1 INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF REPORT

Eskom Transmission Grid Planning and Eskom Distribution Western Cape Operating Unit initiated a study to investigate possible solutions to address the constraints on the sub-transmission network to the east of Bacchus 2x500 MVA 400/132 kV substation. Bacchus substation forms part of the Outeniqua Customer Load Network (CLN) in the Western Cape Grid and it supplies the Vryheid and Ashton sub transmission substations in the east. Ashton substation is supplied via Boskloof 132kV switching station, whilst Vryheid substation is supplied directly from Bacchus substation. Vryheid and Ashton substations are both equipped with 2x40MVA 132/66kV transformers and are radially supplied (Nsovo, 2016).

In order to resolve these network constraints, the proposed Vryheid strengthening project was initiated. The latter entails the development of the new Agulhas 400/132kV 2x500 MVA Transmission Substation and associated loop in and out lines.

This Visual Impact Assessment (VIA) is undertaken as a result of the findings of the Scoping Report prepared by Nsovo Environmental Consulting for the proposed Vryheid network strengthening project. As a result, this VIA is undertaken as part of the Environmental Impact Assessment (EIA) process being facilitated by Nsovo Environmental Consulting, in terms of the National Environmental Management Act 107 of 1998 (NEMA).

The purpose of this report is therefore to assess the proposed activity in terms of the *Guidelines for Involving Visual and Aesthetic Specialists in the EIA Process and the NEMAEIA Regulations of 2014*.

1.2 COMPONENTS OF THE REPORT

The aspects addressed in this report are as follows:

a) Description of the methodology adopted in preparing the report.
b) Description of the receiving environment.
c) Description of the view catchment area, view corridors, viewpoints and receptors.
d) Identification and evaluation of potential visual impacts associated with the proposed activity and the alternatives identified, by using the established criteria, including potential lighting impacts at night.

e) Identification in terms of best practical environmental option in terms of visual impact.

f) Addressing of additional issues such as:
- Impact on skyline.
- Negative visual impact.
- Impact on aesthetic quality and character of place.

g) Assumptions made and uncertainties or gaps in knowledge.

h) Recommendations in respect of mitigation measures that should be considered by the applicant and competent authority.

1.3 STUDY METHODOLOGY

As stated previously, this VIA was undertaken in accordance with the *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes*, as issued by the Western Cape Government's Department of Environmental Affairs and Development Planning during 2005.

The VIA was undertaken in distinct steps, each of which informed the subsequent steps. Figure 1 below summarises the methodology adopted for undertaking the assessment.

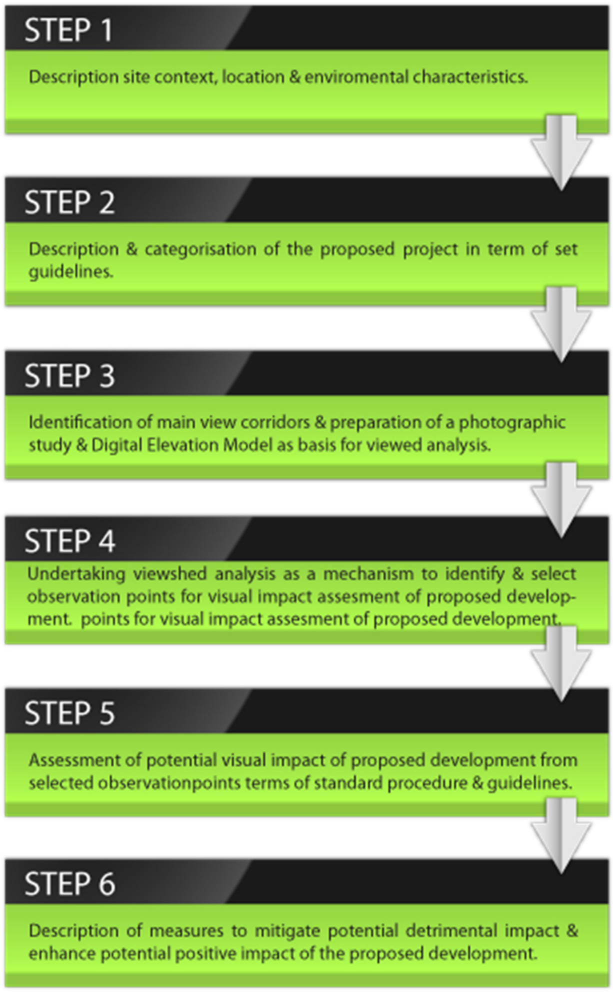

Figure 1: Methodology adopted for the VIA.

1.4 SUPPLEMENTARY DOCUMENTATION

This report is to be read together with Annexure 2 (Selected observation point viewsheds and assessments), which provides an identification of selected observation points and visual assessment of the proposed activity from each of these points.

1.5 GAPS IN KNOWLEDGE, ASSUMPTIONS AND LIMITATIONS

This assessment was undertaken during the impact assessment phase of the project and is based on the information provided by Nsovo Environmental Consulting on 14, 18 July and 29 September

2016, for the mentioned project. Other than to perform a VIA for the proposed powerline, no specific Terms of Reference has been provided.

Assessments of this nature generally suffer from a number of defects that must be acknowledged:

- **Limited time:** A comprehensive assessment requires a systematic assessment of the environment at different times of the day. Such luxury is not always possible and therefore most assessments are based on observations made at a specific time of day. Educated estimates are made, where applicable, based on the knowledge of the area.
- **Availability of literature:** A thorough assessment requires that all relevant literature on the subject matter is studied, acknowledged and incorporated in the report. Due to a range of factors, forward planning documents are not always available for all spheres of government.

2 LANDSCAPE CHARACTER AND VISUAL AMENITY

Since the late 1980s and early 1990s, the European Landscape Convention adopted the following definition of landscape that has since been widely adopted: *Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'* (Council for Europe, 2000).

This definition was expanded as follows by Sanwick, C. and Land Use Consultants (2002): *'Landscape is about the relationship between people and place. It provides the setting for our day-to-day lives. The term does not mean just special or designated landscapes and it does not only apply to the countryside. It results from the way that different components of our environment - both natural (the influences of geology, soils, climate, flora and fauna) and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) - interact together and are perceived by us. People's perceptions turn land into the concept of landscape'*.

Landscape results from the interplay of the physical, natural and cultural components of our surroundings and the way that people perceive these interactions. Different combinations of these elements create the distinctive character of landscapes in different places, allowing different landscapes to be mapped, analysed and described. Character is not just about the elements or the 'things' that make up a landscape, but also embraces the aesthetic and perceptual factors that make different places distinctive (GLVIA, 2002).

When the inter-relationships between people and landscape is considered this introduces related, but very different considerations, notably the views that people have of the landscape and the effects of change on their visual amenity. When a landscape is changed in some way there is a probability that the change will be seen by someone and often by several different groups of people. This may affect both particular views of the landscape and have an effect on the overall pleasantness of the surroundings that people enjoy - which is what visual amenity means.

A visual impact assessment should therefore be concerned with how the surroundings of individuals or groups of people may be specifically affected by change in the landscape. This result in assessing potential changes in specific views and in the general visual amenity experienced by general observers in particular places.

3 THE AFFECTED ENVIRONMENT

3.1 LOCALITY

The proposed new Eskom Agulhas Main Transmission Substation is located in the Swellendam Municipality as part of the Overberg District Municipality, in the Western Cape Province. Four site alternatives have been put forward from the Scoping Process and will be assessed in this report. These sites are all located in relative close proximity to each other, the area of which is generically referred to as the project site.

The project site is located approximately 10km south-west of Swellendam in a predominantly agricultural landscape. The proposed substation is to be located directly south of the N2 national road while the R319 regional road connects to the N2 at the project site. The project site straddles the existing 400kV Bachhus Proteus powerline which runs partly parallel to the N2. In addition to the above infrastructure, the existing Vryheid substation is located in close proximity to the 400kV powerline, approximately 4.5km south of the project site on the Farm Kluitjieskraal No. 256.

Despite being an agricultural landscape where intensive agriculture is at the order of the day, the area is characterised by several other land uses such as recreational areas, tourist attractions, infrastructural developments and conservation areas.

Swellendam is the regional node at the foot of the Langeberg mountain range. It is the 3rd oldest town in South Africa and has more than 17 000 inhabitants. The town has a rich cultural historic heritage and has over 50 provincial heritage sites most of them buildings of Cape Dutch architecture.

Swellendam Local Municipality is currently the third biggest contributor to the economic growth and GDPR of the Overberg District. Swellendam registered an average annual growth rate of 3.2% in GDPR from 1995 to 2004, the second highest rate in the Overberg District. When considering the most recent data and shorter periods, economic growth was higher than the long-term average, averaging 3.5% between 2000 and 2004, 4% between 2003 and 2004 and 5.5% in 2006.

The main economic sectors are primary agriculture and agro-processing of products which includes deciduous fruits, wheat, barley, young berry, livestock and grapes for exporting and the making of wine. Tourism is the other major sector in the area with a big emphasis on eco-tourism and cultural heritage tourism activities. The other sectors are retail and manufacturing, mining and quarrying. A potential sector for higher economic growth in the area is wholesale and packaging (Nsovo Consulting, 2014).

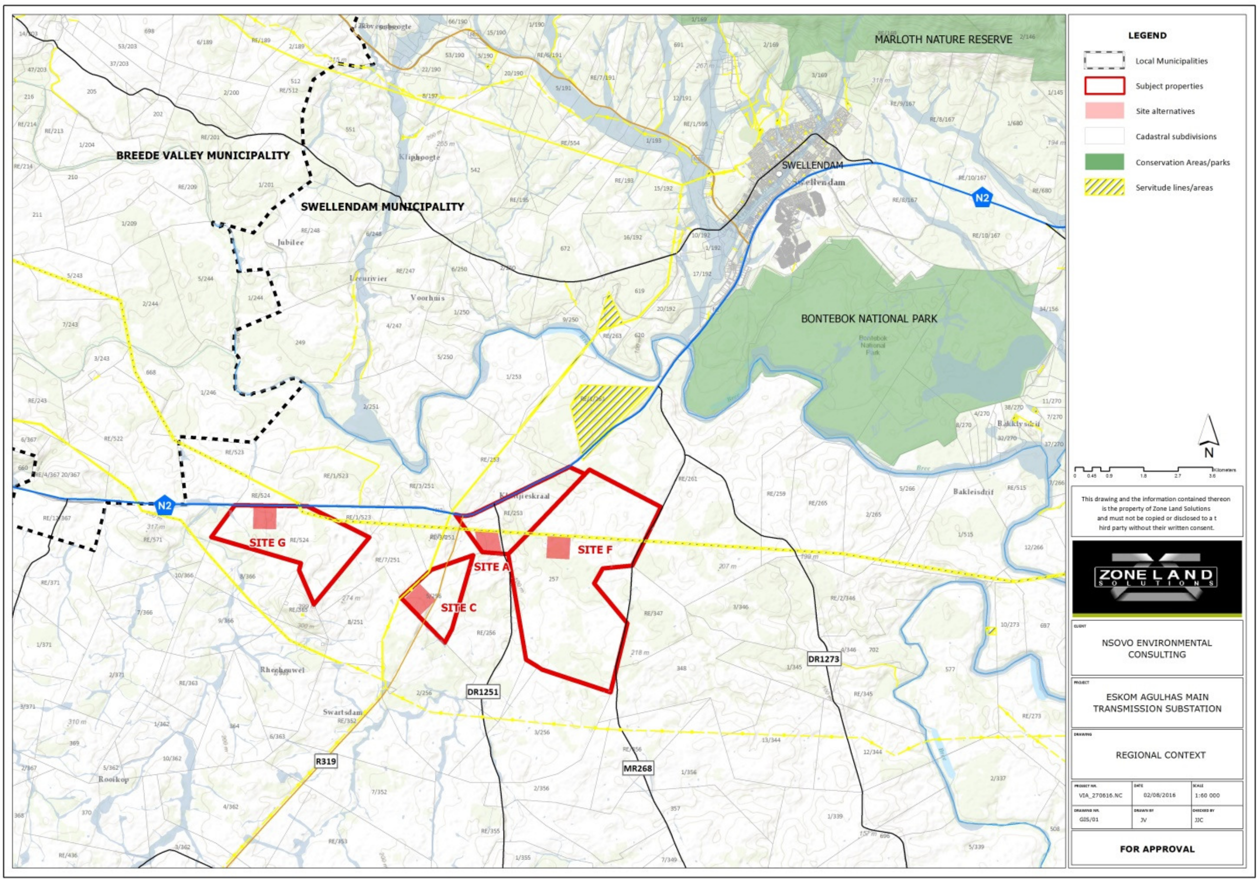

Figure 2: Regional context of the project site.

Swellendam is situated on the N2, approximately 220 km from both Cape Town and George. The Swellendam SDF (2014) notes that Swellendam is the main commercial and administrative centre for the municipal area and is strategically located within the centre of the municipal area, on the N2. Apart from the latter road that crosses immediately north of the project site, several other regional and local distributors are found throughout the area. Of particular importance to the proposed project are the R319, DR1251 and MR268 that connects the N2 with coastal towns such as, Agulhas, Struisbaai, Malgas and Witsand.

Important rivers traversing the area include the Breede River (north of the project site), Buffeljags River, Koornlands River, Sonderend River and Tradouwhoek River. Several other smaller rivers such as the Kluitjieskraal River and other drainage lines are found throughout the project site.

Some of the most significant conservation areas within the Municipality are Bontebok National Park, Marloth Nature Reserve in the Langeberg, and Sanbona Wildlife Reserve. There is emphasis on ecotourism and cultural heritage tourist activities within the Municipality (Nsovo, 2016).

Figure 3: General view of the landscape in the vicinity of the project site.

3.1.1 Description of the Landscape Character

The Swellendam Municipal area is transected in the northern parts by the east-west aligned Langeberg Mountains, which form a significant topographic feature between the coastal plains to the south and the Little Karoo to the north. The lower lying coastal plains, which form an extensive part of the Swellendam Municipal area, are characterised by an undulating landscape.

The municipal area is drained, in the main, by the Breede River which transects the Swellendam Municipal area in a generally northwest-southeast direction to its estuary at the coast at Witsand. A relatively small section of the Sonderend River, a major tributary of the Breede River, has its confluence with the Breede River in the western part of the Swellendam Municipal area. The Buffeljags River, another significant tributary of the Breede River in the Swellendam Municipal area, drains a portion of the Langeberg Mountains to the east of Swellendam (Swellendam SDF, 2014).

The project site has a generally undulating terrain. The landscape of the proposed substation sites vary in height between approximately 110m above mean sea level (Site A) to 180m amsl (Site C) – a difference of 70m in elevation.

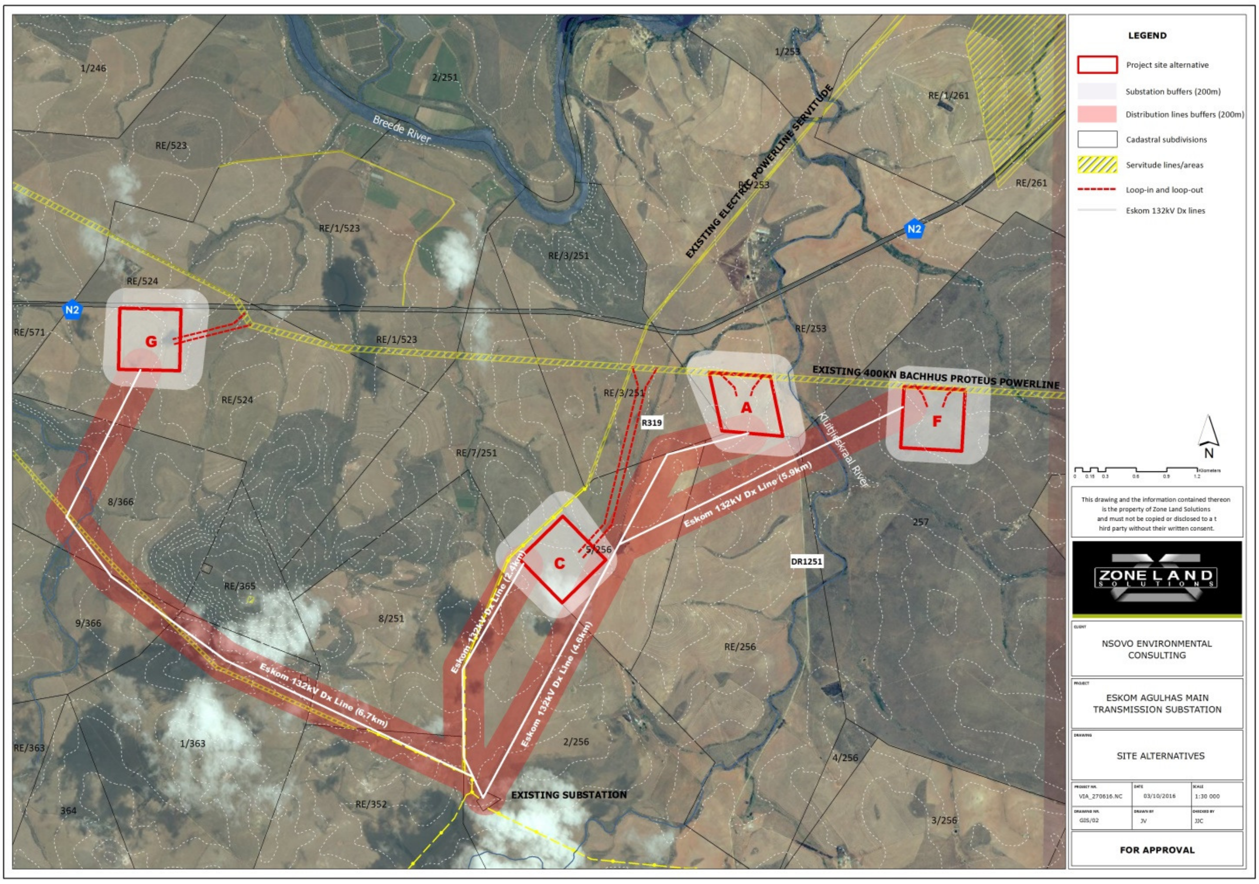

Figure 4: Aerial perspective of the project site indicating the existing uses on site and the surrounding properties.

The vast majority of the project site has been transformed by intensive agriculture. However, several drainage lines and areas of conservation-worthy habitats, such as the Luiperdsberg and the Remainder of Farm No. 521/3 are in existence in the immediate proximity of the project site.

The Swellendam area on average receives approximately 462mm of rain per annum, with most of the rainfall occurring during mid-winter. The average midday temperatures range from approximately 17.1°C in July to 27.5°C in January. The region is the coldest during July when the mercury drops to 5.0°C on average during the night (http://www.saexplorer.co.za/south-africa/climate/swellendam_climate.asp).

The area is dominated by Eastern Ruens Shale Renosterveld (FRs 13) while the riverine areas and drainage channels are dominated by Cape Lowland Alluvial Vegetation (AZa 2). The former vegetation type occur on the Eastern Ruens from Bredasdorp and the area of the Breede River near Swellendam; between the coastal limestone belt in the south and vegetation types of the southern foothills of the Langeberg.

According to Mucina and Rutherford (2012), the vegetation type occurs on the moderately undulating hills and plains supporting cupressoid and small-leaved, low to moderately tall grassy shrubland, dominated by renosterbos. The southern limits are often covered by a thin layer of calcrete. Little of this vegetation remains, but some thicker calcrete deposits, too thick to be ploughed, support mesotrophic asteraceous 'fynbos' with *Crassula expansa*, *Leucadendron linifolium* and *Nylandtia spinosa*.

Eastern Ruens Shale Renosterveld is considered to be critically endangered.

As mentioned above, the river valleys, watercourses and bottomlands support Aza 2 Cape Lowland Alluvial Vegetation dominated by *Acacia karroo*, *Aloe ferox*, *Buddleja saligna* and *Rhus pallens*.

The vegetation and landscape features characteristic of this type include a flat landscape with slow-flowing (in place meandering) lowland rivers fringed on banks by extensive tall reeds dominated by *Phragmites australis* and *Typha capensis* as well as by flooded grasslands and herblands and tall riparian thickets (gallery forests) with *Salix mucronata* subsp. *capensis* on the river terraces.

Cape Lowland Alluvial is also considered to be critically endangered with a conservation target of 31% while only approximately 1% is statutorily conserved in areas such as the Bontebok National Park, Verlorenvlei and Marloth Nature Reserves.

Figure 5: View of the undulating landscape in the vicinity of the project site.

3 PROJECT SITE DESCRIPTION

The area required for the proposed substation will be approximately 600m x 600m to account for current and future needs. The substation footprint will be anywhere within this demarcated area. The loop-in and loop-out lines will vary in distance depending on the final location of the substation. A number of site alternatives have been identified, as described below. The proposed sites are located approximately 10km from Swellendam town along the N2 and R319 roads, as illustrated on Figure 4 above.

The farms affected by the proposed project are indicated by the table below. Also included is the project component to be considered on these properties.

Table 1: Details of affected farms.

FARM NAME	FARM NO.	SG CODE	PROJECT COMPONENT
	253	C07300000000025300000	Site Alternative A & loop-in and loop-out
	257	C07300000000025700000	Site Alternative F & loop-in and loop-out
Kluitjeskraal	256/5	C07300000000025600005	Site Alternative F & loop-in and loop-out
Leeuw Rivier	251/3	C07300000000025100003	Loop-in and loop-out to Site C
Dagbreek	524	C07300000000052400000	Site Alternative G & loop-in and loop-out

4 PROJECT DESCRIPTION AND PROPOSED INFRASTRUCTURE

4.1 BACKGROUND

As mentioned above, Eskom initiated a study to investigate possible solutions to address the constraints on the sub-transmission network to the east of Bacchus 2x500 MVA 400/132kV substation, which forms part of the Outeniqua CLN in the Western Cape Grid. In order to resolve the current constraints, Eskom has proposed the Vryheid Network Strengthening.

4.2 PROJECT COMPONENTS

The proposed scope of work entails the development of the following:

a) The Agulhas 400/132kV 2 x 500 MVA Main Transmission Substation (MTS) of approximately 600m x 600m;
b) The loop-in and loop-out lines to connect the proposed Agulhas MTS to the existing 400kV line Bacchus – Proteus 1;
c) A double-circuit Kingbird line from Agulhas MTS Vryheid; and
d) Extended Vryheid 132 kV Busbar and two new 132kV feeder bays.

Access to the project site will be via the R319 while secondary access will be through public roads as well as private farm roads, the access which is still to be negotiated with land owners. Where such roads do not provide access, access roads may need to be established. The construction of access roads will be compliant with a Type 6 gravel road; which comprises of 6 meter wide raised gravel extended to 14 meters with meadow drainage in flat terrain, increased to 16 meters with 'V' type drainage in rolling terrain.

A fifty five meter (55m) servitude is required for each of the proposed 2x400kV loop-in and loop-out powerlines. As a result, a total of one hundred and ten meter (110m) servitude will be cleared. Only flora within the servitude will be cleared for construction purposes (Nsovo, 2016).

4.3 STRUCTURAL ALTERNATIVES

Several design alternatives have been proposed and may include one or more of the following pylon types:

a) Cross-Rope suspension type;
b) Self-supporting type; and

c) Guyed V towers.

Some of the pylon types are illustrated by Figure 6 below. It is important to note that the topography will largely dictate the types of towers to be used. From this perspective, it should be noted that where the line crosses undulating terrains and when it changes direction at an angle, there will be a need to use self-supporting towers. None of the above options have been dismissed and remain alternatives depending on the terrain and topography.

4.3.1 CONDUCTOR CABLES

The conductor cables used to carry current are held up by the pylons. The conductor cables are bare, meaning they are insulated by the air alone. The distance between each conductor, and between the conductors and the ground, ensures that they remain insulated.

The insulator strings, usually made of glass, insulate the pylon from the live cable. The higher the voltage of the line, the more insulators are required. More recent composite insulators have a glass-fibre core with silicon sheds for insulation and are used to connect the conductors to the towers. Composite insulators are lightweight and resistant to both vandalism and pollution.

Shield wires, which do not carry an electric current, typically run above the conductor cables to provide lightning protection.

Figure 6: Examples of a self-supporting tower (left). Example of a cross-rope suspension tower (right).

4.4 SITE ALTERNATIVES

A total of seven (7) sites have been put forward as site alternatives. However, during the scoping process several of these sites have been eliminated as non-viable. As a result, four (4) site alternatives have been put forward for assessment during the EIA phase. The sites are as follows:

4.4.1 SUBSTATION SITE ALTERNATIVE A

Site alternative A is located in the corner between the N2, R319 and the DR1251. The site is completely transformed and located adjacent to the existing 400kV overhead powerline. The Loop-in loop-out line from the substation will be approximately 273m. This is the shortest line of all alternatives considered. The Kluitjieskraal River is located about 500m east of the substation site A. Furthermore, a small stream that connects with the Kluitjieskraal River is located north of the site. The terrain has a side slope of about 6 to 9%.

Figure 7: Site Alternative A aerial view.

4.4.2 SUBSTATION SITE ALTERNATIVE C

Site Alternative C is situated in an old pasture next to the R319. The site has a smooth terrain and a side slope of about 2% to 7%. A pan micro-habitat is located within the vicinity of the site. The site is situated approximately 2km south of Bacchus - Proteus 400kV line and approximately 2.5km north of Vryheid Substation. The loop-in loop-out line from the substation will be approximately 2.039km. There is a water course and 3 small dams immediately north of the site. The Dankbaarheid homestead is located some 720m northwest of this site.

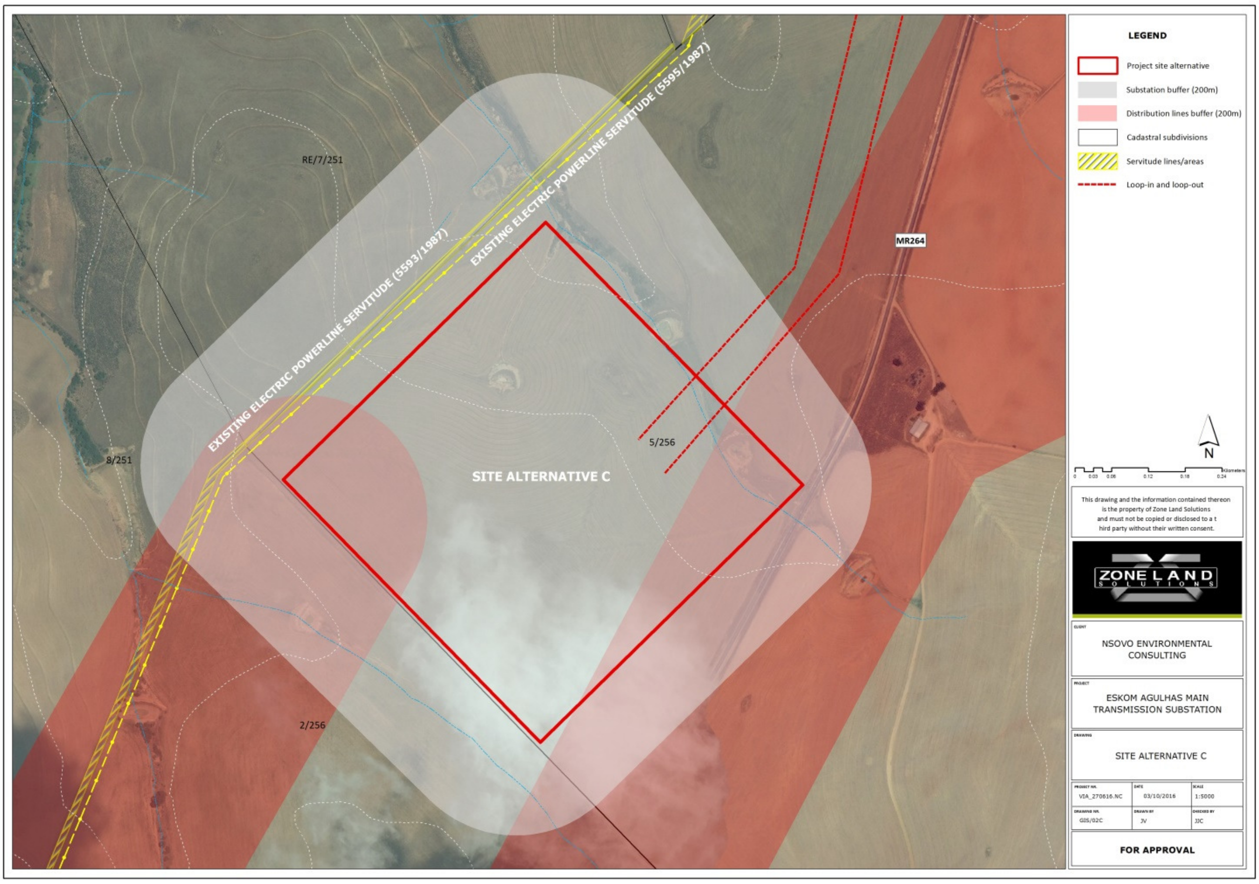

Figure 8: Site Alternative C aerial view.

4.4.3 SUBSTATION SITE ALTERNATIVE F

Site Alternative F is located on elevated landform the furthest east of all site alternatives. The site is located on agricultural lands with the existing 400kV powerline and N2 national road located within close proximity of this site. A drainage line and tributary to the Kluitjieskraal River is located approximately 400m to the east of the site. There are no farmsteads located in the immediate facility of this site.

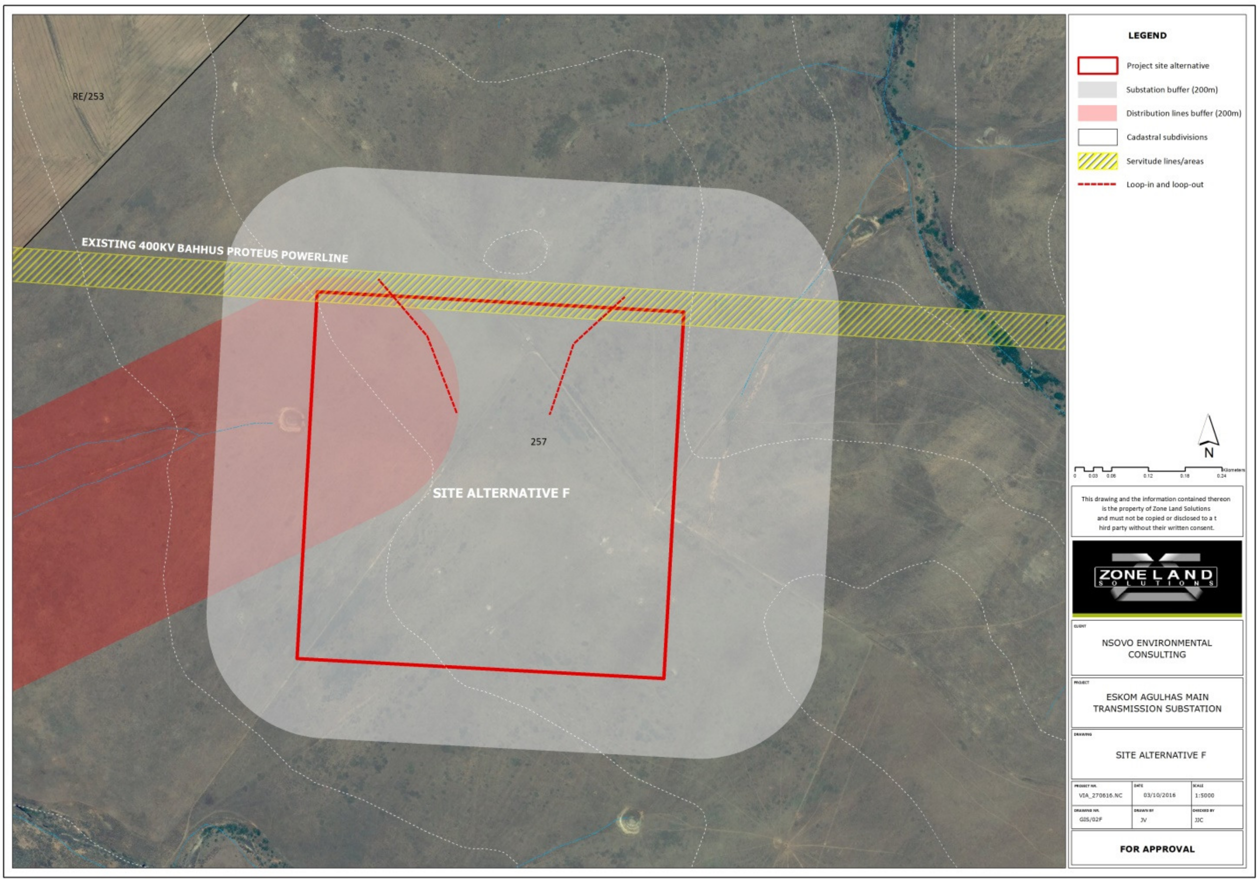

Figure 9: Site Alternative F aerial view.

4.4.3 SUBSTATION SITE ALTERNATIVE G

Site Alternative G is located furthest west of all site alternatives. The site is located immediately south of the N2 road. Similar to some of the other site alternatives, this site is located on high potential agricultural soils that are actively farmed. There are no environmental features of significance on this site. The nearest drainage line to the site is some 300m to the east. Immediately north of this site, opposite the N2 is the Dagbreek homestead. Other homesteads in the area include the Leeuwfontein homestead, approximately 1.2 km south-west of the site and the Diamant homestead, 1.6km west of the site.

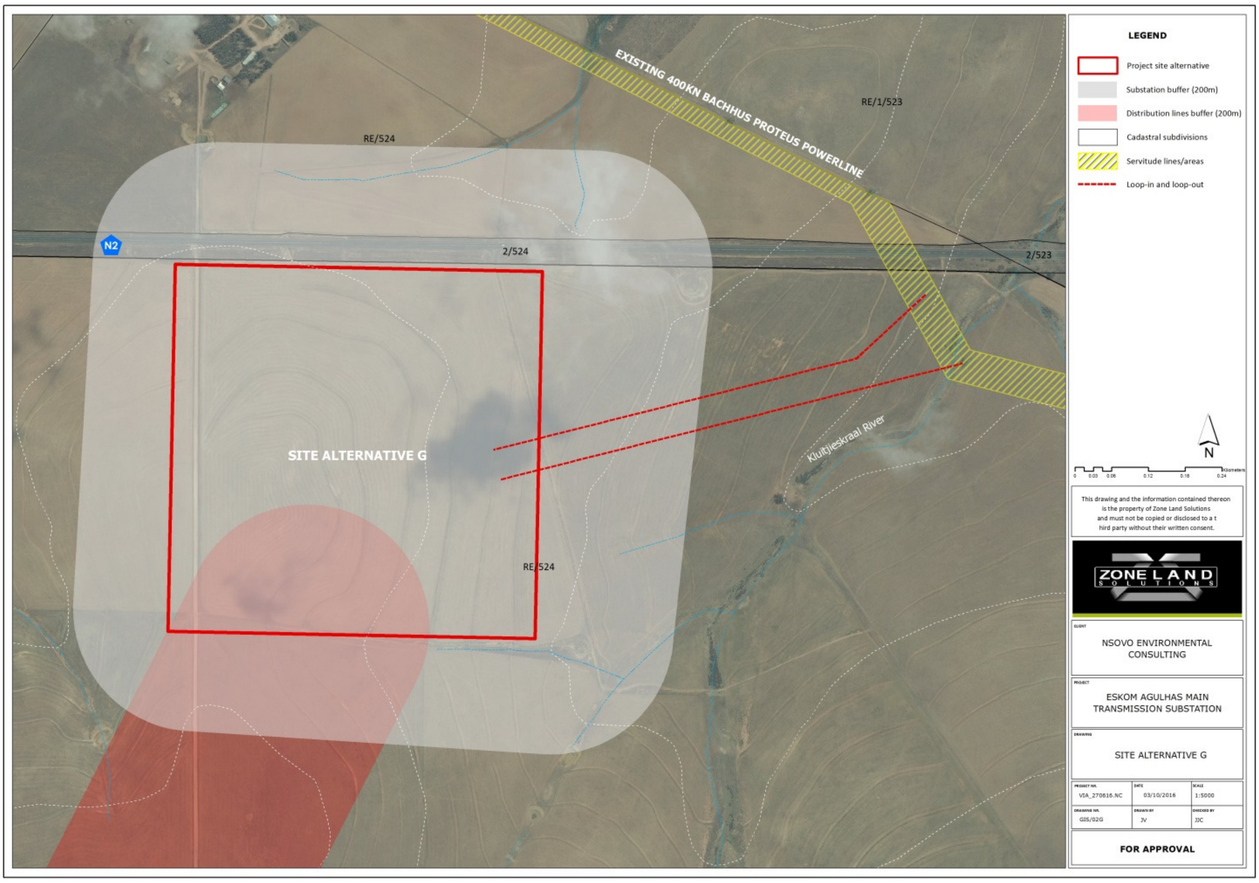

Figure 10: Site Alternative G aerial view.

5 POLICY CONTEXT

5.1 OVERBERG DISTRICT MUNICIPALITY SPATIAL DEVELOPMENT FRAMEWORK

The vision and core ideas of the Overberg District Municipality Spatial Development Framework (SDF) is *'To optimize the rich and balanced mix of the Overberg's agriculture, tourism, heritage, conservation resources (including natural and scenic resources) and eco system services within their scenic setting which is contained by the Riviersonderend and Langeberg mountains in the north, descends across the rolling hills of the Rûens and the varied ecology of the Agulhas plain and culminates in the rocky headlands and long sandy beaches of the Atlantic and Indian oceans."*

The implications of this vision are:

- *The area's unique agricultural, environmental and urban qualities must be maintained;*
- *In particular, the Elgin valley and the Rûens must continue to be farmed to as intensely as possible but care must be taken to safeguard their key inputs, namely fertile soil which should be protected from erosion, over use and its water;*

- *Private conservation areas must continue to be promoted with careful consideration of appropriate development rights to mobilise the necessary resources for veld rehabilitation and management;*
- *In particular Renosterveld linkage corridors across the Rûens linking remnant patches not suitable for agriculture should be encouraged;*
- *These corridors can provide both a tourism opportunity as well as channels for faunal movement and seed transport;*
- *The tourist appeal and promotion of the various Act 9 and other similar settlements should be promoted so as to increase awareness of them and thereby help to improve the livelihoods of their residents, particularly those for whom these settlements may represent poverty traps; and,*
- *Development and tourism efforts should take advantage of the district's close proximity to Cape Town as well as ensuring maximum benefits for local residents*.

The SDF is built upon a synthesis of aspects such as the natural systems, the socio-economic and built environment, sector GVA and employment contributors. These aspects gave rise to a broad conceptual framework which highlights the existing character of the district. This conceptual framework is further elaborated upon in the following key areas which illustrate the spatial vision for the Overberg District:

- Bio-regions,
- spatial planning categories,
- estuaries,
- settlement hierarchy,
- main tourism destinations,
- proposed major projects,
- land reform,
- energy generation projects,
- marine & coastal resources,
- principles for urban design guidelines,
- vertical and horizontal alignment,
- local municipal proposals, and
- human settlements.

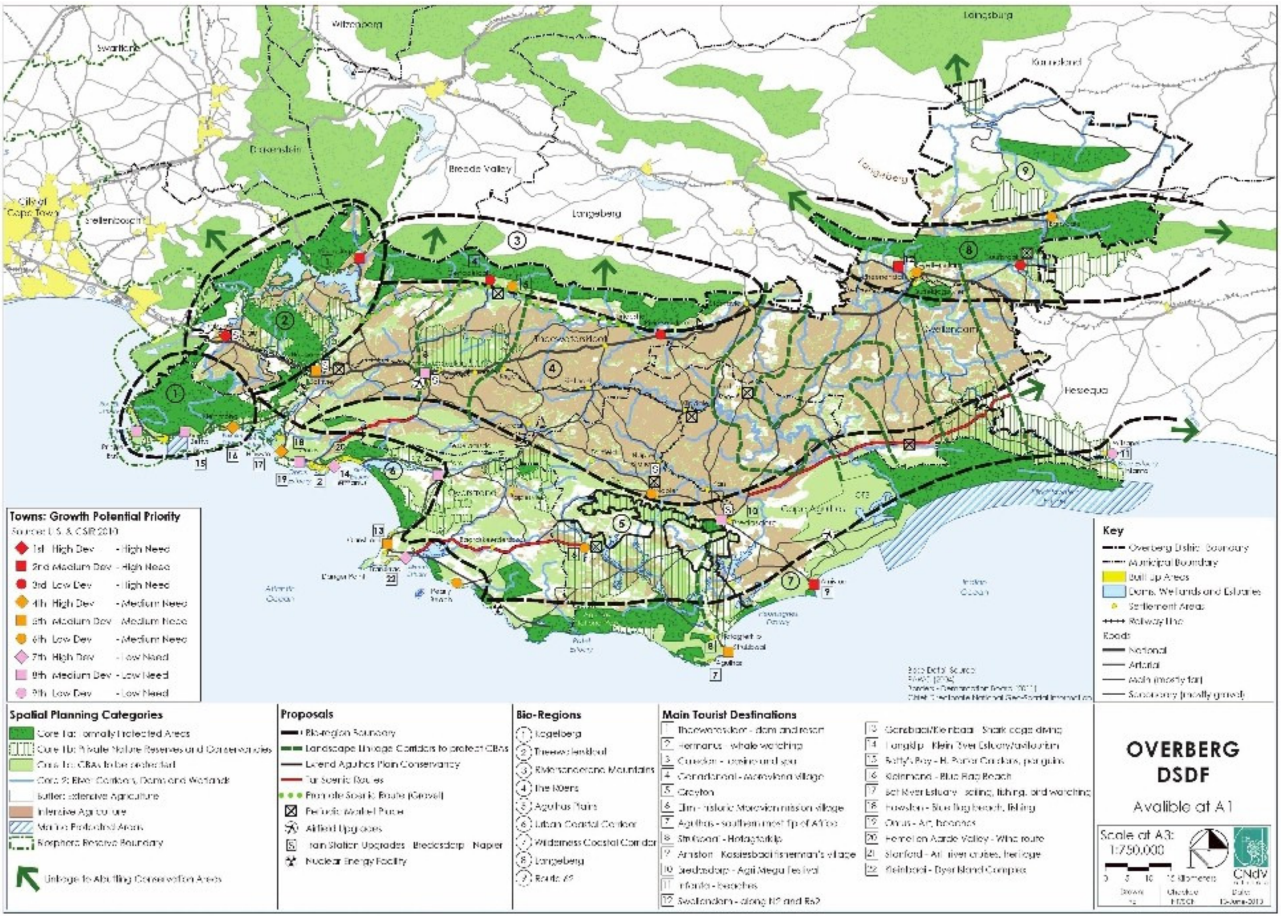

Figure 11: Overberg District SDF.

In terms of the spatial vision for the District, the proposed MTS substation is located on an area categorised as *Intensive Agriculture*. The project site is also situated outside of the Critical Biodiversity Areas and areas identified as potential scenic routes or landscape linkages and environmental corridors.

No specific or indirect reference is made in the SDF to large infrastructure projects such as the proposed MTS substation as it relates to the construction or upgrading of infrastructure networks.

5.2 SWELLENDAM SPATIAL DEVELOPMENT FRAMEWORK

The Swellendam Spatial Development Framework was approved by the Swellendam Council on 18 March 2015, in terms of the Local Government: Municipal Systems Act 32 of 2000.

The primary objective of the Swellendam SDF is to:

a) *provide spatial goals and supporting policies to achieve positive changes in the spatial organisation of Municipal areas to better ensure a sustainable development future;*

b) *promote the sound planning principles according to the relevant legislation;*

c) *promote the general well-being of its inhabitants, thereby ensuring that the most effective and orderly planning is achieved for an area whereby changes, needs and growth in the area can be managed to the benefit of its inhabitants.*

The SDF provides guidelines for the future development and conservation of the study area. The SDF therefore is a statutory policy document to guide decision-making and it presents a management system according to defined objectives and policies.

The spatial vision for the SDF is the following:

"To enhance the agriculture, tourism, heritage and conservation resources inherent to the varied natural and man-made landscapes of the Swellendam Municipality, from Karoo to coast, focusing on the historical settlement of Swellendam, in the shadow of the Langeberg Mountains and the confluence of the Riviersonderend and Breede Rivers."

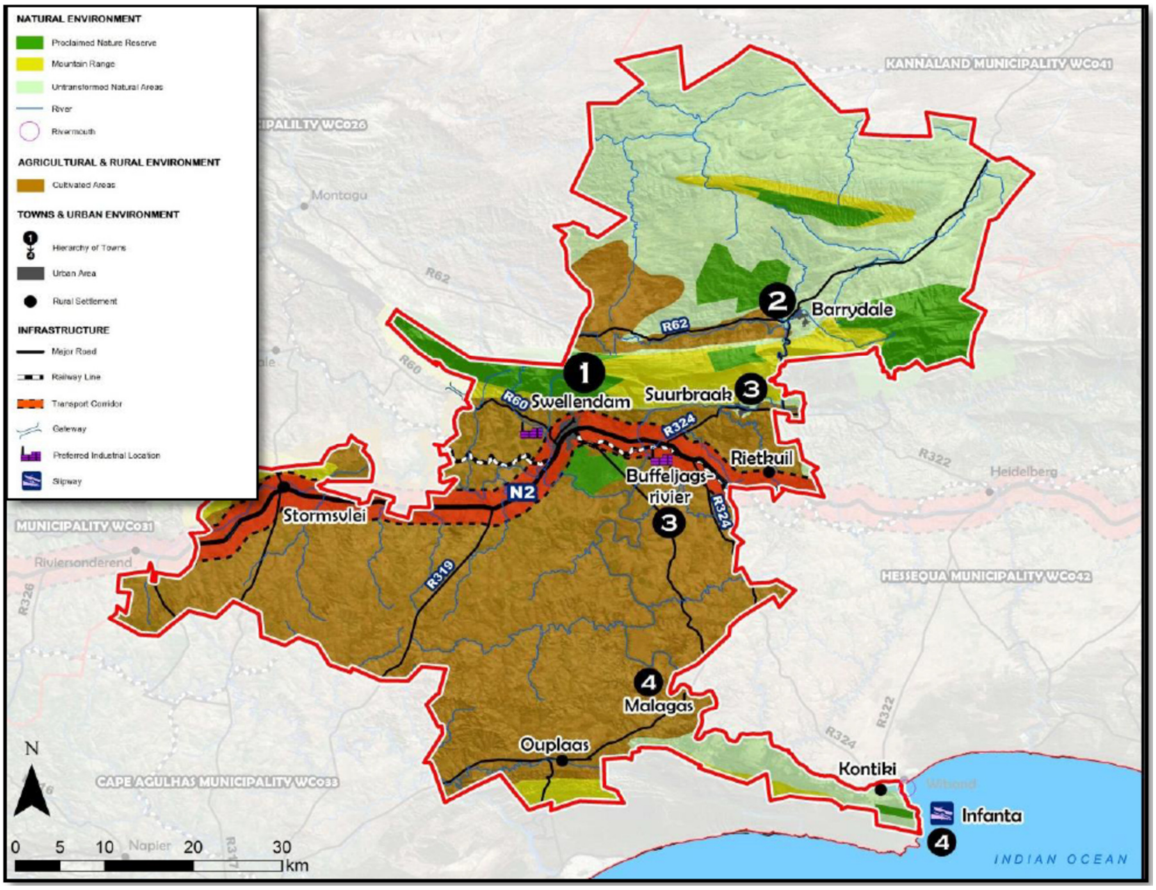

Figure 12: Swellendam Spatial Management Concept.

The figure above illustrates the spatial management concept as a guide to the management of land use and development within the municipality. It is stated in the SDF that this concept must be viewed as an informed response to understanding the spatial dynamics as the relationship between growth potential, anthropogenic impacts, socio-economic factors, natural features and processes.

As far as the project site is concerned, the SDF presents a number of policies, strategies and guidelines which is primarily aimed at protecting valuable agricultural land and landscapes. The SDF does, however, allow for activities other than *de facto* agricultural activities to be undertaken on agricultural-zoned properties. To that extent the following policies are put forward, which should also be adopted in the design of the proposed substation:

a) Protect valuable agricultural land and landscapes.
b) Prohibit transformation of Critically Endangered natural vegetation, or habitat of Red Data Book or Red List species.
c) Safeguard areas identified as important for key ecological and evolutionary processes.
d) Protect the distinctive landscape character of the area.
e) Protect rivers, streams and floodplains, with associated setback lines and/ or supporting wetlands.
f) Promote rehabilitation or restoration of degraded or disturbed areas.
g) Retain areas of high primary production potential for agricultural use.
h) Prohibit land uses that would effectively sterilise productive use of agricultural land and resources, and change the agricultural landscape.

6 POTENTIAL 'TRIGGERS' OR KEY ISSUES

A 'trigger' is a characteristic of either the receiving environment or the proposed project which indicates that visibility and aesthetics are likely to be key issues and may require further specialist involvement (DEA&DP, 2005).

The 'triggers', as it relates to the proposed project refer to the following:

Table 2: Potential triggers.

KEY ISSUE	FOCAL POINTS
a) **Nature of the receiving environment:**	*Areas with proclaimed heritage sites or scenic routes.* *Areas with intact or outstanding rural or townscape qualities.* *Areas with a recognised special character or sense of place* *Areas lying outside a defined urban edge line.* *Areas of important tourism or recreational value.* *Areas with important vistas or scenic corridors.*
b) **Nature of the project:**	*A change in land use from the prevailing use.*
	Possible visual intrusion in the landscape.

6.1 DEVELOPMENT CATEGORY

Based upon the 'triggers' and key issues and the environmental context summarised above, the proposed activity is categorised as a **Category 4 Development**.

This categorisation is based upon the *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes*, which lists the following categories of development:

Box 3: KEY TO CATEGORIES OF DEVELOPMENT

Category 1 Development: *e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.*

Category 2 Development: *e.g. low-key recreation/resort/residential type development, small-scale agriculture/nurseries/narrow roads and small-scale infrastructure.*

Category 3 Development: *e.g. low density residential/resort type development, golf or polo estates, low to medium-scale infrastructure.*

Category 4 Development:* *e.g. medium density residential development, sport facilities, small-scale commercial facilities/office parks, one-stop petrol stations, light industry, medium-scale infrastructure.

Category 5 Development: *e.g. high density township/residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agriculture land and commercial tree plantations. Quarrying and mining activities with related processing plants.*

Based upon the above categorization and the assessment criteria provided in the *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes* it is expected that a **'moderate to very high visual impact'** could be expected as a result of the proposed activity (refer to the table below).

The objectives of the VIA described in this report is to:

a) determine whether such broad impact categorisation is appropriate and if not, to determine an appropriate category of impact;

b) formulate and implement measures or interventions that would mitigate any detrimental impacts to the extent that the activity will be acceptable.

Table 3: Categorization of expected visual impact (DEA&DP, 2005).

Type of environment	**Type of development**				
	Category 1	**Category 2**	**Category 3**	**Category 4**	**Category 5**
Protected/wild areas of international or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	**High visual impact expected**	High visual impact expected
Areas or routes of low scenic, cultural or historical significance/disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

7 VIEWSHED ANALYSIS

7.1 DOMINANT VIEW CORRIDORS

As a first step of this VIA, a survey was undertaken to determine the existence of significant view corridors associated with the project site. A view corridor is defined as *'a linear geographic area, usually along movement routes, that is visible to users of the route'* (DEA&DP, 2005).

When determining dominant view corridors, one has to take into consideration the class of the road, the dominance and nature of the town/settlement/neighbourhood/district in which direction it travels and the distance from the proposed activity. With regard to the study area it is important to note that Swellendam is regarded in its municipal context as the only major town on the N2 and therefore functions as both a gateway and a destination to the area. As such, the corridors listed below relate directly to the proposed project.

Having regard for the above, the following dominant *view corridors* were identified in the immediate vicinity of the proposed powerline, namely:

a) **N2** The national road between Cape Town and Durban through Port Elizabeth and East London. The N2 is the main distributor route through the municipal area and provides linkages to the hinterland areas.

b) **R319** The R319 is a Regional Route in South Africa that connects Agulhas and Struisbaai in the south with the N2 near Swellendam via Bredasdorp.

c) **DR1251** The divisional road between the N2 in the north and the DR1223 in the south.

d) **MR264** The main road between the N2 in the north and the DR1223 in the south, via the DR1250.

7.2 RELEVANT TOPOGRAPHIC AND PHYSICAL CHARACTERISTICS

A further key aspect affecting the potential visual impact of any proposed activity is the topography of the project site and the surrounding environment and the existence of prominent biophysical features from where the project site is visible. The topography and the major ridgelines of the area were subsequently determined and mapped by using a *Digital Elevation Model*[1].

As illustrated by the DEM below, the respective site alternatives are all located at an altitude between 110m amsl and 180m amsl. The DEM illustrates the undulating nature of the landscape and the depressions in the landscape associated with the river corridors. From the DEM it is also evident that, with the exception of the Luiperdsberg situated between Site C and Site G, there are not prominent ridges or topographical manifestations within the immediate vicinity of the project site, from where the proposed activity could potentially be visible.

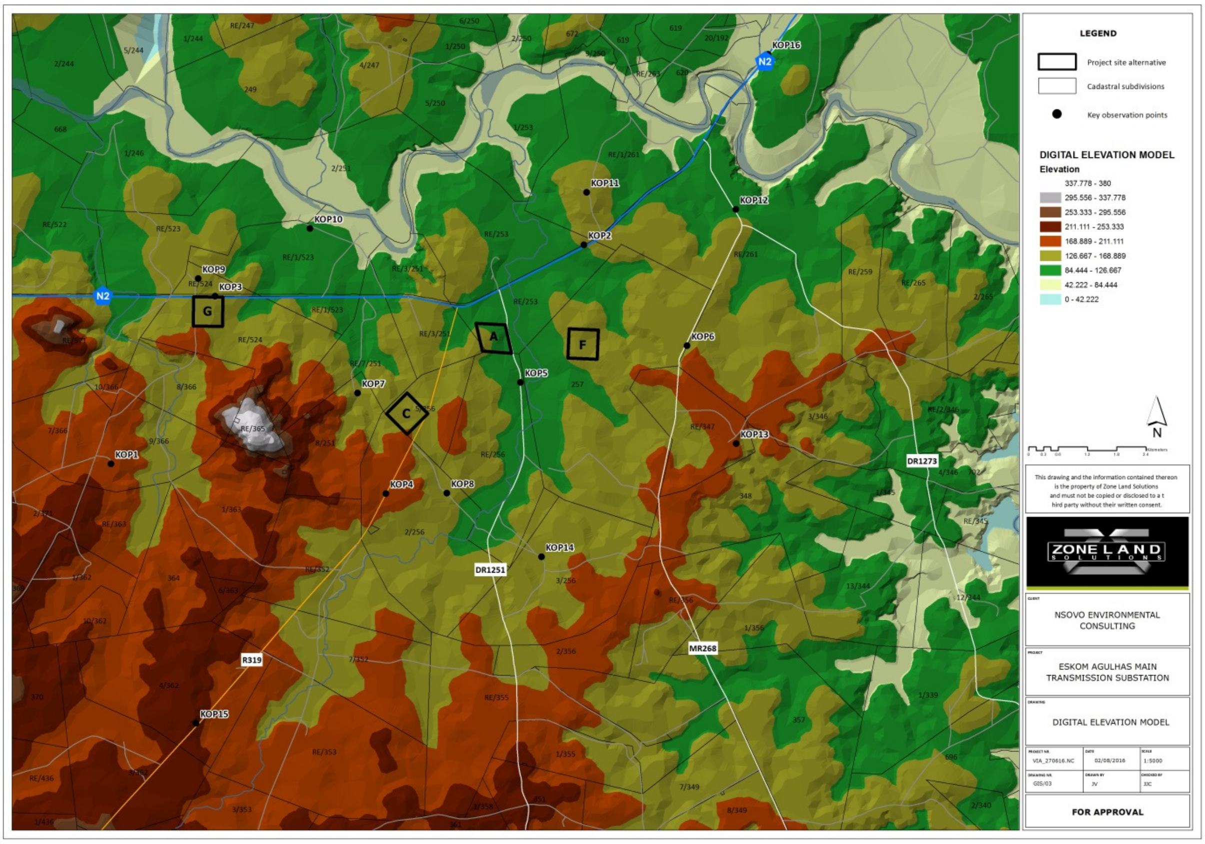

Figure 13: Digital Elevation Model illustrating the landscape of the area and the dominant view corridors in the region.

7.3 PHOTOGRAPHIC STUDY AS SUPPLEMENTARY COMPONENT

In order to quantify and assess the visibility and potential impact of the proposed activity and to provide a basis for selecting appropriate observation points outside of the project site, a

[1] A Digital Elevation Model (DEM) is a geographic information system-based outcome generated from contours for a specific area. In this instance, 20m contour intervals for reference sheet no. 3420ab were used to calculate the DEM for the region.

photographic study and analysis was undertaken in the vicinity of the project site. The analysis identified several observation points with similar characteristics and assessments outcomes. A selection of Key Observation Points is therefore included under Annexure 2.

Figure 14: Panoramic view of the existing Kluitjieskraal substation south of the project site.

8 DIGITAL VIEWSHED ANALYSIS

The photographic study summarised above was supplemented with a digital viewshed analysis based upon the Digital Elevation Model (refer to Figure 13). As stated previously, the purpose of these two steps was to provide a basis for the identification and selection of appropriate observation points outside the project site for the VIA.

The viewshed[2] analysis was undertaken in accordance with the *Guideline Document for involving Visual Specialists in EIA Processes*. Geographic Information Systems (GIS) technology was used to analyse and map information in order to understand the relationships that exist between the observer and the observed view. Key aspects of the viewshed are as follows:

- It is based on a *single viewpoint* from the highest point of the project site.
- It is calculated at an average 30m above the existing natural ground level to reflect the highest point of the proposed activity.
- It represents a '*broad-brush' designation*, which implies that the zone of visual influence may include portions that are located in a view of shadow and it is therefore not visible from the project site and *vice versa*. This may be as a result of landscape features such as vegetation, buildings and infrastructure not taken into consideration by the DEM.

[2] A viewshed is defined as *'the outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed'*. A Viewshed Analysis is therefore the study into the extent to which a defined area is visible to its surroundings.

- The viewshed generated from each of the selected observation points referred to in Annexure 2 is calculated at 1.7m above the natural ground level to reflect the average height of person either walking or sitting in a vehicle.

As illustrated by the generated viewsheds below (refer to Figures 15 - 18), the *zone of visual influence*[3] was determined from each of the site alternatives. In general, the viewshed coincides with the major topographical features in the landscape.

The GIS-generated viewshed illustrates a theoretical *zone of visual influence*. This does not mean that the proposed activity would be visible from all observation points in this area. The distance radii indicating the various viewing distances from the project site, as well as the major view corridors, are also illustrated on the figures below.

Figure 15 represent the viewshed from **Site Alternative A**. As can be seen from the latter, the viewshed is mostly concentrated to within 5km from the project site, although some visual pockets do occur outside this area. The viewshed is relatively uniform across the landscape within the 5km radius but tend to be slightly elongated in a north-south direction.

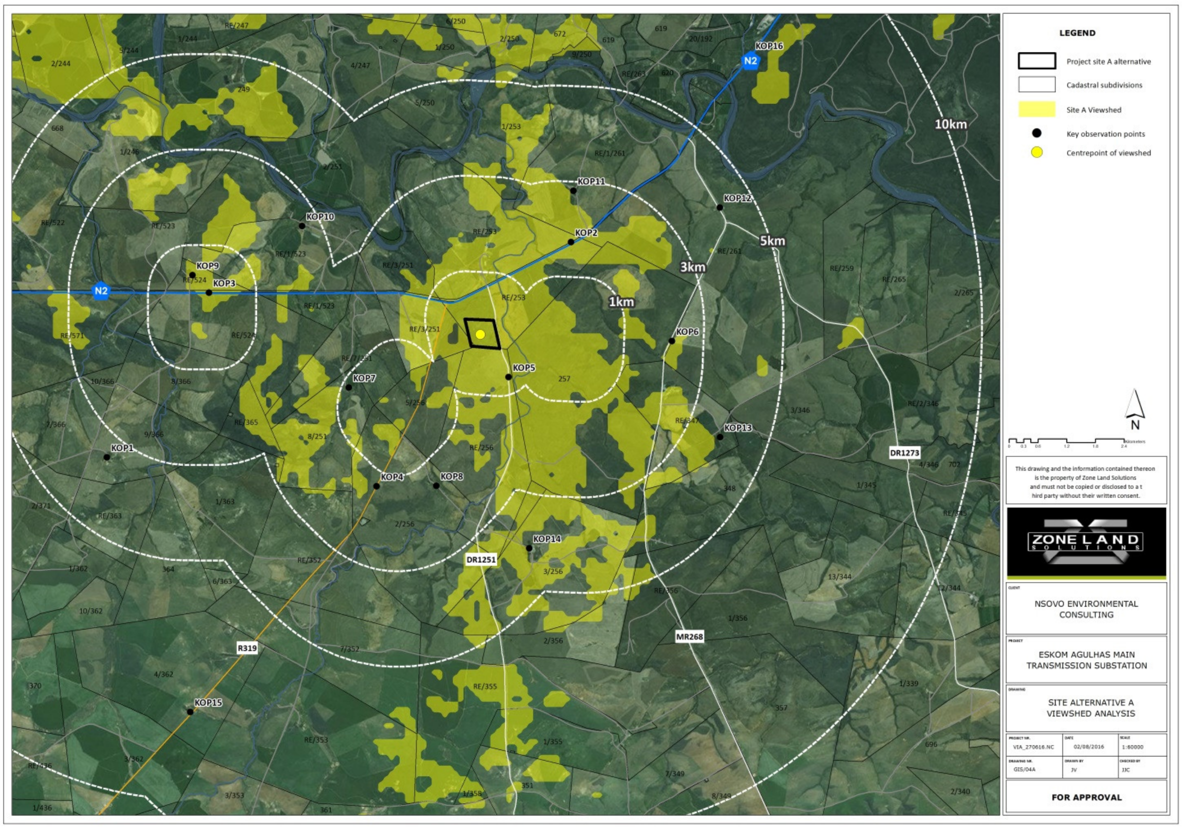

Figure 15: Viewshed generated from the centre of Site Alternative A.

3 Zone of visual influence is defined as 'An area subject to the direct visual influence of a particular project'.

The viewshed from **Site Alternative C** is much more scattered across the landscape. The viewshed is largely orientated in a north-south direction and also extends eastwards. The extent of the viewshed in a westerly direction is effectively halted by the Luiperdsberg approximately 1.5km from the site.

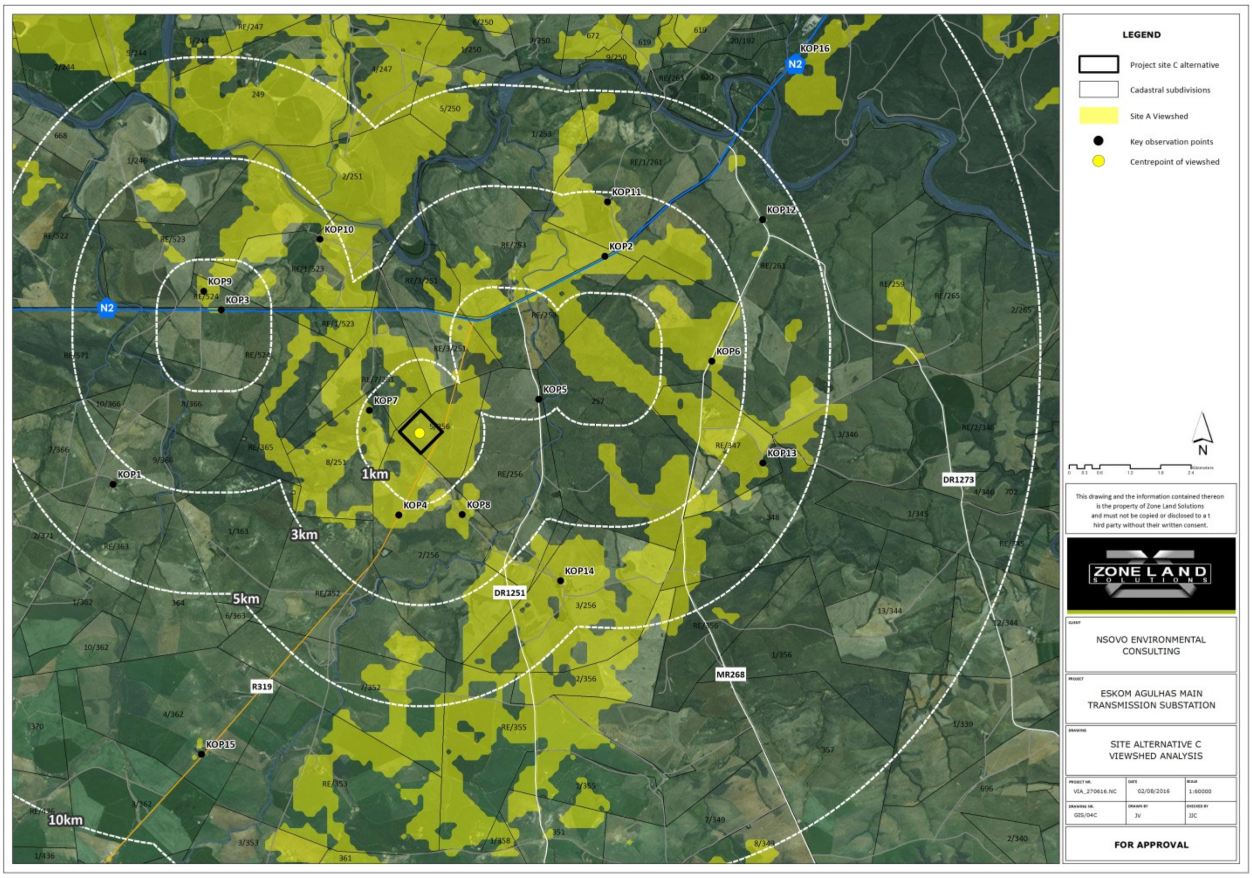

Figure 16: Viewshed generated from the centre of Site Alternative C.

The viewshed from **Site Alternative F** largely echoes that of Site Alternative A as the zone of visual influence is largely found within 5km from the site. Several isolated pockets do, however, occur outside this area, especially in a south-western direction along the R319.

Due to the location of **Site Alternative G**, the viewshed generated from the latter presents different to the other sites. The viewshed from this site is largely found in a northern direction with isolated pockets occurring east of the site up to 15km. The viewshed also extends in a narrow band to the south of the site. Due to the topography of the area, no views present in a south-eastern direction.

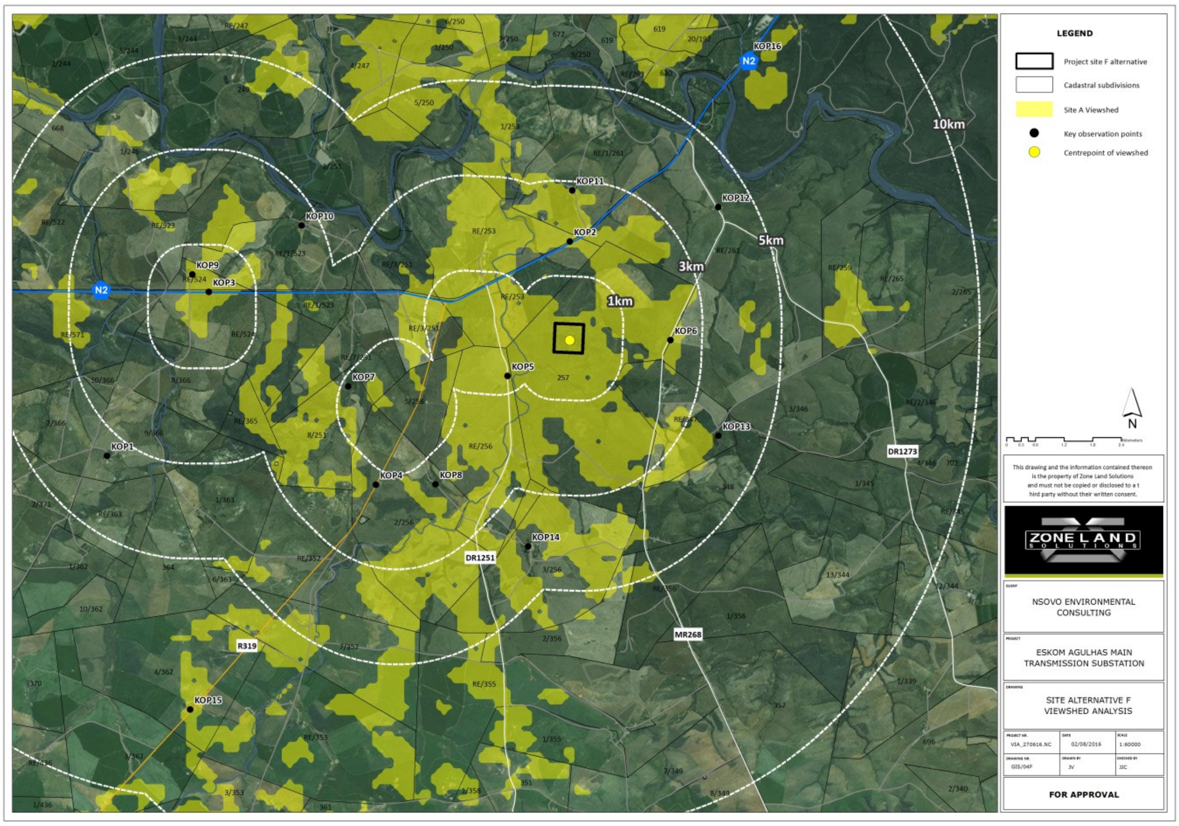

Figure 17: Viewshed generated from the centre of Site Alternative F.

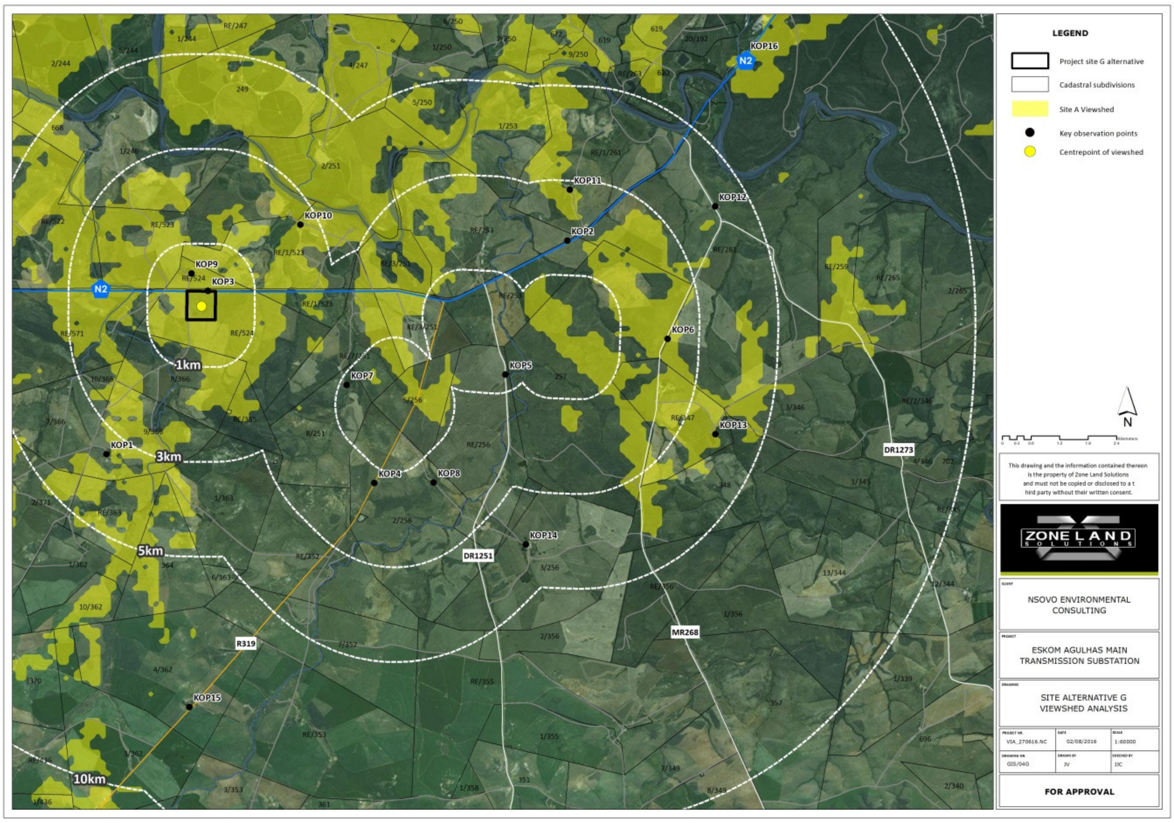

Figure 18: Viewshed generated from the centre of Site Alternative G.

8.1 KEY ASPECTS OF THE VIEWSHED

The distance between the observer and the observed activity is an important determinant of the magnitude of the visual impact. This is due to the visual impact of an activity diminishing as the distance between the viewer and the activity increases. Viewsheds are categorised into three broad categories of significance, namely:

a) Foreground: The foreground is defined as the area within 1km from the observer within which details such as colour, texture, styles, forms and structure can be recognised. Objects in this zone are highly visible unless obscured by other landscape features, existing structures or vegetation.

b) Middle ground: The middle ground is the area between 1km and 3km from the observer where the type of detail which is clearly visible in the foreground becomes indistinguishable. Objects in the middle ground can be classified as visible to moderately visible, unless obscured by other elements within the landscape.

c) Background: the background stretches from approximately 3km onwards. Background views are only distinguishable by colour and lines, while structures, textures, styles and forms are often not visible (SRK Consulting, 2007).

9 VISUAL IMPACT ASSESSMENT

9.1 SELECTION OF OBSERVATION POINTS

A number of Key Observation Points (KOPs) were provisionally identified and selected within the defined viewshed for the visual assessment in accordance with the selection criteria stipulated in the Visual Guidelines. These KOPs correspond with movement routes, residential areas and general populated areas, commercial and institutional areas in the region. As a result of the similarity in the assessment results of the KOPs, the description and assessment of only a selected few KOPs are included in Annexure 2.

KOPs selected for the assessment are generally located at the intersection between the zone of visual influence and the defined view corridors (refer to Section 5.1 above). The view corridors are those areas that are accessible to the general observer.

9.2 ASSESSMENT PROCESS

The identified *observation points* were categorised and assessed as summarised in the table below.

Table 4: VIA methodology and process.

KEY	DESCRIPTION
NUMBER	Each observation point was allocated a reference number.
CO-ORDINATES	The co-ordinates of each of the observation points are provided.
ALTITUDE	The altitude of the observation point was provided in meters above sea level.
DESCRIPTION	A brief description where the observation point is located is provided.
TYPE	Each observation point is categorised according to its location and significance rating. These criteria include the following: • Tourist-related corridors, including linear geographical areas visible to users of a route or vantage points. • Residential areas. • Institutional areas. • Commercial areas. • Recreational area.
PHOTOGRAPH	A photograph was taken from each observation point in the direction of the project site to verify the digitally-generated viewshed.
PROPERTY LOCATION	The location of the property was described a *foreground*, *middle ground* or *background*.
PROXIMITY	The distance between the observation point and the project site was provided in kilometres.
VISUAL SENSITIVITY OF RECEPTORS	The visual impact considered acceptable is dependent on the type of receptors. A *high* (i.e. residential areas, nature reserves and scenic routes or trails), *moderate* (e.g. sporting or recreational areas, or places or work), or *low* sensitivity (e.g. industrial, mining or degraded areas) was awarded to each observation point.
VISUAL EXPOSURE	Exposure or visual impact tends to diminish exponentially with distance. A *high* (dominant or clearly visible), *moderate* (recognisable to the viewer) or *low* exposure (not particularly visible to the viewer) rating was allocated to each observation point.
VISUAL ABSORPTION CAPACITY (VAC)	The potential of the landscape to conceal the proposed activity was assessed. A rating of *high* (effective screening by topography and vegetation), *moderate* (partial screening) and *low* (little screening) was allocated to each observation point.
VISUAL INTRUSION	The potential of the activity to fit into the surrounding environment was determined. The visual intrusion relates to the context of the proposed activity while maintaining the integrity of the landscape. A rating of *high* (noticeable change), *moderate* (partially fits into the surroundings) or *low* (blends in well with the surroundings) was allocated.
DURATION	With regard to roads, the distance (in kilometres) and duration (in seconds) for which

	the property will be visible to the road user, were calculated for each observation point.

9.3 SUMMARY OF ASSESSMENT

Based on the viewshed analysis and the preceding sections, the envisaged visual impact of the proposed activity was assessed in accordance with the criteria for visual impact assessments (DEA&DP, 2005). The findings of the assessment from selected observation points are included under Annexure 2.

9.3.1 Assessment Criteria

It is stated in the DEA&DP's Visual Guidelines that to aid decision-making, the assessment and reporting of possible impacts requires consistency in the interpretation of impact assessment criteria. The criteria that specifically relate to VIAs were therefore described in Table 3 and Annexure 2.

The potential visual impact of the proposed activity was assessed against these criteria, with reference to the summary of criteria in Box 12 of the Visual Guidelines. Table 5 provides a description of the summary criteria used to determine the impact significance.

Table 5: Summary of criteria used to assess the potential impacts of the proposed activity.

CRITERIA	CATEGORY	DESCRIPTION	RATING
Nature of Impact	N.A.	The nature of the impact refers to the visual effect the proposed activity would have on the receiving environment. The nature of the development proposals are described in the preceding sections.	
Extent of Impact	Site-related	Impact extends only as far as the activity.	1
	Local	Impact limited to the immediate surroundings.	2
	Regional	Impact affecting a larger metropolitan or regional area.	3
	National	Impact affecting large parts of the country.	4
	International	Impact affecting areas across international boundaries.	5
Duration of Impact	Immediate	Impact lifetime 0	1
	Short Term	Impact lifetime <1 year	2
	Medium Term	Impact lifetime 1-5 years	3
	Long Term	Impact lifetime 5-15 years	4
	Permanent	Impact lifetime >15 years	5

Magnitude of Impact	No effect		0
	Low	Visual and scenic resources not affected	2
	Minor	Will not result in impact on processes	4
	Medium	Affected to a limited scale	6
	High	Scenic and cultural resources are significantly affected	8
	Very high	Result in complete destruction of patterns	10
Probability of Impact	None	Impact will probably not happen.	0
	Improbable	Very low possibility of impact occurring.	1
	Low	Low possibility of impact occurring.	2
	Medium	Distinct possibility that the impact will occur.	3
	Highly probable	Most likely that impact will occur.	4
	Definitive	Impact will occur regardless of preventative measures.	5
Reversibility of Impact	Reversible	Impact can be reversed after cause or stress is removed or remedial steps have been taken.	
	Irreversible	The activity will lead to a permanent impact.	
Irreplaceability of Impact	Replaceable	Mitigation steps following the impact will lead to conditions similar prior to impact, e.g. grazing veld.	
	Irreplaceable	Conditions prior to impact are permanently lost and mitigation is unlikely to restore previous environmental state.	
Significance of Impact	The significance is calculated by combining the criteria in the following formula: **S = (E+D+M)P** S = Significance E = Extent D = Duration M = Magnitude P = Probability		
	Low	Where it will not have an influence on the decision.	<30
	Medium	Where it should have an influence on the decision unless it is mitigated.	30-60
	High	Where it would influence the decision regardless of any possible mitigation.	>60
Status of Impact	Positive	Impact will enhance environmental functions and processes.	
	Negative	Impact will negatively affect environmental functions and processes.	

9.4 ASSESSMENT OF IMPACTS

9.4.1 Assessment of Impact on the Landscape Character

Scenic landscapes, historic settlements and the sense of place which underpins their quality are being eroded by inappropriate developments that detract from the unique identify of towns. Causes include inappropriate development, a lack of adequate information and proactive management systems (WCPSDF, 2014).

The sensitivity of the landscape character is an indication of '*the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character*' (GLVIA, 2002). A landscape with a high sensitivity would be one that is greatly valued for its aesthetic attractiveness and/or have ecological, cultural or social importance through which it contributes to the inherent character of the visual resource (Axis Landscape Architect, 2014).

A landscape sensitivity rating was adapted from GOSW (2006) and applied in the classification of the study area into different sensitivity zones.

Table 6: Landscape character sensitivity rating (adapted from GOSW, 2006).

	DESCRIPTION
Low Sensitivity	These landscapes are likely to: • Have distinct landforms; • Have a strong sense of enclosure that reduces visual sensitivity; • Have been affected by man-made features; • Have reduced tranquillity; • Have little inter-visibility with adjacent landscapes; and • Exhibit a low density of sensitive landscape features.
Moderate sensitivity	These landscapes are likely to: • Have moderately prominent landforms that provide some form of enclosure; • Have been affected by some man-made features; • Have little inter-visibility with adjacent landscapes; and • Exhibit a moderate density of sensitive landscape features.

High sensitivity	These landscapes are likely to: • Have poorly defined landforms; • Be open or exposed with a remote character and an absence of man-made features; • Be highly visible from adjacent landscapes; and • Exhibit a high density of sensitive landscape features.

Having regard for the rural nature of the Swellendam region, it is argued that the sense of place of the area is largely intact. As a result, the sense of place of the area is commonly associated with extensive agriculture uses and natural resources as it presents itself in the form of the Breede River and Langeberg Mountains. The landscape character of the area is therefore considered to be **moderate sensitivity**.

The table below attempts to summarise the significance of the activities in relation to the landscape character.

Table 7: Impact table summarising the significance of visual impact on the landscape character.

NATURE:	**Potential visual impact on the landscape character and sense of place.**			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional	**3**	Local	**2**
DURATION	Permanent	**5**	Long term	**4**
MAGNITUDE	Minor	**4**	Low	**2**
PROBABILITY	Low	**2**	Improbable	**1**
SIGNIFICANCE	Low	**24**	Low	**12**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Partially			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be direct as the effects would occur at the same time and in the same space as the activity. The cumulative effect would also be additive (e.g. the sum of all the effects).			
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether. Provided that the site is rehabilitated to its current state, the visual impact will also be removed.			

9.4.2 Assessment of Impact on Tourist Value of the Area

Specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed activity. The visual receptors are grouped according to their location and significance. Differentiation is made between:

a) Tourist-related and areas of cultural significance.
b) Motorists along roads.
c) Residential Areas and Farmstead.
d) Recreational areas.

Tourists are regarded as visual receptors of exceptional high sensitivity. Their attention is focused towards the landscape which they essentially utilise for enjoyment purposes and appreciation of the quality of the landscape.

Residents of the affected environment are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment.

Motorists are generally classified as visual receptors of low sensitivity due to their momentary view and experience of the proposed development. As a motorist's speed increases, the sharpness of lateral vision declines and the motorist tends to focus on the line of travel (USDOT, 1981). This adds weight to the assumption that under normal conditions, motorists will show low levels of sensitivity as their attention is focused on the road and their exposure to roadside objects is brief.

Motorists on scenic routes will present a higher sensitivity. Their reason for being in the landscape is similar to that of the tourists and they will therefore be categorised as part of the tourist viewer group (Axis Landscape Architects, 2014).

Table 8: Impact table summarising the significance of visual impact on the tourism value of the area.

NATURE:	**Potential visual impact on the tourism value of the area.**			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Local	**2**	Local	**2**
DURATION	Long term	**4**	Long term	**4**
MAGNITUDE	Medium	**6**	Minor	**4**

PROBABILITY	Medium	**3**	Low	**2**
SIGNIFICANCE	Medium	**36**	Low	**20**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Partially			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be direct as the effects would occur at the same time and in the same space as the activity. The cumulative effect would also be additive (e.g. the sum of all the effects).			
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether. Provided that the site is rehabilitated to its current state, the visual impact will also be removed.			

9.4.3 Assessment of Reflectivity and Glare of Structures

Glare is an adverse consequence of using large smooth and polished surfaces as a building material. Glare is characterised by alight, often reflected, within the field of vision that is brighter than the surroundings resulting in visual discomfort or impairment. Glare also occurs when the light level of a region is brighter than the level to which the eyes are adapted.

The impact of glare source depends on the nature of the receptor, the size of the source relative to the visual field, the position of the source within the visual field and intensity of the source. Glare can pose, at minimum, a nuisance and in other cases can create a safety risk. Areas of particular sensitivity include roads, airports and rail as individuals are guiding vehicles and are required to visually scan their environment without averting their gaze (www.rwdi.com).

It is noted from the information provided that the infrastructure will be galvanised and allowed to oxidise over time, thus minimising its reflective capabilities. These should be actively managed to prevent a potential negative visual impact.

Table 9: Impact table summarising the significance of visual impact of reflectivity and glare of structures.

NATURE:	**Potential visual impact of reflectivity and glare of structures.**			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional	**3**	Local	**2**
DURATION	Long term	**4**	Long term	**4**
MAGNITUDE	Medium	**6**	Minor	**4**
PROBABILITY	Probable	**3**	Improbable	**2**
SIGNIFICANCE	Medium	**39**	Low	**20**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be direct as the effects would occur at the same time and in the same space as the activity. The cumulative effect would also be synergistic (the incremental addition of the substation to the area already improved with large powerlines).			
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether. Provided that the site is rehabilitated to its current state, the visual impact will also be removed.			

9.4.4 Assessment of Impact of Lighting

The project site has a very low illumination factor. The occurrence of light sources in the vicinity of the project site is strictly confined to individual farmsteads. A sky glow effect[4] is therefore not present in the immediate vicinity of the project site but is only associated with the town of Swellendam some 10km away.

The proposed main transmission substation and its ancillary buildings and infrastructure might include several light sources. Due care needs to be taken in the planning, design and operation of the substation that the site does not contribute to light pollution of the area. In order to ensure this, the proposed mitigation measures will have to be complied with.

4 Sky glow refers to the illumination of the night sky or parts thereof. The most common cause of sky glow is artificial light that emits light pollution, which accumulates into a fast glow that can be seen from miles away.

Table 10: Impact table summarising the significance of visual impact of lighting.

NATURE:	Potential visual impact of reflectivity and glare of structures.			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional	**3**	Local	**2**
DURATION	Long term	**4**	Long term	**4**
MAGNITUDE	Medium	**6**	Minor	**4**
PROBABILITY	Probable	**3**	Probable	**3**
SIGNIFICANCE	Medium	**39**	Medium	**30**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be direct as the effects would occur at the same time and in the same space as the activity. The cumulative effect would also be additive (e.g. the sum of all the effects).			
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether. Provided that the site is rehabilitated to its current state, the visual impact will also be removed.			

10 IMPACT STATEMENT

The on-site verification from the selected Key Observation Points and the viewsheds generated from the latter points indicated that, with the exception of one or two of the alternative sites, the proposed activity will be visually shielded from most of the observation points in region. This is primarily due to the undulating landscape which provides a natural high visual absorption capacity. To this end, the results of the viewshed analysis from defined Key Observation Points, together with photographs indicating the actual view has been included under Annexure 2.

The results of the Visual Impact Assessment for the proposed Agulhas Main Transmission Substation consequently found that the overall visual impact of the respective site alternatives is as follows:

- Site Alternative A - **medium negative significance**
- Site Alternative C - **medium negative significance**
- Site Alternative F - **low negative significance**
- Site Alternative G - **medium to high negative significance**

The primary informants of this assessment are as follows:

a) The topography of the landscape in the immediate vicinity of the project site is complex and results in an ‘interrupted’ line of sight from most of the observation points en-route to the site alternatives.
b) Site Alternative F is located the furthest from any of the view corridors and, hence will have the least impact on users of such roads.
c) The proposed loop-in and loop-outs to Site Alternative A and F will be the shortest as these sites are located immediately south of the current overhead transmission line.
d) All forward planning documents reference the importance of services infrastructure to supply in the needs of the greater community. The documents also do not specifically note that such installations could not be considered in the area.

It is therefore concluded that the sense of place, and most other expected impacts of the proposed activity, will not alter to such an extent where users might experience the visual landscape in a less appealing or less positive light.

10.1 RECOMMENDATIONS AND PROPOSED MITIGATION MEASURES

The following mitigation measures should be implemented:

a) Keep disturbed areas to a minimum.
b) No clearing of land to take place outside the demarcated footprints.
c) Make use of stepping in building platforms to minimise cut-and-fill areas and lower the structures into the site as much as possible.
d) Institute a planting regime around the boundaries of the project site to ‘soften’ the views onto the infrastructure from the respective receptors. Only indigenous plant species to be introduced.
e) The contractor should maintain good housekeeping on site to avoid litter and minimise waste.
f) Erosion risks should be assessed and minimised.
g) The steel components should not be painted but be galvanised and allowed to oxidise naturally over time. The grey colour produced in this process will help to reduce the visual impact.
h) Those parts of the substation that require the protection of paint should be painted in colours chosen from a palette that is matched to the natural colours found in the surrounding landscape.

i) Utilise existing roads and tracks to the extent possible. Where new roads are required, they should be two-track gravel roads, maintained to prevent dust plumes and erosion.

j) Create stormwater channels alongside access roads and divert stormwater in the natural veld at regular intervals along the road.

k) All contractors to adhere to a construction phase Environmental Management Plan.

11 ENVIRONMENTAL MANAGEMENT PROGRAMME

The management plan 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.

Table 11: Environmental Management Programme – Construction Phase

OBJECTIVE:	**Mitigate the potential visual impact associated with the construction phase.**	
Project component/s	Construction site	
Potential Impact	Visual impact of general construction activities and associated impacts.	
Activity/risk source	Potential impact on sensitive receptors within the foreground.	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and general acceptance and compliance with Environmental Specifications.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
An Environmental Control Officer (ECO) must be appointed to oversee the construction process and ensure compliance with conditions of approval.	Eskom	Pre-construction
Demarcate sensitive areas and no-go areas with danger tape to prevent disturbance during construction.	Eskom / contractor	Pre-construction
Plan construction times in such a manner to have the least impact on surrounding properties.	Eskom / contractor	Pre-construction
Keep disturbed areas to a minimum.	Eskom / contractor	Throughout construction
Identify suitable areas within the construction camp for fuel storage, temporary workshops, eating areas, ablution facilities and sashing areas.	Eskom / contractor	Throughout construction
Institute a solid waste management programme to minimise waste generation on the construction site and recycle where possible.	Eskom / contractor	Throughout construction
Reduce and control dust through the use of approved dust suspension techniques as and when required.	Eskom / contractor	Throughout construction

Construction to occur only during daytime. Should the ECO authorize night work, low flux and frequency lighting shall be used.	Eskom / contractor	Throughout construction
Rehabilitate all disturbed areas in accordance with the EMPr.	Eskom / contractor	Throughout construction
Performance Indicator	Construction site is confined to the demarcated areas identified on a Development Plan. No transgression of the Environmental Specifications visible and natural processes occurring freely outside boundaries of the construction site.	
Monitoring	Monitoring to be undertaken by an appointed Site Engineer who will enforce compliance with the Environmental Specifications.	

Table 12: Environmental Management Programme – Operational Phase

OBJECTIVE:	**Mitigate the possible visual impact associated with the operational phase.**	
Project component/s	Main Transmission Substation and loop-in and loop-out powerlines	
Potential Impact	Potential visual intrusion in the area and damage to the natural environment.	
Activity/risk source	Potential impact on sensitive receptors within the *foreground*.	
Mitigation: Target/Objective	An activity that results in the least visual impact on all receptors.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
Maintain the general appearance of the substation as a whole.	Eskom / contractor	Throughout operational phase
Monitor land surface in the vicinity of the substation to prevent loss of vegetation and first signs of desertification.	Eskom / contractor	Throughout operational phase
Maintain access roads to prevent scouring and erosion, especially after rains.	Eskom / contractor	Throughout operational phase
Performance Indicator	Well maintained activity that has little or no impact on the environment. All actions to be measured against the Operational Phase Environmental Management Plan.	
Monitoring	ECO to undertake monitoring functions for 1 year after the construction has been completed to ensure compliance and effectiveness of mitigation measures. Management thereafter to be undertaken by the responsible entity.	

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