PROPOSED BLANCO 400/132KV MTS SUBSTATION AND DROERIVIER PROTEUS LOOP-IN LOOP-OUT POWERLINE PROJECT

VISUAL IMPACT ASSESSMENT

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– Revised November 2014 –

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1 INTRODUCTION

1.1 QUALIFICATION AND EXPERIENCE OF THE PROFESSIONAL TEAM

NuLeaf Planning and Environmental Pty (Ltd) undertook this visual assessment in collaboration with Strategic Environmental Focus (Pty) Ltd, who contributed to the regional mapping, and Dereck Townshend, who undertook the Viewshed Analyses and Photo Simulations.

The team undertaking the visual assessment has extensive practical knowledge in spatial analysis, environmental modeling and digital mapping.

The visual assessment team is also familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape Province of South Africa, the core elements are more widely applicable.

Strategic Environmental Focus (Pty) Ltd also represents the main Environmental Assessment Practitioner (EAP), and appointed NuLeaf Planning and Environmental (Pty) Ltd as an independent specialist consultant to undertake the visual impact assessment for the proposed Blanco 400/132kv MTS substation and Droerivier Proteus loop-in loop-out powerline project.

Neither the author, nor any member of the team undertaking the Visual Impact Assessment will benefit from the outcome of the project decision-making.

1.2 LEGAL FRAMEWORK

The following legislation and guidelines have been considered in the preparation of this report:

- The Environmental Impact Assessment Amendment Regulations, 2010;
- Guideline on Generic Terms of Reference for EAPs and Project Schedules (DEADP, Provincial Government of the Western Cape, 2011).
- Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (DEADP, Provincial Government of the Western Cape, 2005).

1.3 INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps and GIS generated data were sourced from the Surveyor General, Surveys and Mapping in Mowbray, Cape Town and SEFGIS (2011) respectively;
- Observations made and photographs taken during site visits;
- Conceptual layout plan received from the main Environmental Assessment Practitioner;
- Professional judgement based on experience gained from similar projects; and
- Literature research on similar projects.

1.4 ASSUMPTIONS AND LIMITATIONS

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

In terms of the tower design, a number of options are beign considered, namely Eskom's 515 A, B, C, D E and H designs. These designs range in height from around 27,5m to 40,5m.

This Visual Impact Assessment and all associated mapping has been undertaken according to the worst case scenario, which assumes the tallest tower.

1.5 LEVEL OF CONFIDENCE

Level of confidence[1] is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
  - **3**: A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
  - **2**: A moderate level of information is available of the study area and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.
  - **1**: Limited information is available of the study area and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.
- The information available, understanding of the project and experience of this type of project by the practitioner:
  - **3**: A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
  - **2**: A moderate level of information and knowledge is available of the project and the visual impact assessor is moderately experienced in this type of project and level of assessment.
  - **1**: Limited information and knowledge is available of the project and the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

[1] Adapted from Oberholzer (2005).

Table 1: Level of Confidence

	Information on the project & experience of the practitioner			
Information on the study area		**3**	**2**	**1**
	3	9	6	3
	2	6	4	2
	1	3	2	1

*The level of confidence for this assessment is determined to be **9** and indicates that the author's confidence in the accuracy of the findings is high:*

- The information available, and understanding of the study area by the practitioner is rated as **3** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

2 METHODOLOGY

The study was undertaken using Geographic Information Systems (GIS) technology as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from 20m interval contours supplied by the Chief Directorate National Geo-Spatial Information.

The approach utilised to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed facility could have a potential impact;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

This report (visual impact assessment) sets out to identify and quantify the possible visual impacts related to the proposed facility, including related infrastructure, as well as offer potential mitigation measures, where required.

The following methodology has been followed for the assessment of visual impact[2]:

- **Determine potential visual exposure**

  The visibility or visual exposure of any structure or infrastructure is the point of departure for the visual impact assessment. It stands to reason that if the proposed infrastructure were not visible, no impact would occur.

[2] This methodology is adapted from that developed by MetroGIS, and detailed in Visual Impact Assessments undertaken by them.

Viewshed analyses of the proposed infrastructure indicate the potential visibility.

- **Determine visual distance and observer proximity to the facility**

  In order to refine the visual exposure of the infrastructure on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence.

  Proximity radii for the proposed alignment corridors are created in order to indicate the scale and viewing distance of the infrastructure and to determine the prominence thereof in relation to their environment.

  The visual distance theory and the observer's proximity to the infrastructure are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed infrastructure.

- **Determine viewer incidence, perception and sensitivity**

  The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of a structure is favourable to all observers, then the visual impact would be positive.

  It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure.

  It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the visual absorption capacity**

  This is the capacity of the receiving environment to absorb the potential visual impact of the proposed infrastructure. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

  The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

  The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

  The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate the potential visual absorption capacity (VAC) of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover and other landscape characteristics.

- **Determine the visual impact index**

  The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

- **Determine impact significance**

  The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of extent, duration, magnitude and probability.

3 PROJECT DESCRIPTION

The following background information was extracted from the Final Scoping Report entitled *Proposed Blanco substation and power line project*[3] and ammended in response to changes to the project scope during subsequent correspondence with the EAP.

'Eskom Transmission Grid Planning initiated a study to investigate possible solutions to address transformation constraints at Proteus Main Transmission Station (MTS) as well as the sub-transmission constraints experienced on the network supplying the Blanco area.

In response to this, Eskom proposes the establishment of a new 400/132kV MTS with an expected development footprint of approximately 400 X 450m and loop in – loop out power lines with a length in the region of 1.8 – 4km (dependent on the alternative chosen).

In terms of the tower design, a number of options are beign considered, namely Eskom's 515 A, B, C, D E and H designs. These designs range in height from around 27,5m to 40,5m. The image above shows a typical 515 tower design.

The spacing between the towers will depend on the tower design selected and the terrain of the alignment. The average span on a 400kV line is 450m, but this value may vary from 150m – 500m.

Final profiling along the alignemnts will only be undertaken once a route has been approved.

[3] SEF, August 2013

Figure 1: Typical 515 Tower design[4]

Eskom has investigated 6 possible alternative sites for the proposed 400/132kV Blanco substation, each with an associated 400kV loop-in loop-out power line. These alternatives include the following:

- **Alternative 1:**

  The proposed new 400kV/132kV substation is proposed to the immediate north east of the existing 132kV Yard, across the local gravel road. This is a technically preferred location because it will be easy to integrate into the existing network. The property was previously owned by Eskom but has since been sold to a local farmer. There is a pivot which will be directly affected by this alternative.

  The associated power line (with an approximate distance of 2.5 km) will connect (or "T") with the existing high voltage power line and follow a southerly route across a road, a perennial river and agricultural land where it will feed into the proposed new 400kV/132kV substation (namely alternative substation 1).

- **Alternative 2:**

  In November 2014, a new alternative was suggested, in which the proposed new 400kV/132kV substation is proposed to the immediate north of the existing 132kV Yard, and slightly south west of the Alternative 1 site. As with Alternative 1, this site is a technically preferred location because it will be easy to integrate into the existing network.

  The associated power line (with an approximate distance of 2.3 km) will connect (or "T") with an existing high voltage power line, then follow a southerly route across agricultural land, a wetland and a road before feeding into the proposed new 400kV/132kV substation (namely alternative substation 2).

[4] Image sourced from Eskom's *Transmission Suspension Tower* poster

- **Alternative 3:**

  This alternative is proposed further to the north east of the existing substation, across the road. The location has a larger area and is also closer to the existing distribution line. This alternative may, however, affect this existing distribution line, which passes through the site.

  The associated power line (with an approximate distance of 1.7 km) will connect (or "T") with an existing high voltage power line, cross a perennial river, then follow a southerly direction across a road and agricultural land and eventually feed into the proposed new 400kV/132kV substation (namely alternative substation 3).

- **Alternative 4:**

  This alternative is proposed on the south western side of the existing substation beyond the road and a local wetland. It is however located further away from the existing distribution line, will cover a longer distance and will affect several land owners.

  The associated power line (with an approximate distance of 3.7 km) will connect (or "T") with an existing high voltage power line, then follow a southerly direction across agricultural land, a wetland, a secondary road and a tree line until it will feed into the proposed new 400kV/132kV substation (namely alternative substation 4).

- **Alternative 5:**

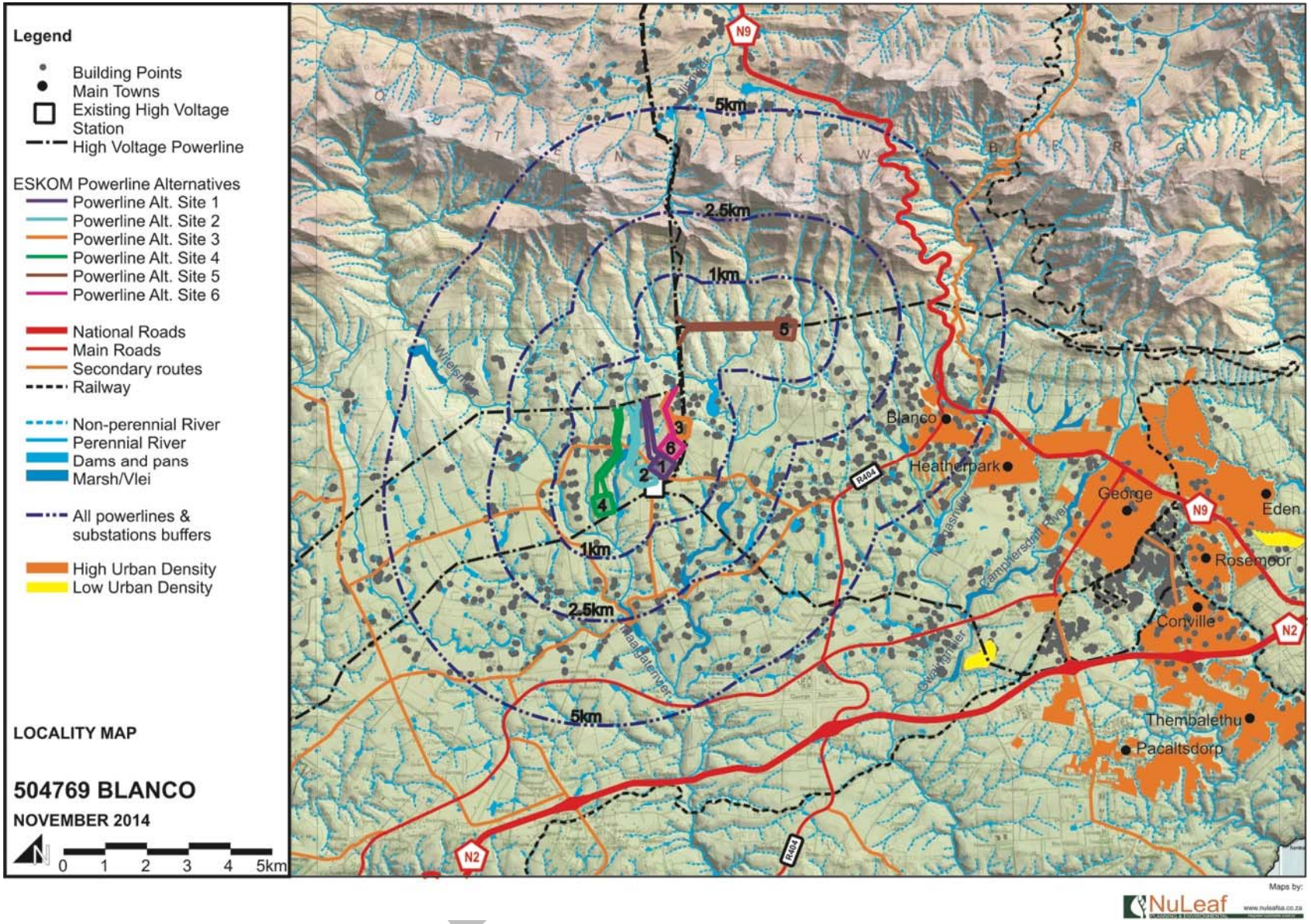
  A new site alternative was suggested by a landowner on 8 May 2013. This site was looked at but was subsequently regarded as not feasible based on the gradient of the site. An alternative substation site was then suggested, which is located well to the east of the existing powerlines, at the foot of the mountains.

  The associated power line (with an approximate distance of 4.1 km) will connect (or "T") with an existing high voltage power line, then follow the route of the existing 132kV powerlines heading eastwards towards Blanco, and will feed into the proposed new 400kV/132kV substation (namely substation 5).

- **Alternative 6:**

  A sixth alternative was brought forward in November 2014. This alternative is proposed on the north eastern side of the existing substation, across the road, slightly beyond the location of the Alternative 1 site. Again, as with Alternative 1, this is a technically preferred location because it will be easy to integrate into the existing network. The location lies adjacent to the Droerivier Proteus 400kV line on a site currently occupied by a pivot.

  The associated power line (with an approximate distance of 1.4 km) will connect (or "T") with an existing high voltage power line, cross a perennial river, then follow a southerly direction across a road and agricultural land and eventually feed into the proposed new 400kV/132kV substation (namely alternative substation 6).



Map 1: Locality and Context of the proposed project showing Project Alternatives

4 SCOPE OF WORK

The scope of work for this assessment includes the determination of the potential visual impacts in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed substation and associated power line corridor, and the 6 alternatives identified. Mitigation measures are recommended where appropriate.

In addition, the scope includes a comparative assessment of the 6 alternatives, and a recommendation of a preferred alternative from a visual perspective.

Issues related to the proposed Blanco 400/132kv MTS Substation and Droerivier Proteus loop-in loop-out powerline project include the following:

- The visibility of the proposed infrastructure to, and potential visual impact on, users of national roads (N2, N9), arterial roads (R102, R404) and secondary roads.
- The visibility of the proposed infrastructure to, and potential visual impact on farmsteads and settlements.
- The visibility of the proposed infrastructure to, and potential visual impact on residents of built-up centres and populated places (i.e. the towns of Blanco, Heather Park and George).
- The visibility of the proposed infrastructure to, and potential visual impact on protected and conservation areas (i.e. the Witfontein Nature Reserve, the Doringrivier Nature Reserve, the Ruitersbos Nature Reserve and the Outenique Mountains Important Birding Area)[5].
- The potential visual impact of associated infrastructure (i.e. access roads and cleared servitudes) on sensitive visual receptors.
- Potential visual impacts associated with the construction phase.
- The potential visual impact of operational, safety and security lighting of the facility at night.
- The visibility of the proposed infrastructure to, and potential visual impact on the landscape quality defined by natural features (i.e. the mountains).
- The potential impact of the proposed infrastructure on the visual character and sense of place of the region.
- The potential impact of the proposed infrastructure on tourism, with specific reference to tourist access routes (i.e. the N3, N9, N12, R102 and R504), tourist destinations (i.e. attractions and accommodation) and the scenic Garden Route.
- Potential cumulative visual impacts.
- The potential to mitigate visual impacts and inform the design process.

5 THE AFFECTED ENVIRONMENT

Regionally, the study area is located in the south east of the Western Cape Province near to the main centre of George.

The terrain of the study area is generally described as *undulating hills* and *moderately undulating plains.* The north of the study area consists of *low mountains,* which are formally known as the Outeniqua Mountain Range.

[5] These Provincial and National conservation areas have been sourced from the SANBI database.

Prominent hydrological features in the study area include two main river systems. The first consist of perennial drainage lines such as the Witelsrivier, the Koeksterbosrivier, the Moerasrivier (and others), which drain from the Outeniqua Mountain Range towards the Maalgaterivier, which runs southwards towards the coast.

The second river system also drains from the mountain range southwards towards the coast. This consists of perennial drainage lines such as the Gwaingrivier, the Malgasrivier and the Camfersdrift River, along with other non-perennials which converge at the Gwaingrivier, running southwards towards the coast. Refer to **Map 1.**

The natural vegetation of the study area is primarily *Fynbos* with some remaining natural *Forest* areas towards the coast line. *Thicket interspersed* with *Succulent Karoo* lies further towards the north.[6]

CapeNature, the custodian of biodiversity in the Western Cape, has emphasized that the mapped vegetation units[7] of the receiving environment wherein the linear development is proposed consists of *Critically Endangered* Cape Lowland Alluvial Vegetation, *Endangered* Garden Route Granite Fynbos, *Vulnerable* Garden Route Shale Fynbos, and *Vulnerable* Southern Cape Afrotemperate Forest.

In terms of land use and land cover, the northern, mountainous part of the study area is characterised by *thicket and bushland* and exotic pine *plantations*. The southern part of the study area is predominantly agricultural, with large areas given over to cultivation (south west) and grazing (central and south east). *Thicket and bushland* also line the main perennial rivers. Small patches of *indigenous forest* and *shrubland fynbos* appear in the central and western part of the study area at the foot of the mountain range. Refer to **Map 2.**

Together with the topography, the river systems have largely influenced the settlement pattern within the study area. Farms and farmstead settlements are concentrated in the centre of the study area and in the far north, generally where gradient permits cultivation and water is permanently available. There is little to no settlement within the mountainous areas.

Figure 2: Typical homestead within the study area

[6] Waterwise Gardening. 2010. Van Jaarsveld, E. *Biomes of Southern Africa.* Random House Struik (Pty) Ltd.
[7] Mucina, L & Rutherford, MC (eds) 2006. Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

George is the largest urban centre within the study area, and is located in the far east of the region. The town consists of a commercial core and is surrounded by residential land use. Smaller built up areas include Blanco, Heather Park, Rosemoor, Conville, Lawaaikamp, Parkdene, Ballotsview, Pacaltsdorp and Thembalethu.

The N2 and N9, as well as a number of regional arterial roads (i.e. the R404 and R102) traverse the area. In addition, a number of secondary roads interconnect within the region. The former are surfaced roads, while most of the secondary roads serving the farms are gravel roads.

Figure 3: View of the study area from the N3

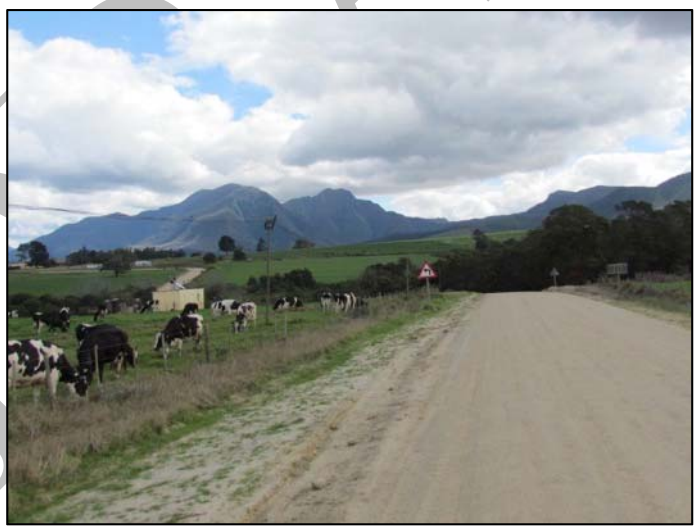


Figure 4: Typical secondary road serving the farmland within the study area

Two railway lines are present within the study area, running from the south west and from the north respectively. Considering the context, it is expected that these lines carry both commuters and tourists. The *Outinqua Chootjoe*, a well known tourist attraction, passes though the study area south of the Outiniqua's.

Other industrial infrastructure within the study area includes George Industria to the south of the town, George Airport to the south west and existing high voltage power lines, which traverse the study area both from east to west, and from north to south.

These existing alignments converge roughly in the centre of the study area at the existing Blanco Substation, in the vicinity of the proposed project sites.

Figure 5: The existing Blanco Substation

Figure 6: Existing electrical infrastructure within the study area

The study area includes three formally protected conservation areas, namely the Doringrivier and Ruitersbos Nature Reserves in the north west and the Witfontein Nature Reserve in the north east. Both reserves fall within the Outeniqua Mountains, which is also host to the Outeniqua Mountains Important Birding Area (IBA). Refer to **Map 3.**

Conservation and nature oriented tourism is known to occur within the area, as it is transected by the well-known Garden Route. Furthermore, George is known to be the Garden Route's largest city and main administrative centre[8].

Internet-based research revealed that the two nature reserves are eco-tourism destinations (i.e. they are used for 4x4 routes and hiking trails), although minimal infrastructure appears to be present. Regardless of current state, both reserves are

[8] Wikipedia (2013). Available: < *http://en.wikipedia.org/wiki/Garden_Route*>

considered to have the potential of becoming well-frequented tourist destinations as they lie within the region of the popular Garden Route.

The N2, N9, R102 and R404 are the primary roads in the region and are the main link between George, Mossel Bay, Sedgefield, Knysna and Oudtshoorn. These are the main roads serving the Garden Route and are thus considered to be routes that are most likely to carry tourists.

In terms of tourist destinations and accommodation, George is known to host a relatively high concentration of attractions and overnight facilities. To a lesser degree, Blanco offers a range of guest house accomodations. The well-known Fancourt Golf Estate is located to the immediate south of Blanco.

Figure 7: Stud Farm / wedding destination within the study area

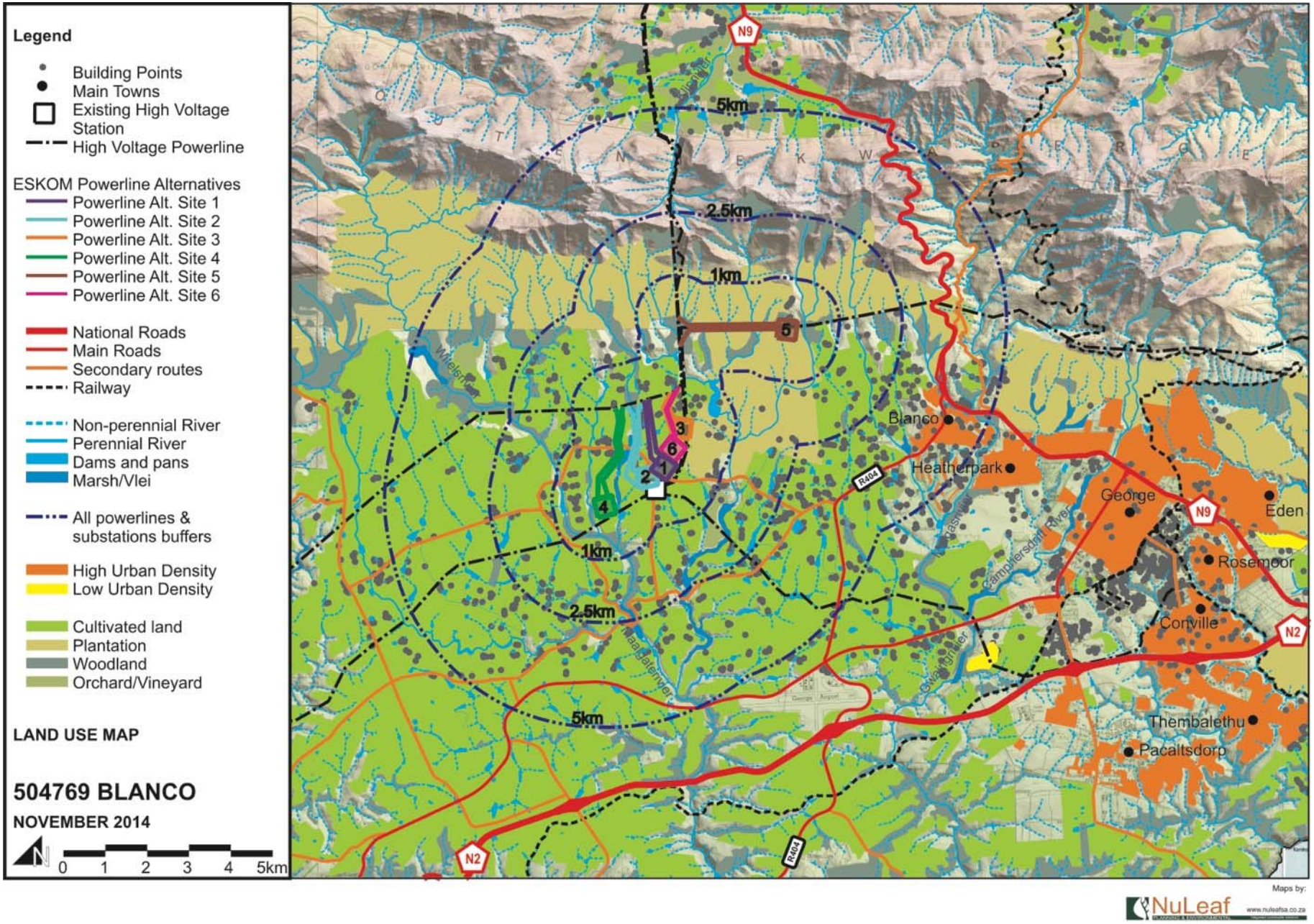
It may also be expected that farms within the region will also cater for tourists to some extent, providing guest houses and suchlike. At this stage, however, the locations of such tourist destinations are not known.

Overall, the study area is considered to have a very high visual and scenic quality by virtue of the landcape and environment. Sense of place is strongly pastoral, defined by green, picturesque farmland and fields set against the backdrop of the dramatic Outiniqua Mountains and punctuated by meandering, bush-lined rivers. Development outside of the towns and built up areas is domestic in scale, and sparsely spread.

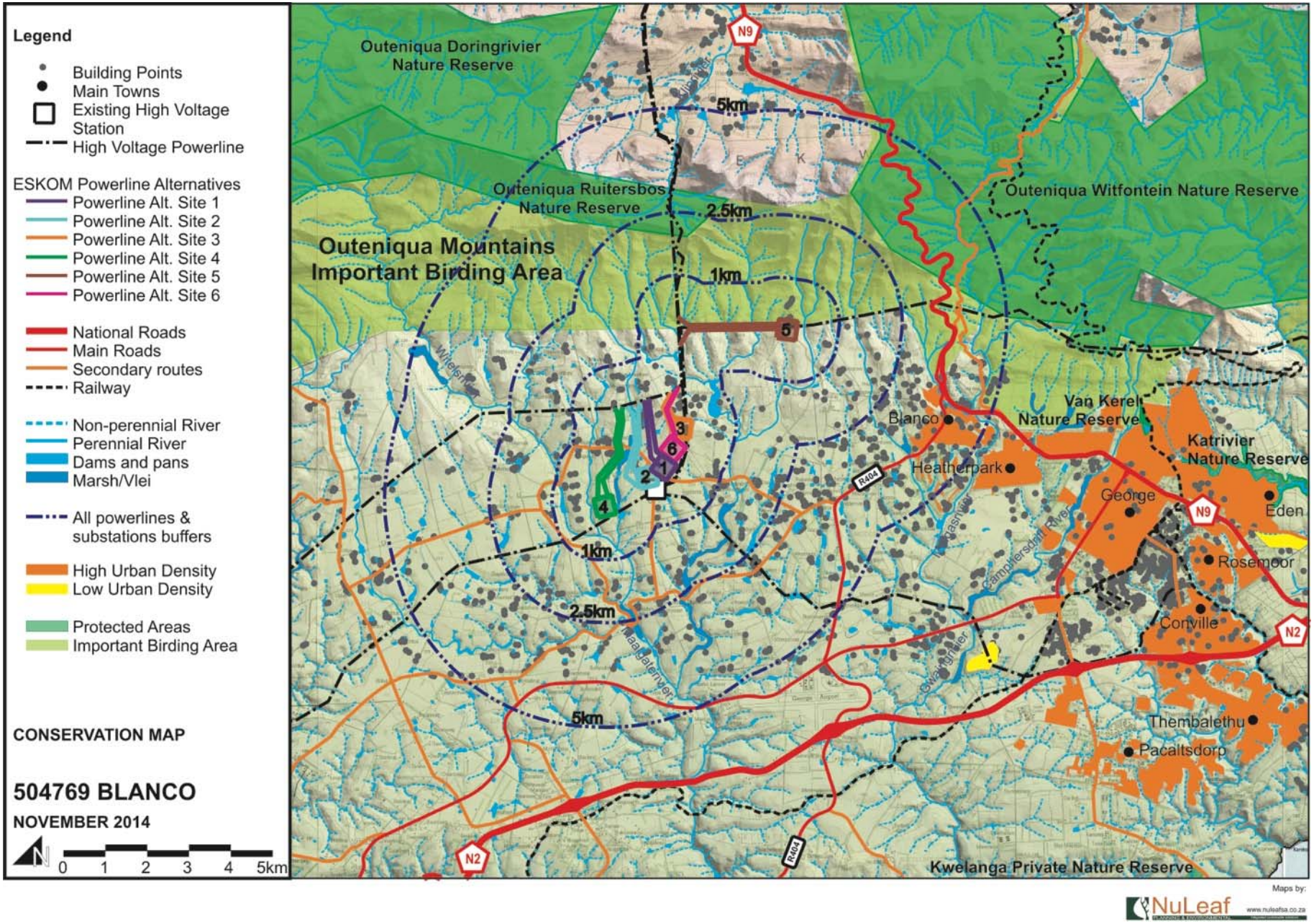
Figure 8: High visual quality of the study area

Figure 9: Pastoral sense of place of the study area

Figure 10: Intact natural riviers within the study area



Map 2: Land cover and land use map within the study area



Map 3: Conservation and Protected Areas within the study area

6 RESULTS

6.1 POTENTIAL VISUAL EXPOSURE

The visibility analyses (or viewsheds) for the project alternatives were calculated from each power line at an offset height of 32m above ground level (i.e. the average height of a 400kV power line). The visibility analysis for each alternative was generated from a number of points along the alignment, spaced at intervals of approximately 400m. Receptor height was set at eye level.

The height of the substation will not exceed two storeys (i.e. 6m), therefore the visual exposure of this component will fall within the viewshed generated for each power line alternative.

The analyses show that all project alternatives will be visually exposed to some extent within the study area, due to the tall power line infrastructure. It is thus anticipated that all 6 project alternatives would be visible to observers (i.e. people travelling along roads, residing in towns and at homesteads or visiting the region), and could potentially constitute a high visual prominence, potentially resulting in a visual impact.

The following is of specific relevance regarding the anticipated visual exposure of the 6 alternatives:

6.1.1 ALTERNATIVE 1

Refer to **Map 4a**.

This substation alternative is proposed to the immediate north east of the existing 132kV Yard. The power line alternative will connect (or "T") with an existing high voltage power line and follow a southerly route across a road, a perennial river and agricultural land where it will feed into the proposed new 400kV/132kV substation.

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 1km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 8) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Parts of Blanco, Heather Park and George, including parts of the Fancourt Golf Estate may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

6.1.2 ALTERNATIVE 2

Refer to **Map 4b**.

This substation alternative is proposed proposed to the immediate north of the existing 132kV Yard, and slightly south west of the Alternative 1 site. The power line alternative will connect (or "T") with an existing high voltage power line, then follow a southerly route across agricultural land, a wetland and a road before feeding into the proposed new 400kV/132kV substation.

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 1km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 6) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Very limited parts of Blanco as well as parts of Heather Park and George may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

6.1.3 ALTERNATIVE 3

Refer to **Map 4c**.

This substation alternative is proposed further to the north east of the existing 132kV Yard. The associated power line (with an approximate distance of 1.7 km) will connect (or "T") with an existing high voltage power line, cross a perennial river, then follow a southerly direction across a road and agricultural land and eventually feed into the proposed new 400kV/132kV substation

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 2km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 4) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Parts of Blanco (including the Fancourt Golf Estate) and large parts of Heather Park and George may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

6.1.4 ALTERNATIVE 4

Refer to **Map 4d**.

This substation alternative is proposed on the south western side of the existing substation beyond the road and a local wetland. The associated power line (with an approximate distance of 3.7 km) will connect (or "T") with an existing high voltage power line, then follow a southerly direction across agricultural land, a wetland, a secondary road and a tree line until it will feed into the proposed new 400kV/132kV substation

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 2km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 7) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Limited parts of Blanco (including small sections of the Fancourt Golf Estate) and larger parts of Heather Park and George may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

6.1.5 ALTERNATIVE 5

Refer to **Map 4e**.

This substation alternative is propsoed on the eastern side of the existing 132kV Yard well to the east of the existing powerlines, at the foot of the mountains. The associated power line (with an approximate distance of 4.1 km) will connect (or "T") with an existing high voltage power line, then follow the route of the existing 132kV powerlines heading eastwards towards Blanco, and will feed into the proposed new 400kV/132kV substation.

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 2km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

One homestead is located in close proximity to the proposed alignment, and few secondary and other roads are evident. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Parts of Blanco (including the Fancourt Golf Estate and large parts of Heather Park and George may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed in close proximity.

6.1.6 ALTERNATIVE 6

Refer to **Map 4f**.

This substation alternative is proposed on the north eastern side of the existing substation, across the road, slightly beyond the location of the Alternative 1 site. The location lies adjacent to the Droerivier Proteus 400kV line on a site currently occupied by a pivot. The power line alternative will connect (or "T") with an existing high voltage power line, cross a perennial river, then follow a southerly direction across a road and agricultural land and eventually feed into the proposed new 400kV/132kV substation.

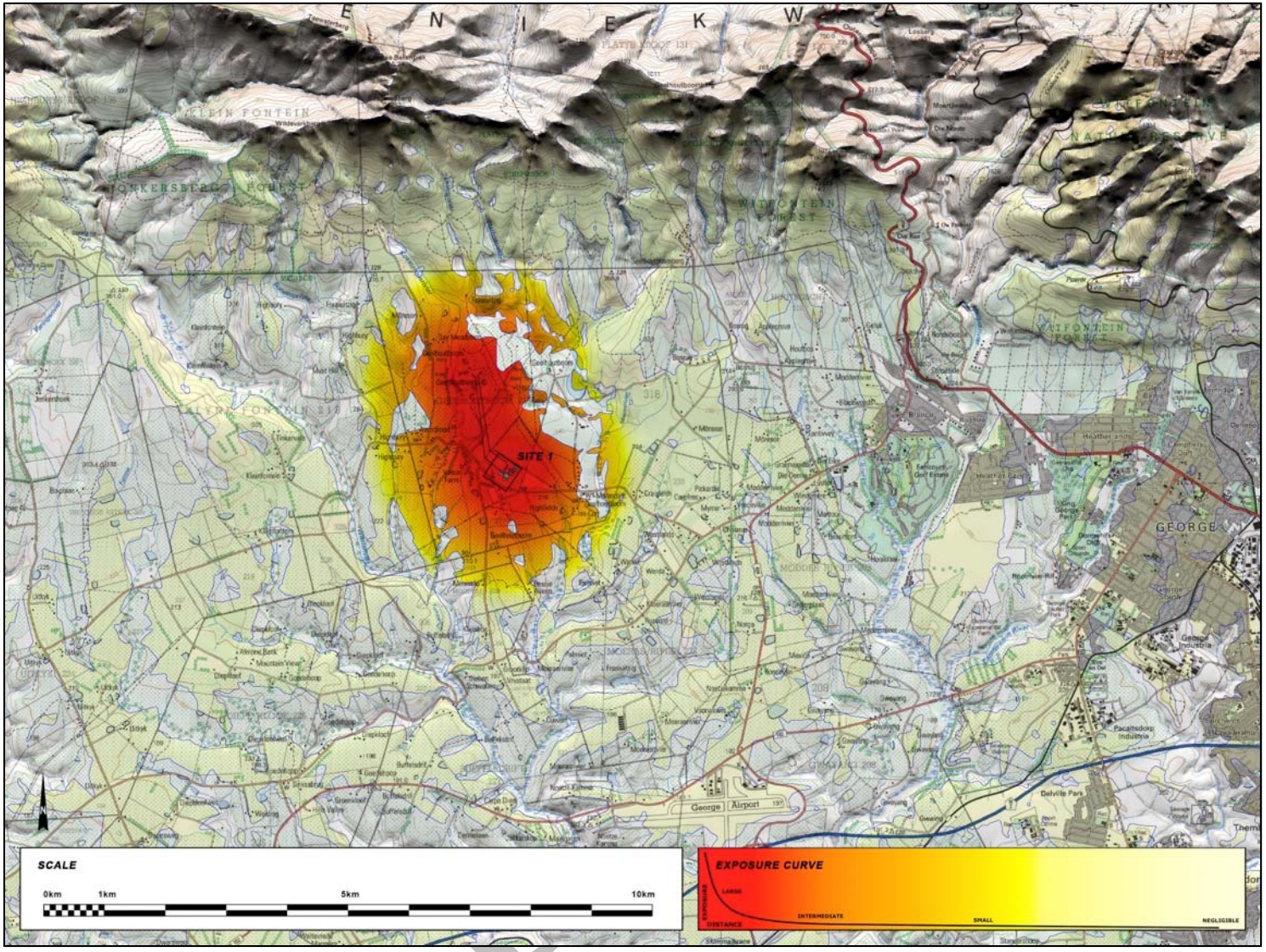
This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 2km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

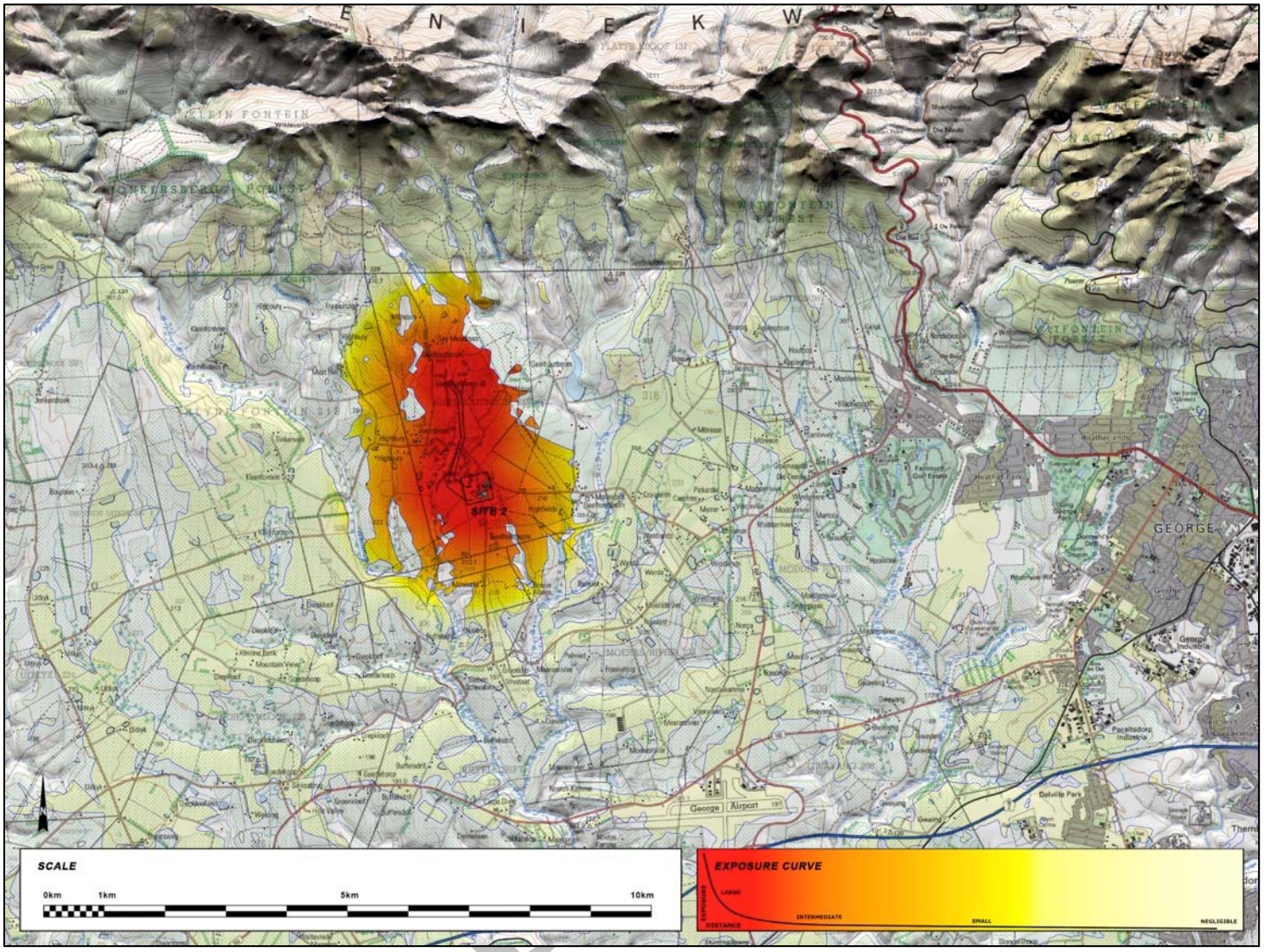
A number of homesteads (approx. 4) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Parts of Blanco (and Fancourt Golf Estate), Heather Park and George may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

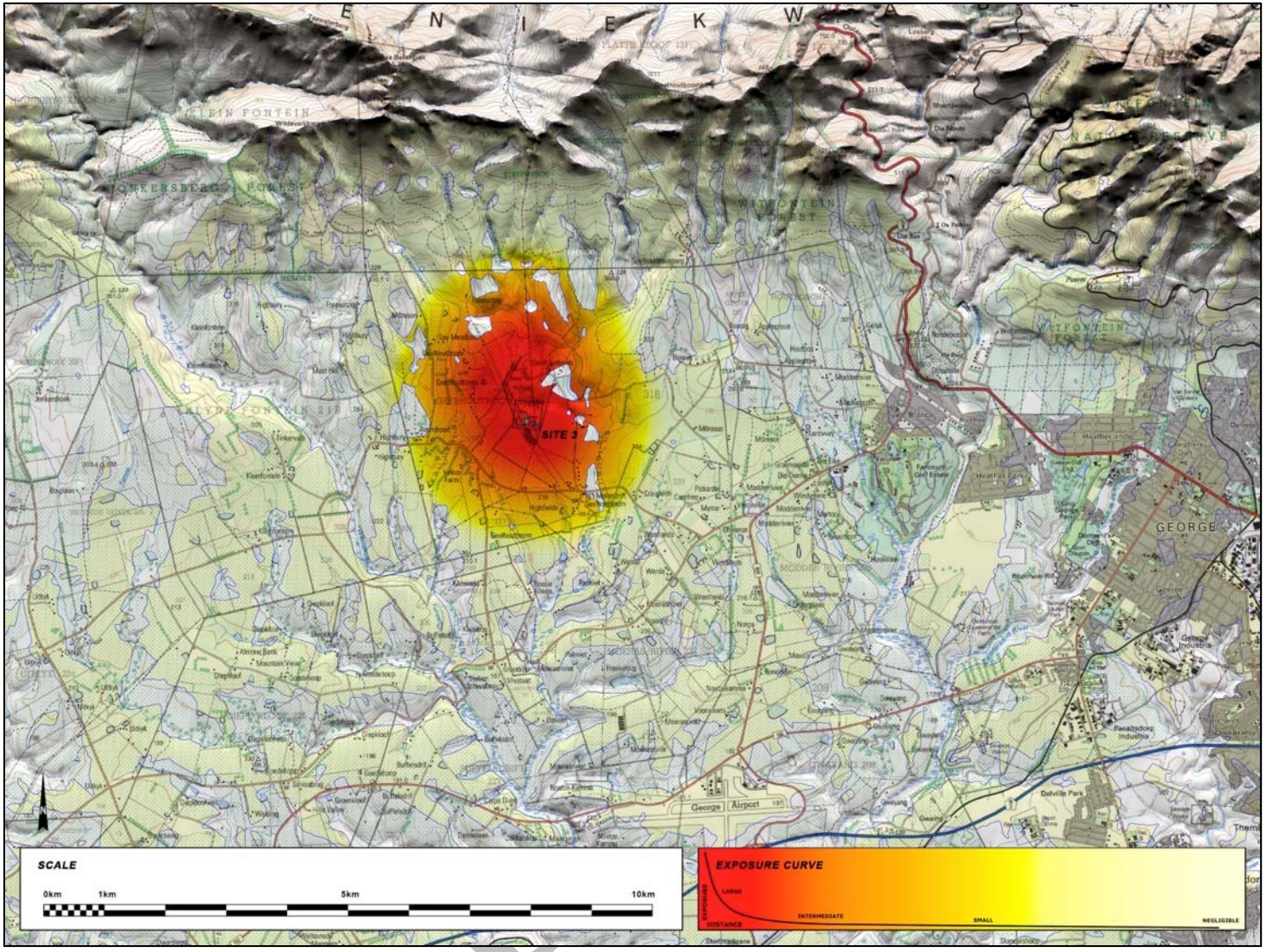
In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.



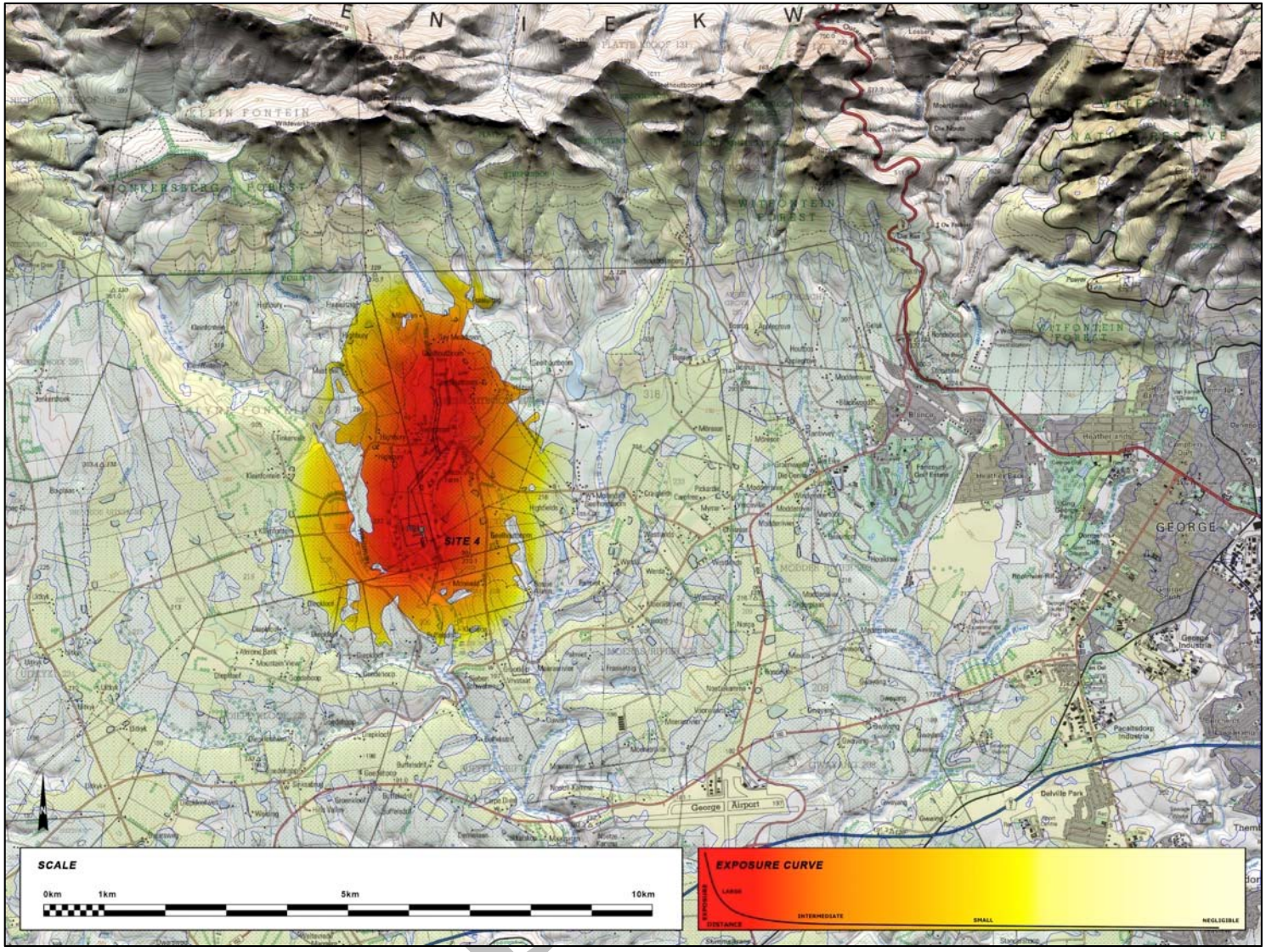
Map 4a: Viewshed Analysis of Alternative 1



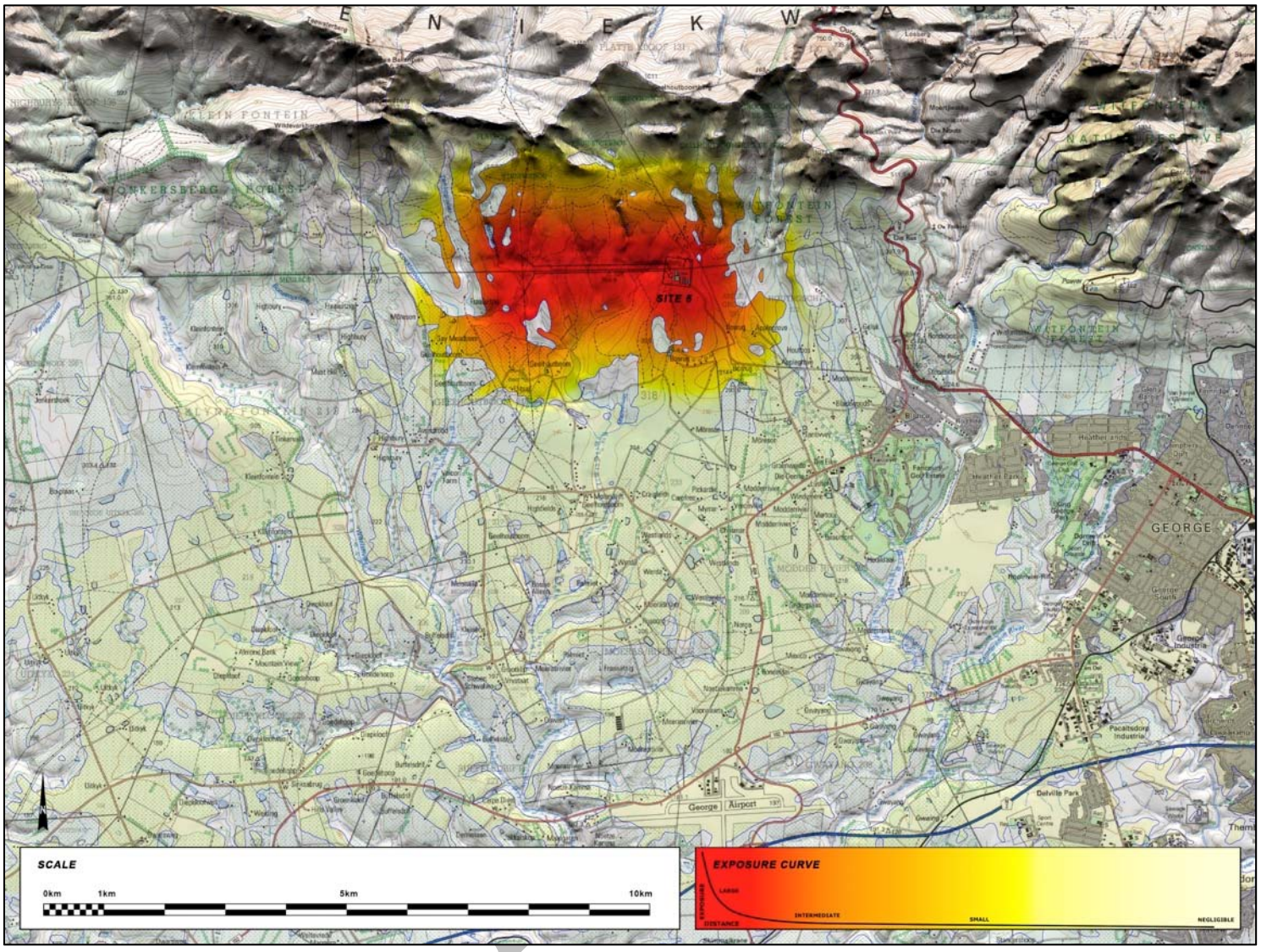
Map 4b: Viewshed Analysis of Alternative 2



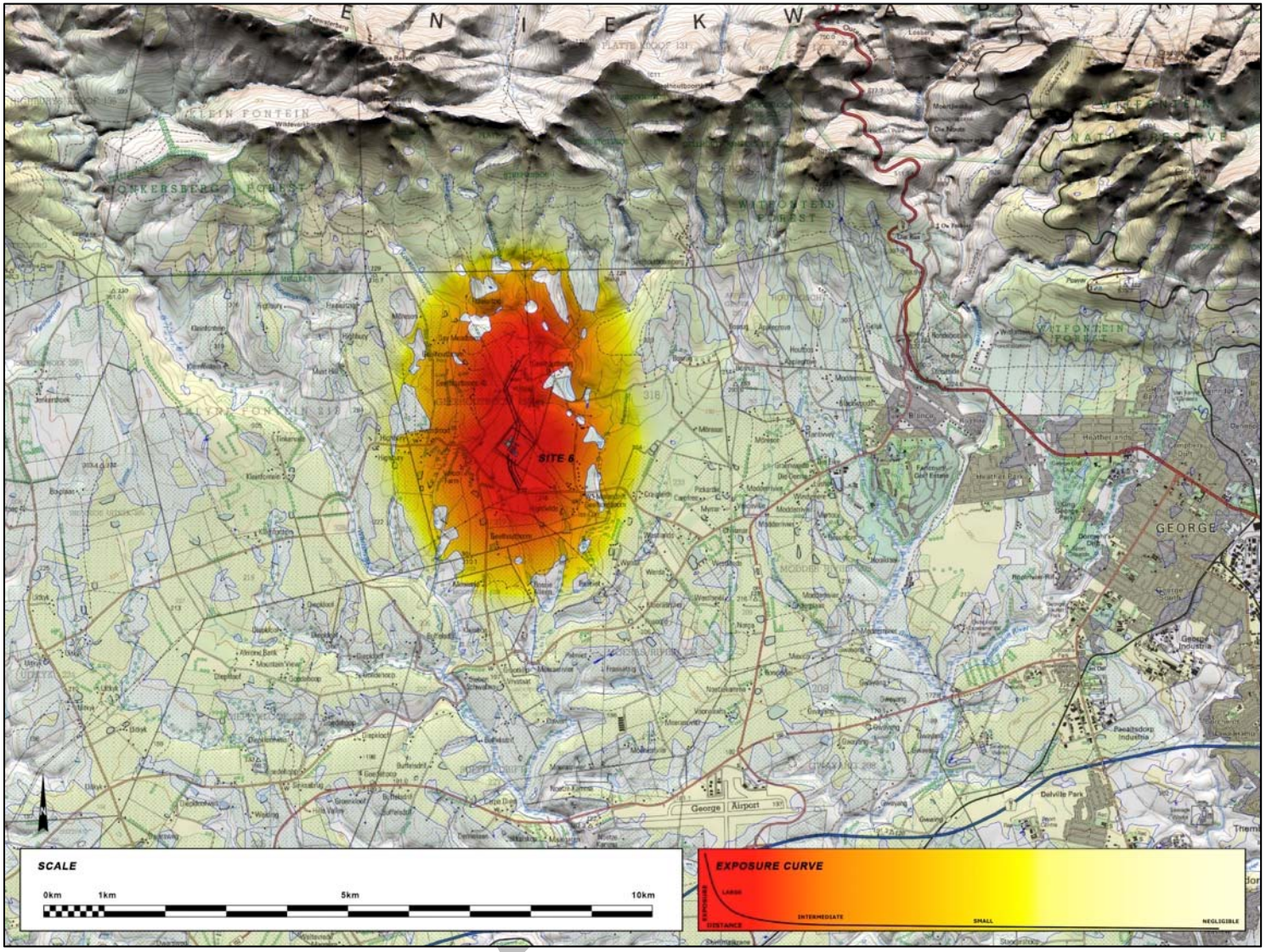
Map 4c: Viewshed Analysis of Alternative 3



Map 4d: Viewshed Analysis of Alternative 4



Map 4e: Viewshed Analysis of Alternative 5



Map 4f: Viewshed Analysis of Alternative 6

6.2 VISUAL DISTANCE AND OBSERVER PROXIMITY

Nu Leaf Planning and Environmental determined proximity offsets based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed infrastructure). In general, the severity of the visual impact on visual receptors decreases with increased distance from the proposed infrastructure.

The proximity offsets (calculated from the centre line of each power line alignment) are as follows:

- 0 – 1km - Short distance view where the infrastructure would dominate the frame of vision and constitute a very high visual prominence.
- 1km - 2.5km - Medium distance views where the infrastructure would be easily and comfortably visible and constitute a high visual prominence.
- 2.5km – 5km - Medium to longer distance view where the infrastructure would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 5km - Long distance view where the infrastructure would still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the infrastructure.

6.3 VIEWER INCIDENCE, PERCEPTION AND SENSITIVITY

Viewer incidence is calculated to be the highest along the national and main roads (i.e. the N9, N2, R404, R102) as well secondary roads within the study area. Commuters and tourists using these roads, and those associated with the Garden Route may be negatively impacted upon by visual exposure to the proposed infrastructure.

Other than along the above roads, viewer incidence is concentrated in the populated places within the study area. These include the major towns of Blanco and George and the smaller urban areas (i.e. Heather Park, Rosemoor, Conville, Lawaaikamp, Parkdene, Ballotsview, Pacaltsdorp and Thembalethu). Despite the population densities in these areas, the receptors are not considered to be particularly sensitive to visual impact, due to the presence of the urban environment and associated visual clutter.

Homesteads and settlements, by virtue of their visually exposed nature, are considered to be sensitive visual receptors. A high concentration of homesteads and settlements are dotted throughout the study area south of the mountains. The Fancourt Golf Estate located south of Blanco is also considered to be a sensitive visual receptor as are tourists visiting or passing through the region.

The region as a whole has a high scenic value, and an associated tourism value. Tourists and visitors to this area are therefore seen as sensitive visual receptors upon which the construction of the new power line could have a negative visual impact.

Tourists may be expected along main routes and railway lines, as well as in accommodation and hospitality facilities within the urban areas and on homesteads.

The public participation process undertaken by SEF as part of the Scoping Phase indicates an overall negative perception of the proposed project within the receiving environment.

6.4 VISUAL ABSORPTION CAPACITY

The broader study area receives between 505mm and 1015 mm of rainfall per year and the proposed site is situated mostly within the *Coastal Renoster-Bushveld* vegetation type[9]. Land use consists primarily of grazing and cultivation with some exotic plantation in the mountains. Thicket and bushland occurs north of the Outeniqua Mountain Range and along permanenet water courses. The study area is characterised by urban and residential landcover in the south east.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment is deemed to be low by virtue of the low growing vegetation and small scale of development overall.

High VAC is expected along roads passing through plantation areas, but as a plantation is a temporary land use, this VAC will not be considered in the visual assessment, thus assuming a worst-case scenario.

Where homesteads and settlements occur, some more significant vegetation and trees may have been planted, which would contribute to visual absorption. As this is not a consistent occurrence, however, VAC will not be taken into account for any of the homesteads or settlements, again assuming a worst-case scenario.

Within the towns and built-up areas, VAC will be of relevance due to the presence of buildings, structures and equipment, also known as visual clutter. In this respect, the presence of the built-up environment will 'absorb' the visual impact to some extent.

The scale and form of the proposed infrastructure means that there is some potential that the receiving environment will visually absorb it in terms of texture, colour, form and light / shade characteristics. This is more likely in areas where power lines or other infrastructure are already present.

VAC will therefore not be taken into account for the impact assessment, except in towns and along existing power line routes.

[9] Environmental Potential Atlas, 2000

Figure 11: Low VAC of grazing areas within the study area

Figure 12: High VAC of plantations within the study area

6.5 VISUAL IMPACT INDEX

The weighted results of the visual exposure plus visual distance are displayed on **Maps 4a – 4f**. The magnitude of impact and the likely areas of impact are indicated as a graded visual impact index for each of the Project Alternatives.

An area with short distance, anticipated visual exposure, high viewer incidence and a predominantly negative perception would therefore have a higher magnitude of impact in terms of the index, and are shaded in red. As distance from the infrastructure increases, so the shading lightens to a yellow colour. This helps in focussing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

The following is of relevance regarding the 6 Project Alternatives:

6.5.1 ALTERNATIVE 1

Refer to **Map 4a**.

- The visual impact index map indicates a core area of potentially **high** visual impact within a 1km offset of the proposed infrasrtucture (i.e. short distance). Potential areas of **very high** visual impact within the short distance include settlements and homesteads such as *Gay Meadows, Geelhoutboom, Avondrood, Valcor Farm, Highfields* and *Uitsig*.

- The extent of visual impact persists the medium distance (i.e. between the 1km and 2,5km offset). Potential visual impact is mostly **moderate** within this zone, including the outhern slopes of the Outeniqua Mountains and the associated Important Birding Area. Potential areas of **high** visual impact within the medium distance include settlements and homesteads.

- The extent of visual impact decreases in the medium to longer distance (i.e. between the 2,5km and 5km offset). Potential visual impact is mostly **low** within this zone. Potential areas of **moderate** visual impact within the medium to longer distance include settlements and homesteads as well as stretches of the N9 and R404 in the east, and the R102 in the south.

- Beyond the 5km offset (i.e. long distance), the extent of visual impact is reduced as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.2 ALTERNATIVE 2

Refer to **Map 4b**.

- The visual impact index map indicates a core area of potentially **high** visual impact within a 1km offset of the proposed infrasrtucture (i.e. short distance). Potential areas of **very high** visual impact within the short distance include settlements and homesteads such *as Gay Meaows, Geelhoutboom*, *Anvondrood* and *Valcor Farm*.

- The extent of visual impact persists the medium distance (i.e. between the 1km and 2,5km offset). Potential visual impact is mostly **moderate** within this zone, including the outhern slopes of the Outeniqua Mountains and the associated Important Birding Area. Potential areas of **high** visual impact within the medium distance include settlements and homesteads.

- The extent of visual impact decreases in the medium to longer distance (i.e. between the 2,5km and 5km offset). Potential visual impact is mostly **low** within this zone. Potential areas of **moderate** visual impact within the medium to longer distance include settlements and homesteads and stretches of the N9 and R404 in the east, and the R102 in the south.

- Beyond the 5km offset (i.e. long distance), the extent of visual impact is reduced as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.3 ALTERNATIVE 3

Refer to **Map 4c**.

- The visual impact index map indicates a core area of potentially **high** visual impact within a 1km offset on either side of the proposed infrasrtucture (i.e. short distance). Potential areas of **very high** visual impact within the short distance include settlements and homesteads such as *Geelhoutboom* and *Uitsig*.

- The extent of visual impact remains relatively high the medium distance (i.e. between the 1km and 2,5km offset). Potential visual impact is mostly **moderate** within this zone, including the outhern slopes of the Outeniqua Mountains and the associated Important Birding Area. Potential areas of **high** visual impact within the medium distance include settlements and homesteads.

- The extent of visual impact persists in the medium to longer distance (i.e. between the 2,5km and 5km offset). Potential visual impact is mostly **low** within this zone. Potential areas of **moderate** visual impact within the medium to longer distance include settlements and homesteads and stretches of the N9, and R404 in the east, and the R102 in the south.

- Beyond the 5km offset (i.e. long distance), the extent of visual impact is reduced as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.4 ALTERNATIVE 4

Refer to **Map 4d**.

- The visual impact index map indicates a core area of potentially **high** visual impact within a 1km offset on either side of the proposed infrasrtucture (i.e. short distance). Potential areas of **very high** visual impact within the short distance include settlements and homesteads such as *Gay Meadows, Geelhoutboom, Avondrood, Highbury* and *Valcor Farm*.

- The extent of visual impact remains relatively high the medium distance (i.e. between the 1km and 2,5km offset). Potential visual impact is mostly **moderate** within this zone, including the outhern slopes of the Outeniqua Mountains and the associated Important Birding Area. Potential areas of **high** visual impact within the medium distance include settlements and homesteads.

- The extent of visual impact persists in the medium to longer distance (i.e. between the 2,5km and 5km offset). Potential visual impact is mostly **low** within this zone. Potential areas of **moderate** visual impact within the medium to longer distance include settlements and homesteads and stretches of the N9 and R404 in the east, and the R102 in the south.

- Beyond the 5km offset (i.e. long distance), the extent of visual impact is reduced as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.5 ALTERNATIVE 5

Refer to **Map 4e**.

- The visual impact index map indicates a core area of potentially **high** visual impact within a 1km offset on either side of the proposed infrasrtucture (i.e. short distance), including the outhern slopes of the Outeniqua Mountains and the associated Important Birding Area. Potential areas of **very high** visual impact within the short distance include the homestead of *Geelhoutboomberg*.

- The extent of visual impact persists in the medium distance (i.e. between the 1km and 2,5km offset). Potential visual impact is mostly **moderate** within this zone. Potential areas of **high** visual impact within the medium distance include settlements and homesteads.

- The extent of visual impact decreases in the medium to longer distance (i.e. between the 2,5km and 5km offset). Potential visual impact is mostly **low** within this zone. Potential areas of **moderate** visual impact within the medium to longer distance include settlements and homesteads and longer stretches of the N9 and R404 in the east, and the R102 in the south.

- Beyond the 5km offset (i.e. long distance), the extent of visual impact is reduced as topographical undulations and hills screen visual impacts beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.5.6 ALTERNATIVE 6

Refer to **Map 4f**.

- The visual impact index map indicates a core area of potentially **high** visual impact within a 1km offset on either side of the proposed infrasrtucture (i.e. short distance). Potential areas of **very high** visual impact within the short distance include settlements and homesteads such as *Geelhoutboom* and *Uitsig*.

- The extent of visual impact remains relatively high the medium distance (i.e. between the 1km and 2,5km offset). Potential visual impact is mostly **moderate** within this zone, including the outhern slopes of the Outeniqua Mountains and the associated Important Birding Area. Potential areas of **high** visual impact within the medium distance include settlements and homesteads.

- The extent of visual impact presists in the medium to longer distance (i.e. between the 2,5km and 5km offset). Potential visual impact is mostly **low** within this zone. Potential areas of **moderate** visual impact within the medium to longer distance include settlements and homesteads and stretches of the N9, and R404 in the east, and the R102 in the south.

- Beyond the 5km offset (i.e. long distance), the extent of visual impact is reduced as topographical undulations and hills screen visual impacts

beyond to some extent. Potential visual impacts are mostly **very low** within this zone.

6.6 VISUAL IMPACT ASSESSMENT: METHODOLOGY

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed infrastructure) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - international (very high = 5), national (high = 4), regional (medium = 3), local (low = 2) or site specific (very low = 1)
- **Duration** - very short (0-1 yrs = 1), short (2-5 yrs = 2), medium (5-15 yrs = 3), long (>15 yrs = 4), and permanent (= 5)
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10). This value is read off the Visual Impact Index maps.
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5)
- **Status** (positive, negative or neutral)
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5)
- **Significance** - low, medium or high

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

6.7 VISUAL IMPACT ASSESSMENT: PRIMARY IMPACTS

6.7.1 POTENTIAL VISUAL IMPACT SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE PROPOSED INFRASTRUCTURE.

The visual impact sensitive visual receptors (i.e. users of main roads and residents of homesteads and settlements) in close proximity to the proposed infrastructure (i.e. within 1km) are expected to be of **high** significance for Alternatives 1 and 4 and of **moderate** significance for all other Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The number of farmsteads and settlements exposed to visual impact influences the probability rating for each of the alternatives.

Table 2: Impact table summarising the significance of sensitive visual receptors in close proximity to the proposed infrastructure

Nature of Impact: Potential visual impact on sensitive visual receptors in close proximity to the proposed infrastructure												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Local **(2)**	N/a	Local **(2)**	N/a	Local **(2)**	N/a	Local **(2)**	N/a	Local **(2)**	N/a	Local **(2)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	V high **(10)**	N/a	V high **(10)**	N/a	V high **(10)**	N/a	V high **(10)**	N/a	V high **(10)**	N/a	V high **(10)**	N/a
Probability	High **(4)**	N/a	Probable **(3)**	N/a	Probable **(3)**	N/a	High **(4)**	N/a	Improb **(2)**	N/a	Improb **(2)**	N/a
Significance	High **(69)**	N/a	Moderate **(51)**	N/a	Moderate **(51)**	N/a	High **(69)**	N/a	Moderate **(34)**	N/a	Moderate **(34)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.7.2 POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE REGION

The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 1km offset) is expected to be of **moderate** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: The number of farmsteads and settlements exposed to visual impact influences the probability rating for each of the alternatives.

Table 3: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region

Nature of Impact: Potential visual impact on sensitive visual receptors within the region												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	High **(8)**	N/a	High **(8)**	N/a	High **(8)**	N/a	High **(8)**	N/a	High **(8)**	N/a	High **(8)**	N/a
Probability	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a
Significance	Moderate **(32)**	N/a	Moderate **(32)**	N/a	Moderate **(32)**	N/a	Moderate **(32)**	N/a	Moderate **(32)**	N/a	Moderate **(32)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.7.3 POTENTIAL VISUAL IMPACT ON RESIDENTS OF BUILT UP AREAS AND TOWNS WITHIN THE REGION

The potential visual impact on residents of residents of built-up centres and populated places (i.e. the towns of Blanco, Heather Park and George, as well as the residential areas south of George) within the region beyond the 1km offset is expected to be of **low** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Note: Overall, the presence of visual clutter within the urban environment reduces the probability of this impact occurring.

Table 4: Impact table summarising the significance of visual impacts on residents of built up areas and towns within the region

Nature of Impact: Potential visual impact on residents of built up areas and towns within the region												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a
Probability	V improb. **(1)**	N/a	V improb. **(1)**	N/a	V improb. **(1)**	N/a	V improb. **(1)**	N/a	V improb. **(1)**	N/a	V improb. **(1)**	N/a
Significance	Low **(12)**	N/a	Low **(12)**	N/a	Low **(12)**	N/a	Low **(12)**	N/a	Low **(12)**	N/a	Low **(12)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.7.4 POTENTIAL VISUAL IMPACT ON CONSERVATION AREAS WITHIN THE REGION

The potential visual impact on protected and conservation areas (i.e. the Witfontein, Doringriver and Ruitersbos Nature Reserves) is expected to be of **low** significance for all Alternatives. No mitigation is possible. The table below illustrates this impact assessment.

Potential visual impact on the Outeniqua Mountains Important Birding Areas (IBA) is likely to be of high significance for Alternative 5 and of moderate significance for all other Alternatives. The Outeniqua Mountains IBA is not, however, a formal Protected Area.

Additional conservation initiatives, such as Private Nature Reserves and Conservancies may exist within the study area, but as the locations of these are not known at this stage, the visual impact on them cannot be determined.

Table 5: Impact table summarising the significance of visual impacts on conservation areas within the region

Nature of Impact: Potential visual impact on conservation areas within the region												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a
Probability	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a
Significance	Low **(24)**	N/a	Low **(24)**	N/a	Low **(24)**	N/a	Low **(24)**	N/a	Low **(24)**	N/a	Low **(24)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.7.5 POTENTIAL VISUAL IMPACT OF ASSOCIATED INFRASTRUCTURE ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY THERETO

The height of the substation will not exceed two storeys (i.e. 6m), therefore the visual exposure of this component will fall within the viewsheds generated for the power line infrasrtucture (which is not expected to exceed 42m). Other associated infrastructure would include access roads and cleared servitudes along the alignment.

Servitudes will need to be maintained along the length of the proposed power lines for their entire operation life, and access roads will be required both to construct the power lines, and to maintain the servitudes (operational phase). These servitudes and access roads have the potential of manifesting as landscape scarring, and thus represent a potential visual impact within the viewshed areas. This is especially relevant for steep slopes where erosion could occur over time. Such erosion and landscape scarring could represent a visual impact.

As access roads and servitudes have no elevation or height, so the visual impact of this associated infrastructure will be absorbed by the visual impact the primary infrastructure.

The potential visual impact of the associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be of **high** significance for Alternative 4 and of **moderate** significance for all other Alternatives. Impacts may be mitigated to **low** for Alternatives 3, 5 and 6, but remain **moderate** for Alternative 1, 2 and 4. The table overleaf illustrates the assessment of this anticipated impact.

Note: The proximity of existing infrastructure (i.e. existing power line infrastructure) reduces the probability of this impact occurring.

Table 6: Impact table summarising the significance of visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto

Nature of Impact: Potential visual impact of associated infrastructure on sensitive visual receptors in close proximity thereto												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**
Duration	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**
Magnitude	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**	V high **(10)**
Probability	Probable **(3)**	Improb **(2)**	Probable **(3)**	Improb **(2)**	improb **(2)**	V Improb **(1)**	H Probable **(4)**	Probable **(3)**	improb **(2)**	V improb **(1)**	improb **(2)**	V Improb **(1)**
Significance	Moderate **(51)**	Moderate **(34)**	Moderate **(51)**	Moderate **(34)**	Moderate **(34)**	Low **(17)**	High **(68)**	Moderate **(51)**	Moderate **(34)**	Low **(17)**	Moderate **(34)**	Low **(17)**
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a
Mitigation: Planning: Plan with due cognisance of topography; use existing roads / disturbed areas where possible; consolidate infrastructure where possible. Construction: Rehabilitation of all construction areas, including servitudes. Operation: Maintenance of access roads and servitudes, and rehabilitation where required to avoid dust and erosion.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.7.6 POTENTIAL VISUAL IMPACT OF CONSTRUCTION ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE INFRASTRUCTURE

During the construction period, there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Mitigation entails proper planning, management and rehabilitation of all construction sites to forego visual impacts.

The table below illustrates the assessment of the anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure. Visual impacts are likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low** or **neglibible.**

Table 7: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed infrastructure

Nature of Impact: Potential visual impact of construction on visual receptors in close proximity to the infrastructure												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**
Duration	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**	Short term **(2)**
Magnitude	High **(8)**	Moderate **(6)**	High **(8)**	Moderate **(6)**	High **(8)**	Moderate **(6)**	High **(8)**	Moderate **(6)**	High **(8)**	Moderate **(6)**	High **(8)**	Moderate **(6)**
Probability	High **(4)**	Probable **(3)**	Probable **(3)**	Improb **(2)**	Probable **(3)**	Improb **(2)**	High **(4)**	Probable **(3)**	Improb **(2)**	V Improb **(1)**	Improb **(2)**	V Improb **(1)**
Significance	Moderate **(48)**	Low **(30)**	Moderate **(36)**	Low **(20)**	Moderate **(36)**	Low **(20)**	Moderate **(48)**	Low **(30)**	Moderate **(48)**	Neglig **(10)**	Moderate **(48)**	Neglig **(10)**
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No	No	No	No	No	No	No	No	No	No	No
Can impacts be mitigated?	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a
Mitigation: Construction: Proper planning, management and rehabilitation of the construction sites.												
Cumulative impacts: None.												
Residual impacts: None.												

6.7.7 POTENTIAL VISUAL IMPACT OF LIGHTING AT NIGHT ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE INFRASTRUCTURE

The receiving environment has a relatively small number of populated places, and it can be expected that the light trespass and glare from the security and after-hours operational lighting (flood lights) for the substation will have some significance.

Furthermore, the sense of place and rural ambiance of the local area increases its sensitivity to such lighting intrusions. It is also important that note be taken of the eco-tourist destinations within close proximity to the proposed infrastructure.

Another potential lighting impact known as sky glow. Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contributes to the increase in sky glow. The substation lighting may contribute to the effect of sky glow in an otherwise dark environment.

The table below illustrates the assessment of the anticipated visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed infrastructure. Visual impacts are likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low** for all Alternatives except for Alternatives 1 and 4, which will remain **moderate.**

Note: The number of farmsteads and settlements exposed to visual impact influences the probability rating for each of the alternatives.

Table 8: Impact table summarising the significance of visual impact of lighting at night on visual receptors in close proximity to the proposed infrastructure

Nature of Impact: Potential visual impact of construction on visual receptors in close proximity to the infrastructure												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**	Local **(2)**
Duration	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**	Perm **(5)**
Magnitude	Moderate **(6)**	Low **(4)**	Moderate **(6)**	Low **(4)**	Moderate **(6)**	Low **(4)**	Moderate **(6)**	Low **(4)**	Moderate **(6)**	Low **(4)**	Moderate **(6)**	Low **(4)**
Probability	High **(4)**	Probable **(3)**	Probable **(3)**	Improb **(2)**	Probable **(3)**	Improb **(2)**	High **(4)**	Probable **(3)**	Improb **(2)**	V Improb **(2)**	Probable **(3)**	Improb **(2)**
Significance	Moderate **(52)**	Moderate **(33)**	Moderate **(39)**	Low **(22)**	Moderate **(39)**	Low **(22)**	Moderate **(52)**	Moderate **(33)**	Moderate **(39)**	Low **(22)**	Moderate **(39)**	Low **(22)**
Status (positive or negative)	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reversibility	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**	Recoverable **(3)**
Irreplaceable loss of resources?	No	No	No	No	No	No	No	No	No	No	No	No
Can impacts be mitigated?	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a	Yes	N/a
Mitigation: Planning: pro-active lighting design and planning												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of lighting within the region. This is specifically relevant in light of the existing Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.8 VISUAL IMPACT ASSESSMENT: SECONDARY IMPACTS

6.8.1 POTENTIAL VISUAL IMPACT ON LANDSCAPE QUALITY WITHIN THE REGION.

The nature of the mountainous terrain is such that it offers some degree of visual absorption (ie. towards the north of the Outeniqua Mountain Range), but it is also sensitive to visual intrusion. The mountainous part of the study is also scenic, and the construction of a power line within such an area is highly likey to constitute a visual impact. This would be rendered more significant due to the sensitive nature of the natural features.

The anticipated visual impact on the landscape quality as defined by natural features (specifically the mountains) within the study area is expected to be of **low** significance for Alternatives 1, 2, 3, 4 and 6 and of **moderate** significance for Alternative 5. There is no mitigation for this impact. The table below illustrates the assessment of this anticipated impact.

Note: The distance of the mountains from the proposed alternatives influences the probability of this impact occurring.

Table 9: Impact table summarising the significance of visual impacts on landscape quality within the region

Nature of Impact: Potential visual impact on landscape quality within the region												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Low **(4)**	N/a	Moderate **(6)**	N/a	Low **(4)**	N/a
Probability	Improb **(2)**	N/a	Improb **(2)**	N/a	Improb **(2)**	N/a	Improb **(2)**	N/a	Probable **(3)**	N/a	Improb **(2)**	N/a
Significance	Low **(24)**	N/a	Low **(24)**	N/a	Low **(24)**	N/a	Low **(24)**	N/a	Moderate **(42)**	N/a	Low **(24)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.8.2 POTENTIAL VISUAL IMPACT ON THE VISUAL CHARACTER AND SENSE OF PLACE OF THE REGION.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. Sense of place is strongly pastoral, defined by green, picturesque farmland and fields set against the backdrop of the dramatic Outiniqua Mountains and punctuated by meandering, bush-lined rivers. Development outside of the towns and built up areas is domestic in scale, and sparsely spread.

The anticipated visual impact on the visual character and sense of place of the study area is expected to be of **low** significance for Alternatives 3, 5 and 6 and of **moderate** significance for Alternatives 1, 2 and 4. There is no mitigation for this impact. The table below illustrates the assessment of this anticipated impact.

Note: The presence of existing electrical infrastructure within the region reduces the probability of this impact occurring.

Table 10: Impact table summarising the significance of visual impacts on landscape character and sense of place within the region

Nature of Impact: Potential visual impact on visual character and sense of place within the region.												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Low **(4)**	N/a	Moderate **(3)**	N/a
Probability	Probable **(3)**	N/a	Probable **(3)**	N/a	improb **(2)**	N/a	H Probable **(4)**	N/a	improb **(2)**	N/a	improb **(2)**	N/a
Significance	Moderate **(33)**	N/a	Moderate **(33)**	N/a	Low **(22)**	N/a	Moderate **(44)**	N/a	Low **(22)**	N/a	Low **(22)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.8.3 POTENTIAL VISUAL IMPACT ON TOURIST ACCESS ROUTES AND TOURIST DESTINATIONS WITHIN THE REGION.

The greater region is generally seen as having a high scenic value and tourism value potential. Outside of towns, the landscape is characterised by wide-open spaces with a high visual quality and strong sense of place. The N2, N9, N12, R102 and R404 are the primary roads in the region and are the main link between George, Mossel Bay, Sedgefield, Knysna and Oudtshoorn. These are the main roads serving the Garden Route and are thus considered to be routes that are most likely to carry tourists.

In terms of tourist destinations and accommodation, George is known to host a relatively high concentration of attractions and overnight facilities. To a lesser degree, Blanco offers a range of guest house accomodations. The well-known Fancourt Golf Estate is located to the immediate south of Blanco. It may also be expected that farms within the region will also cater for tourists to some extent.

Visual intrusion through the development of industrial type infrastructure within this environment could affect the area's tourism value and potential.

The anticipated visual impact of the proposed infrastructure on tourist access routes (i.e. the N2, N9, N12, R102 and R404) and tourist destinations (i.e. attractions and accommodation) within the region is expected to be of **low** significance for all Alternatives. There is no mitigation for this impact. The table overleaf illustrates the assessment of this anticipated impact.

Note: The presence of existing electrical infrastructure within the region reduces the probability of this impact occurring.

Table 11: Impact table summarising the significance of visual impacts on tourist access routes and tourist destinations within the region

Nature of Impact: Potential visual impact on tourist access routes and tourist destinations within the region.												
	ALTERNATIVE 1		***ALTERNATIVE 2***		***ALTERNATIVE 3***		***ALTERNATIVE 4***		***ALTERNATIVE 5***		***ALTERNATIVE 6***	
	No mitigation	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***	***No mitigation***	***Mitigation considered***
Extent	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a	Regional **(3)**	N/a
Duration	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a	Perm **(5)**	N/a
Magnitude	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Moderate **(3)**	N/a	Moderate **(3)**	N/a
Probability	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a	Improbable **(2)**	N/a
Significance	Low **(22)**	N/a	Low **(22)**	N/a	Low **(22)**	N/a	Low **(22)**	N/a	Low **(22)**	N/a	Low **(22)**	N/a
Status (positive or negative)	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a	Negative	N/a
Reversibility	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a	Recoverable **(3)**	N/a
Irreplaceable loss of resources?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Can impacts be mitigated?	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a	No	N/a
Mitigation: None.												
Cumulative impacts: The construction of the infrastructure will increase the cumulative visual impact of electrical type infrastructure within the region. This is specifically relevant in light of the existing power lines in the area and the Blanco Substation present in the study area.												
Residual impacts: None. The visual impact of the power line and substation will be removed after decommissioning. If the substation and lines are not decommissioned and removed, then the impact will persist.												

6.9 THE POTENTIAL TO MITIGATE VISUAL IMPACTS

The primary visual impact, namely the presence of the proposed Blanco 400/132kV MTS substation and Droerivier Proteus loop-in loop-out powerline project, is not possible to mitigate. The following is, however possible:

- Mitigation of visual impacts associated with the construction of access roads is possible through the use of existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Access roads, which are not required post-construction, should be ripped and rehabilitated.
- Consolidate infrastructure and make use of already disturbed sites rather than pristine areas wherever possible.
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of all construction sites. Construction should be managed according to the following principles:
  - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
  - Reduce the construction period through careful logistical planning and productive implementation of resources.
  - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor in order to minimise vegetation clearing.
  - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
  - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
  - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
  - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
  - Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.
  - Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
  - Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Mitigation of other lighting impacts includes the pro-active design, planning and specification lighting for the substation. The correct specification and placement of lighting and light fixtures will go far to contain rather than spread the light. Additional measures include the following:
  - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);

- Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
- Making use of minimum lumen or wattage in fixtures;
- Making use of down-lighters, or shielded fixtures;
- Making use of Low Pressure Sodium lighting or other types of low impact lighting.
- Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

- Secondary impacts anticipated as a result of the proposed infrastructure (i.e. impacts on landscape character, sense of place, tourist access routes and tourist destinations) are not possible to mitigate.
- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated.

The possible mitigation of both primary and secondary visual impacts as listed above should be implemented and maintained on an on-going basis.

7 PHOTO SIMULATIONS

Photo simulations were undertaken (in addition to the above spatial analyses) in order to illustrate the potential visual impact of the proposed Blanco 400/132kV MTS substation and Droerivier Proteus loop-in loop-out powerline project within the receiving environment.

The purpose of the photo simulation exercise is to support the findings of the VIA, and is not an exercise to illustrate what the facility will look like from all directions.

The photo simulations indicate the anticipated visual alteration of the landscape from various points located at different distances from the infrastructure. The simulations are based on the infrastructure dimensions and layout as indicated on **Figure 1** and **Map 1** respectively.

The photograph positions are indicated on the reference maps provided for each point and should be referenced with the photo simulation being viewed in order to place the observer in spatial context.

It is assumed that the necessary post-construction phase rehabilitation and mitigation measures, as proposed by the various specialists in the environmental impact assessment report, have been undertaken. These photographs can therefore be seen as an ideal operational scenario (from a visual impact point of view) that should be aspired to. Additional infrastructure (e.g. access roads, etc.) associated with the facility are not included in the photo simulations.

Each photographic simulation is preceded by a panoramic overview of the landscape from the specified viewpoint being discussed.

The simulated infrastructure, as shown on the photographs, were adapted to the atmospheric conditions present when the original photographs were taken. This implies that factors such as haze and solar glare were also simulated in order to realistically represent the observer's potential view of the infrastructure.

7.1 PHOTOSIMULATION 1

Photo Simulation 1 has been generated from a viewpoint situated south west of Project Alternative 3, looking to the north east. The point from which the photo was taken is approximately 1,8km from the project alternative and is indicative of a medium range view that locals and tourists using this gravel road will have when travelling east.

Figure 13a: Pre construction panoramic overview from Viewpoint 1

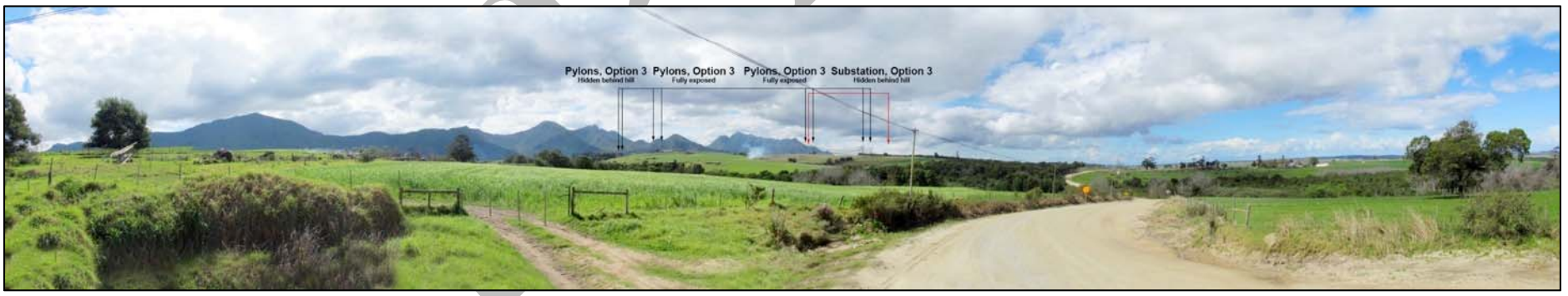
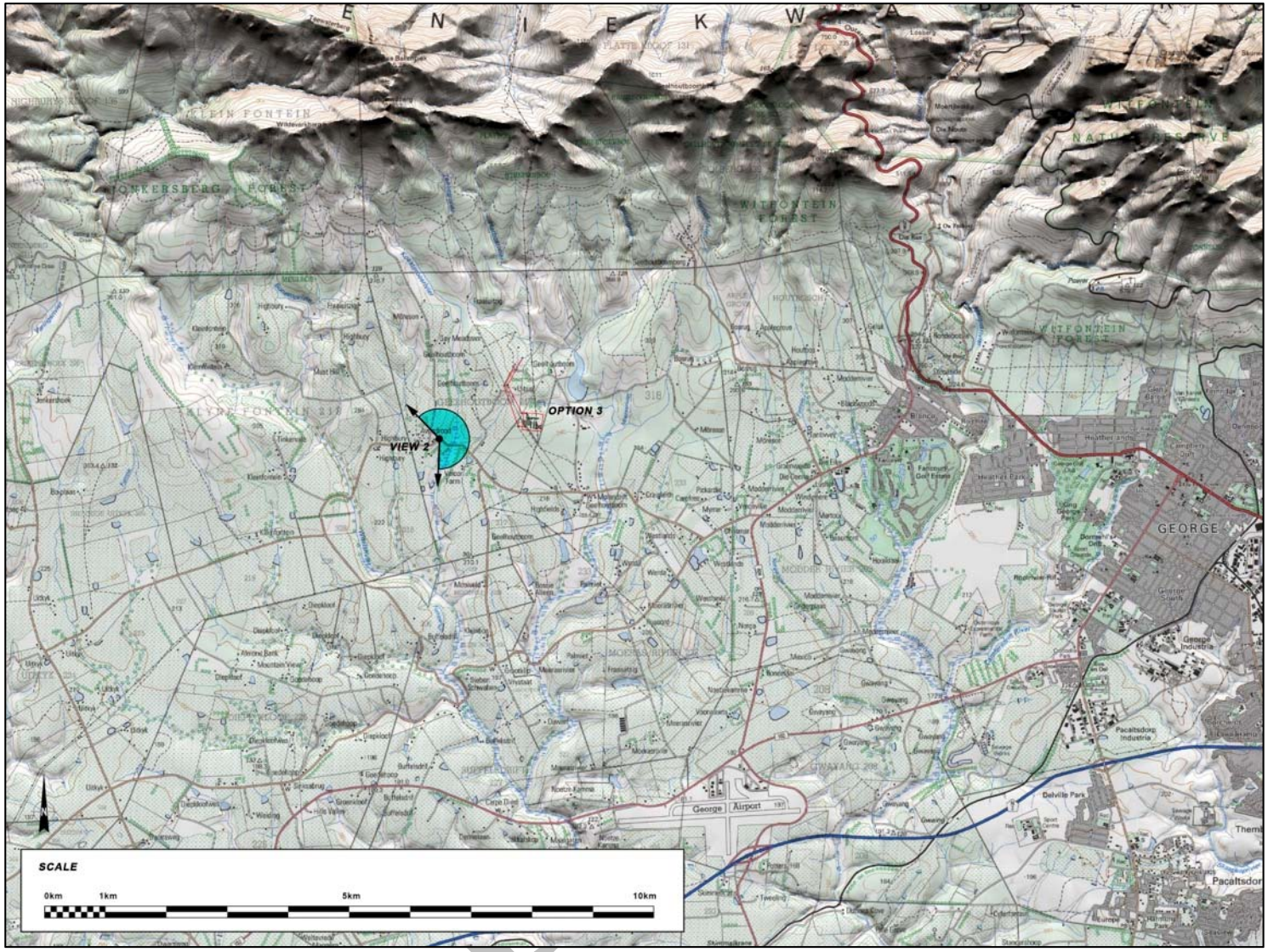


Figure 13b: Post construction panoramic overview from Viewpoint 1

Figure 13c: Post construction photosimulation from Viewpoint 1 (enlarged left)

Figure 13d: Post construction photosimulation from Viewpoint 1 (enlarged right)



Map 5a: Photograph position for Photo Simulation 1

7.2 PHOTOSIMULATION 2

Photo Simulation 2 has been generated from a viewpoint situated to the west of Project Alternative 1, looking to the east. The point from which the photo was taken is approximately 1km from the project alternative and is indicative of a close range view that locals and tourists using this gravel road will have when travelling north or south.

Figure 14a: Pre construction panoramic overview from Viewpoint 3

Figure 14b: Post construction panoramic overview from Viewpoint 3

Figure 14c: Post construction photosimulation from Viewpoint 3 (enlarged left)

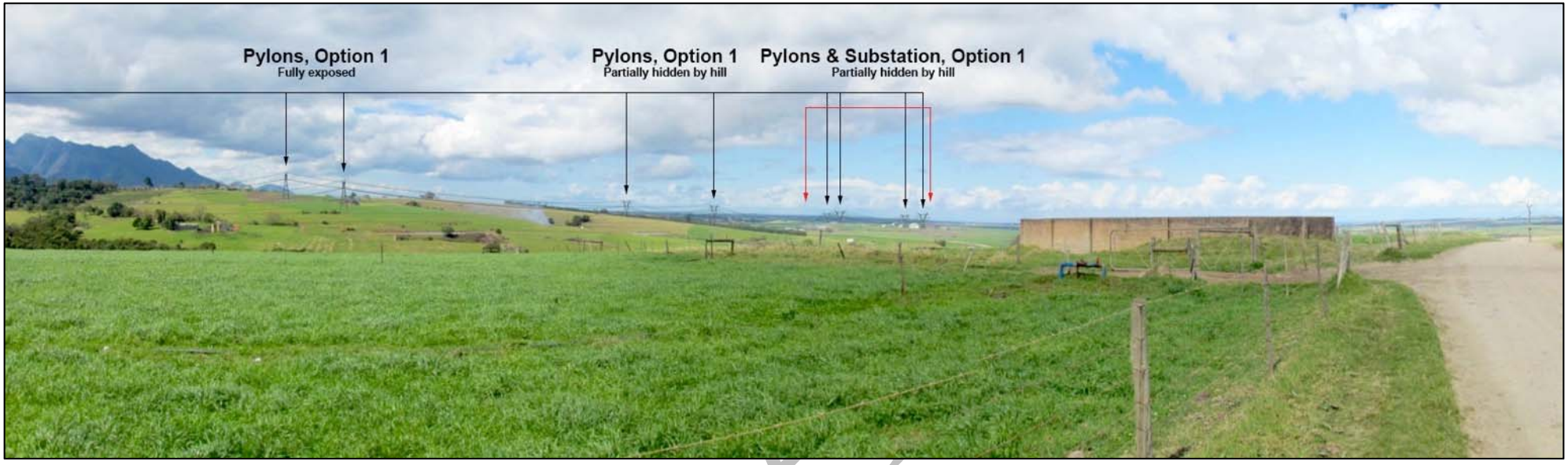
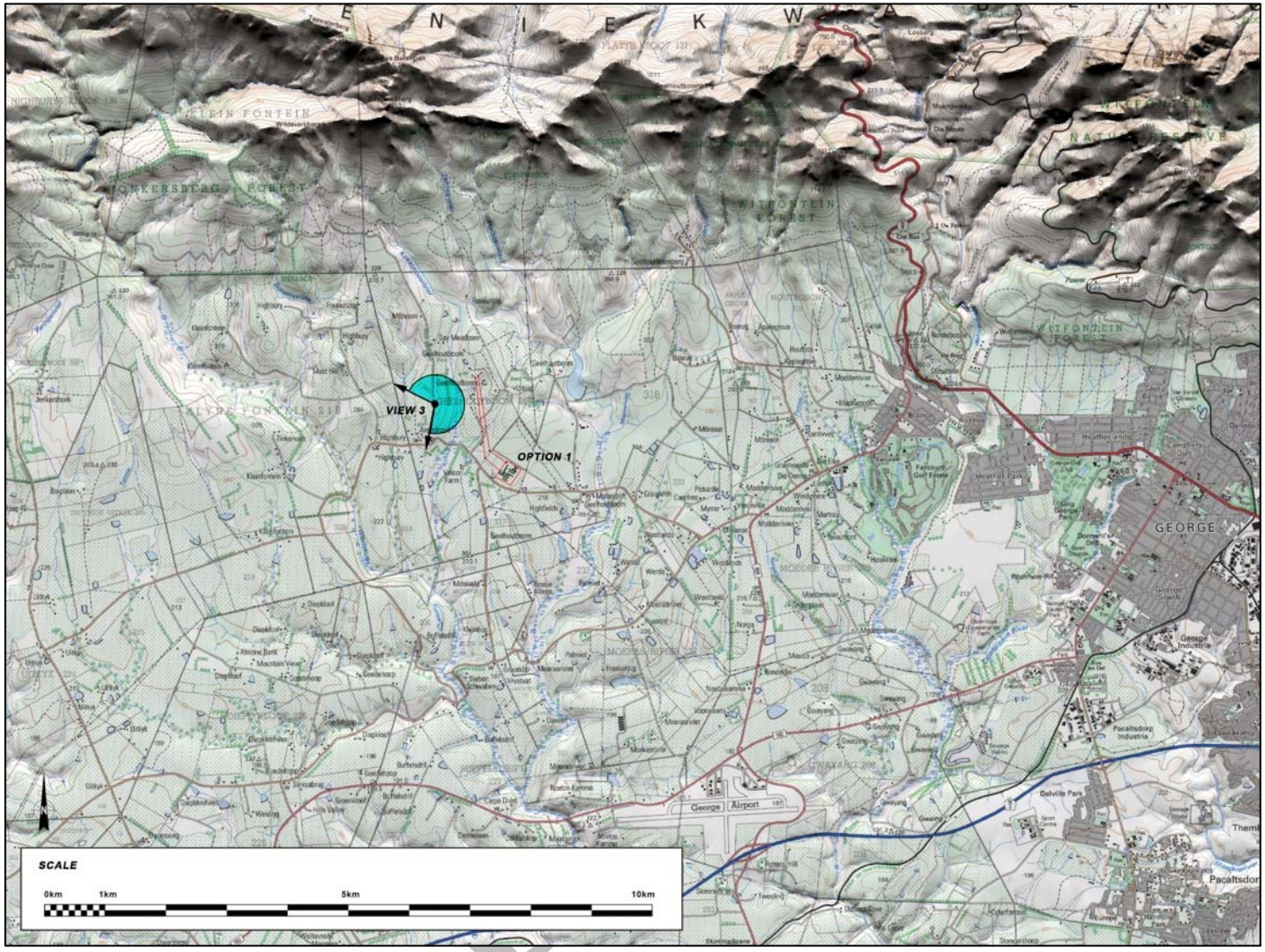


Figure 14d: Post construction photosimulation from Viewpoint 3 (enlarged right)



Map 5b: Photograph position for Photo Simulation 2.

7.3 PHOTOSIMULATION 3

Photo Simulation 3 has been generated from a viewpoint situated to the west of Project Alternative 4, looking to the north east. The point from which the photo was taken is approximately 1,2km from the project alternative and is indicative of a medium to close range view that locals and tourists using this gravel road will have when travelling north or south.

Figure 15a: Pre construction panoramic overview from Viewpoint 4

Figure 15b: Post construction panoramic overview from Viewpoint 4

Figure 15c: Post construction photosimulation from Viewpoint 4 (enlarged left)

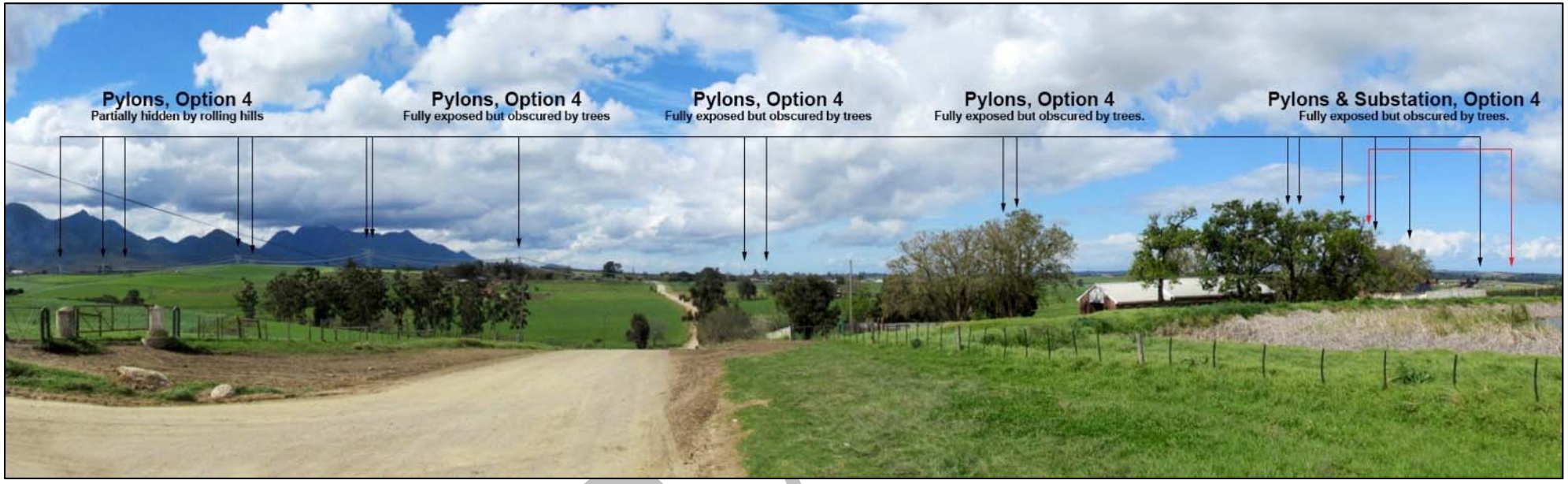
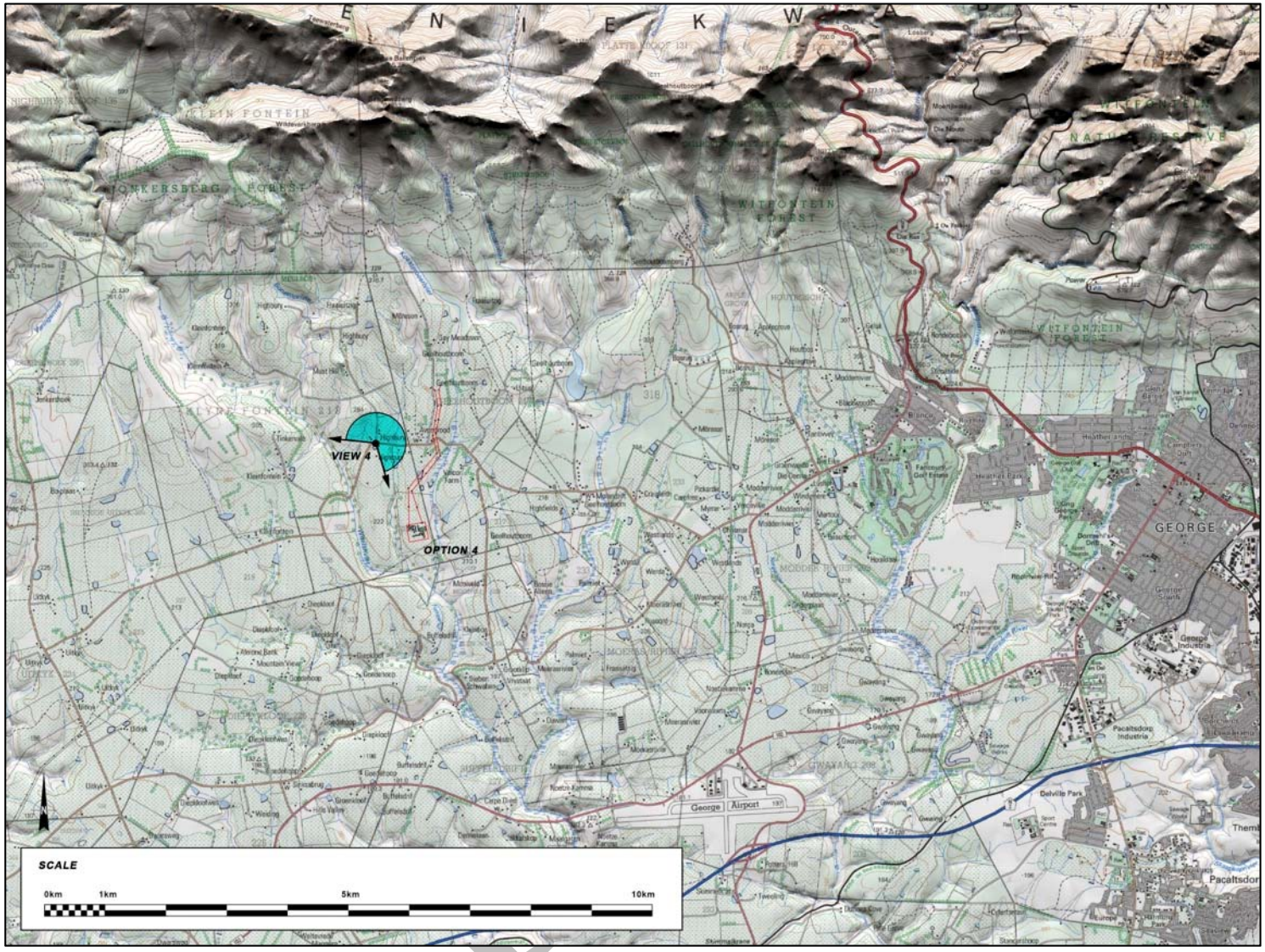


Figure 15d: Post construction photosimulation from Viewpoint 4 (enlarged right)



Map 5c: Photograph position for Photo Simulation 3.

8 COMPARATIVE ASSESSMENT OF THE ALTERNATIVES

The scope of work undertaken in **Section 6** has revealed much in terms of the anticipated nature and significance of the visual impacts likely to result from the 6 proposed project alternatives. This exercise was not sufficient, however to distinguish between and compare the alternatives from a visual perspective.

In this respect, it is necessary to undertake a comparative assessment of each of the six alternatives according to relevant visual criteria. The aim of the assessment is to identify which alternative is most and least preferable. The following visual criteria are applied[10]:

- The length of the proposed power line corridor. The longer the alignment, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to secondary roads, based on the frequency of road crossings and / or the proximity of these roads within a 1km offset. The greater the exposure, the greater the visual impact, and therefore the less desirable the alternative.
- The exposure to farmsteads and settlements based on the frequency of occurrence within a 1km offset. The higher the number of farmsteads and settlements, the greater the number of visual receptors, and therefore the less desirable the alternative.
- The exposure to scenic and sensitive topographical features, specifically mountains. The greater the exposure to hills, maintains and drainage lines, the greater the visual impact, and therefore the less desirable the alternative.
- The proximity of existing power lines and roads along the alignment. It is argued that the presence of an existing visual impact will 'absorb' the potential visual impact of the power line to some extent. The concentration of linear infrastructure within this environment is considered preferable, as it localises the cumulative extent of potential visual impact. The shorter the section of alignment adjacent to existing power line infrastructure, the greater the visual impact, and therefore the less desirable the alternative.
- The remoteness of the alignment, and its potential to affect the character and sense of place of the landscape. This aspect is of relevance within the more remote parts of the study area which have minimal infrastructure and where visual intrusion is not yet existing. These areas may be considered to be visually pristine. The more remote the power line, the greater the visual impact, and therefore the less desirable the alternative.

The following section applies the above criteria to each of the six project alternatives. Weighted values have been used as appropriate, with higher values indicating a high visual impact and low values indicating a low visual impact.

The sum of accumulated values gives an indication of which alternative is likely to have the greatest visual impact. The Alternative with the highest total is the least desirable, while that with the lowest is the preferred option from a visual perspective.

[10] It is important to note that none of these criteria should be viewed in isolation, as all are relevant in the comparison between alternatives. It is the actual comparison of the alternatives making use of these criteria (included as the tables as follows) that is of importance.

Table 12: Comparative visual assessment of the six Project Alternatives

CRITERIA	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5	ALTERNATIVE 6
Total length	**2** (2,5km)	**2** (2,3km)	**1** (1,7km)	**3** (3,7km)	**3** (4,1km)	**1** (1,4km)
Secondary roads	**3** (4)	**3** (4)	**2** (3)	**2** (3)	**1** (1)	**2** (3)
Settlements	**3** (6)	**2** (4)	**1** (2)	**3** (5)	**1** (1)	**1** (2)
Mountains	**1** (low)	**1** (low)	**1** (low)	**1** (low)	**2** (mod)	**1** (low)
Existing infrastructure	**2** (substation)	**2** (substation)	**2** (powerline)	**3** (none)	**1** (power line)	**2** (powerline)
Remoteness	**1**	**1**	**1**	**2**	**3**	**1**
TOTAL	**12**	**11**	**8**	**14**	**11**	**8**

Overall, considering all relevant criteria, Alternatives 3 and 6 are considered most preferable from a visual perspective. Alternatives 2 and 5 are also considered acceptable. Alternative 4 is the least preferable from a visual perspective. None of the Project Alternatives are, however, considered fatally flawed from a visual perspective.

9 CONCLUSION AND RECOMMENDATIONS

The construction and operation of the proposed new Blanco 400/132kV Main Transmission Station and associated loop in – loop out power lines will have a visual impact on the scenic resources of the study area.

The proposed infrastructure will be visible within an area that is generally seen as having a high quality natural and scenic landscape and a resultant tourism value and potential. The infrastructure would thus be visible within an area that incorporates various sensitive visual receptors that would consider visual exposure to this type of infrastructure to be intrusive.

There are not many options as to the mitigation of the visual impact of the proposed infrastructure. No amount of vegetation screening or landscaping would be able to hide structures of these dimensions.

The following mitigation (as detailed in section 6.9) is, however, recommended:

- Mitigation of visual impacts associated with the construction of access roads is possible through the use of existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Access roads, which are not required post-construction, should be ripped and rehabilitated.
- Consolidate infrastructure and make use of already disturbed sites rather than pristine areas wherever possible.
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of all construction sites. Construction should be managed according to the following principles:
    - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
    - Reduce the construction period through careful logistical planning and productive implementation of resources.
    - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor in order to minimise vegetation clearing.
    - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
    - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
    - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
    - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
    - Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.

- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

- Mitigation of other lighting impacts includes the pro-active design, planning and specification lighting for the substation. The correct specification and placement of lighting and light fixtures will go far to contain rather than spread the light. Additional measures include the following:
  - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
  - Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
  - Making use of minimum lumen or wattage in fixtures;
  - Making use of down-lighters, or shielded fixtures;
  - Making use of Low Pressure Sodium lighting or other types of low impact lighting.
  - Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.
- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated.

In terms of the Alternatives, all 6 Project Alternatives will be visually exposed significantly in areas within a 5km radius of the infrastructure. In addition, all Alternatives tend to display an even potential exposure pattern where they traverse flat terrain and more scattered patterns where they encounter elevated topography.

A comparative assessment of the 6 project alternatives revealed that overall, considering all relevant criteria, Alternatives 3 and 6 are considered most preferable from a visual perspective. Alternatives 2 and 5 are also considered acceptable. Alternative 4 is the least preferable from a visual perspective. None of the Project Alternatives are, however, considered fatally flawed from a visual perspective.

10 IMPACT STATEMENT

In light of the results and findings of the Visual Impact Assessment undertaken for the proposed new Blanco 400/132kV Main Transmission Station and associated loop in – loop out power lines, it is acknowledged that the receiving environment will be visually transformed for the entire operational lifespan of the infrastructure.

The following is a summary of impacts:

- The visual impact sensitive visual receptors (i.e. users of main roads and residents of homesteads and settlements) in close proximity to the proposed infrastructure (i.e. within 1km) are expected to be of **high** significance for Alternatives 1 and 4 and of **moderate** significance for all other Alternatives.

- The visual impact sensitive visual receptors (i.e. users of roads and residents of homesteads and settlements) within the region (i.e. beyond the 1km offset) is expected to be of **moderate** significance for all Alternatives.
- The potential visual impact on residents of residents of built-up centres and populated places (i.e. the towns of Blanco, Heather Park and George, as well as the residential areas south of George) within the region beyond the 1km offset is expected to be of **low** significance for all Alternatives.
- The potential visual impact on Protected Areas (i.e. the Witfontein, Doringriver and Ruitersbos Nature Reserves) is expected to be of **low** significance for all Alternatives.
- Potential visual impact on the Outeniqua Mountains Important Birding Areas (IBA) is likely to be of **high** significance for Alternative 5 and of **moderate** significance for all other Alternatives. The Outeniqua Mountains IBA is not, however, a formal Protected Area.
- The potential visual impact of the associated infrastructure on sensitive visual receptors in close proximity thereto is expected to be **high** significance for Alternative 4 and of **moderate** significance for all other Alternatives. Impacts may be mitigated to **low** for Alternatives 3, 5 and 6, but remain **moderate** for Alternative 1, 2 and 4.
- The potential visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure is likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low** or **neglibible**.
- The potential visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed infrastructure is likely to be of **moderate** significance for all Alternatives, and may be mitigated to **low** for all Alternatives except for Alternatives 1 and 4, which will remain **moderate**.
- The anticipated visual impact on the landscape quality as defined by natural features (specifically the mountains) within the study area is expected to be of **low** significance for Alternatives 1, 2, 3, 4 and 6 and of **moderate** significance for Alternative 5.
- The anticipated visual impact on the visual character and sense of place of the study area is expected to be of **low** significance for Alternatives 3, 5 and 6 and of **moderate** significance for Alternatives 1, 2 and 4.
- The anticipated visual impact of the proposed infrastructure on tourist access routes (i.e. the N2, N9, N12, R102 and R404) and tourist destinations (i.e. attractions and accommodation) within the region is expected to be of **low** significance for all Alternatives.

With the exception of the anticipated impacts on rural farmsteads and settlements and on the Outeniqua Mountaind IBA, all impacts above are determined to have a post mitigation significance of moderate or low.

Notwithstanding these residual high impacts, none are considered to be fatal flaws from a visual perspective. This is based on the relatively low density of visual receptors within the study area, the relatively contained extend of the infrastructure and the existing presence of power line infrastructure within the region.

Furthermore, it is the opinion of the author that the anticipated visual impact is not likely to significantly detract from the visual quality, landscape quality or

sense of place. Similarly, significant impact on regional tourism appeal or numbers of tourists frequenting the area is not likely.

It is therefore recommended that the development the proposed new Blanco 400/132kV Main Transmission Station and associated loop in – loop out power lines (i.e. the recommended or acceptable Project Alternative) be supported, subject to the implementation of the recommended mitigation measures (section 6.9) and management actions (Chapter 11).

Alternatives 3 and 6 are considered most preferable from a visual perspective. Alternatives 2 and 5 are also considered acceptable. Alternative 4 is the least preferable from a visual perspective.

11 MANAGEMENT PROGRAMME

The management programme tables aim to summarise the key findings of the visual impact report and to suggest possible management actions in order to mitigate the potential visual impacts. The tables are applicable to all six substation and powerline alternatives.

Table 13: Management Programme: Planning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the planning of the six proposed powerline and substation alternatives.		
Project component/s	The MTS and power lines.	
Potential Impact	Primary visual impact of the infrastructure in the landscape, including lighting at night.	
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure as well as within the region.	
Mitigation: Target/Objective	Optimal planning of infrastructure so as to minimise visual impact.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.	Eskom Holdings Ltd / design consultant	Planning phase.
Consolidate infrastructure and make use of already disturbed sites rather than pristine areas.		
Pro-active design, planning and specification lighting for the substation. Shield sources of light by physical barriers (walls, vegetation, or the structure itself). Limit mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights. Make use of minimum lumen or wattage in fixtures. Make use of down-lighters, or shielded fixtures. Make use of Low Pressure Sodium lighting or other types of low impact lighting. Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.		
Performance Indicator	No access roads and other associated infrastructure are visible from surrounding areas.	
Monitoring	Not applicable.	

Table 14: Management Programme: Construction.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the construction of the six proposed powerline and substation alternatives.		
Project component/s	Construction of the MTS and power lines	
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing as well as lighting at night	
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure.	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	Eskom Holdings Ltd / contractor	Early in the construction phase.
Reduce the construction period through careful logistical planning and productive implementation of resources.		
Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.		Early in and throughout the construction phase.
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.		Throughout the construction phase.
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.		
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).		
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.		
Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.		Throughout and at the end of the construction phase.
Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.		
Performance Indicator	Vegetation cover within the servitudes and in the vicinity of the infrastructure is intact with no evidence of degradation or erosion.	
Monitoring	Monitoring of vegetation clearing during construction. Monitoring of rehabilitated areas post construction.	

Table 15: Management Programme: Operation.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the operation of the six powerline and substation alternatives.			
Project component/s	The MTS and power lines		
Potential Impact	Visual impact of vegetation rehabilitation failure.		
Activity/risk source	The viewing of the above mentioned by observers near the infrastructure.		
Mitigation: Target/Objective	Well-rehabilitated and maintained servitudes.		
Mitigation: Action/control		Responsibility	Timeframe
Maintain roads to forego erosion and to suppress dust.		Eskom Holdings Ltd / operator	Throughout the operational phase.
Monitor rehabilitated areas, and implement remedial action as and when required.			
Performance Indicator	Intact vegetation within servitudes and in the vicinity of the infrastructure.		
Monitoring	Monitoring of rehabilitated areas.		

Table 16: Management Programme: Decommissioning.

OBJECTIVE: The mitigation and possible negation of visual impacts associated with the decommissioning of the six powerline and substation alternatives.			
Project component/s	The MTS and power lines.		
Potential Impact	Visual impact of residual visual scarring and vegetation rehabilitation failure.		
Activity/risk source	The viewing of the above mentioned by observers along or near the corridors.		
Mitigation: Target/Objective	Rehabilitated vegetation in all disturbed areas.		
Mitigation: Action/control		Responsibility	Timeframe
Remove infrastructure not required for the post-decommissioning use of the sites.		Eskom Holdings Ltd / operator	During the decommissioning phase.
Rehabilitate access roads and servitudes not required for the post-decommissioning use of the sites. Consult an ecologist to give input into rehabilitation specifications.			
Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.			Post decommissioning.
Performance Indicator	Intact vegetation along and in the vicinity of the corridors.		
Monitoring	Monitoring of rehabilitated areas.		

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