10. VISUAL ASSESSMENT

Any change in a local view through the introduction of a new development in the line-of-sight can be considered as a visual impact. The significance of this visual impacts is influenced by the nature or "quality" of the affected landscape, the degree of change in the landscape which occurs as a result of the development, as well as by the landscape's capacity to absorb the impact. The assessment of a visual impact is highly subjective, and depends largely on the views of the individual and the aesthetic value of the view. Visual impacts are usually considered most significant when the development is not of a similar nature to other developments in the area, or is readily viewed from areas of public access, paths, roads and view points, or in areas which are characterised by significant natural features.

10.1. Landscape Characteristics of the Study Area

The Poseidon and Grassridge Substations lie approximately 100 km apart (as the crow flies), and are separated by a varying landscape ranging from open agricultural areas in the north, through the mountainous Zuurberg down towards the coastal plateau. The study area incorporates three distinct biotic regions, i.e. the Karoo section in the north, the Zuurberg section in the centre, and the coastal section in the south. As discussed in Chapter 7, the study area is characterised by a number of vegetation types including bonteveld, valley bushveld, afro-montane forest, grassy fynbos, arid savanna, grassy dwarf shrublands and grassland.

10.2. Views/Visibility of the Study Area

The study area is considered to be visually diverse due to the varying landscape characteristics and different vegetation types.

Visibility will be greater in the open, flatter terrain characteristic of the northern portion of the study area. The vegetation characteristic of this section has been largely disturbed by agricultural practices and, therefore, new developments within this area are anticipated to be highly visible from the surrounding area. The central portion of the study area has a great variance in visibility due to the spurs and valleys associated with the deeply dissected mountainous terrain. Views are influenced by the relative heights of the viewer and the subject being viewed, as well as topographical constraints. In addition, the nature of the vegetation of the Zuurberg area results in poor visibility when on the ground. Visibility in the undisturbed Addo Bush is no more than a few metres, as the thicket ranges from 13 000 to 20 000 woody stems per hectare, creating a maze 3-4 m in height (Bannister *et al*., 1987;

Photograph 10.1). The southern portion of the study area flattens out towards the coast. The vegetation is mainly grassland, and has been disturbed to some extent by agricultural activities. Therefore, new developments within this area are anticipated to be visible from many surrounding areas.

Photograph 10.1: Photograph taken from the air showing the relative height of the African Elephant to the Addo Bush within the AENP (Shoshani, 1992)

The study area is currently dissected by several national roads, provincial roads and local roads. Views from these public routes are impacted on where introduced infrastructure is located close to, or crosses the road.

Critical areas within the study area in terms of views and visibility include tourist attraction areas, such as private game lodges and the AENP (and proposed GANP), public routes, residences and towns located in close proximity to proposed corridors 1 and 2.

10.3. Development Feature Characteristics of the Study Area

10.3.1. Land-use

The study area extends from Cookhouse in the north, through the Golden Valley, Middleton, Kommadagga, Ann's Villa, over the Zuurberg in the vicinity of the AENP, past Paterson in the east, including Colchester and Cannonvale in the south, and the Grassridge Substation near Coega. Current land-use within the study area is mainly agricultural, including small- and mixed-stock farming, game farming and annual crops (predominantly citrus). Part of the AENP falls within the study area, and the majority of the southern portion of the study area is proposed to be incorporated into the proposed GANP. As part of the proposal for the GANP,

it is proposed that tourism facilities be developed within this area. This would result in a change in land-use from agricultural to conservation and recreational use for these areas.

10.3.2. Existing Development within the Study Area

The existing 220 kV and 400 kV Transmission lines which transmit power between the Poseidon and Grassridge Substations, form a corridor which crosses the northern leg of the AENP for an approximate 5 km distance, and skirts the western extremity of the AENP in the vicinity of Addo town. These lines impose an existing visual impact on the study area. The existing 220 kV Transmission line has been in the area since the 1970s, and the existing 400 kV Transmission line since the 1990s. The existing Transmission lines are not considered as an issue preventing the establishment of the proposed GANP (Kerley and Boshoff, 1997).

The N10 is the primary route providing access to Cradock in the north from the coastal centres. In addition, the N10 connects Middelton (in the north of the study area) and Paterson (in the east of the study area) with the National Route 2 (N2). The N2 is a major traffic artery providing tourist access to the Garden Route. This N2 route passes past Colchester and Sundays River in the south of the study area.

10.4. Assessment Methodology

The assessment of potential visual impacts associated with the proposed new Transmission line between the Poseidon and Grassridge Substations was undertaken using a combination of a desktop examination of relevant mapping, and an assessment of specific impacts using Geographical Information System (GIS) and a digital terrain model (DTM), ground-truthing, together with the criteria listed in Table 10.1.

10.4.1. Computer Modelling

The DTM and GIS software packages used were TNTmips 6.2 (modelling) and ArcView 3.2 (cartographic output).

A DTM of the study area was created by processing 20 m interval elevation contours. Viewsheds for the proposed new Transmission line within each proposed corridor were calculated using approximate tower positions. These viewsheds were then combined to provide a graded scale of potential visual impact. A simple weighting system based on

distance of the viewer from the Transmission lines was then used to indicate visual impact related to distance. Five buffer zones (i.e. 1 km, 2 km, 3 km, 4 km and 5 km) were generated either side of the line within the two proposed corridors. If the model indicated that the Transmission line would be visible within the 1 km zone, a rating of 5 was assigned to this area, visibility within the 2 km zone was assigned a rating of 4, etc. This emphasised, to some extent, the relationship between viewer's distance from the tower and the tower's visibility. Null (or zero) values were not altered, such that a tower which is not visible from a particular point would not alter the end-result. From these results, potential impact zones were identified. These were then mapped for the current situation (i.e. based on the existence of the existing 220 kV and 400 kV Transmission lines), corridor 1 and corridor 2.

10.4.2. Limitations of the Computer Model

A DTM takes only topographic elevations, as per the surveyor-general, into account, and is, therefore, only as accurate as the available data. In addition, other factors such as vegetation, land-use and horizons are required to be considered within an assessment of the visual impact in order to obtain a complete and accurate assessment. However, the availability of such spatial data for vegetation (including heights, densities and variations) at the required resolution is limited. Spatial land-use data is also limited, but consideration of such data would allow for categorisation of the landscape to reflect the quality or character of pre-development views. The availability of compatible data is considered as a limitation to the study.

In order to include distance of the viewer from the towers as a factor, use was made of generated buffer zones along the proposed Transmission line (for both corridor 1 and corridor 2) and weighting of the viewshed, such that the graded viewshed shows a zone of higher impact which decreases with increasing distance away from the line. However, this graded viewshed shows only a relative impact gradation according to the number of towers visible. Spatial information such as vegetation backdrop, and the height of vegetation relative to the positioning of the towers would alter the potential impact considerably. In addition, the location of a road or building in close proximity to a line or tower would indicate a considerably higher impact than if the development was further away from these features. The weighted zone visible on the viewsheds is up to 5 km from the Transmission line.

This study was conducted at a fairly broad scale in order to fulfil the function of providing an overall assessment for the length of the line. In order to provide detailed data for a specific sensitive area, all possible criteria would be required to be integrated (e.g. vegetation types

and heights, existence of other structures, etc) and evaluated through a ground-truthing exercise.

10.4.3. Field Evaluation

Sample sites identified from the desk top results were ground-truthed in order to verify the accuracy of the model.

10.4.4. Evaluation Criteria

Together with the computer modelling described above, the assessment of specific visual impacts associated with each proposed corridor were evaluated using the set of criteria described in Table 10.1. The evaluations for corridor 1 and 2 can be compared using these criteria.

Table 10.1: Visual assessment criteria ratings

Criteria	High Impact	Moderate Impact	Low Impact
Visual intrusiveness of the proposed development	The development is visible from many places beyond 1 km.	The development is visible from within 1 km, but is partially obscured by intervening objects.	The development is only partly visible or not visible at all from within 1 km.
Degree of view obstruction	The development is not visually accepted by the surrounding landscape due to the landscape being of uniform texture, flat slope and having limited vegetation cover.	The development is visually accepted into the surrounding landscape less easily due to the landscape being less diverse in terms of landform, texture and vegetation.	The development is visually easily accepted into the landscape due to the landscape being diverse in terms of landform, texture and vegetation.
Character, quality or value of the existing view or viewpoint	The development is set within a very attractive setting, which is largely uninfluenced by other developments of a similar nature.	The development is set within an area which has some aesthetic and visual merit, which is partially influenced by other developments of a similar nature.	The development is set in an area which has little or no aesthetic value and is largely influenced by other developments of a similar nature.
Compatibility with surrounding land uses	The development appears totally out of place with regards to the surrounding area.	The development can be accommodated within the surrounding area to some degree.	The development can easily be accommodated within the surrounding area.
Scale of development relative to local elements	Vertical variation of the landscape is limited and most elements are related to the human and horizontal scale.	A landscape with some horizontal and vertical elements in some contrast to the human scale.	A landscape which has horizontal and vertical elements in high contrast to the human scale.
Critical views	Views of the development detract from the natural views from private properties.	Views of the development partially detract from the natural views from private properties.	Views of the development do not detract from the natural views of private properties.

10.5. Potential Impact Zones

10.5.1. Potential Moderate to High Impact Zones

The low, even topography of the coastal section of the study area presents an uninterrupted vista, and thus creates an area of high potential visual impact in terms of the high number of towers which will, theoretically, be visible. In reality, the impact is diminished by association with existing development such as existing Transmission lines, roads, railway lines and agricultural practices, which is particularly noticeable in the vicinity of Addo village.

Transmission lines over the Zuurberg mountains have a high visual impact where towers are exposed against the skyline (Photograph 10.2). The impact is heightened when the existing view is not significantly impacted by other developments of the same nature. This impact can be lessened through the relocation of tower positions from high points.

Photograph 10.2: The existing 220 kV Transmission lines over the Zuurberg mountains have a high visual impact where towers are exposed against the skyline. Such placement of towers should ideally be avoided.

In potentially high impact areas where the backdrop is formed by the mottled colouring of the xeric succulent thicket (i.e. the area has a good capacity to absorb the feature and the impact), intrusion of the features is reduced when these are located below the skyline. Whenever the

viewer is below the feature or the feature is located on a ridge or against the skyline, a high visual impact is created. For example, where the existing Transmission lines extend along the ridge formed by incision of the Sundays River into the coastal plain, their visibility is heightened. Such placement of towers should be ideally avoided.

10.5.2. Potential Low to Moderate Impact Zones

The desk-top study indicated a moderate to low visual impact for the Transmission line crossing the Karroo plains. However, the field investigation indicated that, due to a combination of low, undulating topography and a more uniform backdrop, towers are sometimes more visible than predicted by the model.

10.6. Visual Assessment

10.6.1. Visual Intrusiveness of the Proposed Development

The tower structures are regarded as being the most visually intrusive component of Transmission lines. It is, therefore, the introduction of such infrastructure which is primarily assessed.

- *Corridor 1:*

  This proposed corridor is located alongside the existing 220 kV Transmission line for the majority of the proposed route. The registered vacant servitude which this corridor follows lies between the existing 220 kV and 400 kV Transmission lines. These existing Transmission lines present an existing visual intrusion on the local area (Figure 10.1). For those portions where the servitude exists, and can be widened, the proposed Transmission line would be constructed using CRS towers, which are smaller, less steel-intensive, and less visually intrusive than those towers of the existing Transmission lines (Photograph 10.3).

Photograph 10.3: The proposed Transmission line will be constructed using CRS towers which are smaller, less steel-intensive, and less visually intrusive than those towers of the existing Transmission lines

In addition, it will be required that the Transmission line for the section of the route through the AENP (and proposed GANP) be constructed to fit within the registered servitude width, and therefore the new towers would be required to be constructed in-line with the existing 220 kV Transmission line towers in order to avoid technical difficulties associated with Transmission lines being built in close proximity to one another. Therefore, it is anticipated that the construction of the new Transmission line along this historically disturbed corridor would not further significantly impact on the existing visual intrusiveness associated with the existing Transmission lines which pass through the area. This is reflected in Figures 10.1 and 10.2 which indicate the visual impact associated with the current situation and the visual impact associated with a line constructed within corridor 1, respectively.

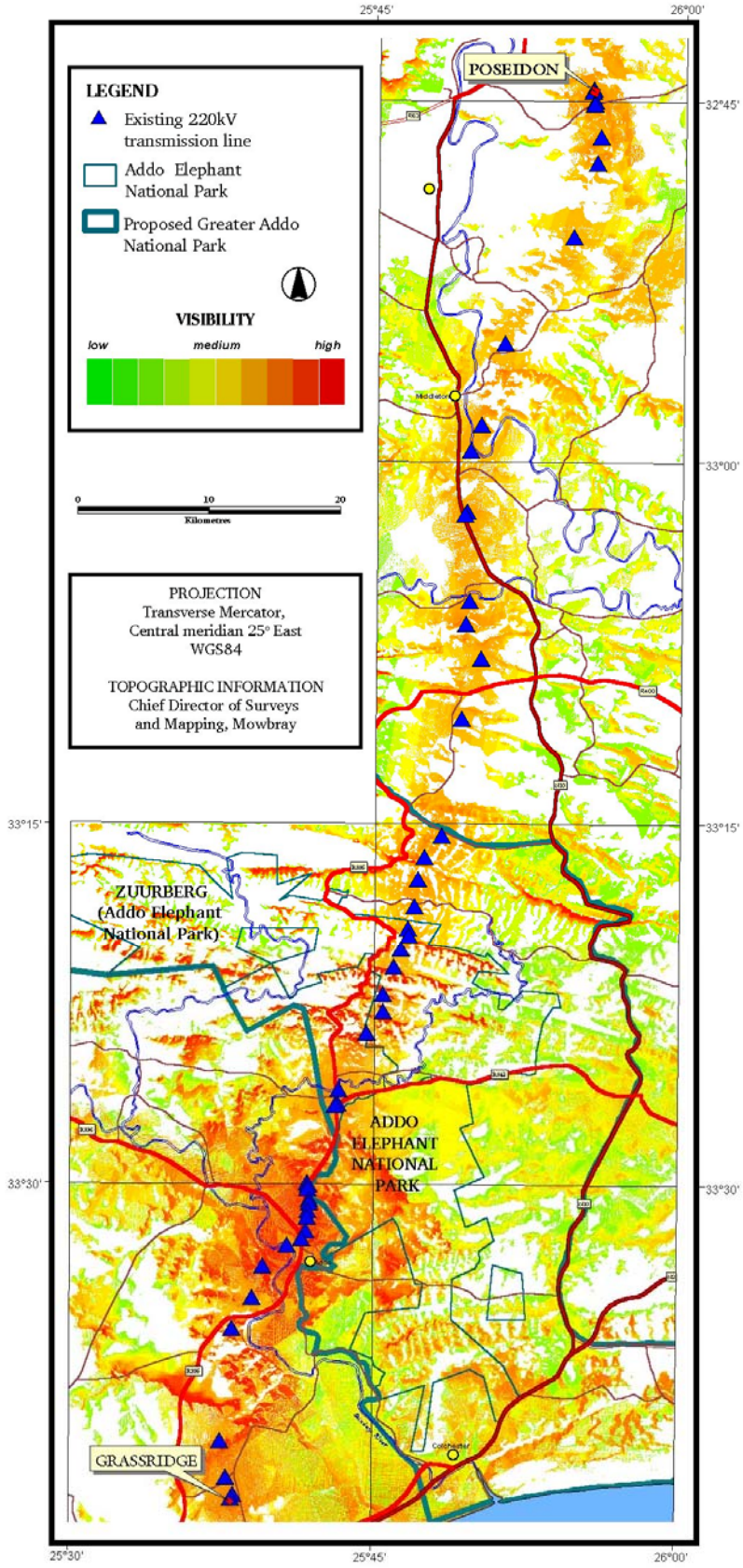

Figure 10.1: Visibility of the current situation, computed using the distance weighted result for 1, 2, 3, 4, 5 km

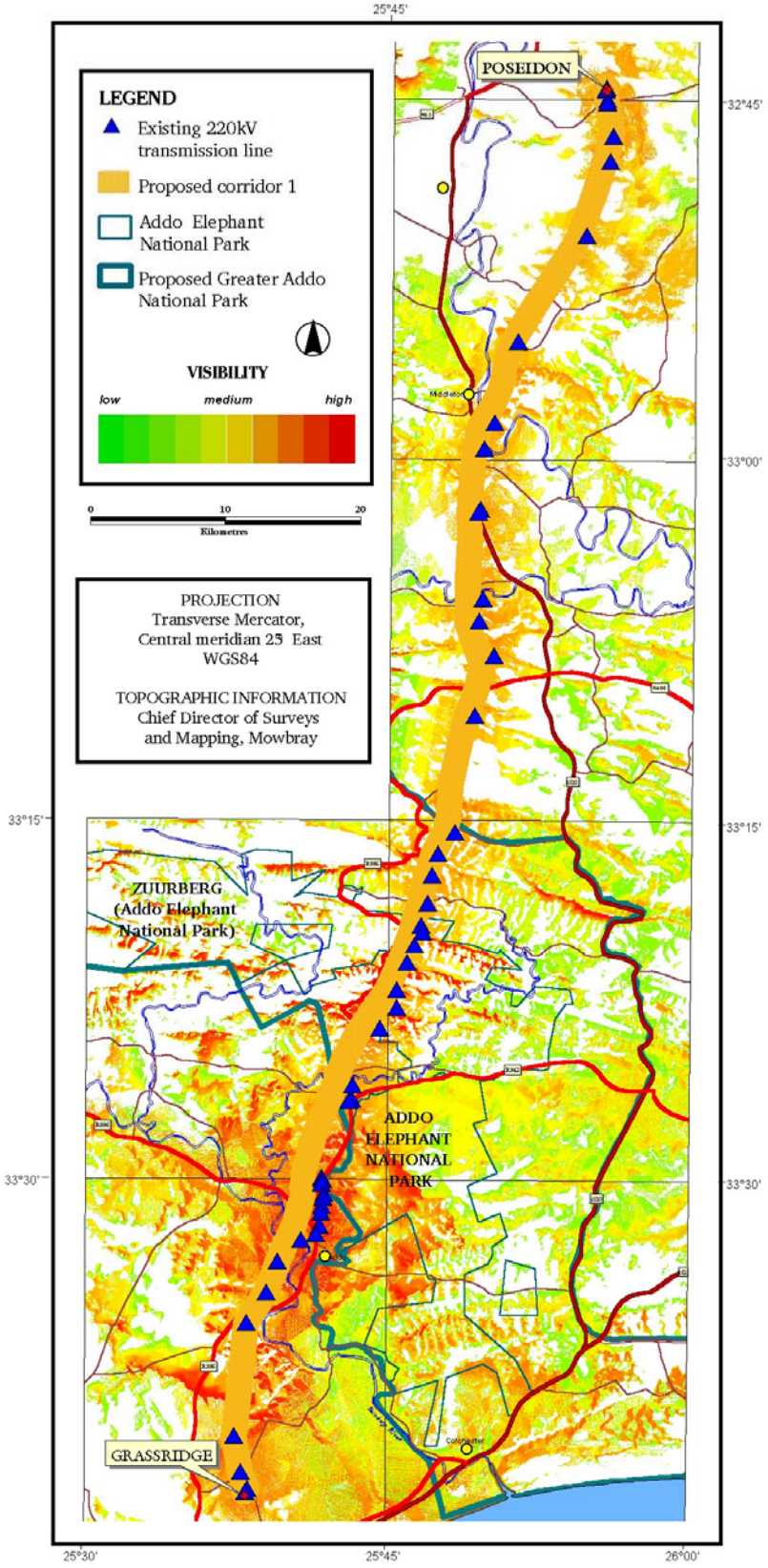

Figure 10.2: Visibility of the current situation together with corridor 1, computed using the distance weighted result for 1, 2, 3, 4, 5 km

- *Corridor 2:*

  Along this route, the proposed new Transmission line will follow the existing 220 kV Transmission line for the northern portion of its length. Along this section, the visual impact is not anticipated to be significantly altered from the current situation (as discussed for corridor 1 above).

  From the boundary of the proposed GANP, corridor 2 is proposed to descend through the Zuurberg mountains in the vicinity of the N10 route. The N10 follows the elevation contours via a pass. In contrast, a Transmission line would be required to follow as straight a route as possible (in order to satisfy technical and economic criteria), and is, therefore, anticipated to cross this road a number of times through the Zuurberg. Therefore, a high visual impact is anticipated along this section, particularly for the users of this National Road. Corridor 2 is proposed to follow the N10 along its length to its junction with the N2. Views of the Transmission line from this linear development will be continuous and potentially highly significant. This will be particularly true where the proposed corridor follows the N2, as this route forms part of the Garden Route, which is known to attract many national and international tourists.

  In addition, it is anticipated that the construction of a Transmission line along this corridor alignment would have a high impact on the Paterson, Colchester and Sundays River areas, which are currently not impacted on by a development of this nature (Figure 10.3). Therefore, it is expected that the visual intrusiveness of the development on this corridor where it currently does not follow existing Transmission lines will be high. The topographical nature of the coastal plain results in high visual intrusiveness where the line is proposed to lie parallel to the coastline.

10.6.2. Degree of View Obstruction

As discussed in 10.1 above, the landscape and vegetation types within the study area are highly diverse. However, the frame-like structure of the Transmission line tower presents a low degree of view obstruction as a result of it not being a solid structure, and allows for blending with background colour/patterns of most landscapes. Shortly after erection, once natural weathering of the steel frame has occurred, the towers are typically marginally shiny and reflective.

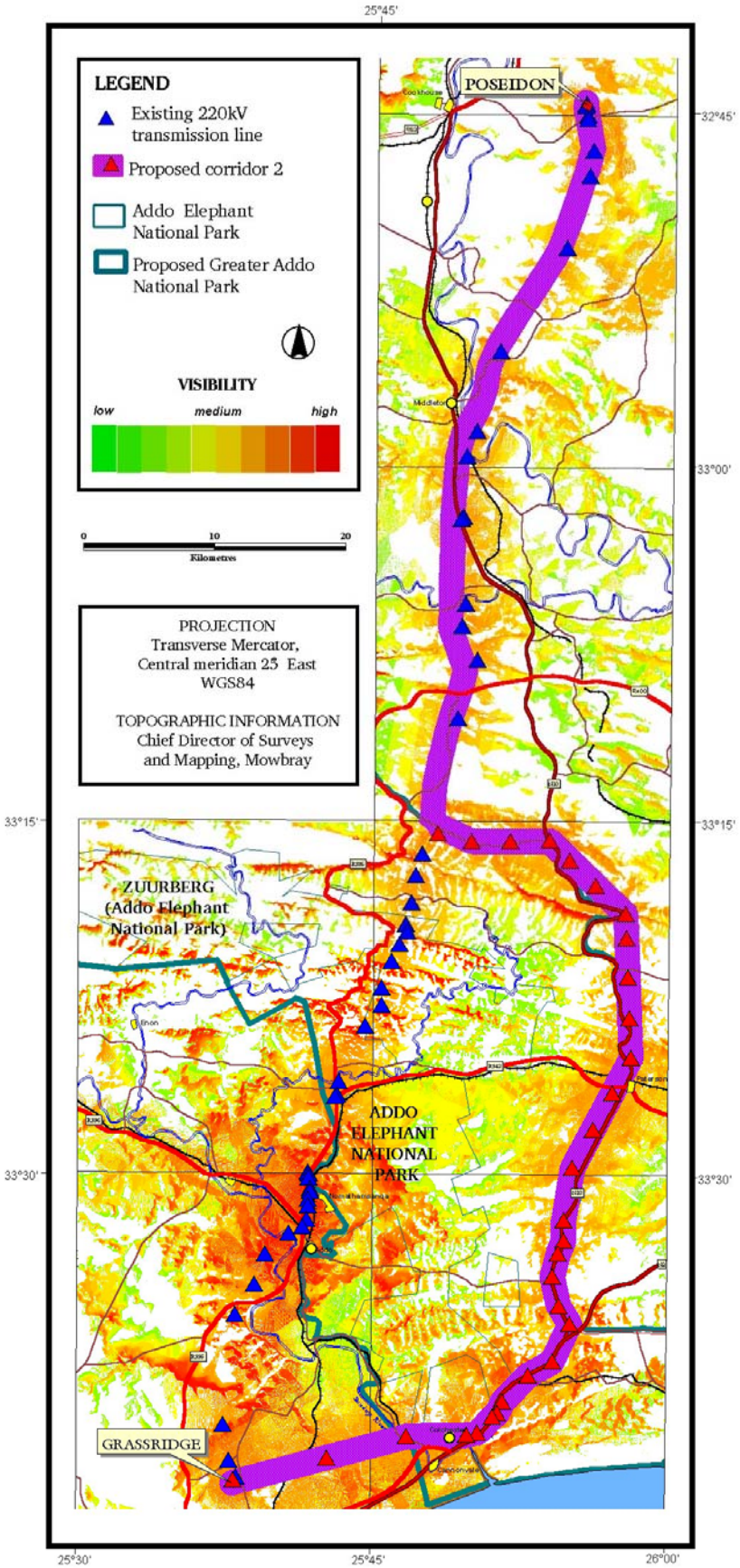

Figure 10.3: Visibility of the current situation together with corridor 2, computed using the distance weighted result for 1, 2, 3, 4, 5 km

In addition, as towers are erected a couple of hundred meters apart a Transmission line is not viewed as a continuous structure (as, for example, a wall would be). Therefore, the impact in terms of this variable is anticipated to be of low significance for both corridors under consideration.

10.6.3. Character, Quality or Value of the Existing View or Viewpoint and Compatibility with surrounding land uses

The study area is currently largely free of heavy urban and industrial development. The majority of the area is sparsely populated and largely characterised by agricultural activities, particularly along the proposed corridor alignments. The two existing Transmission lines extend for the length of the study area. These existing Transmission lines have played a role in pre-determining the character and views for the western portion of the study area. AENP (and the proposed GANP) land falls within the study area, and, as a conservation area, is considered to have a high scenic value. However, the visual quality within the north-eastern portion of the AENP has since the 1970s been impacted on by the presence of existing Transmission lines which cross an approximate 5 km section of the Park.

- *Corridor 1:*

  This corridor is proposed to follow the registered servitude located between the existing 220 kV and 400 kV Transmission lines which currently pass through the study area. The existence of Transmission lines in the area has, to some degree, influenced the general character, quality and views. The existing 220 kV Transmission line was constructed in the 1970s and has been in operation for over 25 years. Therefore, it is anticipated that the absorption capacity of viewers will be higher, and that further development will be more readily accommodated by the surrounding area due to the similarity of development type. The visual impact in terms of this variable is expected to be low to moderate (depending on the receiving environment) as this new Transmission line corridor is consolidated with other developments of a similar nature.

- *Corridor 2:*

  It is anticipated that the development will be of a low to moderate impact (depending on the receiving environment) for the northern portion of the route where this proposed corridor is located between the existing 220 kV and 400 kV Transmission lines (as per corridor 1).

At the junction with the northern boundary of the proposed GANP, this corridor would follow the boundary of the proposed GANP first in an easterly direction, and then in a southerly direction, in close proximity to the N10 and the N2 routes. This will form a new electricity transmission corridor in an area currently absent of Transmission line infrastructure. However, as this corridor is proposed to follow existing linear road developments (i.e. the N10 and N2 routes), it is anticipated that the development's impact on the character and quality of the area will potentially be reduced. Therefore, the visual impact in terms of this variable for this portion of the route is expected to be moderate to high (depending on the receiving environment).

This corridor passes in close proximity to built-up areas such as Paterson and Colchester. A negative impact on the character and quality of the existing view is anticipated, particularly on the coastal plain at Colchester/Sundays River. In addition, the corridor is proposed to hug the boundary of the proposed GANP for almost half its length, and crosses the AENP (and proposed GANP) in the vicinity of Olifantsplaats. The impact on the character, quality and views within this area is anticipated to be high for the Park, particularly with new planned development such as a concession area at Olifantsplaat, the new GANP entrance and a self-drive view area in this area.

10.6.4. Scale of the Development Relative to Local Elements

The height of the towers and total length of the development in this particular topographical setting has a potentially significant visual impact. However, the scale of the structures and the length of the line viewed will be influenced greatly by the position of the viewer relative to the position of the development feature being viewed.

- *Corridor 1:*

  A high impact is anticipated to be associated with a new Transmission line where it is located close to dwellings or homesteads, or is adjacent to, or crosses a road. This corridor is largely removed from primary roads, and passes through predominantly agricultural areas.

- *Corridor 2:*

  Where the Transmission line is proposed to follow the N10 and N2 roads for the length of the southern portion of the corridor, the impact of the new Transmission line would be high to road-users travelling these routes. In addition, the scale of the structures will

have a significant impact when in close proximity to towns and other residential areas along the corridor (e.g. Paterson and Colchester).

10.6.5. Critical Views

The occurrence of critical views or critical viewpoints in close proximity to the development will have a potentially significant visual impact. However, the overall significance of the impact will be influenced by the distance of the development from these critical views.

- *Corridor 1:*

  The existing Transmission lines which pass through the study area have an existing impact on the critical views in this area. The AENP (and proposed GANP) area can be regarded as a critical view area due to the tourist potential of this development. The construction of an additional Transmission line is not anticipated to significantly compound the existing visual impact experienced (refer to Figures 10.1 and 10.2) due to the manner in which towers will be required to be constructed within the Park (i.e. in-line with existing Transmission towers). Although the figures (generated from the desk-top study) indicate that the AENP falls largely within a potential high visual impact area due to the height elevations associated with the Zuurberg mountains, field investigations indicated that, for most of the AENP which visitors have access to, existing visual impact is low due to the nature of the vegetation backdrop and the distance of features from formal viewpoints and rest camps within the Park. From most viewpoints in the Elephant Camp, the existing towers and Transmission lines are barely visible, while other existing developments (e.g. the railway line) are closer and have a higher, more significant visual impact.

- *Corridor 2:*

  The AENP (and proposed GANP) area can be regarded as a critical view area from this corridor due to the tourist potential of this development. The introduced Transmission line along this corridor will be in close proximity to the AENP and planned concession areas within the proposed GANP (refer to Chapter 14), and it is, therefore, anticipated to have a high visual impact on critical views. In addition, the Colchester/Sundays River area is also an area of tourism potential, and lies on the flat coastal plain. The introduction of a Transmission line close to the coast is anticipated to impact on critical views, as there are currently no Transmission lines within this area. The views from private properties and tourist destinations on this coastal plateau will be impacted on as a result of the new development.

10.7. Conclusions and Recommendations

The factors which have been identified in this study as influencing the degree of visual impact of the Transmission line feature in question are:

- distance from viewer;
- difference in elevation between viewer and feature;
- the degree of view obstruction by other features;
- nature of the backdrop to the feature;
- the existing value/character of the view; and
- the occurrence of similar development-types.

In addition, it is evident that visual impacts can be reduced through:

- the use of a corridor along which similar developments occur. This reduces the impact of disturbance with the establishment of a new development through a new area.
- The use of a corridor which lies within a landscape with a high capacity to absorb visual impacts (e.g. one which has topographical constraints such that the viewpoints are restricted), or a previously disturbed area.
- The consolidation of infrastructure along a greater corridor, rather than dispersing the impact across a greater area. This effectively limits the impact to one direction/view angle. Negative visual impacts can be mitigated against by other surrounding sensitive developments through their orientation.
- The avoidance of intersecting the skyline/horizon.
- The use of the natural topography and vegetation cover as a natural backdrop to reduce visibility.
- Ensuring that the placement of towers is carefully considered in order for them to be as inconspicuous as feasible, i.e. towers are not to be placed on hill-tops, but rather on lower-lying land. Also, they can be placed in-line with other existing tower structures.

Table 10.2 overleaf summarises the potential visual impacts associated with the construction of the proposed new 400 kV Transmission line within both corridors under consideration.

Table 10.2: Summary of potential visual impacts associated with the construction of the proposed new 400 kV Transmission line

Issue	Corridor 1					Corridor 2				
	Extent	**Duration**	**Intensity**	**Probability**	**Significance**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance**
Visual intrusiveness of the proposed development	Local	Permanent	High	Definite	None*	Local	Permanent	High	Definite	High
Degree of view obstruction	Local	Permanent	High	Definite	Low	Local	Permanent	High	Definite	Low
Character, quality or value of the existing view or viewpoint	Local	Permanent	High	Definite	Low	Local	Permanent	High	Definite	Moderate
Compatibility with surrounding land uses	Local	Permanent	High	Definite	Low	Local	Permanent	High	Definite	Moderate
Scale of development relative to local elements	Local	Permanent	High	Definite	None*	Local	Permanent	High	Definite	High
Critical views	Local	Permanent	High	Definite	Low	Local	Permanent	High	Definite	High

*The proposed new Transmission line will not significantly add to the existing visual impacts associated with the existing 220 kV and 400 kV Transmission lines

From this table, the following can be concluded:

10.7.1. Corridor 1

The potential visual impact of the proposed Transmission line within this proposed corridor is not anticipated to significantly compound the existing visual impact associated with the existing 220 kV and 400 kV Transmission lines which pass through the study area.

In addition to the presence of this existing Transmission infrastructure, it is anticipated that, where feasible, the proposed line would be constructed using CRS towers, which are smaller and less steel-intensive than the existing towers associated with the existing Transmission lines. This will minimise localsied impacts at tower structures. In addition, it will be required that the Transmission line for the section of the route through the AENP would be constructed to fit within the existing servitude, and therefore the towers would be required to be constructed in line with the existing towers, thereby reducing the number of towers visible when viewing the line from a distance. Therefore, the visual impacts associated with this proposed Transmission line within this corridor is expected to be of low significance.

10.7.2. Corridor 2

The potential visual impact of the proposed Transmission line within this proposed corridor is not anticipated to significantly compound the existing visual impacts for the northern portion of this corridor where this route follows the existing 220 kV and 400 kV Transmission lines. Where the corridor follows the N10 and N2, however, the impacts are anticipated to be moderate to high. Despite the roads being an existing linear development and creating a visual disturbance, the visual impact associated with a Transmission line to a viewer from a distance is greater due to the elevation of towers from ground level.

This corridor is proposed to extend along the eastern boundary of the proposed GANP (following the N10), and along the southern boundary of the AENP (following the N2). The existing 220 kV and 400 kV Transmission lines currently extend across and skirt the western section of the AENP (and proposed GANP).

The construction of the proposed new Transmission line within this eastern corridor would effectively result in the AENP being visually impacted on to the east, west and south of the Park (see Figure 10.4), and effectively being “boxed-in” by Transmission line developments. This is anticipated to be of high significance to the critical views of the AENP (and proposed

GANP) developments in the long-term. Corridor 2 will also impact negatively on other tourist-related developments on the coastal plain.

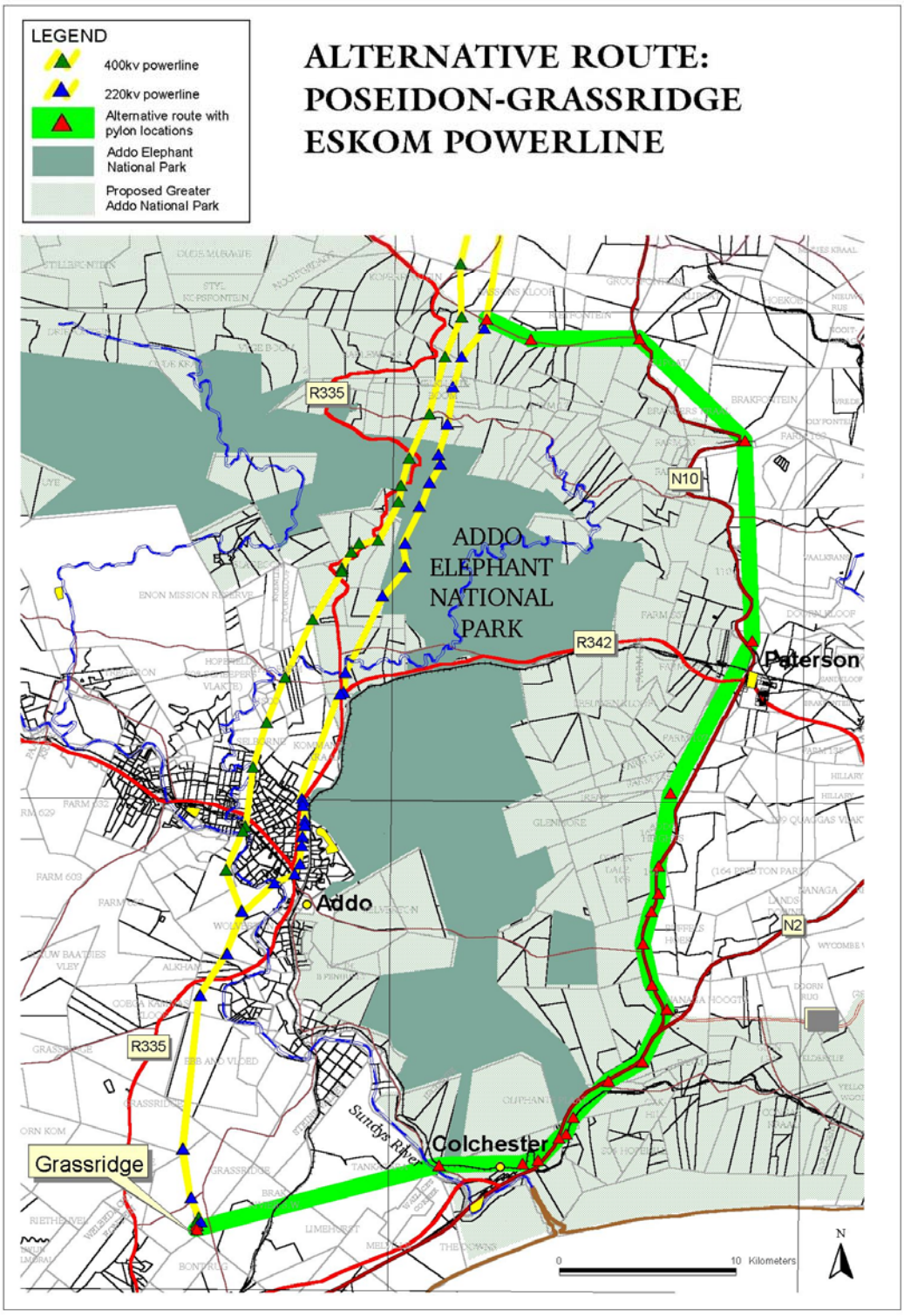

Figure 10.4: The construction of the proposed new Transmission line within corridor 2 would effectively result in the AENP being visually impacted on to the east, west and south of the Park by Transmission lines