

**VISUAL IMPACT ASSESSMENT FOR THE PROPOSED BLANCO  
– DROËRIVIER 400kV TRANSMISSION LINE – EIA PHASE**

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## **EXECUTIVE SUMMARY**

I-scape, an independent consultant, has been appointed by Envirolution Consulting (Pty) Ltd to provide a report for the Environmental Impact Assessment (EIA) of the proposed Blanco - Droërivier 400kV transmission line, on the issues pertaining to visual impacts. The client, ESKOM SOC, has proposed the construction of a 400kV transmission line in the Western Cape and Eastern Cape Provinces between the Blanco Substation (approximately 6.5 km west of George) and the existing Droërivier Substation (approximately 7 km south west of Beaufort West).

A Visual Impact Assessment (VIA) assesses the potential visual changes/impacts to an existing baseline environment resulting from the implementation of a proposed project. The associated visual changes could potentially have an 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. This VIA forms part of the Scoping and EIA study as required by the National Environmental Management Act (NEMA) and the EIA Regulations (2014).

### **PROJECT DESCRIPTION**

The proposed project will join the existing Droërivier Substation to the future Blanco Substation via a 400kV transmission line. Two alternative alignments are proposed within a corridor of 2 km, as indicated in Figure 1.

- Alternative 1: This corridor extends from the Blanco Substation in a westerly direction after which it turns north within 3 km. It crosses the Outeniqua Mountain Range and carries on through the Klein Karoo, passing between the towns of Oudtshoorn and De Rust. It crosses the Swartberg Mountain Range, 10 km west of Meiringspoort Pass. For the remaining 100 km, it roughly follows the N12 route to Beaufort West through the Groot Karoo, until reaching the Droërivier Substation. The corridor follows a similar alignment as an existing transmission line and is approximately 180 km in length.
- Alternative 2: The first couple of kilometres follow the same route as Alternative 1. It turns east shortly after traversing the Outeniqua Mountain Range and roughly follows the R92/N9 towards Uniondale. It passes west of Uniondale maintaining its direction towards Willowmore. It passes over the eastern extremities of the Swartberg Mountain Range before turning north west, through the Groot Karoo towards Beaufort West, until reaching the Droërivier Substation. The alignment is approximately 260 km.

The proposed project traverses numerous properties and municipalities, and influences both the Western Cape and Eastern Cape provinces. Two alternative alignments are proposed with lengths between 180 km and 260 km. Considering the length of the proposed power line and the size of the individual transmission towers, it can be concluded that the project requires assessment on a larger regional scale.

### **LANDSCAPE CHARACTER ASSESSMENT**

The study area can be described as the area affected by visual impact. It has been defined as a zone of up to 5 km from the outer edge of the proposed corridor, or to the limit of the project's visibility, whichever is smallest. This is referred to as the Zone of Visual Influence (ZVI). The

factors that most significantly influence the ZVI are topographic variation and land use or land cover, which could potentially expose or screen the proposed project from sensitive viewpoints. These factors also contribute to the character of the study area.

In order to follow a versatile and pragmatic approach, the study area is divided into five different Landscape Types (LTs), namely:

- **Groot Karoo:**
  - Tourism has steadily increased and people are more and more inclined to visit the Groot Karoo for its unique tourism potential. The Karoo Development Foundation (KDF) issued a statement in a 2013 tourism strategy document that describes the unique character of the Groot Karoo as: “The Karoo offers nothingness, which is increasingly valuable, in terms of space, silence and solitude. Urban people live in stressed societies... and the Karoo offers a healing experience.” The study area fits this descriptive profile and offers a unique sense of solitude and tranquility in an arid natural environment. Although the landscape can be considered mundane when travelling at high speed through the Groot Karoo, the existing tourist facilities provide a myriad of opportunities and focuses on the best offerings associated with the Groot Karoo such as clear starry nights, exceptional local cuisine and simple lifestyles.
- **Swartberg Mountain Range:**
  - The Swartberg Mountain Range has a wilderness, natural landscape character that is an exceptional visual resource with high visual value. Large parts are considered to be in a pristine natural condition, with semi-natural conditions prevailing where major transport routes and power lines occur.
- **Klein Karoo Mountains:**
  - Large regions of this LT are considered to be in a pristine and semi-natural condition, especially on the mountain slopes and peaks closer to the Swartberg Mountain Range. Contained farming activities are present along the Nels and Kango Rivers, which have transformed the valleys to some extent. The agricultural modifications sometimes add favourably to the visual variety and promote visual harmony without major disruptions to the natural landscapes. Power lines traverse the landscape type and follow the same route as proposed by Alternative 1.
- **Klein Karoo:**
  - The Klein Karoo is mostly a rural landscape with various agricultural activities. Ostrich farming is synonymous with the Klein Karoo and flocks of ostriches are seen in camps across the central region. Large parts of the northern and southern regions of the LT are transformed by agricultural activities in the form of pasture fields and ostrich camps. The central region has a more varied topography, occupied by the natural vegetation on the hill slopes and limiting agriculture on the level areas in the valleys.
- **Outeniqua Mountains:**
  - The Outeniqua Mountain Range is considered the most southern part of the study area and consists of extreme topographic variation and pristine natural environments. It features high mountain peaks and deep valleys which makes the area fairly inaccessible. The Langkloof is a 160 km valley that runs east west along the northern part of the mountain range, between the towns of Herald and Twee Riviere. It is a wide valley that provides agricultural potential. Waboomskraal is a valley basin that is located between some high peaks. It is particularly picturesque with the hop plantations in the valley, surrounded by high mountain peaks. The hops are cultivated on tall trellises and this is one of only a few places in South Africa where it is grown. The Waboomskraal valley is renowned for its hop-plantation, which has been in production since 1830.

A LT is a unit in the study area that is similar in its landscape character and aesthetic value. The features can be grouped together as it will react similarly to impacts imposed on it.

## **IMPACT ASSESSMENT**

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. This implies that, firstly, a baseline must be established and secondly, the visual change, resulting from the project, must be compared to the baseline. The quantification of the visual change is referred to as the severity of the impact and is a function of:

- The nature of the impact;
- The probability of the impact occurring;
- The duration of the impact;
- The extent of the impact; and
- The magnitude of the impact.

The essence of determining the significance of a visual impact centres on the severity of the potential impacts, and the sensitivity of the affected receptors. In simple terms, a low severity impact affecting receptors of low sensitivity will result in a low significance. On the other end of the scale, a highly severe impact, affecting highly sensitive receptors, will result in a high significance.

Within the study area observers experience and interact differently with their environment, and therefore value it differently. They may be affected by the proposed project due to additions or alterations in the visual environment which may influence their experience and views of the visual resource. In this study a distinction is made between impacts on the **observers** and impacts on the **visual resource**. The observers represent all people that may be affected visually, while the impacts on the visual resource strictly assess the changes to the landscape character and the impact on its visual value.

### **OBSERVER SENSITIVITY**

Often, the general acceptance or non-acceptance of a project will be reflected in Public Participation events and is considered a valuable indicator of the true viewer sensitivity. The proposed transmission line has received a great deal of criticism, particularly from residents and tourism operators in the study area. The criticism is motivated by negative sentiments due to historical encounters with the applicant, but also issues revolving around health, safety, loss in property value, interference with current land use practices, ecological impacts, etc. The comments that are relevant to this study are specific to issues that causes visual intrusion on observers' views, and the loss in scenic quality of the visual resource.

A brief summary of concerns that were received during the input sessions with I&APs is provided below:

- The transmission line will negatively impact on photographic potential of the landscape;
- The transmission line will spoil the natural environment and therefore decrease the scenic quality of the visual resource;
- The construction process will cause unsightly disturbances that could lead to eyesores due to a lack of proper mitigation;
- Land values may decrease due to visual impact from transmission lines. This is interpreted as an issue relating to the decrease in aesthetic value, as many properties are developed in such a way as to take advantage of scenic views;
- Poor maintenance and aftercare of the servitude that results in eyesores; and

- Negative impact on eco-tourism. This relates to an issue of aesthetic value where tourism activities centres around the scenic quality of the environment.

The main observer groups in the study area are residents, tourists and motorists. 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.

Residents are considered visual receptors of a high sensitivity. They have an attentive awareness towards their living environment and have a sustained exposure to a particular impact.

Tourists are also considered visual receptors of a high sensitivity. Their purpose of visiting an area is to enjoy the scenic environment and they have a high expectation of the aesthetic value provided by the visual resource.

Motorists normally have a low sensitivity as their attention is generally focussed on the road, and their exposure to roadside objects is brief due to the speed they travel. An exception exists where motorists are travelling on scenic routes and the aesthetic qualities of the environment provide picturesque views.

### **LANDSCAPE CHARACTER SENSITIVITY**

The sensitivity of a landscape's character is a measure of the robustness of its character and the ability of the landscape to accommodate certain changes without detrimental impacts to its qualities.

All the LTs have been identified as having a highly sensitive character owing to the pristine natural qualities, high aesthetic value and unique topography of agricultural practices. The areas where a medium sensitivity has been identified are along Alternative 1 in the Groot Karoo LT, and through parts of the Klein Karoo LT.

**IMPACT ASSESSMENT SUMMARY**

Landscape Type	Project Alternative	Sensitivity of receptors	Severity of Impact without mitigation	Severity of Impact with mitigation	Significance of Impact without mitigation	Significance of Impact with mitigation
Groot Karoo	<b>Construction phase</b>					
	Alt 1	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: Medium	Low	Low	Minor	Minor
	Alt 2	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	Medium	Medium	Moderate	Moderate
		VR: Medium	Medium	Medium	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Medium	Medium	Moderate	Moderate
		VR: High	High	High	Major	Major
Swartberg Mountains	<b>Construction phase</b>					
	Alt 1	OB: High	Very low	Very low	Minor	Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Low	Very low	Moderate/Minor	Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	Very low	Very low	Minor	Minor
		VR: High	High	High	Major	Major
	Alt 2	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: High	High	High	Major	Major
Klein Karoo	<b>Construction phase</b>					
	Alt 1	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: Medium	Low	Low	Minor	Minor
<b>Operational phase</b>						

Landscape Type	Project Alternative	Sensitivity of receptors	Severity of Impact without mitigation	Severity of Impact with mitigation	Significance of Impact without mitigation	Significance of Impact with mitigation
	Alt 1	OB: High	Medium	Medium	Moderate	Moderate
		VR: Medium	Medium	Medium	Moderate/Minor	Moderate/Minor
Klein Karoo Mountains	<b>Construction phase</b>					
	Alt 1	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: High	Medium	Low	Moderate	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	Medium	Medium	Moderate	Moderate
		VR: High	Medium	Medium	Moderate	Moderate
	Alt 2	OB: High	High	High	Major	Major
		VR: High	Very high	Very high	Major	Major
Outeniqua Mountains	<b>Construction phase</b>					
	Alt 1	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: High	Medium	Low	Moderate	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	High	High	Major	Major
		VR: High	High	High	Major	Major
	Alt 2	OB: High	High	High	Major	Major
		VR: High	Very High	Very High	Major	Major

## **SUMMARY OF FINDINGS**

This VIA assessed the potential visual changes that may occur as a result of the construction and operation of a new 400 kV transmission line between the Droërivier and Blanco Substations. Two alternative routes have been proposed which extends over distances of 180 km and 260 km, respectively. Both routes are proposed through areas that are considered highly scenic, either for its pristine natural character or for its unique agricultural activities.

In most cases, the transmission line will impact on the visual quality of the visual resource by blemishing the natural character of the study area or interfering with unique and visually interesting land uses. Areas of high scenic value and visual quality have been identified as:

- The Groot Karoo that is valued for its desolate sense of place and uninterrupted panoramic views;
- The mountainous areas of the Swartberg and Outeniqua Mountains that are valued for exceptional scenic views and pristine natural environments;
- The Klein Karoo Mountains that offer scenic views of a mountainous landscape and visually pleasing farming practices in the valleys. Within this LT, the N9 is considered a scenic route, particularly in the area through Potjiesberg Pass;
- The Langkloof with visually pleasing views of the farming practices in the Langkloof valley; and
- Waboomskraal with the unique hops agricultural practices and highly scenic surroundings of the Outeniqua Mountains.

The study area is predominantly a rural area, with the exception of a few relatively small towns. The viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysveldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are within the ZMVE;

A high risk of cumulative visual impacts will be experienced along Alternative 1 as the route is proposed alongside an existing transmission line and lower voltage power line. These parallel running power lines increase the visual dominance of electrical infrastructure, and contrast with the rural or pristine natural character that prevails.

Reduction and remediation mitigation will not be effective to prevent residual impacts from occurring. The proposed transmission line will remain visible unless major design or alignment changes are implemented. The option of consolidating existing lines into the design of the new transmission line is regarded as very effective and is highly recommended to prevent major cumulative impacts. Although cumulative impacts may still occur, the significance thereof will be reduced and the breaching of a visual intolerance threshold may be avoided.

Avoiding sensitive landscape features and observers is regarded as being the most effective mitigation measure in reducing direct, cumulative and residual impacts. This is, however, a complex measure to implement, and is reliant on technical/feasibility studies as well as a much larger study area assessment to ensure that other sensitive features and observers are not impacted. Due to these unknown factors, avoidance mitigation is only proposed within the 2 km corridor that will reduce visual impacts on certain receptors.

### **PREFERRED ROUTE**

The most preferred route is Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact. Empirical research has indicated that two parallel running power lines are considered below the visual tolerance threshold in most cases, but three or more power lines nears, or exceeds, the threshold, increasing cumulative impacts to unacceptable levels. This is especially relevant in landscapes with high scenic value or high tourist potential as is found in parts of the study area. Without drastic mitigation measures, these impacts will remain high.

The No-Go alternative will have no change to the visual environment and will therefore not cause any impacts.

### **CONCLUSION**

This assessment has highlighted that highly significant impacts are expected in the Groot Karoo, Swartberg Mountains, Klein Karoo Mountains and Outeniqua Mountains LTs, and require major interventions to reduce the direct and cumulative impacts in particular. Authorisation of this project will result in significant losses in aesthetic value that will cause high levels of visual intrusion in some areas. The impact is only reversible with human intervention and stand a moderate risk of causing an irreplaceable loss in resources.

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## LIST OF ABBREVIATIONS

EIA	Environmental Impact Assessment
DEM	Digital Elevation Model
GIS	Geographical Information System
I&AP	Interested and Affected Party
LCA	Landscape Character Assessment
LT	Landscape Type
OB	Observer
POI	Points of Interest
SOC	State Owned Company
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VR	Visual Resource
ZMVE	Zone of Maximum Visual Exposure
ZVI	Zone of Visual Influence

## 1 INTRODUCTION

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The site investigations were done during the months of March and July on two separate occasions. A large part of the study area is predominantly a winter rainfall area and the photographs used in the document represents the character of the landscape during autumn and winter months.

## 2 LIMITATIONS AND ASSUMPTIONS

This section provides a clear description of the limitations and assumptions that influence the accuracy of the assessment and the confidence of the visual specialist in his professional judgement. The level of confidence is a function of the level of knowledge and information that is available regarding to the study area and the project. The following aspects have been identified as uncertainties, unknowns or limitations:

- A Visual Impact Assessment is not a purely objective science and often integrates qualitative evaluations based on expected 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;
- The period of assessment was during the month of July (2015) and a brief visit to selected parts of the study area was done during March (2016). Time and budget constraints does not allow for site investigations across all seasons and investigating the character changes throughout the study area. The visual specialist is confident that this constraint does not affect the accuracy of the assessment;
- Large parts of the study area consist of privately owned properties and access is often restricted. The photographic record represents views from publicly accessible places;
- The proposed project has not yet reached an advanced technical design phase, and therefore lacks information on exact alignments, construction duration and positioning of construction camps, etc. These unknowns have a negative impact on the accuracy of the assessment during the construction phase in particular, but assumptions are drawn from experience with other projects of a similar nature.

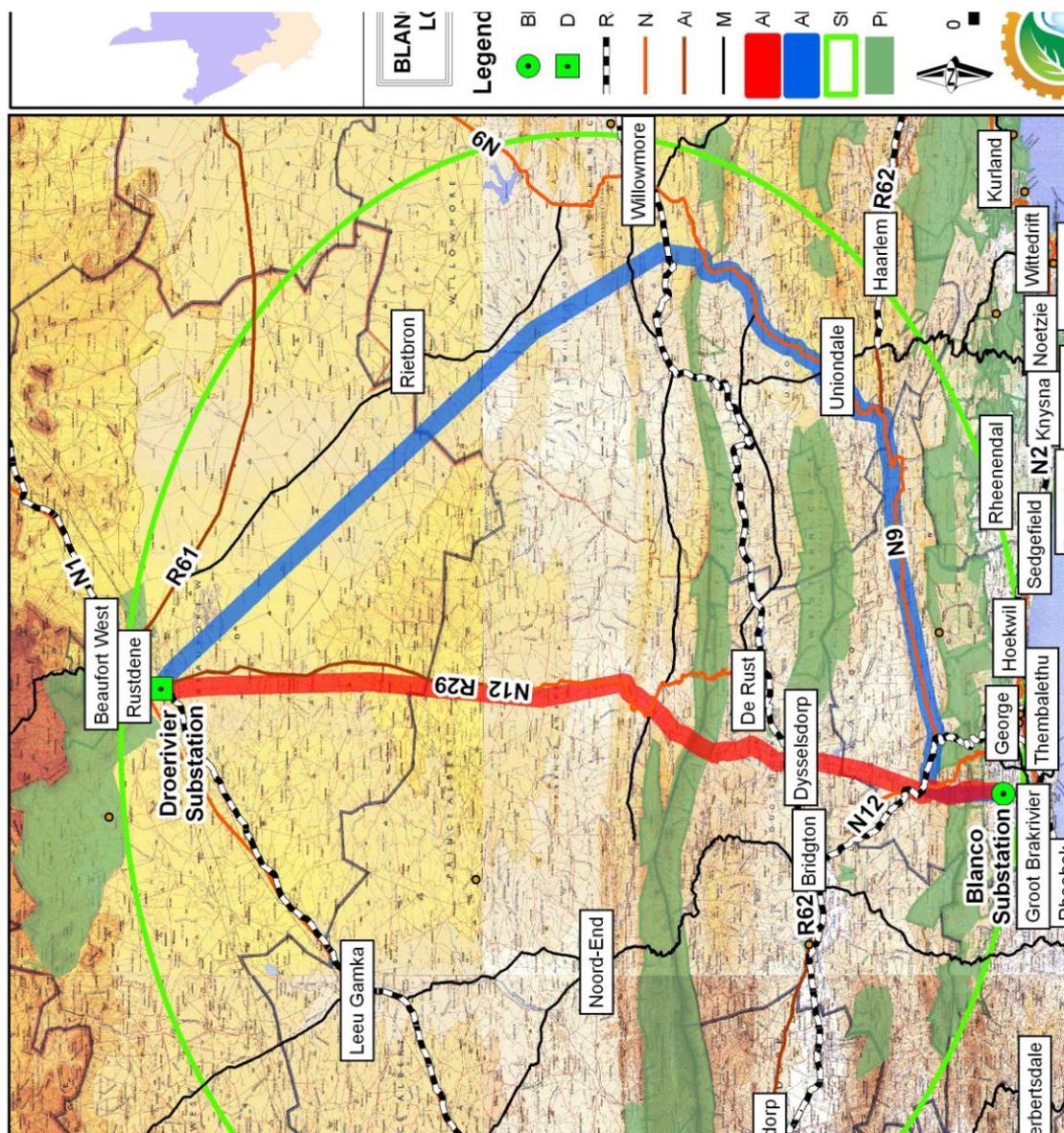


Figure 1: Locality Map

### 3 INFORMATION SOURCES

Research is done over a wide platform in order to understand the macro-scale complexities of the study area. The information sources that are typically utilised include, but are not limited to:

- GIS generated maps such as land cover and elevation maps;
- Visibility analyses based on 20 m contours generated by GIS software;
- Google Earth images of the project site;
- Web searches on specific items in or surrounding the study area;
- A site investigation to establish a photographic record;
- Comments made, and/or information provided by I&APs;
- Project specific information provided by Eskom SOC and/or the lead consultant;
- Professional knowledge and experience gained from similar projects.

Section 0 provide a list of specific references that influenced the study approach and methodology.

## 4 METHODOLOGY STATEMENT

### 4.1 INTRODUCTION

According to a study by the Transportation Research Board of the National Academies (2013), criteria of ten points can be implemented to evaluate a VIA methodology. The ten points that define a good standard of reporting are described as being:

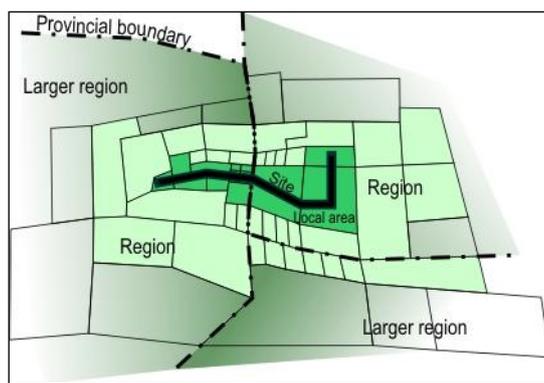
1. Objective – the procedure should be designed to eliminate individual bias;
2. Valid – the procedure should be defensible and legitimate within a legal framework;
3. Reliable – adequately trained professionals following the same procedure should reach similar results;
4. Precise – the data required by the procedure should be measured at a grain or scale sufficiently fine to validly measure or describe characteristics of substantive interest and sufficiently coarse to be pragmatically implemented;
5. Versatile – the procedure supports valid assessments of different types of proposed changes from the perspectives of different viewer groups interacting with different landscape settings;
6. Pragmatic – the procedure can be easily and efficiently implemented by a trained professional;
7. Easily understood – the procedure and assessments are accessible to the public and decision makers;
8. Useful – the procedure and assessments affect location, design or mitigation decisions.
9. Consistently implemented – the procedure can be applied consistently among different projects and individual assessments are consistent with the chosen procedure;
10. Legitimate – the procedure is supported by laws, regulations or other legal mechanisms, uses socially/culturally accepted standards as well as scientifically accepted standards.

These ten points are considered international benchmarks in the compilation of a Visual Impact Assessment and will dictate the VIA methodology and assessment strategy for this project.

### 4.2 DEFINING A SCALE AND LEVEL OF ASSESSMENT

The size of the study area and the extent of the project impact will determine the scale and level of assessment. The study area can be described as the area affected by visual impact. The study area can be defined by four assessment levels namely:

- **Site** is the smallest level of assessment and stipulates the extent of the activities related to the project. This is limited to the footprint of the project or the area of disturbance;
- The **local area** is limited to the immediate surroundings and will often be defined by the properties on which the project is located and could possibly include the surrounding properties;
- A **region** is described by area classifications such as cities/towns and municipalities/districts; and
- A **larger region** will be measured by provincial, national or international borders being crossed or affected.



A study by Hull & Bishop (1988) concluded that a power line has its maximum impact on the visual environment when viewed from distances  $\leq$  than 1 km. Beyond this distance, the impact decreases considerably to a point where it is virtually insignificant. This should not be confused with the visibility of a power line. It is possible to visually detect a power line over much greater distances, but Hull & Bishop specifically assessed the impact of a power line on the visual environment. A zone of maximum visual impact is therefore delineated around the project area at 1 km, but a larger zone of up to 5 km is assessed to verify Hull & Bishop's findings.

The proposed project traverses numerous properties and municipalities, and influences both the Western Cape and Eastern Cape provinces. Two alternative alignments are proposed with lengths between 180 km and 260 km. Considering the length of the proposed power line and the size of the individual transmission towers, it can be concluded that the project requires assessment on a larger regional scale.

Point 4 in Section 4.1 refers to the level of detail that is appropriate to the scale of the assessment. The project is considered a large scale project due to its linear length and influences a study area on a larger regional scale. The level of detail deemed appropriate to the scale of the assessment is on a regional scale and translates into the identification of landscape types and viewer groups that will be similar in characteristics and experiences respectively. In certain cases, specific landscape features or viewers will be highlighted to address particular impacts at that location.

### **4.3 VIA OBJECTIVES**

The objectives of this study will be to:

- Establish a methodology that abides to the criteria in section 4.1 as well as to the NEMA regulations;
- Address the concerns from Interested and Affected Parties (I&APs) that are raised during the EIA process which relates to aesthetic or visual aspects;
- Determine the significance of the impacts on the observers in the study area and the landscape character due to the change in the visual characteristics of the environment;
- Recommend mitigation measures to alleviate or reduce the anticipated impacts; and
- Arrive at a preferred alternative as determined by the findings of this study.

#### **4.4 VIA METHODOLOGY**

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

- 1) **Site investigation:** Identify sensitive viewpoints and capture the character of the visual environment by establishing a photographic record;
- 2) **Project description:** Describe the type, scale and visual characteristics of the proposed project and its individual elements or phases;
- 3) **Delineate the study area and divide it into logical landscape types:** Determine the extent of the study area and identify landscape types that have similar visual characteristics;
- 4) **Compile a Landscape Character Assessment:** Discuss the tangible and intangible characteristics of the study area to determine its value and sensitivity;
- 5) **Determine the sensitivity of receptors:** Assess the sensitivity of observer groups and landscape types with regards to visual change;
- 6) **Visual Impact Assessment:** Identify and describe the potential direct, indirect, cumulative and residual impacts on both the observer groups and landscape types;
- 7) **Mitigation measures:** Propose mitigation measures to alleviate or completely eliminate the potential impacts that are identified;
- 8) **Rate alternatives:** Provide an argument as to which alternative is most preferred based on the findings of the assessment; and
- 9) **Conclusion and recommendations:** Discuss the project's main issues and provide recommendations where necessary.

### **5 PROJECT DESCRIPTION**

The proposed project will join the existing Droërivier Substation to the future Blanco Substation via a 400kV transmission line. Two alternative alignments are proposed within a corridor of 2 km, as indicated in Figure 1.

- **Alternative 1:** This corridor extends from the Blanco Substation in a westerly direction after which it turns north within 3 km. It crosses the Outeniqua Mountain Range and carries on through the Klein Karoo, passing between the towns of Oudtshoorn and De Rust. It crosses the Swartberg Mountain Range, 10 km west of Meiringspoort Pass. For the remaining 100 km, it roughly follows the N12 route to Beaufort West through the Groot Karoo, until reaching the Droërivier Substation. The corridor follows a similar alignment as an existing transmission line and is approximately 180 km in length.
- **Alternative 2:** The first couple of kilometres follow the same route as Alternative 1. It turns east shortly after traversing the Outeniqua Mountain Range and roughly follows the R92/N9 towards Uniondale. It passes west of Uniondale maintaining its direction towards Willowmore. It passes over the eastern extremities of the Swartberg Mountain Range before turning north west, through the Groot Karoo towards Beaufort West, until reaching the Droërivier Substation. The alignment is approximately 260 km.

The type of towers to be constructed will most probably be steel lattice towers such as those illustrated in Figure 2. The height of such towers may vary depending on the terrain it traverses, but on average, it can be assumed to be 30 to 40 m tall. Additional technical information is provided in Figure 4.

The duration of the construction process is unknown at this stage but it is expected to run in excess of 24 months. This is a relatively large-scale electrical infrastructure development,

mainly due to the distance of the project area and the physical size of the towers/pylons that will be constructed.

The following construction procedures are generic stages, normally associated with power line construction, and may vary according to the terrain or type of tower to be assembled:

- Survey and pegging of pole/tower positions through ground and air survey teams;
- Establishment of a construction camp and stockyards;
- Construction of additional access roads and gates if required. Existing roads will be used as far as possible but it can be expected that new roads will typically be established by means of driving over the vegetation continuously and creating a two-tread passage as oppose to a graded gravel road;
- Clearing or trimming of vegetation in the servitude that may interfere with the line;
- Construction of foundations by means of earthmoving equipment such as excavators;
- Tower assembly and erection by means of a ground team and mobile crane. Helicopters may also be used in inaccessible places;
- Conductor stringing and tensioning;
- Servitude rehabilitation;
- Testing and commissioning; and
- Sporadic maintenance.

The physical construction activities are considered low intensity construction. A great percentage of the assembly occurs off site and limited earthworks are required. The location where each tower will be located will be most severely impacted by construction activities such as the operation of earthmoving machinery and delivery trucks. A ground crew will also be present to assist in the construction process. Vegetation will be trampled or removed around the tower base and where new roads are to be constructed, which will expose the underlying soils (refer to Figure 3).

In areas where higher growing vegetation is deemed a safety risk in the servitude, it will be removed or trimmed to the required height. This often results in a corridor devoid of trees and shrubs, and subsequently reduced to grassland or low growing scrub. This is likely to occur in the Klein Karoo Mountains, and Outeniqua Mountains LTs where trees and certain shrubs grow relatively tall. In some isolated instances, it will may occur in other parts of the study area as well.

Once the power line is completed, the most visible elements will be the towers that are spaced at regular intervals, and the conductors joining the individual towers. A power line is generally considered a weak visual element. The true or actual visibility of an object in the landscape is influenced by a combination of factors. Apart from physical objects 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 depends on several aspects, of which distance from an object and contrast between the object and its surroundings are considered most influential. The conditions of the atmosphere play a role in the perceivable contrast between an object and its background. Even on the clearest of days, the sky is not entirely transparent and airborne particulates cause a reduction in the vividness of colours. The contrast between light and dark diminishes as the viewing distance increases and the object becomes less and less visible. The object eventually appears to merge with the background, making it imperceptible with the naked eye.

Empirical research suggests that the type of tower (i.e. physical size, intricateness of lattice work and colour), atmospheric conditions, the relative position of the tower in relation to the sun and observer and the distance between the observer and the towers are the main factors influencing true visibility. New towers often have a much shinier appearance than older towers due to the silver, galvanised paint. When light reflects off the new towers it is much more noticeable from greater distances, but weathering reduces the shiny appearance over time. In addition, towers set against a backdrop of muted colours are less visible than those protruding above the skyline with the sky as backdrop. The cross-rope towers are considered the least visible due to their slender and minimalistic appearance, but can only be used on the straight sections of an alignment. The self-supporting towers are bulkier and require thicker steel members to counter sideway forces. These are used on corners.

It has been noted that towers of this scale are fairly visible up to distances of 5 km, but atmospheric conditions and the lack of contrast with the background makes it increasingly difficult to detect at greater distances. This can also be attributed to the slender lattice type construction that is permeable and easily blends in with the background at this distance. Exceptions do exist, but in general, 8 km is considered the furthest a tower is detectible with the naked eye. A new tower is potentially visible from greater distances but its shiny appearance is temporary.

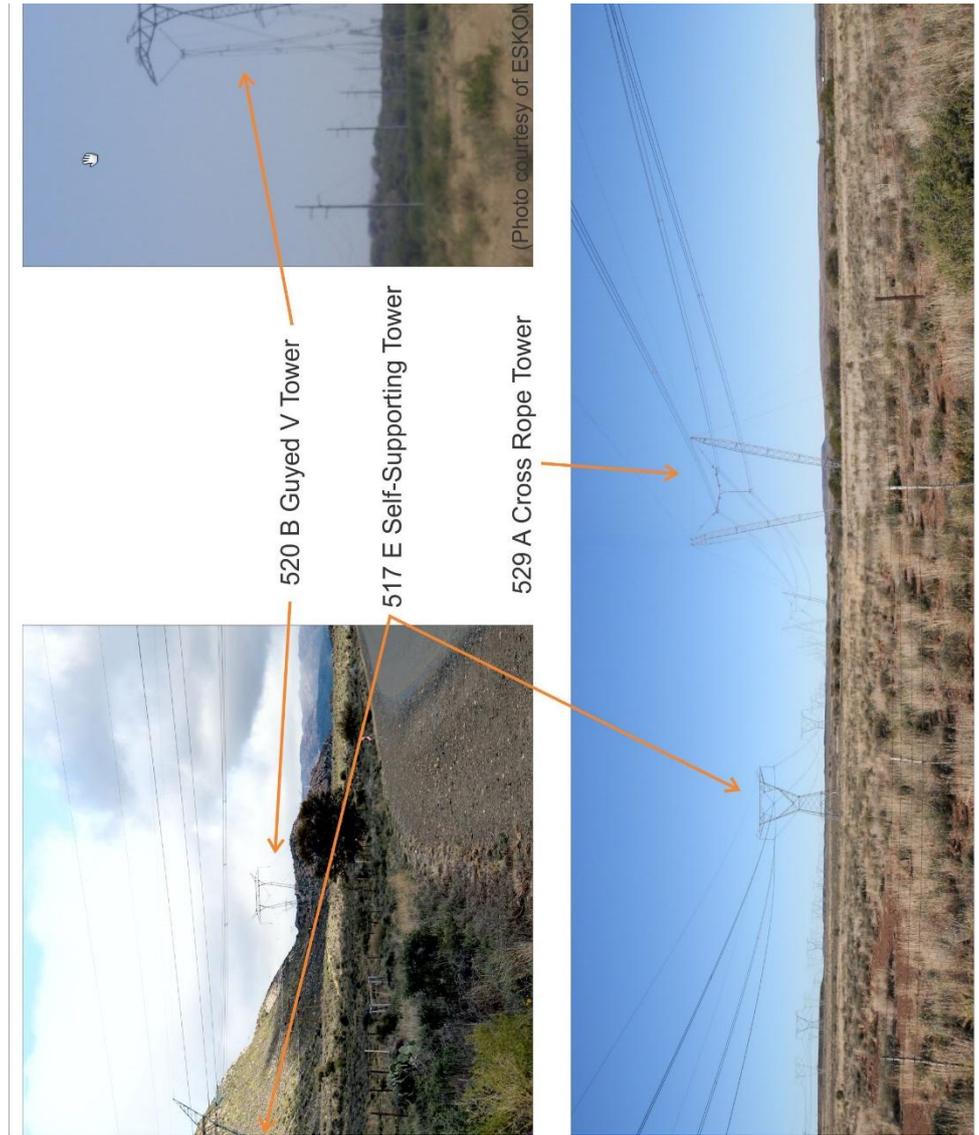


Figure 2: Types of towers being considered



Figure 3: Assembly and construction process



Project name:  
Droërivier- Blanco 400kV Servitude  
Visual Impact Assessment  
Date: 2016 - 07 - 21

represent certain phases of the construction of a tower with a capacity of 400kV or more. It illustrates some of the components of the tower while assembly is underway. The tower components

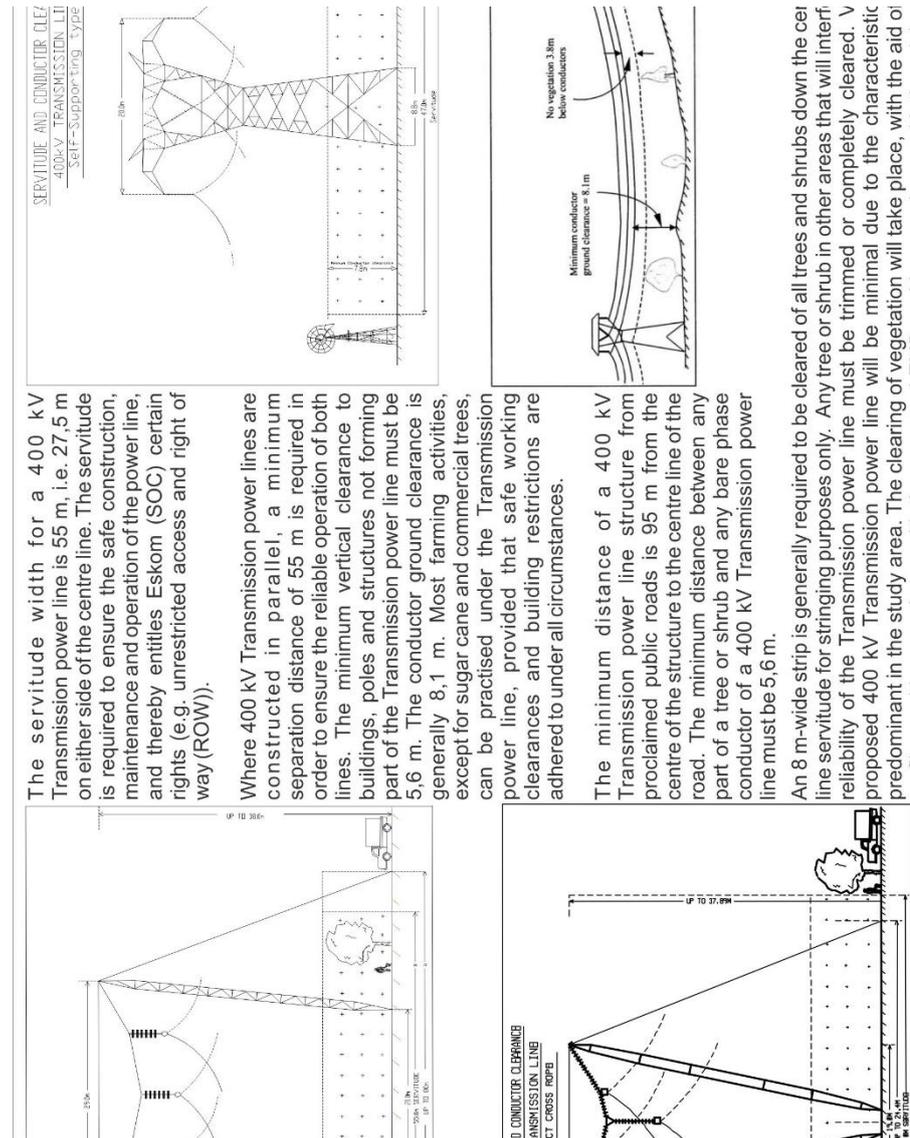


Figure 4: Technical information on transmission lines

## 6 LANDSCAPE CHARACTER ASSESSMENT

### 6.1 INTRODUCTION

The study area can be described as the area affected by visual impact. It has been defined as a zone of up to 5 km from the outer edge of the proposed corridor, or to the limit of the project's visibility, whichever is smallest. This is referred to as the Zone of Visual Influence (ZVI). The factors that most significantly influence the ZVI are topographic variation and land use or land cover, which could potentially expose or screen the proposed project from sensitive viewpoints. These factors also contribute to the character of the study area.

In order to follow a versatile and pragmatic approach, the study area is divided into five different Landscape Types (LTs). A LT is a unit in the study area that is similar in its landscape character and aesthetic value. The LTs are illustrated in Figure 5 - Figure 7 with some points of interest (POI) shown on the maps.

A Landscape Character Assessment (LCA) identifies and describes the comprising attributes and their qualities/values in the study area. It recognises that a landscape consists of



interconnected systems, patterns and individual components that is defined by the natural, cultural and historical aspects of the region. Vorel et al (2006) states that “the character of a certain landscape segment is the result of the interplay of natural attributes (especially morphology, water bodies, character of vegetation), cultural attributes (land use, form and structure of built-up areas, individual buildings and their relationship with the surrounding landscape, the cultural value of the place) and historical attributes (the presence of elements and textures that bear witness to the historical development of a landscape and its continuity).”

Globally, pristine and semi-natural<sup>1</sup> environments are severely under pressure and a small percentage of intact and undisturbed ecosystems remain. Natural environments are considered finite visual resources due to the pressures of modern day development and ecosystem transformation. Similar to other natural resources, a visual resource has a value to a group of people / observers, which in this case is an aesthetic value. An aesthetic value can be described as the degree of appreciation for the qualities associated with a visual resource and refers to the sensory experience one has when exposed to the perceivable landscape attributes.

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<sup>1</sup> Semi-natural environments are environments that have experienced some transformation but its general condition remains natural. Pristine natural environments have no visible signs of human interference or transformation.

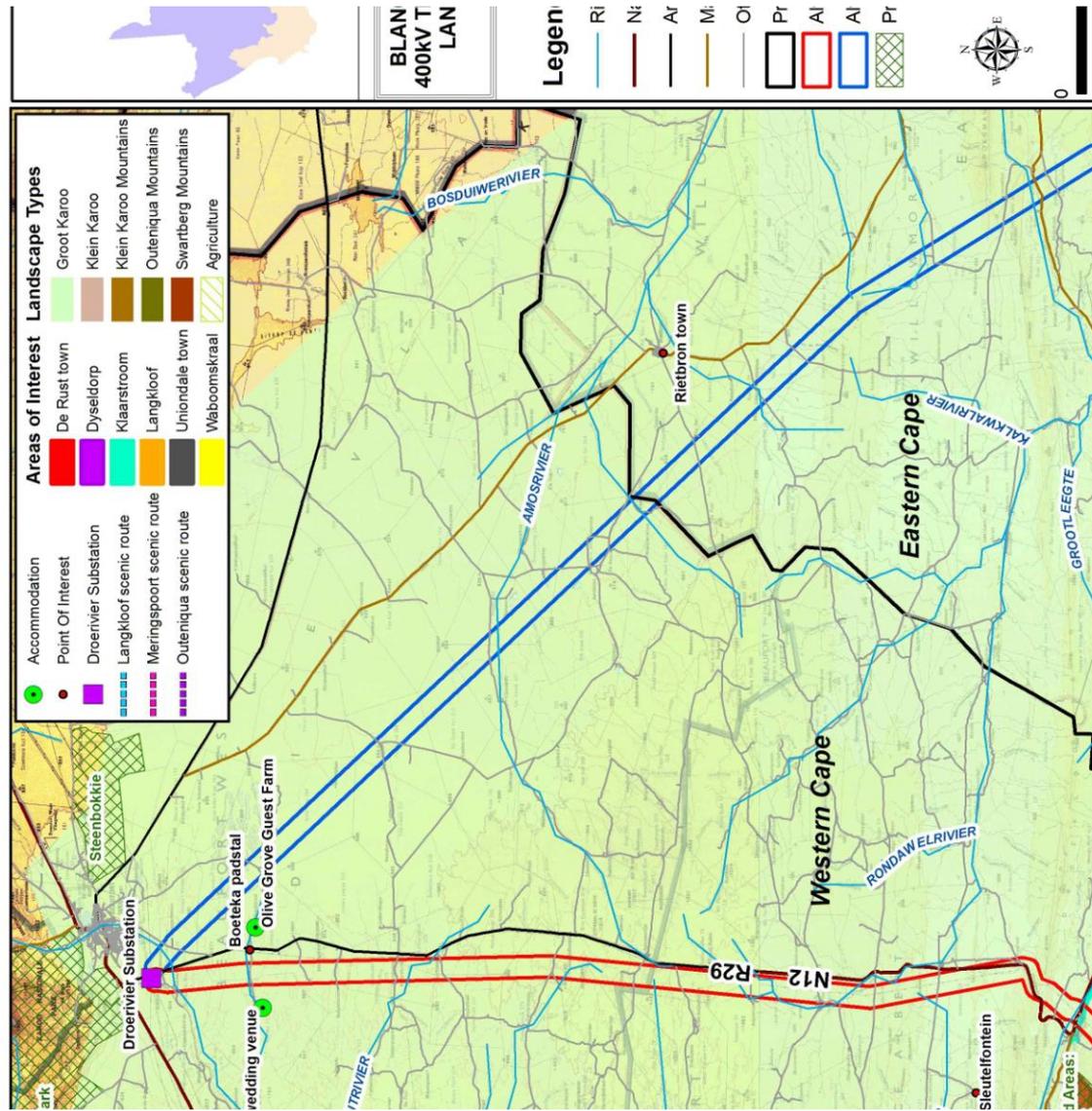


Figure 5: Landscape types in northern region



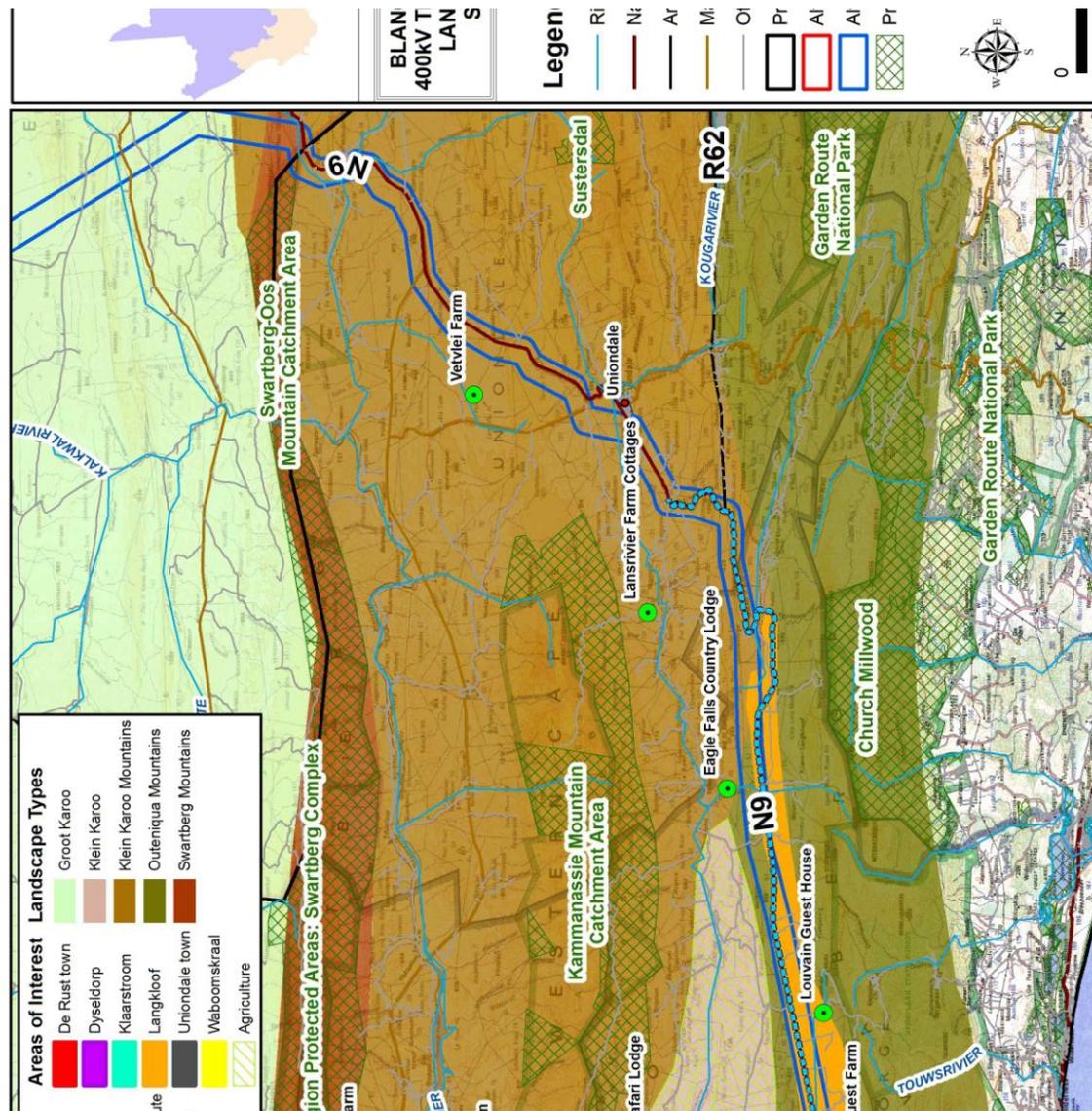


Figure 7: Landscape Types in South Eastern region



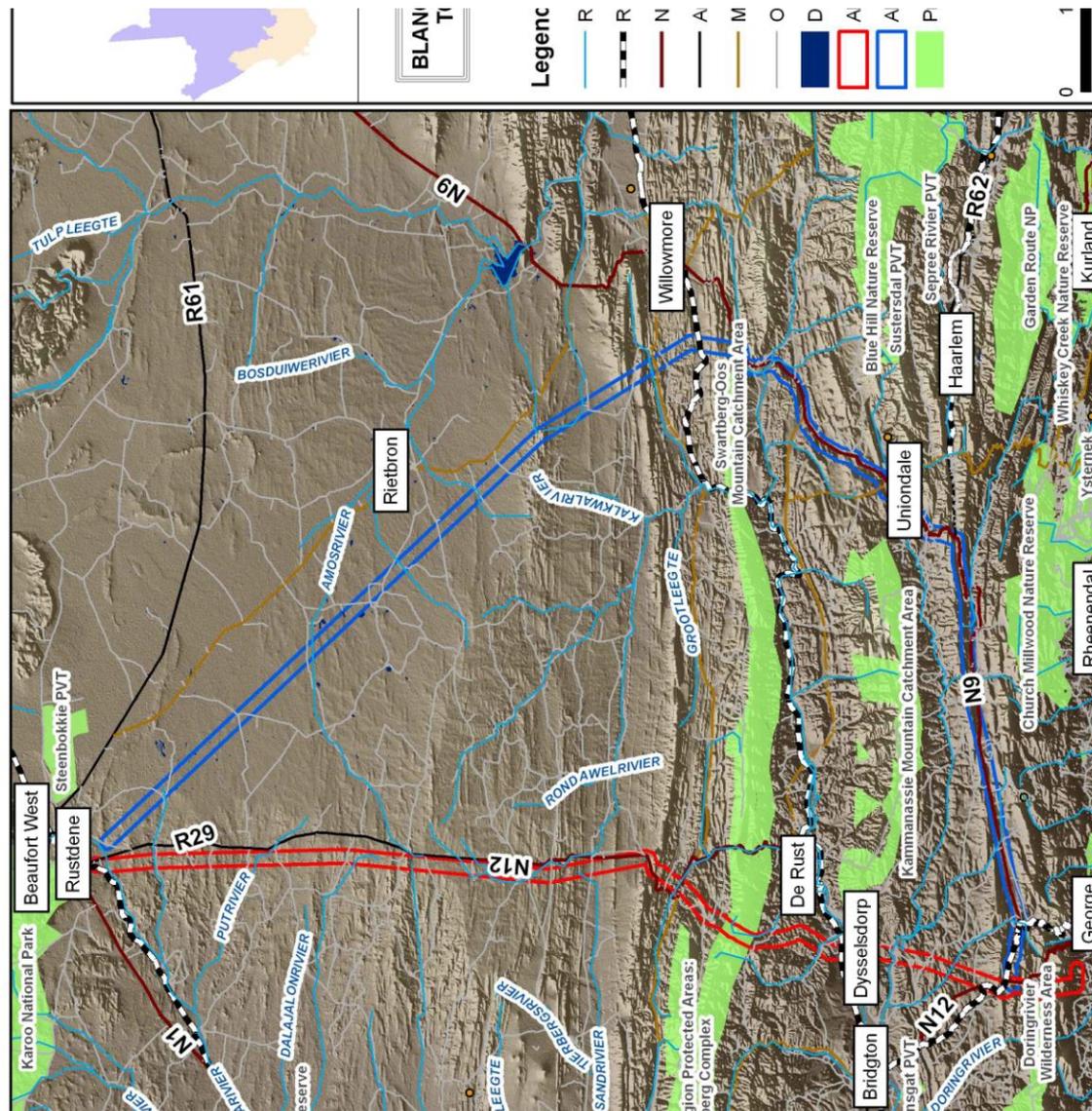


Figure 9: Topographic map

## 6.2 GROOT KAROO

Topography	Relatively even and undulating plains with occasional low-lying ridges through the landscape and panoramic views. The topography becomes increasingly varied and elevated towards the south, near the Swartberg Mountains. Similar topographic features can be found west of Willowmore. Natural drainage corridors are sparse and mostly inconspicuous. Streams are intermittent and the occasional small farm dam is noticeable in the study area. Water is more abundant near Klaarstroom raising the agricultural potential.
Vegetation	The arid climate limits vegetation to low growing scrub and succulents associated with Succulent Karoo vegetation. The vegetation patterns are uniform and covers the undulating plains in a homogenous surface layer. The Karoo region offers exceptional grazing for sheep. Karoo Lamb and Mutton, produced and slaughtered in the Karoo region, can be certified under the <i>Certified Karoo Meat of Origin</i> standards. This places emphasis on the value of the Karoo vegetation as an agricultural asset. Very limited cultivation is noticeable in the Groot Karoo. Small scale cultivation is occasionally present along streams where a patch of pasture can be irrigated. Olives have been introduced into the region on selected farms such as Olive Grove Guest Farm. No extensive plantations are present and it is considered a small-scale and localised practice. The most southern region, along the foothills of the Swartberg Mountains, consists of a series of ridges and valleys that offer more suitable environments for cultivated pastures. The Aaps and Wit Rivers provide water for irrigation and several small farm dams are present. The natural vegetation still remains low growing scrub and succulents associated with Rhenosterveld.
Land use	The predominant land use is agricultural and is used for the grazing of sheep or game farming. The farms are exceptionally large due to the low carrying capacity of the natural vegetation. Game farming is common and is usually done in conjunction with sheep farming. Olive farms can be found in certain isolated areas such as Olive Grove Guest Farm. Klaarstroom is a small agricultural village along the northern foothills of the Swartberg Mountain Range. This is a transition zone between the Groot Karoo and the Swartberg Mountains where the topography becomes increasingly more elevated. The availability of water from the river makes it possible to sustain small-scale cultivation in the valley.
Degree of naturalness/transformation	Due to the unique grazing quality of the Karoo vegetation, the endemic vegetation is preserved over most of the study area. The Groot Karoo is sparsely developed and the degree of transformation is limited. The olive farms and pasture fields have transformed the landscape in isolated locations, but still maintains the integrity of the natural landscape. The olive groves and the contrasting green pastures within an arid landscape create visual interest and contribute to pleasant views. An existing 400kV transmission line and a lower-voltage power line follow a similar route as Alternative 1 from Droërivier Substation to the Swartberg Mountain Range. The route proposed by Alternative 2 has no major electrical infrastructure.
Points of interest	The Karoo has redefined itself over the last couple of years as a tourist destination. This particular part is still underutilised, but a few roadside shops are selling local produce such as lamb meat and olive products. Olive Grove Guest Farm and Boeteka Wedding Venue combine the tranquil and isolated sense of place with tourist activities such as guided tours, game viewing and function facilities. Groot Sleutelfontein Private Game Reserve offers a hunting experience. The N12 is a main connection between the N1 at Beaufort West and the coastal towns of George and Knysna, thereby providing an important tourist corridor.
Landscape exposure	Due to the low topographic variation, expansive views are possible across the landscape. The Swartberg Mountains are visible from the higher lying areas of Beaufort West, which is a distance of approximately 100 km. The more mountainous areas near Klaarstroom and west of Willowmore offer views within the valleys.
Additional notes	Tourism has steadily increased and people are more and more inclined to visit the Groot Karoo for its unique tourism potential. The Karoo Development Foundation (KDF) issued a statement in a 2013 tourism strategy document that describes the unique character of the Groot Karoo as: "The Karoo offers nothingness, which is increasingly valuable, in terms of space, silence and solitude. Urban people live in stressed societies... and

the Karoo offers a healing experience.” The study area fits this descriptive profile and offers a unique sense of solitude and tranquility in an arid natural environment. Although the landscape can be considered mundane when travelling at high speed through the Groot Karoo, the existing tourist facilities provide a myriad of opportunities and focuses on the best offerings associated with the Groot Karoo such as clear starry nights, exceptional local cuisine and simple lifestyles.



Figure 10: Padstal next to N12



Figure 11: Church at Seekoevlei



Figure 12: 15km west of Willowmore on R407

### 6.3 SWARTBERG MOUNTAIN RANGE

Topography	Highly varied topography along the linear mountain range featuring high peaks and deep valleys. Mountains are often jagged with exposed rock faces and cliffs. Interesting geological patterns are visible such as those found in Meiringspoort gorge. The mountains are a geographical divide between the Groot and Klein Karoo, and access to this area is difficult.
Vegetation	The Swartberg Mountains consist of natural vegetation that is represented by low growing shrubs and succulents on the mountainsides and peaks. Vegetation communities range from Mountain Fynbos to Renosterveld and are rich in its biodiversity. The valleys are consistent with riverine vegetation with medium sized trees and shrubs lining the river beds.
Land use	The Swartberg Mountain Range is a protected reserve and is a world heritage site (declared in 2004). It stretches over 121 000 ha conserving its unique fauna and flora, but its primary conservation goal is to manage the mountain catchment and water yields in the region. It is fairly inaccessible with Meiringspoort Pass and the N9 being the main connections between the Groot and Klein Karoo. No major farming is noticeable on the mountains, but pasture fields and livestock farming are confined to the more accessible foothills.
Degree of naturalness/transformation	Due to its protected status, the Swartberg Mountain Range is largely in a natural condition. Its inaccessibility and mountainous environment does not allow for major human intervention and many parts can only be reached by foot. History portrays existence of the San people, but European farmers in the 1700s constructed small settlements and roads connecting the Groot and Klein Karoo. Two existing power lines cross over the Swartberg Mountains along the same route as proposed by Alternative 1. The environment is considered largely in a pristine condition with limited human interventions apart from the existing power lines.
Points of interest	The Swartberg Mountains provide tourist activities such as hiking and accommodation to the west of the study area. The study area itself traverses a part of the Swartberg Mountains that provides no access to the public. The nearest tourist facilities are Wilgemonde Farm Cottage and Oudemuragie Guest Farm along the northern and southern foothills of the Swartberg Mountains, respectively. The mountains provide a picturesque backdrop to the farms and towns in the Klein Karoo and are the main feature of many photographs. It is a unique landscape with a high topographical elevation, distinct vegetation communities, and contributes significantly to the wilderness character of the region.
Landscape exposure	The Swartberg Mountain Range is a visual barrier between the Groot and Klein Karoo. It provides a spectacular backdrop for views from the lower lying foothills. The only public roads connecting the Groot and Klein Karoo near the study area are Meiringspoort Pass that follows the Groot Rivier valley, and the N9 between Uniondale and Willowmore.
Additional notes	The Swartberg Mountain Range has a wilderness, natural landscape character that is an exceptional visual resource with high visual value. Large parts are considered to be in a pristine natural condition, with semi-natural conditions prevailing where major transport routes and power lines occur.



Figure 13: Farm on the foothills of Swartberg Mountains

## 6.4 KLEIN KAROO MOUNTAINS

Topography	Mountainous landscape along the southern foothills of the Swartberg Mountain Range, but not as dramatic and jagged as the Swartberg Mountain Range itself. Hills are more rounded in appearance with occasional rocky outcrops or small cliffs. Wider valleys and moderate slopes create opportunities for contained agriculture.
Vegetation	The natural vegetation consists of low growing shrubs on the mountain slopes and crests with riverine vegetation in the valleys. Large aloe species often tower above the shrubs on the mountainsides. Mountain Fynbos covers the higher peaks of the mountains. Farming activities occur along the Nels and Kango Rivers in the form of pastures fields, while vineyards and olive trees are also cultivated in these valleys. Exotic woodlands are noticeable, especially around farmsteads.
Land use	The natural vegetation of the mountain peaks and slopes appears in large areas north of the N12 between De Rust and Oudtshoorn. The valleys of the Nels and Kango Rivers are transformed by agricultural activities. Pasture fields and some vineyards and olive plantations occur in these areas. Cattle, sheep and ostrich farms are also present. Large-scale agriculture is present along the Olifants River, south of the N12. Irrigated pasture fields and vineyards stretch along the river up to Oudtshoorn. The Klein Karoo Mountains has a semi-natural, rural character.
Degree of naturalness/transformation	Large regions of this LT are considered to be in a pristine and semi-natural condition, especially on the mountain slopes and peaks closer to the Swartberg Mountain Range. Contained farming activities are present along the Nels and Kango Rivers, which have transformed the valleys to some extent. The agricultural modifications sometimes add favourably to the visual variety and promote visual harmony without major disruptions to the natural landscapes. Power lines traverse the landscape type and follow the same route as proposed by Alternative 1.
Points of interest	A couple of guest farms and venues for overnight accommodation are present along the transmission line routes such as Oudemuragie Guest Farm and Thabile Lodge. The Potjiesberg Pass is considered a scenic route and offers views of interesting geological features and pristine natural environments. The Klein Karoo Mountains have tremendous natural beauty and offer picturesque scenes, with the Swartberg Mountains

	and Kammanassie Mountains as backdrop.
Landscape exposure	Due to the mountainous character and limited access to the area, visibility is often limited to the valley of the Nels and Kango Rivers. On some occasions, the road goes over a ridge granting elevated views down the valleys and towards the magnificent Swartberg Mountains. The views along the N9 are often more expansive and extend along the lengths of the valleys. The road crosses over mountains and provides elevated views of the landscape.



Figure 14: View of the hills near De Rust



Figure 15: View from Potjiesberg pass

## 6.5 KLEIN KAROO

KLEIN KAROO	
Topography	Undulating topography and hilly terrain in the central region, levelling out into large open plains towards the south and north. The topography is varied with low hills and ridges becoming more elevated and mountainous near the Kammanassie inselberg to the east. The northern area near Dysseldorp and the southern region on the foothills of the Outeniqua Mountains are large open plains with extensive agriculture.
Vegetation	The natural vegetation consists of low growing shrubs associated with the Renosterveld. Large aloe species appear in groups on the hill slopes and deliver spectacular flowering displays of red and orange. Intensive cultivation occurs along the Olifants and Kammanassie Rivers where the soil is fertile and water is available for irrigation.
Land use	The Klein Karoo is mostly a rural landscape with various agricultural activities. Ostrich farming is synonymous with the Klein Karoo and flocks of ostriches are seen in camps across the central region. Intensive cultivation is present along the major rivers and the foothills of the Outeniqua Mountains.
Degree of naturalness/transformation	Large parts of the northern and southern regions of the LT are transformed by agricultural activities in the form of pasture fields and ostrich camps. The central region has a more varied topography, occupied by the natural vegetation on the hill slopes and limiting agriculture on the level areas in the valleys.
Points of interest	The Kammanassie Dam is located in the central region between the mountains. It dams up the Kammanassie River that provides water to the pasture fields in the Kammanassie valley. The scenes are visually pleasing and flower displays from the aloes can be dramatic in some areas.
Landscape exposure	The landscape is very exposed in the northern and southern regions where the topography is mainly flat. The central region offers more varied and hilly terrain, limiting views from the lower laying areas. Expansive and panoramic views are possible on the crests of the hills.



Figure 16: View of ostrich farms below the Kammanassie Dam



Figure 17: Views of central region with Kammanassie Dam in the distance

## 6.6 OUTENIQUA MOUNTAINS

OUTENIQUA MOUNTAINS	
Topography	The Outeniqua Mountain Range is considered the most southern part of the study area and consists of extreme topographic variation and pristine natural environments. The Outeniqua Mountains consists of a series of ridges and jagged hills of approximately 10 km wide, which extend along the coastline for many hundreds of kilometers. It features high mountain peaks and deep valleys which makes the area fairly inaccessible. The Langkloof is a 160 km valley that runs east west along the northern part of the mountain range, between the towns of Herald and Twee Riviere. It is a wide valley that provides agricultural potential. Waboonskraal is a valley basin that is located between some high peaks. It is particularly picturesque with the hop plantations in the valley, surrounded by high mountain peaks.
Vegetation	This is generally a high rainfall region, and numerous small tributaries originate from within the mountains, sustaining rich ecological biodiversity. The natural vegetation is predominantly Outeniqua Sandstone fynbos with patches of Afro temperate forests in some isolated valleys. The Langkloof and Waboonskraal valleys are cultivated and generate a variety of crops. The most unique crop is produced at the hop-plantations in Waboonskraal. The hops are cultivated on tall trellises and this is one of only a few places in South Africa where it is grown. The Waboonskraal valley is renowned for its hop-plantation, which has been in production since 1830.
Land use	Due to the inaccessibility of the mountains, large parts remain in a pristine natural condition, and Witfontein Nature Reserve and Doringrivier Wilderness area conserve most of the Outeniqua Mountain Range. Langkloof and Waboonskraal are areas suitable for cultivation due to the even topography and fertile soil. A pristine natural landscape character prevails with pockets of cultivation in the valleys.
Degree of naturalness/ transformation	A high degree of naturalness occurs on the mountain range. The agricultural activities in the Langkloof and Waboonskraal valleys have transformed the natural landscape over many years. The modifications add favourably to the visual variety and promote visual harmony that produces picturesque views. Some power lines traverse the Outeniqua Mountains through Waboonskraal, and run parallel to the proposed routes.
Points of interest	The Outeniqua Mountain Range provides a magnificent backdrop to the coastal town of George as well as the northern part of the Klein Karoo. It is a gateway, separating the inland Karoo from the Garden Route, connected with the sinuous Outeniqua Pass. The mountain range is a source of many interesting sightings such as waterfalls, mountain peaks and valleys, to name a few. The Waboonskraal and Langkloof valleys are accessible by road and provide picturesque views. Overnight accommodation is available in Waboonskraal, and also along the southern foothills of the Outeniqua Mountains. This part of the study area has tremendous natural beauty and is considered a tourist attraction.
Landscape exposure	Views are contained within the valleys, but the Waboonskraal and Langkloof valleys are wide and offer panoramic views with the high mountain peaks in the background.



Figure 18: Aerial perspective of Langkloof

## 7 VISUAL IMPACT ASSESSMENT

### 7.1 INTRODUCTION

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. This implies that, firstly, a baseline must be established and secondly, the visual change, resulting from the project, must be compared to the baseline. The quantification of the visual change is referred to as the severity of the impact and is a function of:

- The nature of the impact;
- The probability of the impact occurring;
- The duration of the impact;
- The extent of the impact; and
- The magnitude of the impact.

The essence of determining the significance of a visual impact centres on the severity of the potential impacts, and the sensitivity of the affected receptors. In simple terms, a low severity impact affecting receptors of low sensitivity will result in a low significance. On the other end of the scale, a highly severe impact, affecting highly sensitive receptors, will result in a high significance. This is illustrated in Table 1 and more thoroughly discussed in Appendix 3.

Table 1: Impact significance matrix

		Impact severity				
		Very high	High	Medium	Low	Very low
Receptor sensitivity	Very high	Substantial	Major	Major/Moderate	Moderate	Moderate/Minor
	High	Major	Major	Moderate	Moderate/Minor	Minor
	Medium	Major/Moderate	Moderate	Moderate/Minor	Minor	Minor/Negligible
	Low	Moderate	Moderate/Minor	Minor	Minor/Negligible	Negligible
	Very low	Moderate/Minor	Minor	Minor/Negligible	Negligible	Negligible/None

### 7.2 BASELINE ESTABLISHMENT

The baseline environment provides the premise from which the visual change can be evaluated. The study area is assessed in Section 6 and provides a description of its landscape character. Section 7.3.3 addresses the aesthetic value and the landscape sensitivity across the different landscape types.

### 7.3 VISUAL AND LANDSCAPE RECEPTORS

Within the study area observers experience and interact differently with their environment, and therefore value it differently. They may be affected by the proposed project due to additions or alterations in the visual environment which may influence their experience and views of the visual resource. In this study a distinction is made between impacts on the **observers** and impacts on the **visual resource**. The observers represent all people that may be affected visually, while the

impacts on the visual resource strictly assess the changes to the landscape character and the impact on its visual value.

### **7.3.1 OBSERVER SENSITIVITY**

The main observer groups in the study area are residents, tourists and motorists. 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 can be described according to the following factors:

- The value an observer has for the particular visual resource being impacted on;
- The duration of exposure to the impact; and
- The distance of an observer from the source of impact (Refer to Section 4.2).

To determine viewer sensitivity, a commonly used rating system is utilised (Table 2). 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.

### **Public Participation Comments**

Often, the general acceptance or non-acceptance of a project will be reflected in Public Participation events and is considered a valuable indicator of the true viewer sensitivity. The proposed transmission line has received a great deal of criticism, particularly from residents and tourism operators in the study area. The criticism is motivated by negative sentiments due to historical encounters with the applicant, but also issues revolving around health, safety, loss in property value, interference with current land use practices, ecological impacts, etc. The comments that are relevant to this study are specific to issues that causes visual intrusion on observers' views, and the loss in scenic quality of the visual resource. The comments confirm that residents and tourist operators, speaking on behalf of tourists, are highly sensitive, and therefore is consistent with the categorisation of Table 2.

A brief summary of concerns that were received during the input sessions with I&APs is provided below:

- The transmission line will negatively impact on photographic potential of the landscape;
- The transmission line will spoil the natural environment and therefore decrease the scenic quality of the visual resource;
- The construction process will cause unsightly disturbances that could lead to eyesores due to a lack of proper mitigation;
- Land values may decrease due to visual impact from transmission lines. This is interpreted as an issue relating to the decrease in aesthetic value, as many properties are developed in such a way as to take advantage of scenic views;
- Poor maintenance and aftercare of the servitude that results in eyesores; and
- Negative impact on eco-tourism. This relates to an issue of aesthetic value where tourism activities centres around the scenic quality of the environment.

**Table 2: Viewer Sensitivity**

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

One of the aspects that influences the severity of the visual impact is viewer incidence. Viewer incidence is a measure of determining the frequency and number of observers viewing the proposed project. 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 corridor should be located within 1 km of a relatively densely populated area, cross or run parallel to a major national road, and/or pass through a recognised public gathering area such as an acclaimed tourist attraction;
- A **medium** viewer incidence occurs if the servitude is within 2 km of a densely populated area, crosses through or adjacent to a moderately densely populated area such as a rural town or agricultural holdings, or passes through an area with a secondary road infrastructure; and
- A **low** viewer incidence occurs if the servitude passes through vacant-/farmland with no or limited populated areas within 2 km, and only a tertiary road network is present.

Viewer incidence is addressed in the visual impact severity tables in Sections 7.4 - 7.8.

### **Groot Karoo**

#### **Affected receptors:**

- Small rural communities such as Seekoevlei and Klaarstroom as well as farmers residing near Alternative 1 & 2 routes are considered highly sensitive, owing to their sustained visual exposure to the proposed development, as well as their attentive awareness towards their living environment;
- Tourists are highly sensitive. Their main reason for visiting the area is to experience the natural environment and the desolate character that the Karoo is famous for. Tourist destinations within 5 km from the routes are Boeteka Wedding Venue and Padstal, Olive Grove Guest Farm and Wilgemond Farm Cottage; and
- Motorists travelling on the N12 will be affected by Alternative 1. Their sensitivity is considered low as their attention is generally focussed on the road and their exposure to roadside objects is brief due to the speed they travel.

**Distance from proposed routes:**

- A couple of farmsteads are within the ZMVE of both alternatives. Seekoeflei and Klaarstroom are the only rural communities situated within 5 km of Alternative 1;
- Alternative 1 follows the N12 all the way from Droërivier Substation to Klaarstroom. For the entire 100 km stretch, the corridor is within 5 km of the N12; and
- Olive Grove Guest Farm is within 5 km from both alternatives. Boeteka Wedding Venue and Wilgemonnd Farm Cottage are within 2 km of Alternative 1.

### **Swartberg Mountain Range**

**Affected receptors:**

- Motorists travelling on the N9 between Uniondale and Willowmore pass along the eastern extremities of the Swartberg Mountain Range where Alternative 2 crosses over the mountains. Their sensitivity is considered low as their attention is generally focussed on the road and their exposure to roadside objects are brief due to the speed they travel.

**Distance from proposed routes:**

- A short section of Alternative 2 aligns with the N9 at the point where it passes over the Swartberg Mountains. The N9 is within the ZMVE.

### **Klein Karoo Mountains**

**Affected receptors:**

- The residents of Uniondale and the farming communities along the N9 will be affected by Alternative 2. They are considered highly sensitive owing to their sustained visual exposure to the proposed development as well as their attentive awareness towards their living environment. This region has a high visual value due to the mountain ranges and valleys contained within it. The farming activities blend harmoniously with the natural attributes;
- The farming communities along the Nels and Kango Rivers, north of Dysveldorp, are considered highly sensitive to changes to their environment and will be affected by Alternative 1. This region has a high visual value due to the mountainous terrain leading up to the Swartberg Mountain Range, and a high degree of naturalness. The farming activities blend harmoniously with the natural scenery;
- Tourist accommodation is located at Oudemuragie Guest Farm and at Thabile Lodge, north of Dysveldorp. Tourists are considered highly sensitive as they visit the area to enjoy the scenery provided by the mountainous region; and
- Motorists travel along the Potjiesberg Pass on the N9, south of Uniondale. Their sensitivity is regarded high/medium as this is considered a scenic route. However, their exposure to the power line is brief.

**Distance from proposed routes:**

- Numerous farms and farmsteads are within the ZMVE of both alternatives. The town of Uniondale will also be affected by Alternative 2 as it passes west of the town;
- Oudemuragie Guest Farm and Thabile Lodge are within the ZMVE of Alternative 1; and
- Motorists travelling through Potjiesberg Pass towards Uniondale and Willowmore on the N9 will be within the ZMVE of Alternative 2.

## **Klein Karoo**

### **Affected receptors:**

- The residents of Dysseldorp and the numerous farming communities between the N12 and the Outeniqua Mountain Range will be affected by Alternative 1. They are considered highly sensitive owing to their sustained visual exposure to the proposed development, as well as their attentive awareness towards their living environment;
- Tourist accommodation is located at Feather Palace Guest Farm, between the N12 and Dysseldorp. Tourists are considered highly sensitive as they visit the area to enjoy the scenery towards the north; and
- Motorists travel on the N12 between Oudtshoorn and De Rust, and will traverse Alternative 1's route. In addition, a section of the route follows along a portion of the N12 before entering the Outeniqua Mountains. This is a busy highway and motorists travel at high speed. Their sensitivity is considered low as their attention is generally focussed on the road, and their exposure to roadside objects is brief due to the speed they travel.

### **Distance from proposed routes:**

- Numerous farms and farmsteads are within the ZMVE of Alternative 1. The town of Dysseldorp will also be affected by Alternative 1 as it passes west of the town;
- Feather Palace Guest Farm falls just outside the ZMVE of Alternative 1; and
- Motorists travelling on the N12 between Oudtshoorn and De Rust, as well as between Oudtshoorn and Waboomskraal, will be within the ZMVE of Alternative 1.

## **Outeniqua Mountains**

### **Affected receptors:**

- The farming communities in Waboomskraal and Langkloof will be affected by both Alternative 1 and 2. They are considered highly sensitive owing to their sustained visual exposure to the proposed development, as well as their attentive awareness towards their living environment. This region has a high visual value due to the mountainous terrain provided by the Outeniqua Mountain Range, and a high degree of naturalness remains on the mountain slopes and peaks. The farming activities blend harmoniously with the natural scenery;
- Tourist accommodation is located at Highland's Lodge in Waboomskraal, as well as at Over-the-Mountain Guest Farm and Louvain Guest House along the N9. Tourists are considered highly sensitive as they visit the area to enjoy the scenery; and
- Motorists travel on the N12 and N9 along the Outeniqua Pass and the Langkloof Pass. Their sensitivity is regarded high/medium as these are considered scenic routes.

### **Distance from proposed routes:**

- Numerous farming communities and farmsteads are within the ZMVE of both alternatives, in particular in the Waboomskraal and Langkloof areas;
- Highland's Lodge is located within the ZMVE of both alternatives. Over-the-Mountain Guest Farm and Louvain Guest House are within the ZMVE of Alternative 2; and
- Motorists travelling on the N9 through Langkloof will be within the ZMVE of Alternative 2. Motorists on the N12 travelling through Waboomskraal will be within the ZMVE of both alternatives for a section of the route.

### 7.3.2 SENSITIVE AND REPRESENTATIVE VIEWPOINTS

The photo sets in Appendix 2 are selected as representative views of a region or specific viewpoints that are deemed sensitive. The purpose of the photographs is to record the baseline condition of the environment, and to understand the impact of a new power line. It also recognises that viewers experience the landscape in different ways and are exposed to the impacts in varying degrees. An infinite number of viewpoints can be chosen, but to keep the study precise and pragmatic, only highly sensitive and representative views are selected.

The photo sets in Appendix 2 illustrate the baseline condition taken from various locations in the study area. It is divided into the different landscape types, and identifies prominent features in the landscape.

### 7.3.3 LANDSCAPE CHARACTER SENSITIVITY

The sensitivity of a landscape's character is a measure of the robustness of its character and the ability of the landscape to accommodate certain changes without detrimental impacts to its qualities.

A landscape character with a high sensitivity will typically have one or a combination of the following attributes:

- A low Visual Absorption Capacity (VAC);
- A high degree of inter-visibility with adjacent landscapes;
- A well-established identity and sense of place;
- Is often in a pristine natural condition with high ecological value that contributes to a valued aesthetic condition; and
- Is considered scarce or uncommon.

A landscape character with a low sensitivity will typically have one or a combination of the following attributes:

- A high VAC;
- Is often visually isolated with a low degree of inter-visibility with adjacent landscapes;
- A poorly established identity and sense of place;
- Is often greatly developed to an extent where no or very little aesthetic features exist; and
- Is considered common and found in numerous places.

### Groot Karoo

The Groot Karoo LT is considered a landscape with **medium** sensitivity along Alternative 1, but **high** sensitivity along Alternative 2 due to the following reasons:

- Generally, the study area has a low VAC due to the low vegetation growth, mostly undulating topography and the panoramic views that can be experienced over the large expanse of the Karoo plains. VAC is increased in the southern region due to the more varied topography;
- Its identity is very unique due to its desolate sense of place and the arid landscape character that offers experiences such as clear starry nights and tranquillity. This characteristic is even more prominent along Alternative 2 due to its limited accessibility and sparse gravel road network. From a motorist's perspective, especially when travelling at a high speed along the N12, the landscape can be experienced as mundane and

monotonous with few roadside attractions. However, the true identity of the Groot Karoo can only be enjoyed when one spends time in its presence;

- It is mainly undeveloped with the natural scrub vegetation canvassing the endless plains. Its identity is strongly supported by the fact that it appears deserted and that it is remote and isolated. A sense of isolation is even stronger along Alternative 2 due to the limited accessibility and extremely low population density;
- The study area is part of a larger region that features a similar landscape character and is widespread over the central parts of South Africa. This region has attributes that are present throughout the region, but is considered unique in the South African context; and
- An existing high voltage power line follows the same route as proposed by Alternative 1 along the N12. A lower voltage power line, supported by gum pole structures, is also present in the same corridor, which provides a baseline condition which is already impacted by power infrastructure. No major electrical infrastructure could be identified along Alternative 2, thereby increasing its sensitivity towards large-scale projects.

### **Swartberg Mountain Range**

The Swartberg Mountain Range LT is considered **highly** sensitive due to the following reasons:

- VAC is considered high due to the mountainous terrain and the lack of accessibility near Alternative 1. The area where Alternative 2 passes over the mountains is more exposed and accessible, and VAC is considered slightly lower in this region;
- Inter-visibility around Alternative 1 is limited due to the mountainous areas north and south of the Swartberg Mountain Range. The Swartberg Mountains along Alternative 2 is located in an area where it is less mountainous around its base, and the potential of inter-visibility with its surroundings is higher;
- The mountains are in a pristine natural condition and are an important conservation area. It is also a proclaimed World Heritage Site. Its ecological value establishes a strong sense of wilderness. The mountain range is a unique natural attribute that provides an identity to the region and is also valued for its perceivable beauty and scenic qualities. Snow-capped mountain peaks are often present during winter;
- It is unique in its context, dividing the Groot and Klein Karoo. It is one of the few untouched, pristine, natural environments in South Africa, and is considered a scarce visual resource on an international scale. Its ecological value is supported by the fact that it is a World Heritage Site; and
- An existing high voltage as well as a lower voltage power line follow the same route as proposed by Alternative 1 over the Swartberg Mountains. It provides a baseline condition that is already impacted by power infrastructure. No high voltage power lines could be identified over the Swartberg Mountains along Alternative 2. Although the entire Swartberg Mountains LS is considered highly sensitive, the area over which Alternative 2 passes is regarded as even more sensitive towards electrical infrastructure due to its lower VAC and lack of existing high voltage power line development.

### **Klein Karoo Mountains**

The Klein Karoo Mountains are considered **highly** sensitive due to the following reasons:

- VAC is generally very high due to the undulating and mountainous terrain and the positioning of access roads, mainly in the valleys. In some instances, the road passes over a crest and panoramic views are observed down the valleys and over the

mountaintops. VAC near Uniondale is considered lower, as the topographic elevation is less exaggerated and panoramic views are more regular;

- Inter-visibility is considered limited;
- The mountains are mostly covered with natural vegetation, but concentrated farming is present along the Nels and Kango Rivers. The agricultural land use is in visual harmony with its natural context, and interesting and visually pleasing views are often experienced along the roads. A predominantly natural landscape character prevails, with rural features such as farms and the occasional tourist accommodation. The part of the study area near Uniondale provides interesting topographical features through Potjiesberg Pass, and panoramic views are often present along the N9;
- The Klein Karoo Mountains stretch over a large area along the southern part of the Swartberg Mountain Range. It is considered an environment with pristine and semi-natural attributes, with concentrated agriculture in some of the valleys. It provides high scenic value and is an uncommon visual resource on a national scale; and
- An existing high voltage as well as a lower voltage power line follow the same route as proposed by Alternative 1 through the Klein Karoo Mountains. It provides a baseline condition which is already impacted by power infrastructure.

### **Klein Karoo**

The Klein Karoo is generally considered **moderately** sensitive due to the following reasons:

- VAC is moderate owing to the varied topography near Kammanassie Dam, but evens out towards Dysselford in the north and the Outeniqua Mountains in the south. In these regions the VAC is considered low and the landscape is exposed;
- There is a much greater possibility for inter-visibility in the northern part near Dysselford and the southern part near the foot of the Outeniqua Mountains. The topography is even and creates large plains around the Olifants River near Dysselford, as well as along the northern foothills of the Outeniqua Mountains. The central part has a varied topography with rolling hills and small ridges that limit inter-visibility between parts of the study area;
- This part of the Klein Karoo is predominantly used for agriculture, with large pasture fields on the plains. The more mountainous central region has a degree of naturalness in the valleys and hillsides, but ostrich farming is also prominent. The Kammanassie Dam and the agricultural activity in the Kammanassie River valley are visually interesting and provide scenic value. Other individual natural features such as the flowering aloes, as well as smaller valleys and ridges, provide visual variety to the predominantly rural landscape character;
- Ostrich farming is a unique agricultural activity associated with the Klein Karoo. It provides an identity that the Klein Karoo is famous for, and the large ostrich flocks sometimes provide visual interest from a tourist's perspective. It is considered a unique identity on a national scale, but very common in the region;
- An existing high voltage power line follows the same route as proposed by Alternative 1 through the Klein Karoo. It provides a baseline condition which is already impacted by power infrastructure.

### **Outeniqua Mountains**

The Outeniqua Mountains LT is considered **highly** sensitive due to the following reasons:

- VAC is considered medium. The mountainous terrain provides a high potential for screening, but both alternatives pass through areas that has a medium VAC. These areas are comprised of the entire Langkloof valley along the N9, Waboomskraal valley, as well as the top section of the Outeniqua Pass between Langkloof and Waboomskraal;
- Inter-visibility is considered medium. The Langkloof and Waboomskraal valleys are relatively open, and distant views are often uninterrupted. It is however contained within the Outeniqua Mountains LT;
- The mountain slopes and peaks are in a pristine natural condition and are important conservation areas. Its ecological value establishes a sense of wilderness, but a prominent agricultural character is present in the Langkloof and Waboomskraal valleys. The mountain range is a unique natural attribute that provides an identity to the region and is also valued for its perceivable beauty and scenic qualities. The Langkloof and Waboomskraal valleys are established scenic areas due to the unique farming practices associated with the hop-plantations, together with the farming history in the Langkloof dating back to the 1760s;
- The mountain range stretches over several 100 kilometres and provides a backdrop to the highly acclaimed Garden Route. It is one of the few untouched, pristinely natural environments in South Africa, and is considered a scarce visual resource on a national and international scale. The farming practices in Waboomskraal are very unique in the South African context; and
- Existing high voltage power lines traverses the Outeniqua Mountains and Waboomskraal valley along the same route as proposed by Alternative 1. It provides a baseline condition which is already impacted by power infrastructure. A power line, supported by gum pole structures, also follows the N9 through Langkloof, but is considered relatively unobtrusive.

#### **7.4 VISUAL IMPACT SEVERITY – GROOT KAROO LANDSCAPE TYPE**

<b>ALTERNATIVE 1: GROOT KAROO LANDSCAPE TYPE - OBSERVERS</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. Viewer incidence is expected to be medium due to the proximity to a national road, although the overall population density is very low. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (5)	Low (4)
<b>Severity</b>	Medium (36)	Low (28)
<b>Status (Positive/Negative)</b>	Negative	Negative

Operational phase		
<b>Nature of impact:</b> A new transmission line will be added to the visual environment. It will be highly visible due to the low VAC and observers up to 5 km may be exposed to it, although those within the ZMVE will be most significantly affected. Viewer incidence is expected to be medium due to a low overall population density and the proximity to a national road. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the generally natural character of the landscape and will intrude on the observer's visual experience.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	Medium (6)	Low (5)
<b>Severity</b>	Medium (56)	Medium (52)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Low	Low
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited effectiveness, as very little can be done to reduce the visibility of the power line, unless major design changes are incorporated.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the desolate character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.		

ALTERNATIVE 1: GROOT KAROO LANDSCAPE TYPE – VISUAL RESOURCE		
	Without mitigation	With mitigation
Construction phase		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the desolate sense of place of the landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the normal farming activities. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Low (3)

<b>Severity</b>	Low (24)	Low (18)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will add to the visual dominance of the existing electrical infrastructure, and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the uniform landscape, and disrupt the desolate identity of the Groot Karoo.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	Medium (6)	Low (4)
<b>Severity</b>	Medium (42)	Medium (36)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Low	Low
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success unless major design changes are considered.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the desolate character of the study area, thereby causing a loss in visual value. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the loss in visual value is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.		

<b>ALTERNATIVE 2: GROOT KAROO LANDSCAPE TYPE - OBSERVERS</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. A very low viewer incidence is expected due to the sparse population distribution and road network. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Severity</b>	Low (27)	Low (21)

<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be added to the visual environment. It will be highly visible due to the low VAC and observers up to 5 km may be exposed to it, although those within the ZMVE will be most significantly affected. A very low viewer incidence is expected due to the sparse population distribution and road network. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the general natural character of the landscape, and will intrude on the observer's visual experience.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Severity</b>	Medium (36)	Medium (30)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> A low risk of cumulative impacts exists due to the fact that no high voltage power lines occur along Alternative 2.		
<b>Residual Risks:</b> Residual risks will occur as the visibility of the towers cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.		

<b>ALTERNATIVE 2: GROOT KAROO LANDSCAPE TYPE – VISUAL RESOURCE</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the desolate sense of place of the landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the normal farming activities and the spacious Karoo plains. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Severity</b>	Low (24)	Low (15)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be introduced to a visual environment that is free		

of high voltage power lines. The complex industrial character of the towers will contrast with the uniform landscape and disrupt the desolate and largely undeveloped identity of the Groot Karoo. It will blemish the natural character of the wide open plains and the uninterrupted views stretching up to the horizon.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	High (9)	High (9)
<b>Severity</b>	High (68)	High (68)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Low Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> A low risk of cumulative impacts exists due to the fact that no high voltage power lines occur along Alternative 2.		
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.		

## 7.5 VISUAL IMPACT SEVERITY – SWARTBERG MOUNTAINS LANDSCAPE TYPE

ALTERNATIVE 1: SWARTBERG MOUNTAINS LANDSCAPE TYPE - OBSERVERS		
	Without mitigation	With mitigation
<b>Construction phase</b>		
<b>Nature of impact:</b> No viewer groups are expected to be affected by the transmission line construction in this LS as it is completely inaccessible by vehicle and no residents are present. Glimpses of a section of the power line may be visible to individual farm residents on either side of the Swartberg Mountains. Viewer incidence is expected to be insignificantly low.		
<b>Probability</b>	Very improbable (1)	Very improbable (1)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Small (1)	Small (1)
<b>Severity</b>	Very low (3)	Very low (3)
<b>Status (Positive/Negative)</b>	Neutral	Neutral
<b>Operational phase</b>		
<b>Nature of impact:</b> No viewer groups are expected to be affected by the transmission line construction in this LS as it is completely inaccessible by vehicle and no residents are present. Glimpses of a section of the power line may be visible to individual farm residents on either side of the Swartberg Mountains. Viewer incidence is expected to be insignificantly low.		
<b>Probability</b>	Very improbable (1)	Very improbable (1)

<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Small (1)	Small (1)
<b>Severity</b>	Very low (6)	Very low (6)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase to minimise impacts on the visual resource, although no major viewer groups will be affected.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are unlikely due to the insignificantly low viewer incidence and visual exposure to sensitive viewers.		
<b>Residual Risks:</b> Residual risks are very low due to the insignificantly low viewer incidence and visual exposure to sensitive viewers.		

**ALTERNATIVE 1: SWARTBERG MOUNTAINS LANDSCAPE TYPE – VISUAL RESOURCE**

	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the wilderness landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the conservation land use. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Contained on site (1)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Low (28)	Low (20)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will add to the visual dominance of the existing electrical infrastructure and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the conservation status and the wilderness character of the region. The spectacular scenic quality will be blemished even further with the presence of more power lines.		
<b>Probability</b>	Definite (5)	Definite (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	High (70)	High (70)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium

<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success unless major design changes are considered.
<b>Mitigation:</b> Refer to Section 8
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural character of the study area, thereby causing a loss in visual value. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the loss in visual value is considered less than in an area with no electrical infrastructure.
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.

<b>ALTERNATIVE 2: SWARTBERG MOUNTAINS LANDSCAPE TYPE - OBSERVERS</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. Observers exposed to the construction activity will be limited to motorists passing on the N9, possibly catching a glimpse through the hilly terrain, and a few farm residents residing along the foothills of the mountains. Viewer incidence is expected to be medium due to the proximity to a national road and the medium VAC. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.		
<b>Probability</b>	Improbable (2)	Improbable (2)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Minor (2)	Small (1)
<b>Severity</b>	Low (10)	Very Low (8)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be added to the visual environment. It will be moderately visible from viewpoints on the southern side of the Swartberg Mountains as it crosses over the mountainous terrain. The new transmission line will blemish the natural character and cause a visual intrusion on the affected observers. Viewer incidence is expected to be medium due to the proximity to a national road.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Medium (30)	Low (27)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of</b>	Medium	Medium

<b>resources?</b>		
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> A low risk of cumulative impacts exists due to the fact that no high voltage power lines occur along Alternative 2.		
<b>Residual Risks:</b> Residual risks will occur as the visibility of the towers cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.		

<b>ALTERNATIVE 2: SWARTBERG MOUNTAINS LANDSCAPE TYPE – VISUAL RESOURCE</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the natural and largely undisturbed landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the conservation status and the highly natural character of the Swartberg Mountains. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Contained on site (1)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Low (28)	Low (20)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be introduced to a visual environment that is free of high voltage power lines. The complex industrial character of the towers will contrast with the highly natural landscape, and disrupt the undeveloped, conservation identity of the Swartberg Mountains. It will blemish the scenic views of the mountainous terrain covered in natural vegetation.		
<b>Probability</b>	Definite (5)	Definite (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	High (70)	High (70)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> A low risk of cumulative impacts exists due to the fact that no high voltage		

power lines occur along Alternative 2.

**Residual Risks:** Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.

## 7.6 VISUAL IMPACT SEVERITY – KLEIN KAROO LANDSCAPE TYPE

ALTERNATIVE 1: KLEIN KAROO LANDSCAPE TYPE - OBSERVERS		
	Without mitigation	With mitigation
<b>Construction phase</b>		
<p><b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. Visual exposure is considered high near the northern and southern regions which are open, but lower in the hilly central region. Viewer incidence is expected to be high in the north where the corridor crosses the N12 and where it passes the town of Dysseldorp. The central and southern region will experience a low viewer incidence as it is rural and sparsely populated with few roads. A short southern section meets up with the N12, a national road, before entering the Outeniqua Mountains. Here, viewer incidence will be higher. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the uncharacteristic activities in the study area.</p>		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Severity</b>	Low (28)	Low (20)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<p><b>Nature of impact:</b> A new transmission line will be added to the visual environment. It will be highly visible due to the low VAC and observers up to 5 km may be exposed to it, although those within the ZMVE will be most significantly affected. It is considered highly visible in the northern and southern regions due to the flat topography, and a higher viewer incidence can be expected due to the higher population density and the national road. The central region provides a moderate degree of VAC and inter-visibility between parts of the study area is limited. Viewer incidence is expected to be low due to the low population density of the rural communities and sparse road network that are mostly comprised of dirt roads. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the generally agricultural land use as well as some natural features in the central region, and will intrude on the observer's visual experience.</p>		

<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	Medium (6)	Low (5)
<b>Severity</b>	Medium (52)	Medium (48)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Low	Low
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success, unless major design changes are considered.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected which contrasts with the rural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.		

### ALTERNATIVE 1: KLEIN KAROO LANDSCAPE TYPE – VISUAL RESOURCE

	Without mitigation	With mitigation
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the desolate sense of place of the landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the normal farming activities. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Low (24)	Low (18)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will add to the visual dominance of the existing electrical infrastructure and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the farming character that prevails over the entire study area. The area near Kammanassie Dam will experience a greater degree of loss in visual value as it is considered an area with a higher scenic quality.		
<b>Probability</b>	Probable (3)	Probable (3)

<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	Medium (5)	Medium (5)
<b>Severity</b>	Medium (36)	Medium (36)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Low	Low
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success, unless major design changes are considered.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the rural character of the study area, thereby causing a loss in visual value. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the loss in visual value is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.		

## 7.7 VISUAL IMPACT SEVERITY – KLEIN KAROO MOUNTAINS LANDSCAPE TYPE

ALTERNATIVE 1: KLEIN KAROO MOUNTAINS LANDSCAPE TYPE - OBSERVERS		
	Without mitigation	With mitigation
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. It is possible that higher growing vegetation will be removed in the corridor to adhere to safety regulations. As the towers gain height, the visibility and visual exposure will increase progressively. Viewer incidence is expected to be low due to the few roads and sparsely distributed rural population. Visual exposure will also be limited due to the low inter-visibility within the study area and the generally high VAC. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.		
<b>Probability</b>	Improbable (2)	Improbable (2)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Low (3)	Minor (2)
<b>Severity</b>	Low (12)	Low (10)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be added to the visual environment. The mountainous terrain limits visual exposure and inter-visibility within the study area, but the		

towers will be clearly visible when exceeding the horizon. Viewer incidence is expected to be low due to the few roads and sparsely distributed rural population. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the generally natural character of the landscape and will intrude on the observer's visual experience. Highly scenic views of the mountains and valleys will be affected.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	Medium (60)	Medium (60)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited effectiveness, as very little can be done to reduce the visibility of the power line, unless major design changes are incorporated.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the natural and agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.		

<b>ALTERNATIVE 1: KLEIN KAROO MOUNTAINS LANDSCAPE TYPE – VISUAL RESOURCE</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the wilderness landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the conservation land use. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Contained on site (1)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Low (28)	Low (20)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		

<b>Nature of impact:</b> A new transmission line will add to the visual dominance of the existing electrical infrastructure, and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the natural character of the region. The high scenic quality will be blemished even further with the presence of more power lines.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	Medium (60)	Medium (60)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success, unless major design changes are considered.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the natural and agricultural character of the study area, thereby causing a loss in visual value. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the loss in visual value is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.		

<b>ALTERNATIVE 2: KLEIN KAROO MOUNTAINS LANDSCAPE TYPE - OBSERVERS</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. It is possible that higher growing vegetation will be removed in the corridor to adhere to safety regulations. As the towers gain height, the visibility and visual exposure will increase progressively. Viewer incidence is expected to be high due to the proximity to a national road, with the extended farming community, as well as Uniondale, being affected. Visual exposure will be limited due to the low inter-visibility within the study area and the generally high VAC, but the alignment is often positioned in a valley parallel to the N9, which allows distant views of the valley. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area. Picturesque views of the mountains will also be negatively affected.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)

<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Medium (32)	Low (24)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be added to the visual environment. The mountainous terrain limits visual exposure and inter-visibility within the study area, but the towers will be clearly visible when exceeding the horizon. The alignment is often positioned in a valley parallel to the N9, which allows distant views of the valley. Viewer incidence is expected to be high due to the proximity to a national road and also to the extended farming community. Uniondale is a concentration of residents and will also be affected. The industrial character will contrast with the generally natural character of the landscape and the prevailing small-scale farming activities. It will intrude on the observer's visual experience. Highly scenic views of the mountains and valleys will be affected.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	High (64)	High (64)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> A medium risk of cumulative impacts exists as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are present along a section of the corridor.		
<b>Residual Risks:</b> Residual risks will occur as the visibility of the towers cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.		

<b>ALTERNATIVE 2: KLEIN KAROO MOUNTAINS LANDSCAPE TYPE – VISUAL RESOURCE</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the natural and largely undisturbed landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the undisturbed and natural identity of the visual resource. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)

<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Medium (32)	Low (24)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will be introduced to a visual environment that is free of high voltage power lines. The complex industrial character of the towers will contrast with the highly natural landscape and disrupt scenic views of the mountainous terrain covered in natural vegetation. Scenic views can be experienced along the N9, and distant views to the Kammanassie and Swartberg Mountains are also possible. The quality of these scenes will be negatively impacted by the presence of a high voltage power line.		
<b>Probability</b>	Definite (5)	Definite (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	High (9)	High (9)
<b>Severity</b>	Very high (85)	Very high (85)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> A medium risk of cumulative impacts exists as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are present along a section of the corridor.		
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.		

## 7.8 VISUAL IMPACT SEVERITY – OUTENIQUA MOUNTAINS LANDSCAPE TYPE

<b>ALTERNATIVE 1: OUTENIQUA MOUNTAINS LANDSCAPE TYPE - OBSERVERS</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. It is possible that higher growing vegetation will be removed in the corridor to adhere to safety regulations. Viewer incidence is expected to be high due to the proximity to national roads and the extended rural community in Waboomskraal. Visual exposure will be limited due to the mountainous terrain, but Waboomskraal is in an open valley with high visual exposure. Visual intrusion will occur due to the effects on scenic views of the unique agricultural practices in Waboomskraal and the spectacular mountainous backdrop.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)

<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Low (28)	Low (24)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<p><b>Nature of impact:</b> A new transmission line will be added to the visual environment. The mountainous terrain limits visual exposure and inter-visibility within the study area, but the towers will be clearly visible when exceeding the horizon. The Waboomskraal valley is an open agricultural area with particularly scenic views. Viewer incidence is expected to be high due to the proximity to national roads and the extended rural community in Waboomskraal. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. Visual intrusion will occur due to the effects on scenic views of the unique agricultural practices in Waboomskraal and the spectacular mountainous backdrop. The inherent visual harmony will be further disrupted.</p>		
<b>Probability</b>	Definite (5)	Definite (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	High (75)	High (75)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<p><b>Can impacts be mitigated:</b> Impacts can be mitigated with limited effectiveness, as very little can be done to reduce the visibility of the power line, unless major design changes are incorporated.</p>		
<p><b>Mitigation:</b> Refer to Section 8</p>		
<p><b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural and unique agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.</p>		
<p><b>Residual Risks:</b> Residual risks will occur, as the visibility of the power line cannot be effectively reduced and therefore visual intrusion will remain an impacting factor for the lifetime of the project.</p>		

**ALTERNATIVE 1: OUTENIQUA MOUNTAINS LANDSCAPE TYPE – VISUAL RESOURCE**

	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<p><b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation on the mountains, but also on the agricultural practices in Waboomskraal. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to</p>		

the visual resource and will contrast with the natural character of the Outeniqua Mountains and interfere with the agricultural land use in Waboomskraal. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local (2)	Contained on site (1)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Low (28)	Low (20)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will add to the visual dominance of the existing electrical infrastructure, and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the natural character and unique agricultural land use of the region. The spectacular scenic quality will be blemished even further with the presence of more power lines.		
<b>Probability</b>	Definite (5)	Definite (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	High (70)	High (70)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success, unless major design changes are considered.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural and unique agricultural character of the study area, thereby causing a loss in visual value. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the loss in visual value is considered less than in an area with no electrical infrastructure.		
<b>Residual Risks:</b> Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.		

<b>ALTERNATIVE 2: OUTENIQUA MOUNTAINS LANDSCAPE TYPE - OBSERVERS</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. It is possible that higher growing vegetation will be removed in the corridor to adhere to safety regulations. Viewer incidence is expected to be high due to the proximity to national roads and also to the extended		

<p>rural community in Waboomskraal and Langkloof. Visual exposure will be limited due to the mountainous terrain, but the Waboomskraal and Langkloof valleys are open with high levels of visual exposure expected. Visual intrusion will occur due to the effects on scenic views of the harmonious agricultural practices and the spectacular mountain backdrop of the Outeniqua Mountains.</p>		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Medium (32)	Low (24)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<p><b>Nature of impact:</b> A new transmission line will be added to the visual environment. The mountainous terrain limits visual exposure and inter-visibility within the study area, but the towers will be clearly visible when exceeding the horizon. Furthermore, the Waboomskraal and Langkloof valleys are an open agricultural area with particularly scenic views. Viewer incidence is expected to be high due to the proximity to national roads, as well as to the extended rural community in the Waboomskraal and Langkloof valleys. Visual changes will occur as a result of a new transmission line in the Langkloof valley that is currently free of high voltage power lines, and also because of the increased dominance of electrical infrastructure through Waboomskraal and over the Outeniqua Mountains. Visual intrusion will occur due to the effects on scenic views of the unique and visually harmonious agricultural practices and the spectacular mountainous backdrop. The inherent visual harmony will be disrupted.</p>		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	High (8)	High (8)
<b>Severity</b>	High (64)	High (64)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<p><b>Can impacts be mitigated:</b> Impacts can be mitigated with limited effectiveness, as very little can be done to reduce the visibility of the power line, unless major design changes are incorporated.</p>		
<p><b>Mitigation:</b> Refer to Section 8</p>		
<p><b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 2 through Waboomskraal. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural and unique agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.</p> <p>A medium risk of cumulative impacts exists through Langkloof as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are</p>		

present along a section of the corridor.

**Residual Risks:** Residual risks will occur, as the visibility of the towers cannot be effectively reduced and therefore visual intrusion will remain an impacting factor for the lifetime of the project.

**ALTERNATIVE 2: OUTENIQUA MOUNTAINS LANDSCAPE TYPE – VISUAL RESOURCE**

	Without mitigation	With mitigation
<b>Construction phase</b>		
<b>Nature of impact:</b> The construction activity will cause a negative effect, primarily on the natural vegetation on the mountains, but also on the agricultural practices in the Waboomskraal and Langkloof valleys. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the natural character of the Outeniqua Mountains and interfere with the agricultural land use in the aforementioned valleys. It is considered incompatible with the prevailing character.		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Very short term (1)	Very short term (1)
<b>Extent</b>	Local, but over long linear distance (3)	Contained on site, but over long linear distance (2)
<b>Magnitude</b>	Low (4)	Low (3)
<b>Severity</b>	Medium (32)	Low (24)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Operational phase</b>		
<b>Nature of impact:</b> A new transmission line will add to the visual dominance of the existing electrical infrastructure through Waboomskraal, and will increase the visual clutter created by the conductors and intricate steel lattice towers. A new transmission line will be introduced to Langkloof valley that is currently free of high voltage power lines. The complex industrial character of the towers will contrast with the natural character and unique agricultural land use of the region. The spectacular scenic quality will be blemished with the presence of the power lines.		
<b>Probability</b>	Definite (5)	Definite (5)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	High (9)	High (9)
<b>Severity</b>	Very High (85)	Very High (85)
<b>Status (Positive/Negative)</b>	Negative	Negative
<b>Reversibility</b>	Medium	Medium
<b>Irreplaceable loss of resources?</b>	Medium	Medium
<b>Can impacts be mitigated:</b> Impacts can be mitigated with limited success, unless major design changes are considered.		
<b>Mitigation:</b> Refer to Section 8		
<b>Cumulative impacts:</b> Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 2 through Waboomskraal. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural and unique agricultural character of the study area, thereby causing a visual intrusion. However, it is		

considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.

A medium risk of cumulative impacts exists through Langkloof as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are present along a section of the corridor.

**Residual Risks:** Residual risks will occur, as the impact of the power line on the character of the study area cannot be effectively mitigated over the lifetime of the project.

### 7.9 VISUAL IMPACT SIGNIFICANCE SUMMARY

Landscape Type	Project Alternative	Sensitivity of receptors	Severity of Impact without mitigation	Severity of Impact with mitigation	Significance of Impact without mitigation	Significance of Impact with mitigation
Groot Karoo	<b>Construction phase</b>					
	Alt 1	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: Medium	Low	Low	Minor	Minor
	Alt 2	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	Medium	Medium	Moderate	Moderate
		VR: Medium	Medium	Medium	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Medium	Medium	Moderate	Moderate
		VR: High	High	High	Major	Major
Swartberg Mountains	<b>Construction phase</b>					
	Alt 1	OB: High	Very low	Very low	Minor	Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Low	Very low	Moderate/Minor	Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	Very low	Very low	Minor	Minor
		VR: High	High	High	Major	Major
	Alt 2	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: High	High	High	Major	Major
Klein Karoo	<b>Construction phase</b>					
	Alt 1	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: Medium	Low	Low	Minor	Minor
	<b>Operational phase</b>					
Alt 1	OB: High	Medium	Medium	Moderate	Moderate	

Landscape Type	Project Alternative	Sensitivity of receptors	Severity of Impact without mitigation	Severity of Impact with mitigation	Significance of Impact without mitigation	Significance of Impact with mitigation
		VR: Medium	Medium	Medium	Moderate/Minor	Moderate/Minor
Klein Karoo Mountains	<b>Construction phase</b>					
	Alt 1	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: High	Medium	Low	Moderate	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	Medium	Medium	Moderate	Moderate
		VR: High	Medium	Medium	Moderate	Moderate
	Alt 2	OB: High	High	High	Major	Major
		VR: High	Very high	Very high	Major	Major
Outeniqua Mountains	<b>Construction phase</b>					
	Alt 1	OB: High	Low	Low	Moderate/Minor	Moderate/Minor
		VR: High	Low	Low	Moderate/Minor	Moderate/Minor
	Alt 2	OB: High	Medium	Low	Moderate	Moderate/Minor
		VR: High	Medium	Low	Moderate	Moderate/Minor
	<b>Operational phase</b>					
	Alt 1	OB: High	High	High	Major	Major
		VR: High	High	High	Major	Major
	Alt 2	OB: High	High	High	Major	Major
		VR: High	Very High	Very High	Major	Major

## 8 MITIGATION

The aim of mitigation is to reduce or alleviate the anticipated impacts that are a consequence of the proposed project’s components and/or activities. “Mitigation measures are generally more effective if they are designed as an integral part of an iterative process of project planning and design. Mitigation is thus used as a design approach that is, where possible, implemented from project inception when alternative designs or site options are being considered” (Institute of Environmental Assessment et al, 2002). This approach generates preventative measures that will influence design decisions instead of relying on cosmetic landscape remediation of a completed project.

The following five main mitigation strategies for visual impacts are described by the Institute of Environmental Assessment et al (2002):

- Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible.
- Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options.
- Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views.
- Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions.
- Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes.

The mitigation measures for the construction and operational phases are discussed within a tabled format in which the following aspects will be addressed.

- The risk sources;
- The potential impacts/risks involved;
- Mitigation objectives; and
- Mitigation measures.

### 8.1 MITIGATION - CONSTRUCTION PHASE

<b>CONSTRUCTION PHASE</b>	
Risk sources	1.The presence of a construction team in the servitude. 2.Construction camps and stockpiles. 3.Excavations and earthworks.

<p>Potential impacts</p>	<p><b>1. The presence of a construction team in the servitude.</b></p> <p>1.1. Increased construction activities in the servitude that could lead to visually intrusive views and a reduction in the visual value.</p> <p>1.2. Introduction of construction equipment and ground staff that is unfamiliar in the baseline environment.</p> <p><b>2. Construction camps and stockpiles.</b></p> <p>2.1. Visual intrusion relating to unsightly construction camps and their unorganised nature.</p> <p>2.2. Unsightly stockpiling of construction material and storing of equipment.</p> <p><b>3. Excavations and earthworks.</b></p> <p>3.1. Exposed soil and damaged vegetation at each tower/pole location which could lead to unsightly scarring of the landscape and cause a loss in visual value.</p>
<p>Mitigation objectives</p>	<p>1. Avoidance 2. Reduction 3. Remediation</p>
<p>Mitigation measures</p>	<p><b>1. Avoidance</b></p> <p>1.1. Do not locate the construction camp or laydown yards within 1 km from any residential area or tourist attraction, unless it can be completely screened from sensitive viewpoints. Preferably, construction camps should be located outside the study area in a dedicated construction camp near the large towns or cities.</p> <p>1.2. Avoid the construction of additional access roads by keeping to existing roads.</p> <p><b>2. Reduction</b></p> <p>2.1. Clearly demarcate the construction site to limit the area of disturbance.</p> <p>2.2. Keep dust levels down by regularly wetting dirt roads and exposed soil areas.</p> <p>2.3. Remove rubble and other waste that is generated by the construction process as soon as possible and dispose at an appropriate dumpsite.</p> <p>2.4. Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed soil surfaces. Monitor the rehabilitated areas for at least 6 months to ensure a sufficient vegetation cover is established that will prevent erosion from occurring.</p> <p>2.5. Avoid removal of any large trees or shrubs that may open views to the construction site and compromise the natural screening capacity of the study area.</p> <p><b>3. Remediation</b></p> <p>3.1. Keep the construction camp neat and tidy at all times. Remove any waste from the site or contain it in an enclosed area out of sight from sensitive viewpoints.</p> <p>3.2. Enhance screening of the construction camps by erecting a</p>

temporary fence with a 3 m high shade cloth to limit the intrusive nature of such a site.

## 8.2 MITIGATION - OPERATIONAL PHASE

OPERATIONAL PHASE	
Risk sources	1.The presence of a power line through areas of high scenic quality and with highly sensitive viewers.
Potential impacts	1.Visually intrusive views of the power line. 2.Loss of scenic quality. 3.Visual clutter due to the cumulative impact of various electrical infrastructure in close proximity.
Mitigation objectives	1. Avoidance. 2. Reduction. 3. Remediation.
Mitigation measures	<p><b>1. Avoidance</b></p> <p>1.1. Maintaining a minimum buffer of 1 km around sensitive viewers such as residential areas and tourist attractions will avoid the transmission line intersecting with the ZMVE and reduce the negative visual intrusion on the specific viewers. This is not always an option and could lead to major route diversions, thus avoidance mitigation can only be considered if the diversion is feasible, implementable and does not impact on other sensitive receptors.</p> <p>1.2. Avoid landscapes and natural features that are considered highly scenic and contribute to the visual value of the visual resource. This is not always an option and could lead to major route diversions, thus avoidance mitigation can only be considered if the diversion is feasible, implementable and does not impact on other sensitive receptors.</p> <p><b>2.Reduction</b></p> <p>2.1. The consolidation of power lines in parallel servitudes is highly recommended and will have the greatest reduction in the severity of the impacts. Cumulative impacts are considered highly probable along Alternative 1 and parallel power lines increase the visual dominance of electrical infrastructure to potentially intolerable levels. This is a concern especially through the Groot Karoo, Swartberg Mountains, Klein Karoo Mountains and Outeniqua Mountains LTs where at least two power lines are already in parallel. Consolidating power lines results in the removal of one smaller power line and replacing it with a larger power line, thus reducing cumulative visual impacts.</p> <p>2.2. Where the proposed power line is sharing a corridor with an existing transmission line, use the same type of towers and uphold the same tower spacing in order to maintain visual coherence.</p> <p>2.3. Keep to the minimum number of directional changes to limit the</p>

number of strain towers to be used. Strain towers are considered the most visually intrusive due to their larger visual footprint.

- 2.4. Cross-Rope towers are generally the preferred choice as they are considered the least visible. The Guyed V-towers are used for the existing 400kV Transmission line along Alternative 1. To maintain visual coherence, the same type of tower and spacing should be considered.

### **3. Remediation**

- 3.1. Treat the steel members of the transmission towers with a low gloss, galvanized paint to mitigate the initial shiny appearance of a new tower.
- 3.2. Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species or unsightly erosion.

## **9 CONCLUSION**

### **Summary of findings**

This VIA assessed the potential visual changes that may occur as a result of the construction and operation of a new 400 kV transmission line between the Droërivier and Blanco Substations. Two alternative routes have been proposed which extends over distances of 180 km and 260 km, respectively. Both routes are proposed through areas that are considered highly scenic, either for its pristine natural character or for its unique agricultural activities.

In most cases, the transmission line will impact on the visual quality of the visual resource by blemishing the natural character of the study area or interfering with unique and visually interesting land uses. Areas of high scenic value and visual quality have been identified as:

- The Groot Karoo that is valued for its desolate sense of place and uninterrupted panoramic views;
- The mountainous areas of the Swartberg and Outeniqua Mountains that are valued for exceptional scenic views and pristine natural environments;
- The Klein Karoo Mountains that offer scenic views of a mountainous landscape and visually pleasing farming practices in the valleys. Within this LT, the N9 is considered a scenic route, particularly in the area through Potjiesberg Pass;
- The Langkloof with visually pleasing views of the farming practices in the Langkloof valley; and
- Waboomskraal with the unique hops agricultural practices and highly scenic surroundings of the Outeniqua Mountains.

The study area is predominantly a rural area, with the exception of a few relatively small towns. The viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysseldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are within the ZMVE;

A high risk of cumulative visual impacts will be experienced along Alternative 1 as the route is proposed alongside an existing transmission line and lower voltage power line. These parallel running power lines increase the visual dominance of electrical infrastructure, and contrast with the rural or pristine natural character that prevails.

Reduction and remediation mitigation will not be effective to prevent residual impacts from occurring. The proposed transmission line will remain visible unless major design or alignment changes are implemented. The option of consolidating existing lines into the design of the new transmission line is regarded as very effective and is highly recommended to prevent major cumulative impacts. Although cumulative impacts may still occur, the significance thereof will be reduced and the breaching of a visual intolerance threshold may be avoided.

Avoiding sensitive landscape features and observers is regarded as being the most effective mitigation measure in reducing direct, cumulative and residual impacts. This is, however, a complex measure to implement, and is reliant on technical/feasibility studies as well as a much larger study area assessment to ensure that other sensitive features and observers are not impacted. Due to these unknown factors, avoidance mitigation is only proposed within the 2 km corridor that will reduce visual impacts on certain receptors.

### **Preferred route**

The most preferred route is Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact. Empirical research has indicated that two parallel running power lines are considered below the visual tolerance threshold in most cases, but three or more power lines nears, or exceeds, the threshold, increasing cumulative impacts to unacceptable levels. This is especially relevant in landscapes with high scenic value or high tourist potential as is found in parts of the study area. Without drastic mitigation measures, these impacts will remain high.

The No-Go alternative will have no change to the visual environment and will therefore not cause any impacts.

### **Conclusion**

This assessment has highlighted that highly significant impacts are expected in the Groot Karoo, Swartberg Mountains, Klein Karoo Mountains and Outeniqua Mountains LTs, and require major interventions to reduce the direct and cumulative impacts in particular. Authorisation of this project will result in significant losses in aesthetic value that will cause high levels of visual intrusion in some areas. The impact is only reversible with human intervention and stand a moderate risk of causing an irreplaceable loss in resources.



## 10 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:

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## **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 generates 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 are considered negligible and thus omissible. Figure 19 & Figure 20 are visibility maps of the two proposed alternatives at a height of 40 m.

### **CONCLUSION**

The prevailing vegetation cover in the study area plays a limited to insignificant role in screening the transmission line. Most of the screening comes from topographical features as illustrated in the areas where the power lines cross through mountainous regions. The exposed landscapes such as the Groot Karoo and Klein Karoo LTs, provides limited screening.



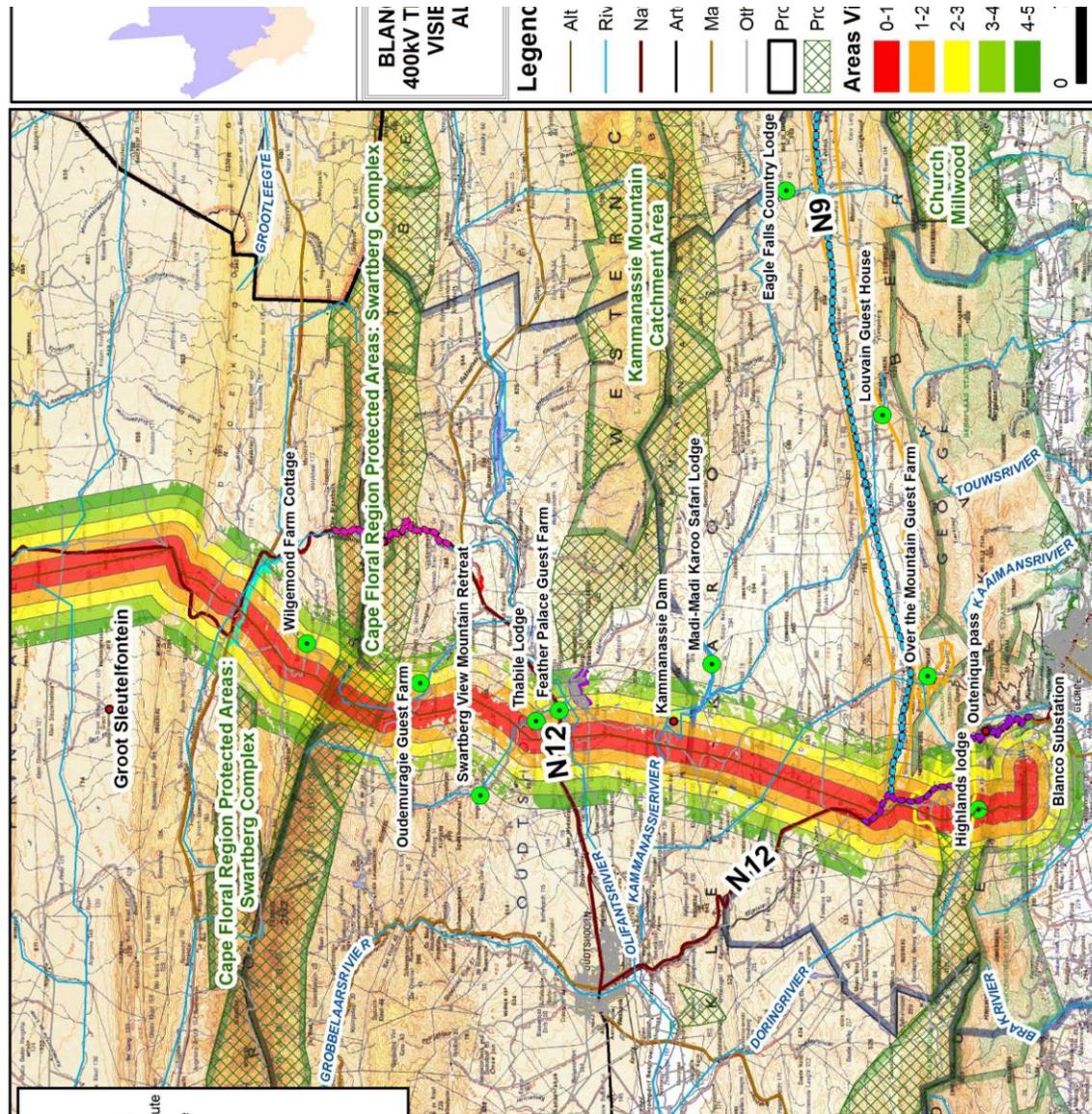


Figure 20: Visibility analysis – Alternative 1 (2)

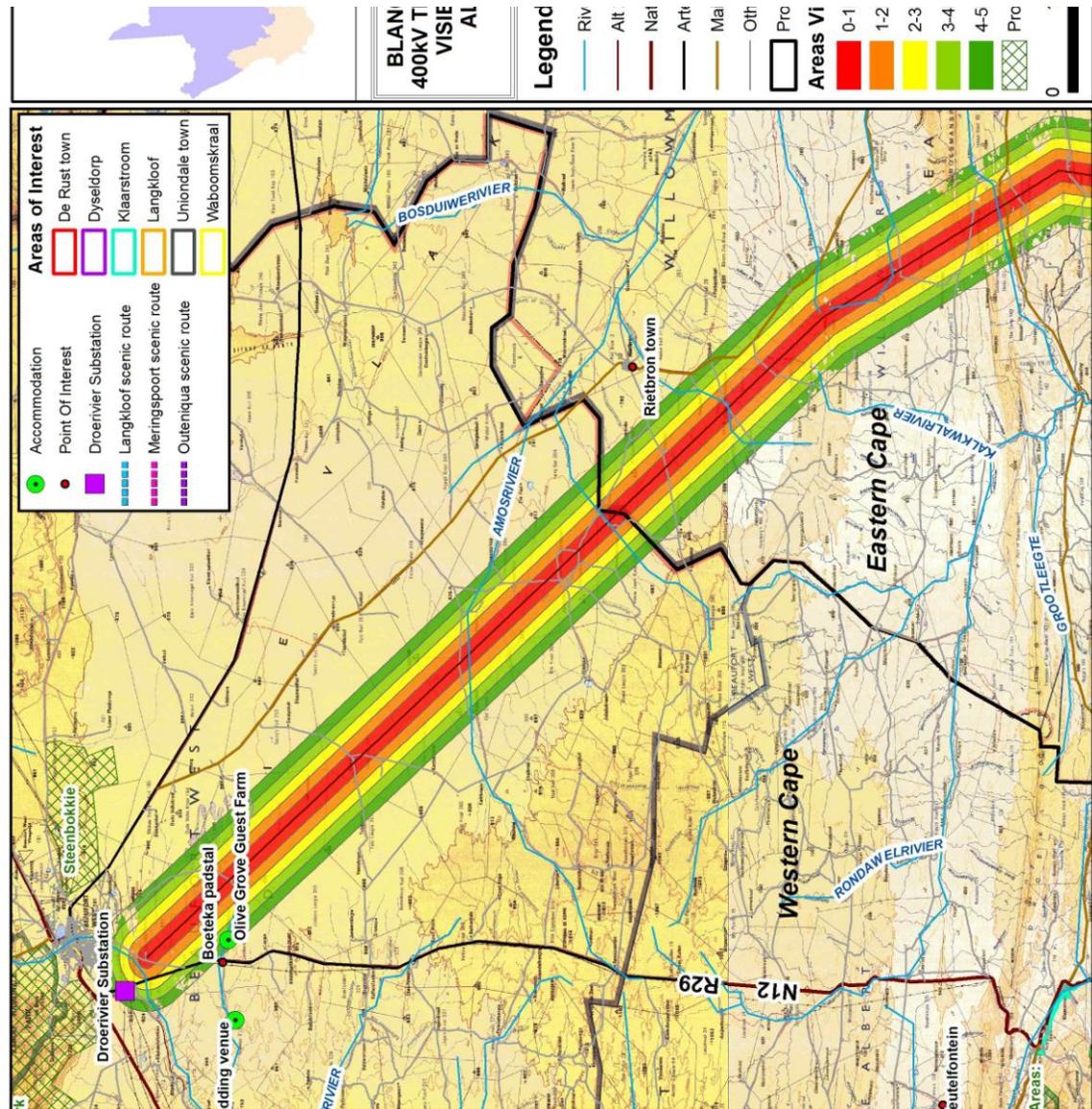


Figure 21: Visibility analysis – Alternative 2 (1)

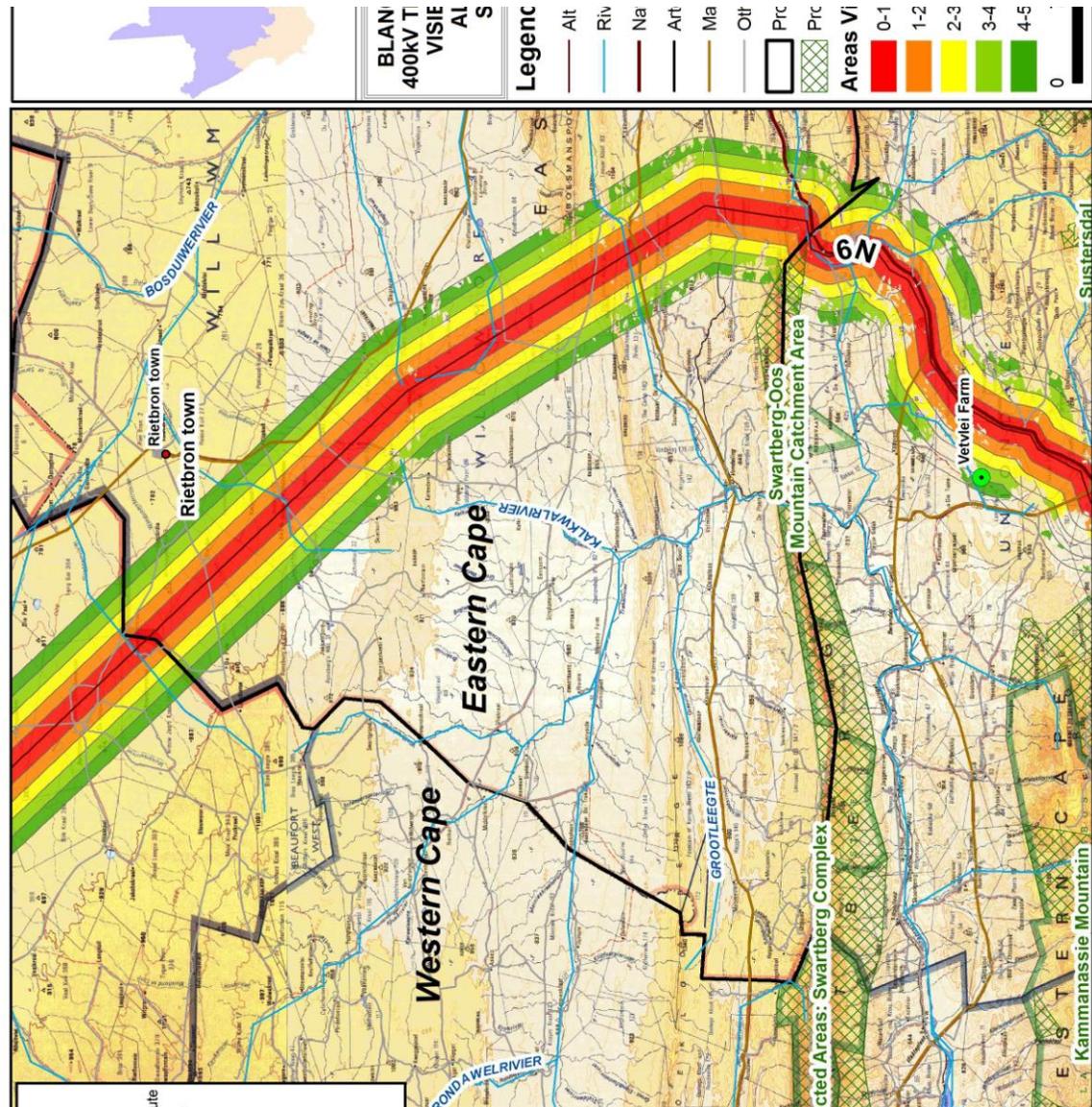


Figure 22: Visibility analysis – Alternative 2 (2)

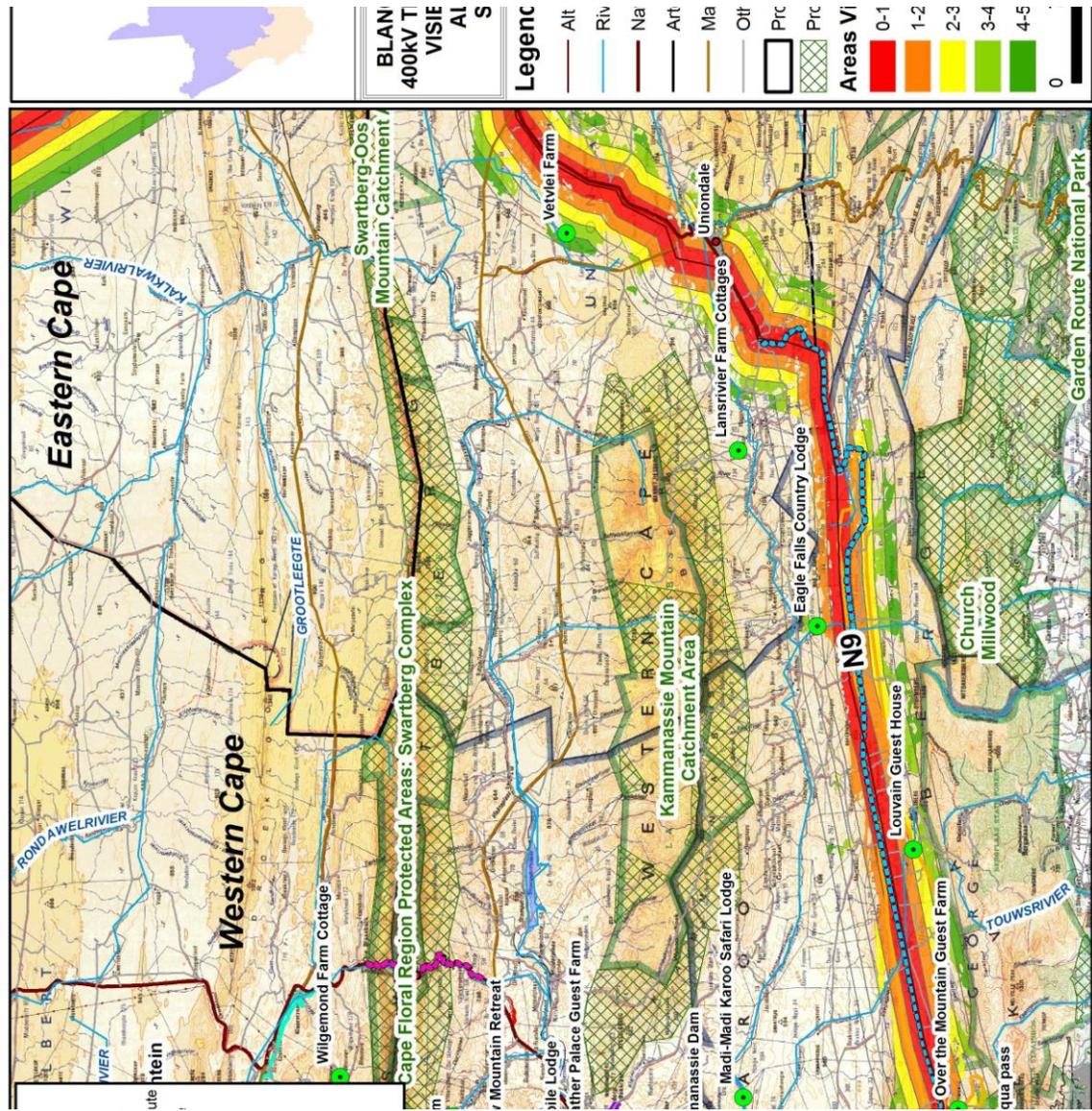


Figure 23: Visibility analysis – Alternative 2 (3)

## APPENDIX 2

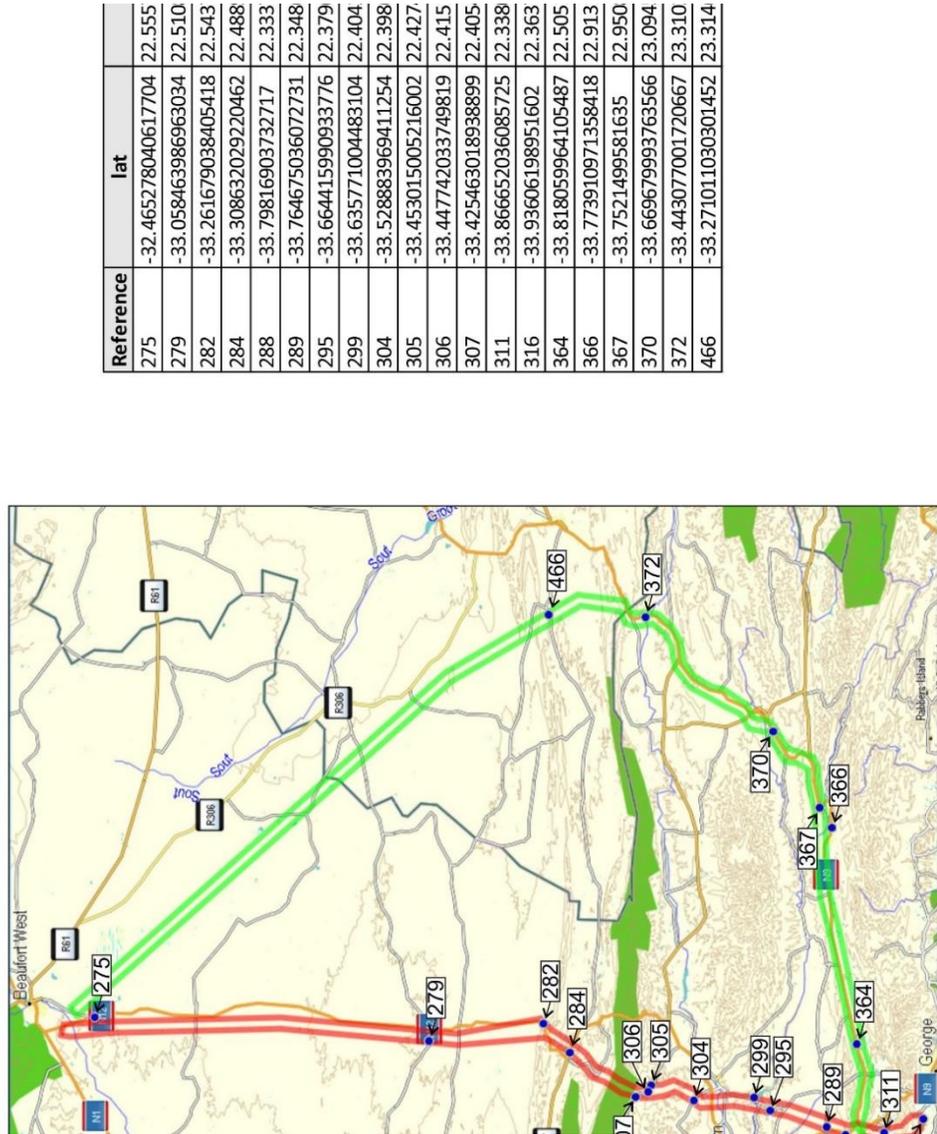


Figure 24: Sensitive Viewpoint locations

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
EMAIL: [ISCAPE@VODAMAIL.CO.ZA](mailto:ISCAPE@VODAMAIL.CO.ZA)  
CELL: 076 169 1435

**POINT COORDINATES  
SENSITIVE AND SENSITIVE VIEWPOINTS**

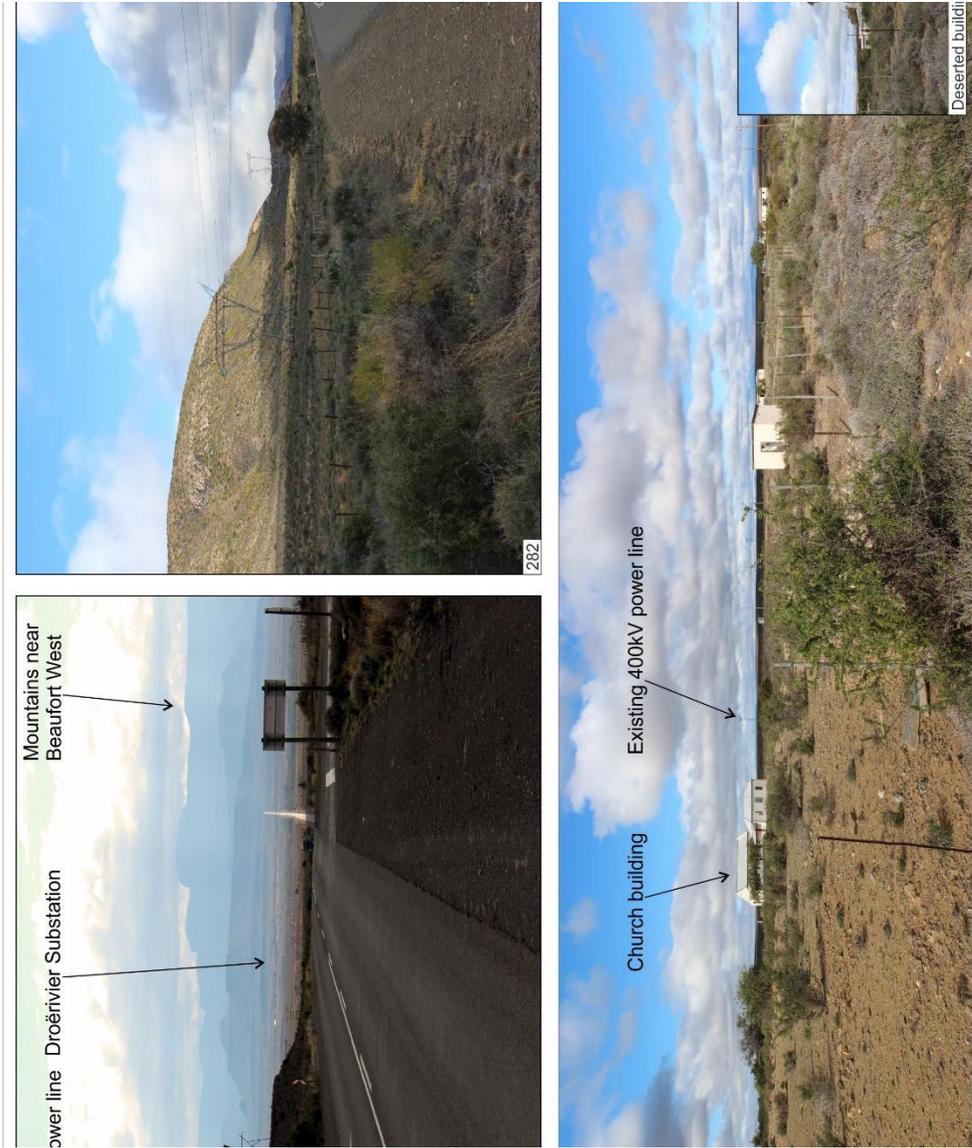


Figure 25: Groot Karoo Viewpoints (1)

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VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
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# GROOT KAROO SENSITIVE AND SENSITIVE VIEWPOINTS



Figure 26: Groot Karoo Viewpoints (2)

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
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CELL: 076 169 1435

## GROOT KAROO SENSITIVE AND SENSITIVE VIEWPOINTS

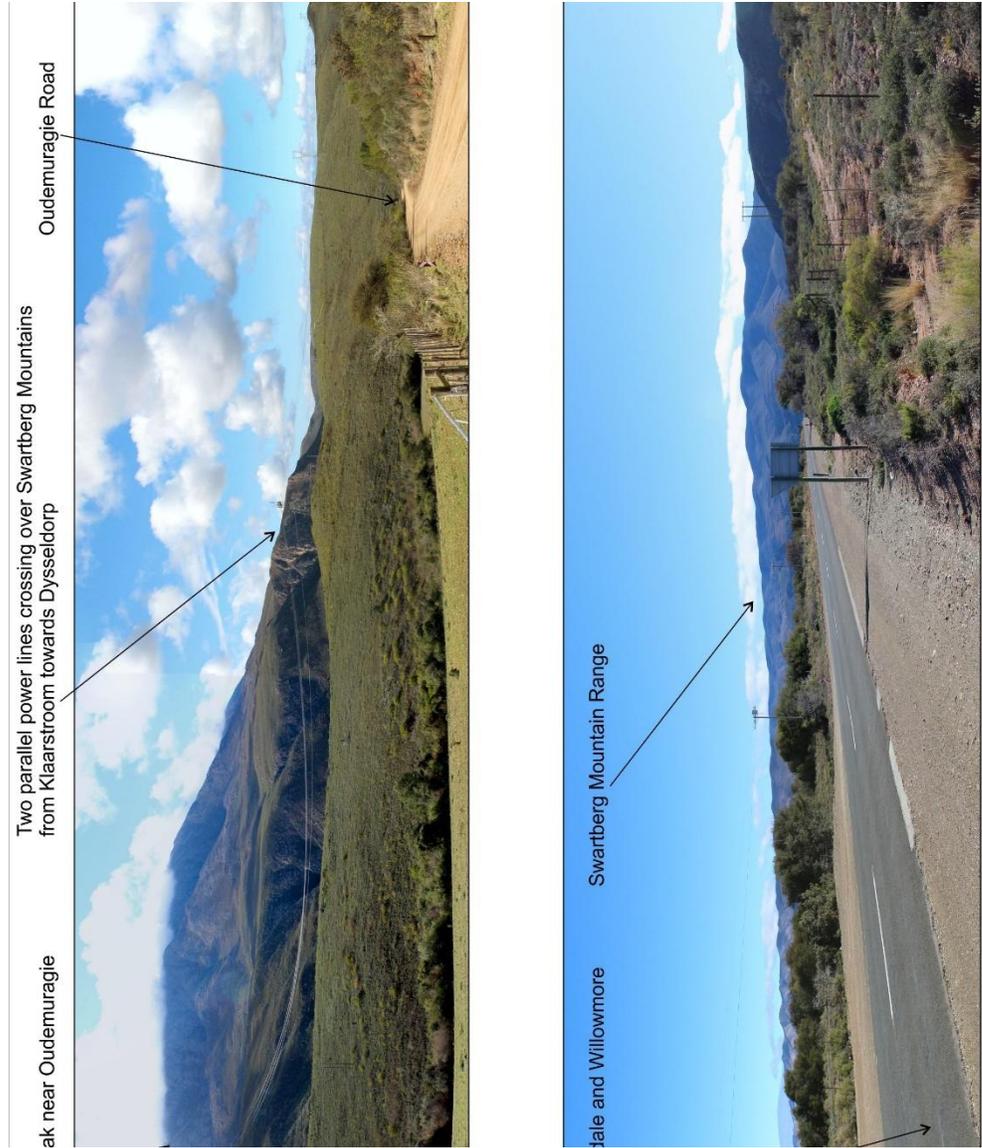


Figure 27: Swartberg Mountain Viewpoints

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
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**BERG MOUNTAIN RANGE  
SENSITIVE VIEWPOINTS**



Figure 28: Klein Karoo Mountains Viewpoints (1)

PROJECT NAME:  
 DROËRIVIER - BLANCO 400KV SERVITUDE  
 VISUAL IMPACT ASSESSMENT  
 DATE: 2016 - 07 - 21  
 CONTACT DETAILS:  
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# N KAROO MOUNTAINS SENSITIVE AND SENSITIVE VIEWPOINTS



Figure 29: Klein Karoo Mountains Viewpoints (2)

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

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# N KAROO MOUNTAINS SENSITIVE AND SENSITIVE VIEWPOINTS



Figure 30: Klein Karoo Viewpoints (1)

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
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# KLEIN KAROO SENSITIVE AND SENSITIVE VIEWPOINTS



Figure 31: Klein Karoo Viewpoints (2)

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
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# KLEIN KAROO SENSITIVE AND SENSITIVE VIEWPOINTS

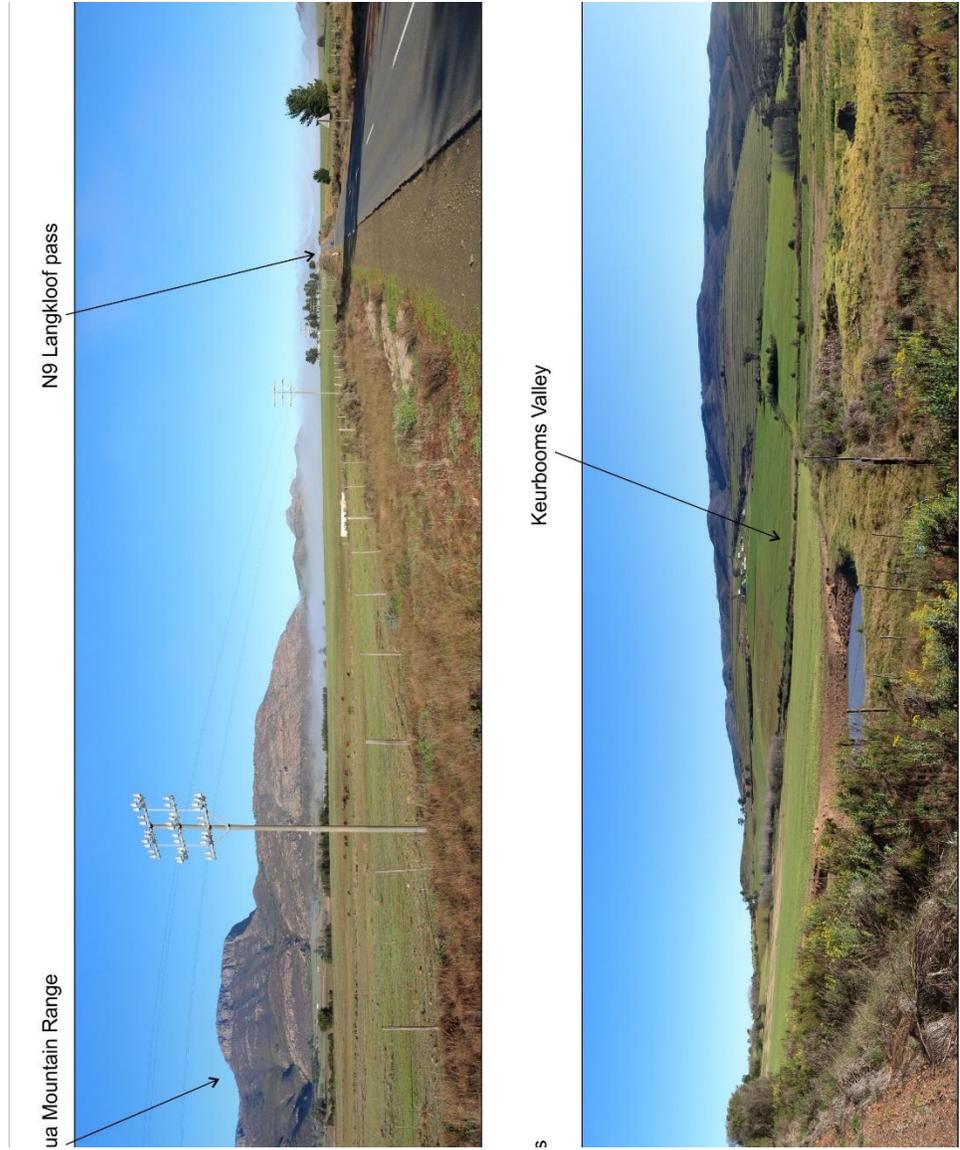


Figure 32: Outeniqua Mountains Viewpoints (1)

PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

CONTACT DETAILS:  
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# OUTENIQUA MOUNTAINS SENSITIVE AND SENSITIVE VIEWPOINTS

Figure

33:



PROJECT NAME:  
DROËRIVIER - BLANCO 400KV SERVITUDE  
VISUAL IMPACT ASSESSMENT  
DATE: 2016 - 07 - 21

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# OUTENIQUA MOUNTAINS SENSITIVE AND SENSITIVE VIEWPOINTS

## APPENDIX 3

### ***IMPACT SEVERITY ASSESSMENT CRITERIA***

The assessment of the significance of a visual or landscape impact is a combination of how severe an impact is considered to be, and how sensitive are the receptors that are being impacted on. According to Section 13 of the 2014 EIA Regulations 982, the following assessment criteria is followed to describe the severity of the impact along the topics of nature of impact, extent, duration, magnitude and probability.

#### **Nature of impact:**

A description of what causes the effect, what will be affected and how it will be affected. A distinction is made between direct, indirect, cumulative and residual impacts.

#### **Extent:**

1. Contained on site.
2. Local area, limited to the project site and adjacent properties.
3. Regional, often affecting a large community such as a town or municipal area.
4. Larger region, affecting an area that is on a provincial or national scale.
5. Crossing international borders.

#### **Duration:**

1. Very short duration, <1 years.
2. Short duration, 2-5 years.
3. Medium term, 5-15 years.
4. Long term, >15 years.
5. Permanent.

#### **Magnitude:**

0. Small and will have no effect on the environment.
2. Minor, although detectable, it will not result in an impact on processes.
4. Low and will cause a slight impact on processes.
6. Moderate and will result in processes continuing but in a modified way.
8. High, processes are altered to the extent that they temporarily cease.
10. Very high and result in complete destruction of patterns and permanent cessation of processes.

#### **Probability:**

1. Very improbable, will probably not happen.
2. Improbable, some possibility but low likelihood.
3. Probable, distinct possibility.
4. Highly probable, most likely.
5. Definite, impact will occur regardless of any prevention measure.

Additional to the aforementioned criteria, there is also mention of the **Reversibility** of an impact and the risk of **Irreplaceable loss of resources**:

#### **Reversibility:**

1. Low – Irreversible.
2. Medium – Reversible but with human intervention.
3. High – Completely reversible.

**Irreplaceable loss of resources:**

1. High – No potential for replacing a particular vulnerable resource that will be impacted.
2. Medium – Resource can be replaced with human intervention.
3. Low – No irreplaceable resource will be impacted.

The significance of the impact is determined by plotting the severity of the impact and the sensitivity of the receptors on a matrix.

		Impact severity				
		Very high	High	Medium	Low	Very low
Receptor sensitivity	Very high	Substantial	Major	Major/Moderate	Moderate	Moderate/Minor
	High	Major	Major	Moderate	Moderate/Minor	Minor
	Medium	Major/Moderate	Moderate	Moderate/Minor	Minor	Minor/Negligible
	Low	Moderate	Moderate/Minor	Minor	Minor/Negligible	Negligible
	Very low	Moderate/Minor	Minor	Minor/Negligible	Negligible	Negligible/None

## APPENDIX 4

### **GLOSSARY OF TERMS**

(Derived from the IEMA & LI Guidelines with additional descriptions)

**Baseline:** Record and analysis of existing landscape and visual conditions. A description of the status quo.

**Cumulative effects/impacts:** The summation of effects that result from changes caused by a development in the conjunction with other past, present and reasonably foreseeable actions.

**Landscape:** The European Landscape Convention (2000) defines landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.” It can also include rural landscapes, townscapes and seascapes.

**No-Go or Do-Nothing alternative:** Continued change/evolution of the landscape or of the environment in the absence of the proposed development.

**Impact severity:** A combination of the probability, duration, extent and magnitude of an impact. It is calculated with an equation of  $S=(E+D+M)P$  where E,D,M and P are given values in the impact report and impact severity is determined to be low, medium or high.

**Impact significance:** A combination of the impact severity and the receptor sensitivity based on values of high to insignificant.

**Indirect impacts:** Impacts on the environment, which are not a direct result of the development, but are often produced away from it, or as a result of, a complex pathway. Sometimes referred to as secondary impacts.

**Land use:** The primary use of the landscape or dominant functions.

**Land cover:** Refers to the elements that are on the surface of the landscape. Relates to the land use.

**Landform:** Combinations of slope and elevation that produce the shape and form of the land surface.

**Landscape Character Assessment:** A Landscape Character Assessment (LCA) identifies and describes the comprising attributes and their qualities/values in the study area. It recognises that a landscape consists of interconnected systems, patterns and individual components that is defined by the natural, cultural and historical aspects of the region.

**Landscape exposure:** Landscape exposure refers to the openness of a landscape and the ability or inability to experience panoramic views across vast distances. It relates to the VAC of a landscape.

**Landscape type:** A landscape type (LT) will have broadly similar patterns of geology, landform, vegetation, land uses, settlement patterns, etc. that gives it a common character.

**Landscape feature:** A prominent eye-catching element that is unique to a specific landscape.

**Landscape sensitivity:** The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects.

**Mitigation:** Measures, including any process, activity or design implementation to avoid, reduce, remedy or compensate for the adverse effect of an impact or visual effect due to a development.

**Receptor (Landscape or viewer):** A physical landscape feature, resource, character component or viewer group that will experience an effect from a development.

**Residual risks:** The risk that will remain after all the recommended measures have been undertaken to mitigate the impact associated with the activity (Green Leaves III, 2014)

**Study area:** An area determined by the specialist to be the area of impact. This area may vary from project to project and is usually the extent of visibility.

**Viewshed:** A viewshed analysis or visibility mapping is a GIS generated area that calculates the direct line of sight of an object in a study area based on the topography in the study area. This provides a first order impression of the visibility of an object without the screening effect of vegetation or other structures.

**Visual Absorption Capacity (VAC):** VAC is the degree of ability of a study area/landscape to conceal or absorb the proposed project.

**Visual Exposure:** Visual exposure has reference to a specific observer or observer group, and relates to how close a viewer is to an impact, or what percentage of the impact is visible, and how it affects the viewers' visual field.

**Visual Resource:** Any scene of a landscape can be referred to as a visual resource. The term, visual resource, is commonly used when the value of the scene is described.

**Visual tolerance/intolerance threshold:** A visual tolerance/intolerance threshold is a point where a specific cumulative impact oversteps the boundary between being accepted or not accepted. It is a very subjective matter and it is up to the visual specialist to motivate why the threshold is reached or exceeded.

**Zone of Visual Influence (ZVI):** Area from which a proposed development is likely to be visible, based on GIS viewsheds and field observations.