elevated vantage points and one's view is often contained within the road corridor. Visual penetration into the bushes is limited to 50-100 m. At most, glimpses of the closest buildings may be visible from the realigned portion of the S114 and S121 but are considered unlikely.  |
| <b>VIEWER SENSITIVITY</b>   |   |
| Tourists are considered highly sensitive.<br>Employees at the sugar cane farm are expected to have low sensitivity.   |   |
| <b>EXPOSURE TO IMPACT</b>   |   |
| Distance to source of impact  | Tourists travelling on the new S114 and existing S121 will come closest to the resort. At its closest point the realigned S114 will be approximately 480 m from the closest family unit. The distance from the S121 at the T-junction with the S114 will be approx. 500m to the nearest unit.<br><br>Employees at the sugar cane farm can come within a range of 250 m.   |
| True visibility   | The field investigation confirmed that the existing vegetation cover will effectively screen the largest part of the resort from surrounding views. It is highly unlikely that any of the buildings will be visible from the realigned S114 and S121 considering the distance from the source of impact and the vegetation cover in the line of sight. One should however consider the increase in visual penetration during winter or a veldt fire where it may be possible to experience glimpses of the closest units. This was however not confirmed  |

|   |  |
|---|--|
|   | during a field survey and cannot be stated as certain.<br>The larger buildings on the Crocodile River banks will only be visible from the sugar cane farm.   |
| Duration  | Tourists may experience glimpses of some of the family units as they travel past the resort on the S114 but are considered unlikely.<br>Employees at the sugar cane farm will be exposed to the impact for short periods at a time at regular intervals. |
| Viewer incidence  | Viewer incidence is expected to be minimal or even insignificant.  |
| <b>MITIGATION</b>   |  |
| Plant additional trees in and around the development to increase the visual screening of the buildings especially near the last family units on the side of the road.<br>Do another on-site visibility test after completion to determine the affect of outdoor lighting on night-drive routes and to make adjustment to light sources if required. |  |

**Table 12: Visual Impacts during Operation Phase**

| Nature of Impact               | Extent of Impact | Duration of Impact                     | Intensity of Impact             | Probability of Impact               | Significance of Impact          | Level of Confidence |
|--------------------------------|------------------|--|---------------------------------|-------------------------------------|---------------------------------|---------------------|
| <b>New Section of the S114</b> |                  |  |                                 |                                     |                                 |                     |
| Without mitigation             | Local            | VR <sup>6</sup> : Long term<br>OB: N/A | VR: Low<br>OB: N/A              | VR: Definite<br>OB: Improbable      | VR: Low<br>OB: None             | High                |
| With mitigation                | Local            | VR: Long term<br>OB: N/A               | VR: Low<br>OB: N/A              | VR: Definite<br>OB: Improbable      | VR: Low<br>OB: None             | High                |
| <b>Park-and-Ride facility</b>  |                  |  |                                 |                                     |                                 |                     |
| Without mitigation             | Local            | VR: Long term<br>OB: Briefly, regular. | VR: Medium<br>OB: High          | VR: Definite<br>OB: Highly probable | VR: Medium<br>OB: Medium        | Medium              |
| With mitigation                | Local            | VR: Long term<br>OB: Briefly           | VR: Low<br>OB: Low              | VR: Highly probable<br>OB: Probable | VR: Low<br>OB: Low              | Medium              |
| <b>Resort development</b>      |                  |  |                                 |                                     |                                 |                     |
| Without mitigation             | Local            | VR: Long term<br>OB: Briefly           | VR: High<br>OB: Low             | VR: Definite<br>OB: Probable        | VR: High<br>OB: Low             | Medium              |
| With mitigation.               | Local            | VR: Long term<br>OB: Briefly           | VR: Medium<br>OB: Insignificant | VR: Definite<br>OB: Improbable      | VR: Medium<br>OB: Insignificant | Medium              |

<sup>6</sup> There is a distinction made between impacts on the Visual Resource (VR) and on Observers (OB). In most of the cases the visual resource will experience major impacts on its character, but due to the high screening capacity of the landscape, observers will have limited views of these changes.

### **8.3.1 POTENTIAL OBTRUSIVE LIGHTING CONDITIONS**

Obtrusive lighting, otherwise known as light pollution refers to excessive lighting conditions which can be harmful, wasteful and/or cause annoyance. It is often a result of poor lighting design and creates conditions of light trespass, glare or sky glow. Obtrusive lighting as a visual impact is typically associated with relatively large developments, developments that require high intensity illumination of outdoor spaces, such as recreational facilities, or developments in wilderness areas where a low ambient light condition is part of the original context and character. In this section the affect of vehicle lights will also be explored.

Obtrusive lighting is identified as a potential impact for two reasons:

- The sites are located in a remote location with no or very few artificial light sources nearby. Any level of light pollution may compromise the night-time character of the study area; and
- Tourists, residents or visitors to the area are highly sensitive to any level of obtrusive lighting.

It should be noted that it is extremely difficult to quantify obtrusive lighting and requires the services of a specialist lighting engineer who can interpret detailed technical information. The aim of this study is not to quantify the impact but rather to discuss the potential problem areas and to provide practical mitigation measures which can be implemented during the detail design stages.

Sections 8.3.1.1 to 8.3.1.3 discuss the various types of obtrusive lighting that can be expected as a result of a development in the study area. The probability of the occurrence of such obtrusive lighting conditions is also discussed.

#### **8.3.1.1 Light trespass**

Light trespass is a condition where emitted light from a source, enters neighbouring properties with annoying consequences. Light trespass typically occurs when light fixtures are mounted in such a way that it directs light onto adjacent properties. Light fixtures without covers allow light to disperse into all directions and can have a similar effect. The level of annoyance relates to the light intensity that is exerted by a specific light source and the sensitivity of the affected viewer. In this case the light intensity of all light sources is expected to be low, i.e. no spotlights, just low-level lighting in outdoor areas. The viewers that will be affected are highly sensitive for the reasons described in Section 8.1.2.

The resort site is relatively remote and the only viewers that may be affected are tourists on night drives passing near the vicinity of the resort. They will become aware of the resort if lights are directed towards the roads. The Park-and-Ride facility is in relative close proximity to Leopard Creek Estate and Pestana Kruger Lodge. At most, faint lights may be visible through the vegetation and is not expected to cause annoyance.

The level of light trespass that may occur is expected to be very low and could even be negligible. The client is aware of the sensitivity of the environment and the viewers in it and it can be assumed with relative certainty that low-level lights will be installed in all outdoor areas. The level of annoyance can be regarded as low to negligible as faint lights may be visible through the vegetation. Light trespass can be completely mitigated with simple design principles.

### **8.3.1.2 Glare**

Glare is a result of excessive contrast between light and dark areas in the visual field which causes visual discomfort or completely disables vision. This impact usually occurs at a very specific location and is typically a result of spot lights directed into the viewing plane of viewers. The impact is at its most severe near the source of the light and diminishes over distance.

Glare can occur when the head lamps of vehicles shine into housing units or on outdoor recreational spaces such as patios during night time. This is of particular concern at the Park-and-Ride facility where vehicles enter and exit the facility at night. Figure 11 studies the expected light patterns from vehicles circulating in and around the facility. The average illumination distance of vehicle lights is estimated at 105 m and 54 m on the high- and low beam settings respectively<sup>7</sup>. This is the distance within which glare can be expected.

The current layout suggests that the facility will be accessed from the main road before Malelane Gate and opposite the gravel road that leads to the staff housing. The major area of concern is where vehicle exist the facility to turn right towards the Crocodile River Bridge. The closest staff units may experience a brief period of glare as the head lamps shine onto the property and possible into the house. This will be greatly screened by the existing vegetation cover. The earth berm that is proposed on the southern and eastern side of the Park-and-Ride is expected to block any lights towards Pestana Kruger Lodge resulting from vehicles entering and exiting the facility.

Another area of concern is on the route between Malelane Gate and the resort. In most cases night drive vehicles are equipped with hand-held spot lights for the tourists. The opportunity exists for tourists to direct the spot lights to Leopard Creek Estate across the Crocodile River. These sources of glare can be a nuisance if tourists are not informed of the impact.

### **8.3.1.3 Sky glow**

Sky glow refers to the “glow” that is visible above extensively developed areas at night. This is a result of light reflecting off surfaces and/or poorly directed light sources being refracted into the atmosphere, illuminating the dust or moisture particles in the air. Sky glow is of particular annoyance to astronomers due to its affect on the visibility of the night sky. It impairs the vividness of stars which are so often an amenity of the wilderness landscape.

Sky glow usually occurs over large populated areas and is highly unlikely to be a result of this project. It is however important to take cognisance of the potential of poorly directed light sources and reflective materials.

### **8.3.1.4 Conclusion and Mitigation**

The PPP Agreement clearly disapproves any form of light pollution associated with the proposed development and provides basic measures to be incorporated (Refer to Appendix 3). As a result the client has committed to adhere to these restrictions in their design. This is an issue that should

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<sup>7</sup> Web sources: <http://www.roadtripamerica.com/forum/content.php?31-Defensive-Driving-Rule-23-Know-When-To-Use-Your-Headlights>  
<http://tonyscott.wordpress.com/2009/02/23/over-driving-you%E2%80%99re-headlights/>

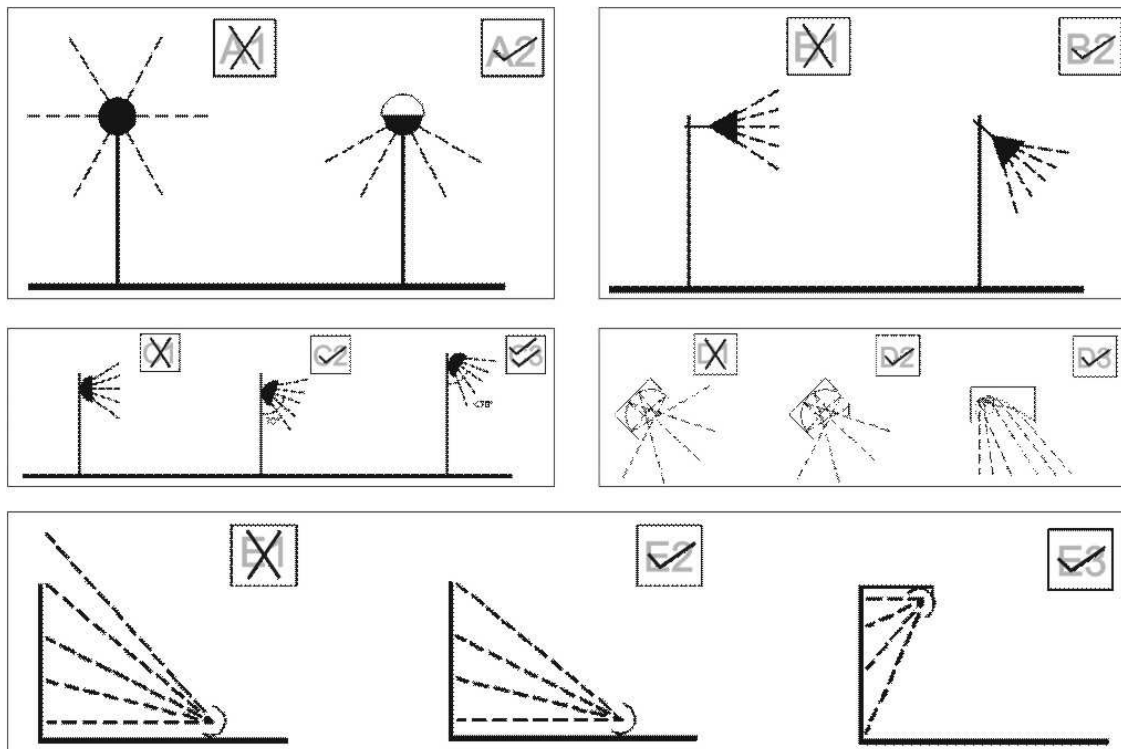


be addressed during the detail design phase of the development. Here follows a few guidelines for designing outdoor lights.

- Confine light output within property boundaries through using specifically designed luminaires such as full cut-off luminaires to minimise upward spread of light near to and above the horizontal (Figure 10 – A);
- Tilt spotlight luminaires to direct the light to the intended spot, instead of allowing it to light areas outside its purpose (Figure 10 – B);
- Mount outdoor spot lights on the appropriate pole height. Higher mounting heights allow lower main beam angles which can reduce glare (Figure 10 – C).
- Utilise control systems to reduce light levels during inactive periods or at predetermined times while maintaining sufficient lighting for safety and security (NEMA , 2000).
- Where vertical surfaces are illuminated, such as advertising signs or buildings façades, it is recommended that luminaires should light downwards. If up-lighting is the only alternative, the use of shields, baffles or louvers should be installed to reduce light spillage over or under the structure (Figure 10 – E).
- Do not over illuminate areas. Use the correct illuminance intensity for the purpose intended.

**Figure 10: Guidelines for the Reduction of Obtrusive Lighting**

(Source: ILE, 2005)



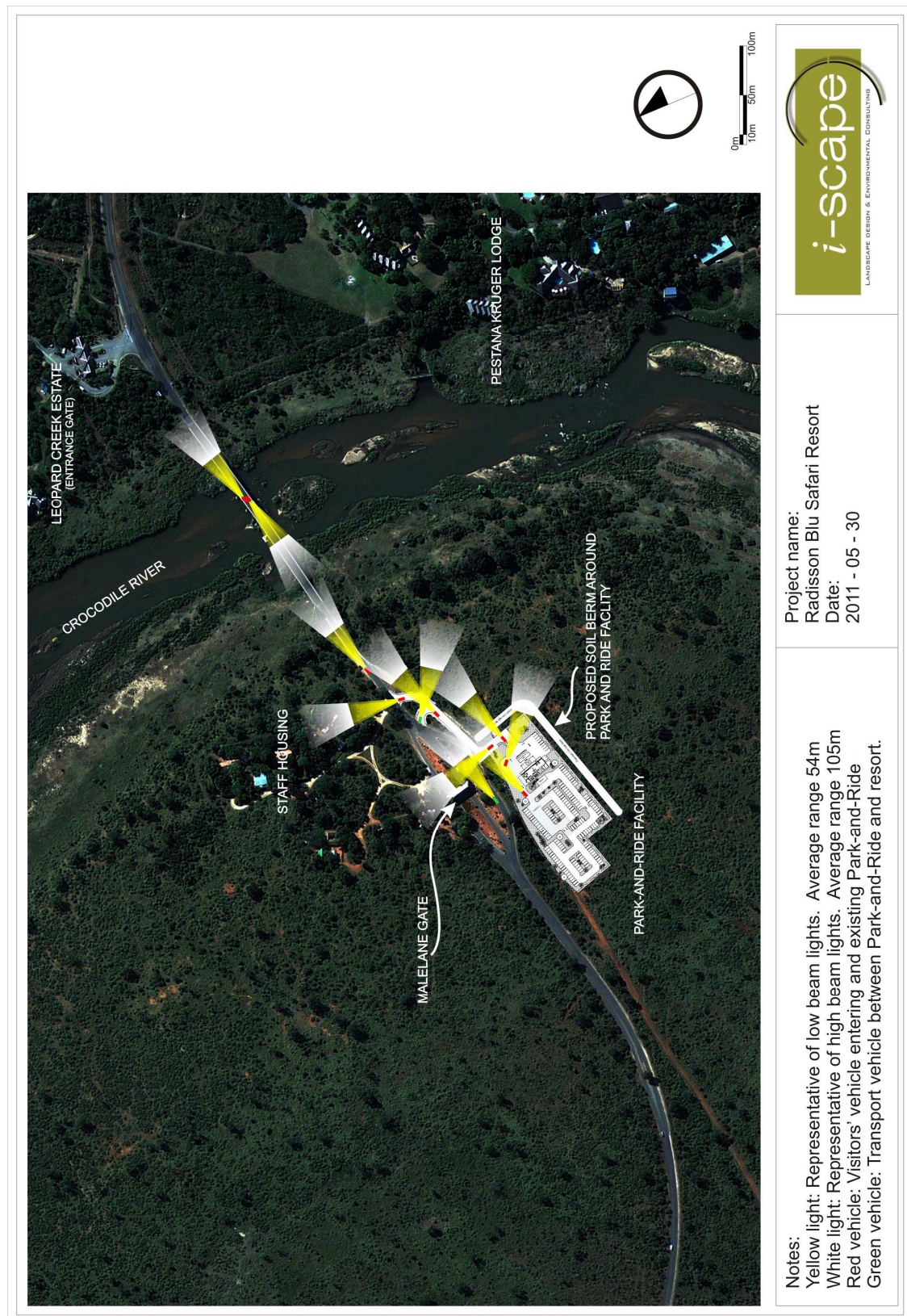


Figure 11: Vehicle light-pattern study

## 9 REFERENCES

As a matter of best practice, this assessment is based on internationally accepted guidelines and standards with regards to VIA. The following sources are frequently referred to:

- Bamard, D, Friend, F, Barnard, C and Visser, H. 2006. *Road Map to Environmental Legislation: Edition 3*. Impact Books CC, Pretoria.
- Hull, R.B. and I.D. Bishop. 1988. *Scenic Impacts of Electricity Transmission Towers: The influence of Landscape Type and Observer Distance*. Journal of Environmental Management. 1988. Vol. 27: pp. 99-108.
- Landscape Institute. 2002. *Guidelines for Landscape and Visual Impact Assessment*. The Landscape Institute with the Institute of Environmental Management and Assessment. Spon Press, London, United Kingdom.
- The Countryside Agency and Scottish Natural Heritage (2002). *Landscape Character Assessment – Topic paper 6*.
- The Institution of Lighting Engineering (ILE) (2005). *Guidance Notes for the Reduction of Obtrusive Lighting*. (<http://www.ile.org.uk/documents/RLP%202005.pdf>). Accessed February 2006.
- U.S. Department of the Interior, Bureau of Land Management - Visual Resource Management. Web Site ([www.blm.gov/VRM/index.html](http://www.blm.gov/VRM/index.html)). Accessed April 2005.
- U.S.D.O.T., Federal Highway Administration, Office of Environmental Policy. (1981). *Visual Impact Assessment for Highway Projects*. U. S. Department of Transportation Washington D. C.

## **APPENDIX 1**

The Zone of Visual Influence (ZVI) can be determined through a method referred to as visibility/viewshed mapping. This provides the visual specialist with a first order impression of the extent of a project's visibility and aids in the identification of sensitive observers that may be affected. Computer-based software creates a three dimensional model of the landscape in which the visibility of an object is tested. The result is a map with coloured regions in which the potential for a direct visual connection exists. These coloured regions are the ZVI and are limited to a distance of 5 km beyond which the sources of visual impact is considered negligible and thus omissible. Figure 12 & Figure 13 are visibility maps of the main lodge building and the welcoming centre respectively.

The visibility of an object in the landscape is influenced by a combination of factors. Apart from physical objects (vegetation, buildings, etc.) that occur in the line-of-sight between the observer and an object, empirical research indicates that the visibility of an object also decreases as the distance between the observer and the object increases. The ability to perceive detail is dependent on several aspects of which distance from an object and contrast between the object and its surroundings, is considered most influential<sup>8</sup>. These aspects were researched during the field investigations and in addition a weather balloon exercise was also conducted.

The computer-based software disregards the land cover and small topographic variations that does not show in the 20 m contour interval data that was used to create the three-dimensional landscape model. In order to give a more accurate result red and white TA50 weather balloons were filled with helium gas and attached to a string as long as the height of the specific building. This was pegged into the ground at more or less the centre of the building footprint. From here photos were taken from all publicly accessible routes or vantage points within 5 km. The weather balloon exercise is a simple and very effective way of determining the true visibility of the proposed buildings. Not all the building positions were pegged with the balloons but only the highest or those best representing a group of buildings. The results are shown in Figure 14 - Figure 20 with associated notes.

## **CONCLUSION**

The vegetation cover proofed to have a significant affect on concealing the proposed development from tourist routes inside the KNP. At most partial, views of the Park-and-Ride facility will be visible from the Malelane Gate and from Pestana Kruger Lodge. It is highly unlikely that the resort development will be visible from tourist routes passing the site, but a part of it will be visible from the sugar cane farm. The limited visibility of the additional buildings plays a substantial role on the intensity and probability of the impact on the identified observers.

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<sup>8</sup> To explain this concept the following example can be used: A black object displayed against a white background from a particular distance will be much more visible than a red object displayed against a maroon background at the same distance. This is because the contrast in colour between a black object and white background is greater and therefore easily distinguished. The same principle applies for texture and form.

It should be noted that the removal of any vegetation during the construction phase may compromise the screening ability and it is therefore crucial to implement stringent mitigation measures during the construction phase.



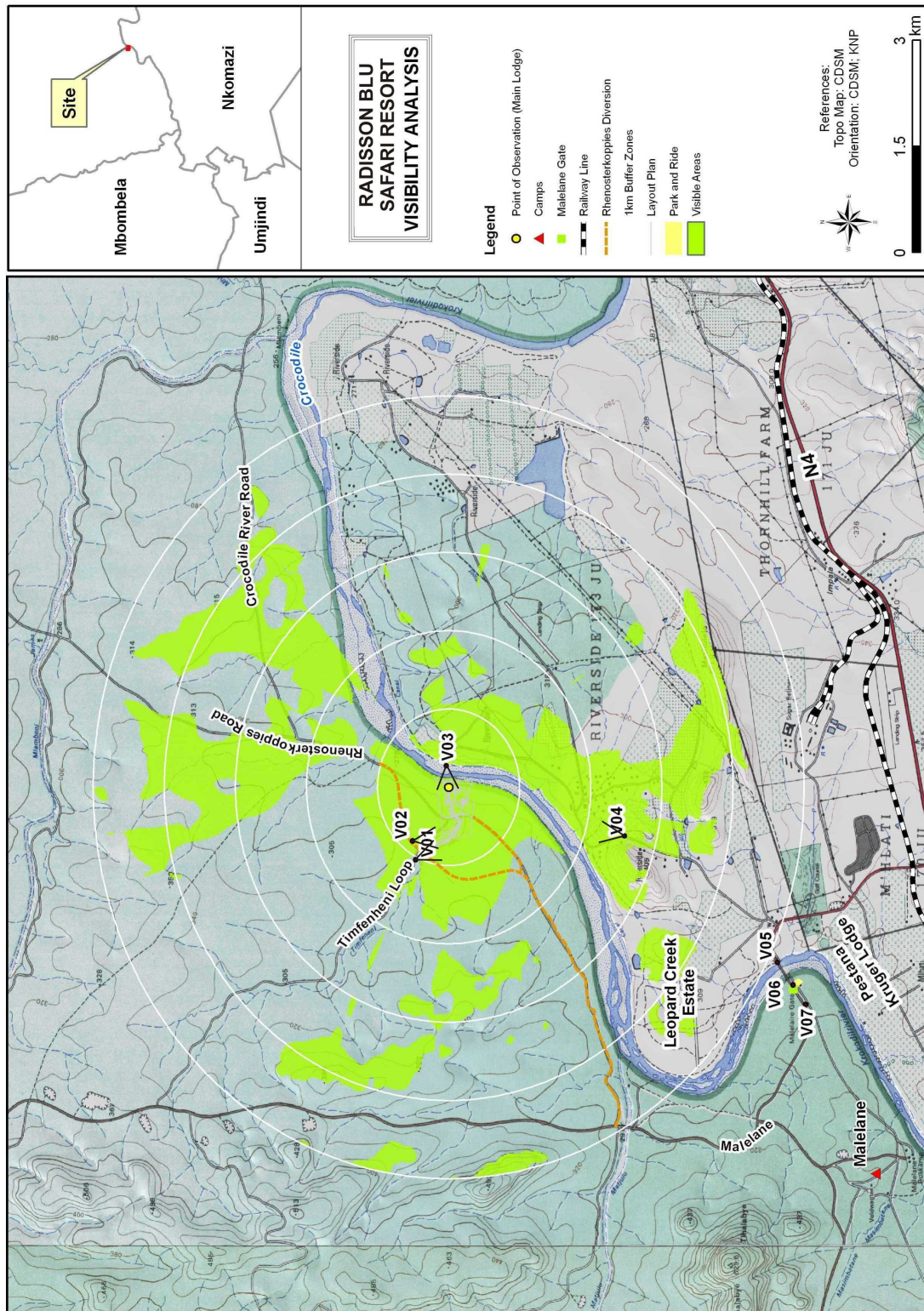


Figure 12: Visibility analysis – Main Lodge  
 (Figure 12 road alignment to be revised)



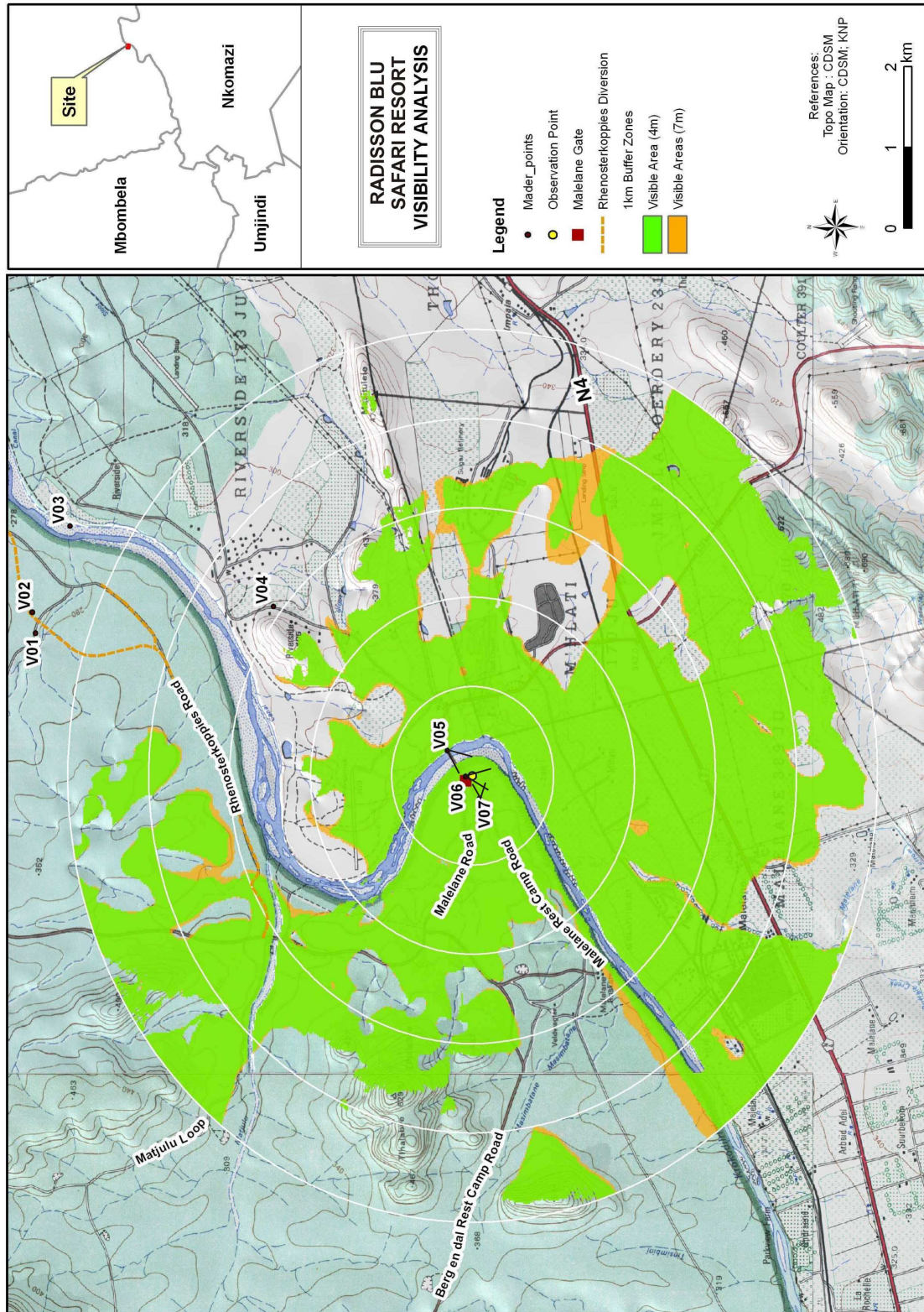


Figure 13: Visibility Analysis – Welcoming Centre



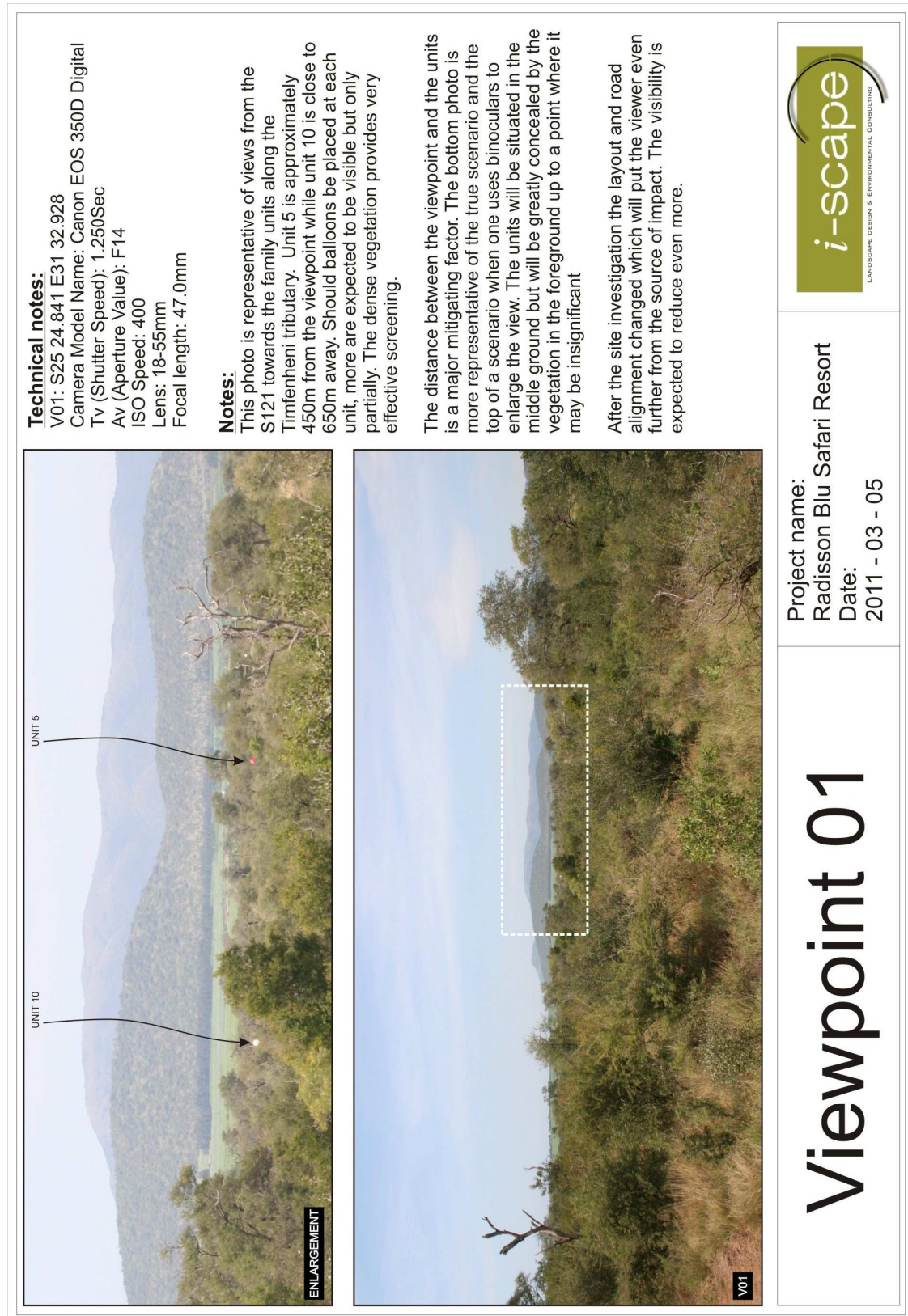


Figure 14: Visibility analysis – Viewpoint 1

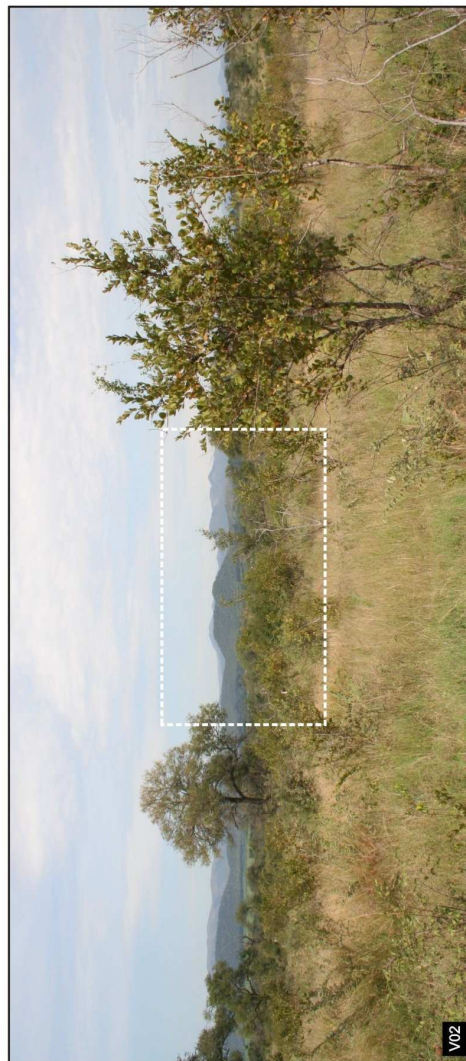
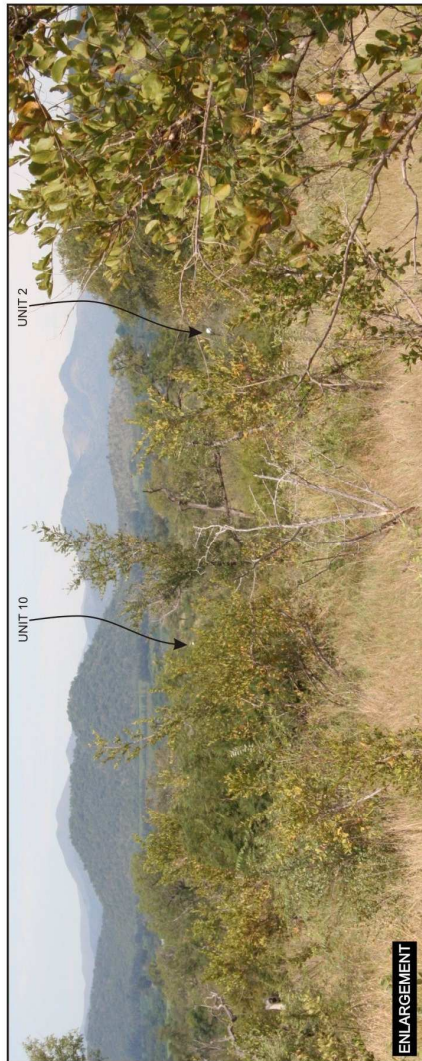
V02: S25 24.818 E31 33.068  
Camera Model Name: Canon  
Tv (Shutter Speed): 1.400Sec  
Av (Aperture Value): F13  
ISO Speed: 400  
Lens: 18-55mm  
Focal length: 18.0mm

**Notes:**

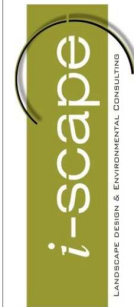
This photo is representative of views from the proposed road realignment towards the family units along the Timfenhi tributary. The balloons over Unit 2 & 10 are barely visible through the bushes. The distance from this viewpoint to the units vary between 400m and 750m away. Should balloons be placed at each unit, more are expected to be visible but only partially. The dense vegetation provides very effective screening and it is assumed that only the roofs will be visible.

The distance between the viewpoint and the units is a major mitigating factor. The bottom photo is more representative of the true scenario and the top of a scenario when one uses binoculars to enlarge the view. The units will be situated in the middle ground but will be greatly concealed by the vegetation in the foreground.

After the site investigation the layout and road alignment changed which will put the viewer even further from the source of impact. The visibility is expected to reduce even more.



Project name:  
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# Viewpoint 02

**Figure 15: Visibility analysis – Viewpoint 2**





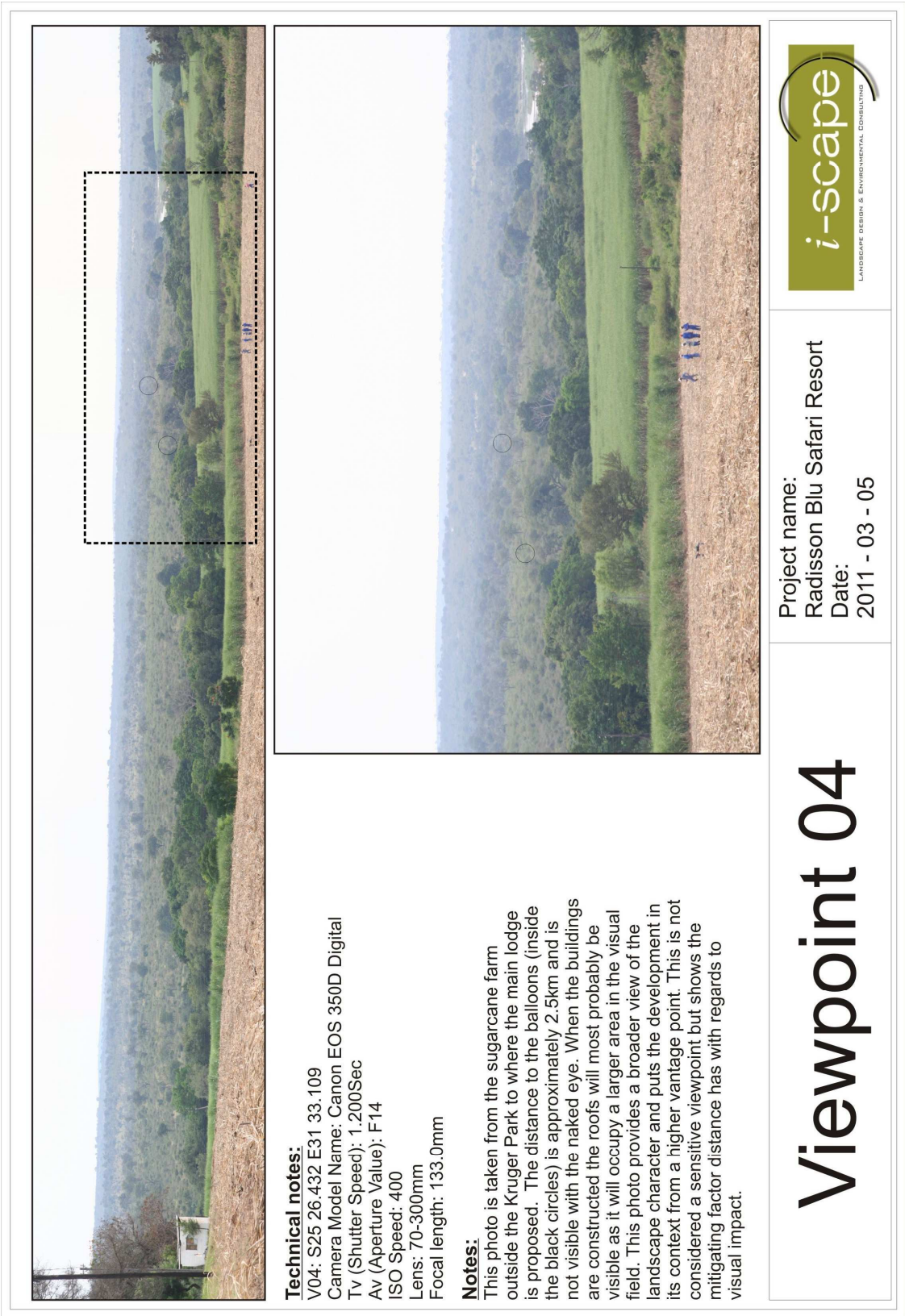


Figure 17: Visibility analysis – Viewpoint 4

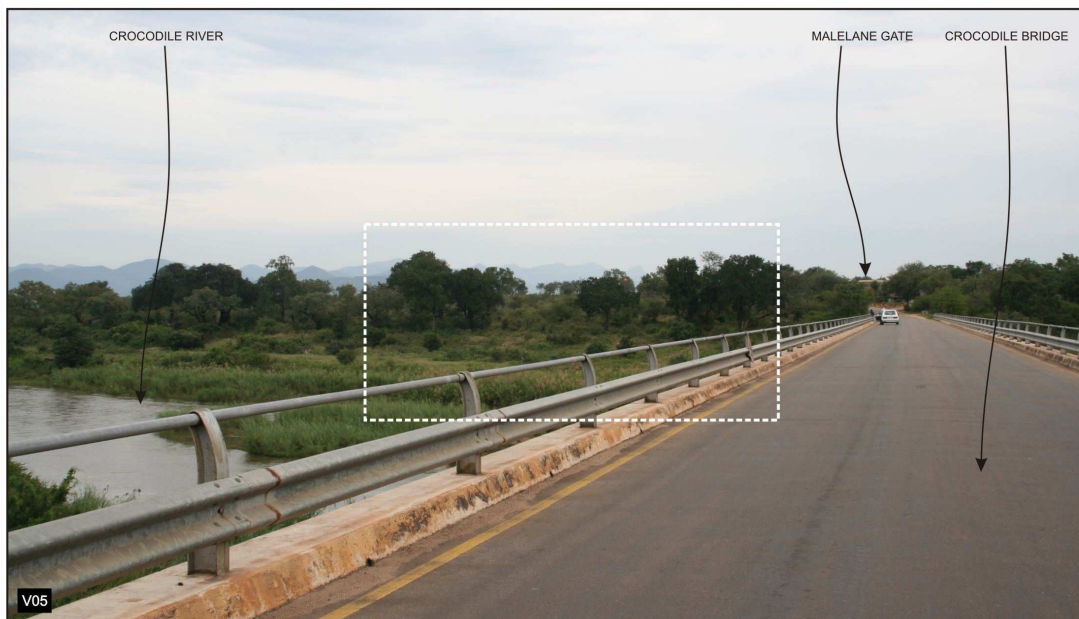


**Technical notes:**

V05: S25 27.597 E31 32.146  
 Camera Model Name: Canon EOS 350D Digital  
 Tv (Shutter Speed): 1.125Sec  
 Av (Aperture Value): F9.0  
 ISO Speed: 100  
 Lens: 18-55mm  
 Focal length: 51.0mm

**Notes:**

This photo is taken from the Crocodile River Bridge and shows the balloon indicating the welcoming centre. The river bank trees provide good screening but partial views will be possible from this vantage point.



# Viewpoint 05

Project name:  
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 Date:  
 2011 - 03 - 05



Figure 18: Visibility analysis – Viewpoint 5



Figure 19: Visibility analysis – Viewpoint 6

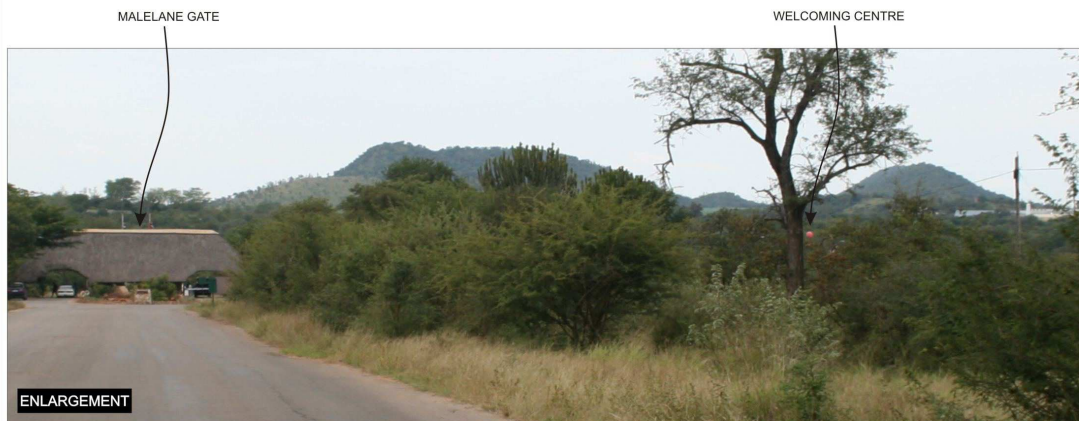


**Technical notes:**

V07: S25 27.810 E31 31.823.  
 Camera Model Name: Canon EOS 350D Digital  
 Tv (Shutter Speed): 1.125Sec  
 Av (Aperture Value): F9.0  
 ISO Speed: 100  
 Lens: 18-55mm  
 Focal length: 46.0mm

**Notes:**

This photo is taken from the approaching road inside the KNP towards the Malelane Gate. The balloon can be seen through the vegetation but for the most part it is hidden behind the existing vegetation.



# Viewpoint 07

Project name:  
 Radisson Blu Safari Resort  
 Date:  
 2011 - 03 - 05



Figure 20: Visibility analysis – Viewpoint 7

## APPENDIX 3

### **EXTRACTS FROM THE MALELANE HOTEL DEVELOPMENT PPP AGREEMENT**

The following are extracts from the Malelane Hotel Development PPP Agreement (January 2010) which has direct reference to the visual impacts of the proposed development.

#### **32.4.4 Visual Impacts**

*Any development within the Parks must take due cognisance of the visual impacts it may have on surrounding areas and other Park users. The Private Party will be provided with a selected site, however, the site will be subject to the findings of the EIA process.*

*SANParks has based its guidelines for visual impacts on interpretations of existing management documents, specifically on the KNP Management Plan section on Recreational Opportunity Zoning (ROZ). ROZ zoned all of KNP into categories of 'Recreational Opportunities' representing different degrees of 'wilderness qualities' ranging from 'wilderness areas' to 'high density development areas'.*

*In terms of zoning, the Private Party should take cognisance of the following:*

*"High Intensity Leisure zones" are defined as follows: "Large camps with fully equipped self contained units. Interpretative centres, restaurant, shops ..." Wilderness is defined as an area "...in which small groups can hike on foot and overnight anywhere in self-carried tents with a 'no trace left' camping ethic". SANParks PPP Agreement Malelane Hotel Development Kruger National Park*

*These definitions suggest that no developments should be visible from wilderness areas. It is assumed that 'visible' means visible to the naked eye as well as glares of lights at night. The structures must also not be visible from existing public Park roads.*

*Irrespective of the zonation designation of the area, SANParks believes that visual impacts must be reduced further by utilising aesthetically pleasing structures that blend into the environment. For example, structures that break the skyline will be more visible than those that lie below the treeline. Careful design both reduces visibility over large distances and affords the Private Party an attractive product that satisfies guests' desire to enjoy a 'wild' experience. Developments that are well hidden within broken topography, hills, or mountains result in less visual impact than those situated on hilltops or plains. The EIA must specifically address the visual impacts of all structures, lights, signage and other significant aspects of the development, and the Private Party must implement the mitigation measures set forth in the EIA in regard to visual impacts. The Development and Environment Proposal must contain sufficient detail regarding the design, location, and orientation of all structures to enable evaluation during the Bid evaluation process.*

*The building style – structure, materials and design -- must be in harmony with the environment including relief, local culture and physiognomy. The height of buildings is important. SANParks will consider double story structures, but the maximum height will be limited to a maximum height of 11m (double volume 3m + 3m + 5m roof (45° on 10m width) or single volume 3m + 8m roof (45°*

*on 16m width) from the final floor-level. This height restriction should not supersede the importance of the visual impacts as captured in the design principles and as determined by the site attributes. There are many 'unnatural' features visible from within many Project Sites, and the Private Party must consider these features in siting the development, so as to reduce their visual impact on guests.*

#### **32.4.4.2 Lighting**

*Developments that blend into the landscape during daylight hours may nonetheless be visible over long distances at night as a result of artificial lighting. The Private Party shall therefore take the impacts of lighting into consideration in siting and designing the development. Such impacts can be minimised, for example, by utilising reflected light off low reflective surfaces. Lights illuminating pathways and other areas must be low to the ground and directed downwards. The design must consider the need to obscure fires and other light sources away from areas of the Park where they may be visible.*



## APPENDIX 4

### **IMPACT ASSESSMENT CRITERIA**

Various criteria are defined in the Environmental Impact Assessment Regulations (DEAT, 1998) which are adopted for the assessment of the visual impacts on the observers in the study area. The interpretation of these criteria is described as follows:

- **Nature of impacts:** An appraisal of the visual effect the activity would have on the receiving environment. This description should include the sensitivity of the receptors that are affected, and the manner in which they are affected, (both positive and negative effects).
- **Extent of impacts:** The spatial or geographic area of influence of the visual impact, i.e:
  - Site-related: extending only as far as the activity;
  - Local: limited to the immediate surroundings;
  - Regional: affecting a larger metropolitan or regional area;
  - National: affecting large parts of the country;
  - International: affecting areas across international boundaries.
- **Duration of impacts:** The predicted life-span of the visual impact:
  - Short term, (e.g. duration of the construction phase);
  - Medium term, (e.g. duration for screening vegetation to mature);
  - Long term, (e.g. lifespan of the project);
  - Permanent, where time will not mitigate the visual impact.
- **Intensity of impacts:** The magnitude of the impact on views, and character of the visual resources.
  - Low, where the character of visual resources or views of the visual resource are not affected;
  - Medium, where the character of visual resources or views of the visual resource are affected to a limited extent;
  - High, where the character of visual resources or views of the visual resource are significantly affected.
- **Probability of impacts:** The degree of likelihood of the visual impact occurring:
  - Improbable, where the possibility of the impact occurring is very low;
  - Probable, where there is a distinct possibility that the impact will occur;
  - Highly probable, where it is most likely that the impact will occur; or
  - Definite, where the impact will occur regardless of any prevention measures.
- **Determination of significance of impacts:** The significance of impacts can be determined through a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability, and are described as:
  - Low, where it will not have an influence on the decision;
  - Medium, where it should have an influence on the decision unless it is mitigated; or
  - High, where it would influence the decision regardless of any possible mitigation. (Oberholzer, 2005)