

7.1.11 Biodiversity Rating

In order to quantify the sensitivity of the fauna, flora and wetlands, a biodiversity assessment is undertaken.

Biodiversity Assessment Methodology

Each vegetation unit and its associated fauna were subjected to a biodiversity assessment according to the following methodology. The biodiversity of an area is measured as a combination of the variety of species and habitats within the area, as well as the ecological processes and functional value of the site. This can be captured in two broader categories namely conservation status and functional status. The conservation status encompasses species diversity, habitat diversity and ecological processes. The functional status encompasses ecological services and human use services.

It is suggested, due to the number of variables to be considered, that the following scoring system is used to first determine the value of each of the components (conservation status and functional status) from which the overall biodiversity value is determined.

Conservation status

The conservation status of a particular habitat / vegetation unit is determined using the methodology described in Table 12 below. The conservation status encompasses species diversity, habitat diversity and ecological processes. Each of the habitats found on site are rated accordingly in the Sections below.

TABLE 12: CONSERVATION STATUS DETERMINATION

A. How much of the larger vegetation type or system of which the defined area is a representative example, still exists?	Rating
Only a small area still exists (< 500km ²)	5
A moderate area still exists (500 to 1000 km ²)	3
A large areas still exist (> 1000 km ²)	1
B. What is (based on a qualitative assessment) the species and habitat diversity of the defined area?	Rating
Noticeably high	5
Difficult to assess	3
Obviously low	1
C. What is the condition (qualitative assessment) of the defined area?	Rating
Pristine and largely undisturbed	5
Moderately disturbed	3
Highly disturbed	1

The possible results for the conservation status of the defined area are based on a combination of the attributes, as follows.

$$A (\text{Size}) + B (\text{Diversity}) + C (\text{Condition}) = \text{Conservation Status}$$

Based on the combined score, the conservation status can range from very high to low, as described below in Table 13:

TABLE 13: CONSERVATION STATUS RATING

Conservation Status	Rating
High conservation status, needs to be maintained and improved	11 – 15
Moderate conservation status, heavily disturbed and will require improvement	6 – 10
Low conservation status, heavily reduced and of limited value.	3 – 5

Functional status

The functional status encompasses ecological services and human use services. All these elements are rated according to the methodology described in Table 14 below. A detailed rating of each habitat is given below.

TABLE 14: FUNCTIONAL STATUS DETERMINATION

A. Are there currently any signs of obvious recreational use of the area, such as walking/hiking, bird watching, mountain biking, fishing, etc?	Rating
Obvious signs of regular use	5
Signs of periodic use	3
No noticeable signs of use	1
B. Does the area carry out any ecological service, such as water purification, flood attenuation, riverbank stabilisation, soil stabilisation, etc?	Rating
Has an obvious functional role	5
Difficult to determine its functional role	3
Clearly has no to very limited functional role	1
C. Does the area serve an aesthetic role?	Rating
Forms part of a larger landscape that is widely visible and has a high aesthetic appeal	5
Forms part of a landscape that has high aesthetic appeal but which is not widely visible	3
Forms part of a landscape that has low aesthetic appeal	1

The possible results for the functional status of the defined area are based on a combination of the attributes, as follows.

$$A \text{ (recreational use)} + B \text{ (ecological service)} + C \text{ (aesthetic value)} = \text{Functional Status}$$

Based on the combined score, the functional status can range from very high to low as illustrated in Table 15 below:

TABLE 15: FUNCTIONAL STATUS RATING

Functional Status	Rating
High service value	11 – 15
Moderate service value	6 – 10
Low service value	3 – 5

Biodiversity value

The perceived biodiversity value of an area to human development is not always easy to describe, but it includes the natural system and its variety of species, the ecological processes and the service or functional value that it provides. The combination of the conservation status and functional status scores provides a ranking of the overall biodiversity value for a defined area, as shown in the matrix in Table 16 below.

TABLE 16: BIODIVERSITY VALUE RATING

Conservation status	Functional status		
	High service value	Moderate service value	Low service value
High	High	High	Moderate
Moderate	Moderate	Moderate	Low
Low	Moderate	Low	Low

Eight vegetation units were found on site and are given below:

- Egoli Granite Grassland
- Rand Highveld Grassland
- Eastern Highveld Grassland
- Cartonville Dolomite Grassland
- Gold Reef Mountain Bushveld
- Andesite Mountain Bushveld
- Marikana Thornveld and
- Eastern Temperate Freshwater Wetlands

Each of the abovementioned vegetation units are rated for their biodiversity value below.

Egoli Granite Grassland

This vegetation unit has a **High** biodiversity rating as indicated in Table 17 below. The **high** conservation value is attributed to the grassland species diversity and composition in the unit and the small area of Egoli Granite Grassland remaining. The **high** functional rating is attributed to the obvious ecological services and the high aesthetic value of the Egoli Granite Grassland.

TABLE 17: BIODIVERSITY RATING FOR THE EGOLI GRANITE GRASSLAND UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	5 – Small	5 - High	1 – Highly Disturbed
Functional status	Use	Ecological service	Aesthetic value
	3 – Periodic	5 – Obvious	3 - Moderate
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	11 – High	11 - High	High

Rand Highveld Grassland

This vegetation unit has a **moderate** biodiversity rating as indicated in Table 18 below. The **moderate** conservation value is attributed to the grassland species diversity and large percentage of grassland present. The **high** functional rating is attributed to the obvious ecological services and the high aesthetic value of the Rand Highveld Grassland.

TABLE 18: BIODIVERSITY RATING FOR THE RAND HIGHVELD GRASSLAND UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	3 – Moderatel	5 - High	1 – Highly Disturbed
Functional status	Use	Ecological service	Aesthetic value
	3 – Periodic	5 – Obvious	5 - High
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	9 –Moderate	13 - High	Moderate

Eastern Highveld Grassland

This vegetation unit has a **low** biodiversity rating as indicated in Table 19 below. The **moderate** conservation value is attributed to the moderate grassland species diversity. The **low** functional rating is attributed to the low ecological services and the moderate aesthetic value of the grassland. Eastern Highveld Grassland makes up a very small part of the route and therefore has a low Biodiversity rating.

TABLE 19: BIODIVERSITY RATING FOR THE EASTERN HIGHVELD GRASSLAND UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	5 – High	3 - Moderate	1 – Highly Disturbed
Functional status	Use	Ecological service	Aesthetic value
	1 – none	1 - Low	3 - Moderate5 - High
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	9 – Moderate	5 - Low	Low

Cartonville Dolomite Grassland

This vegetation unit has a **moderate** biodiversity rating as indicated in Table 20 below. The **moderate** conservation value is attributed to the high species diversity and percentage of grassland present. The **moderate** functional rating is attributed to the ecological services that are difficult to determine and the moderate aesthetic value of the Cartonville Dolomite Grassland.

TABLE 20: BIODIVERSITY RATING FOR THE CARTONVILLE DOLOMITE GRASSLAND UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	3 – Moderatel	5 - High	1 – Highly Disturbed
Functional status	Use	Ecological service	Aesthetic value
	3 – Periodic	3 - Undetermined	3 - Moderate
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	9 –Moderate	9 –Moderate	Moderate

Gold Reef Mountain Bushveld

This vegetation unit has a **high** biodiversity rating as indicated in Table 21 below. The **high** conservation value is attributed to the Moderate species diversity and the low level of disturbance. The **high** functional rating is attributed to the aesthetic value of the vegetation unit.

TABLE 21: BIODIVERSITY RATING FOR THE GOLD REEF MOUNTAIN BUSHVELD UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	3 - Moderate	3 - Moderate	5 – Low disturbance
Functional status	Use	Ecological service	Aesthetic value
	3 - Periodic	3 - Undetermined	5 - High
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	11 - High	11 - High	High

Andesite Mountain Bushveld

This vegetation unit has a **high** biodiversity rating as indicated in Table 22 below. The **high** conservation value is attributed to the Moderate species diversity and the low level of disturbance. The **high** functional rating is attributed to the aesthetic value of the vegetation unit.

TABLE 22: BIODIVERSITY RATING FOR THE GOLD REEF MOUNTAIN BUSHVELD UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	3 - Moderate	3 - Moderate	5 – Low disturbance
Functional status	Use	Ecological service	Aesthetic value
	3 - Periodic	3 - Undetermined	5 - High
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	11 - High	11 - High	High

Marikana Thornveld

This vegetation unit has a **high** biodiversity rating as indicated in Table 23 below. The **high** conservation value is attributed to the species diversity and in the unit and the small area of Marikana Thornveld remaining. The **moderate** functional rating is attributed to the undefined ecological services and the moderate aesthetic value of the Marikana Thornveld. This vegetation unit has been classified as endangered.

TABLE 23: BIODIVERSITY RATING FOR THE *MARIKANA THORNVELD* UNIT

Conservation status	Size of vegetation unit	Species diversity	Condition
	5 – Small	5 - High	1 – Highly Disturbed
Functional status	Use	Ecological service	Aesthetic value
	3 – Periodic	3 -Undefined	3 - Moderate
Biodiversity Rating	Conservation status	Functional status	Biodiversity
	11 – High	9 - Moderate	High

Eastern Temperate Freshwater Wetlands

This vegetation unit has a **high** biodiversity rating as indicated in Table 24 below. The **high** conservation value is attributed to the high grassland species diversity in the unit and the small area of wetlands remaining. The **high** functional rating is attributed to the obvious ecological services and the high aesthetic value of the wetlands and seepage areas.

TABLE 24: BIODIVERSITY RATING FOR THE *EASTERN TEMPERATE FRESHWATER WETLANDS*

	Size of vegetation unit	Species diversity	Condition
Conservation status	5 – Small	5 – High	3 – Moderately Disturbed
	Use	Ecological service	Aesthetic value
Functional status	1 – none	5 – Obvious	5 - High
	Conservation status	Functional status	Biodiversity
Biodiversity Rating	13 – High	11 - High	High

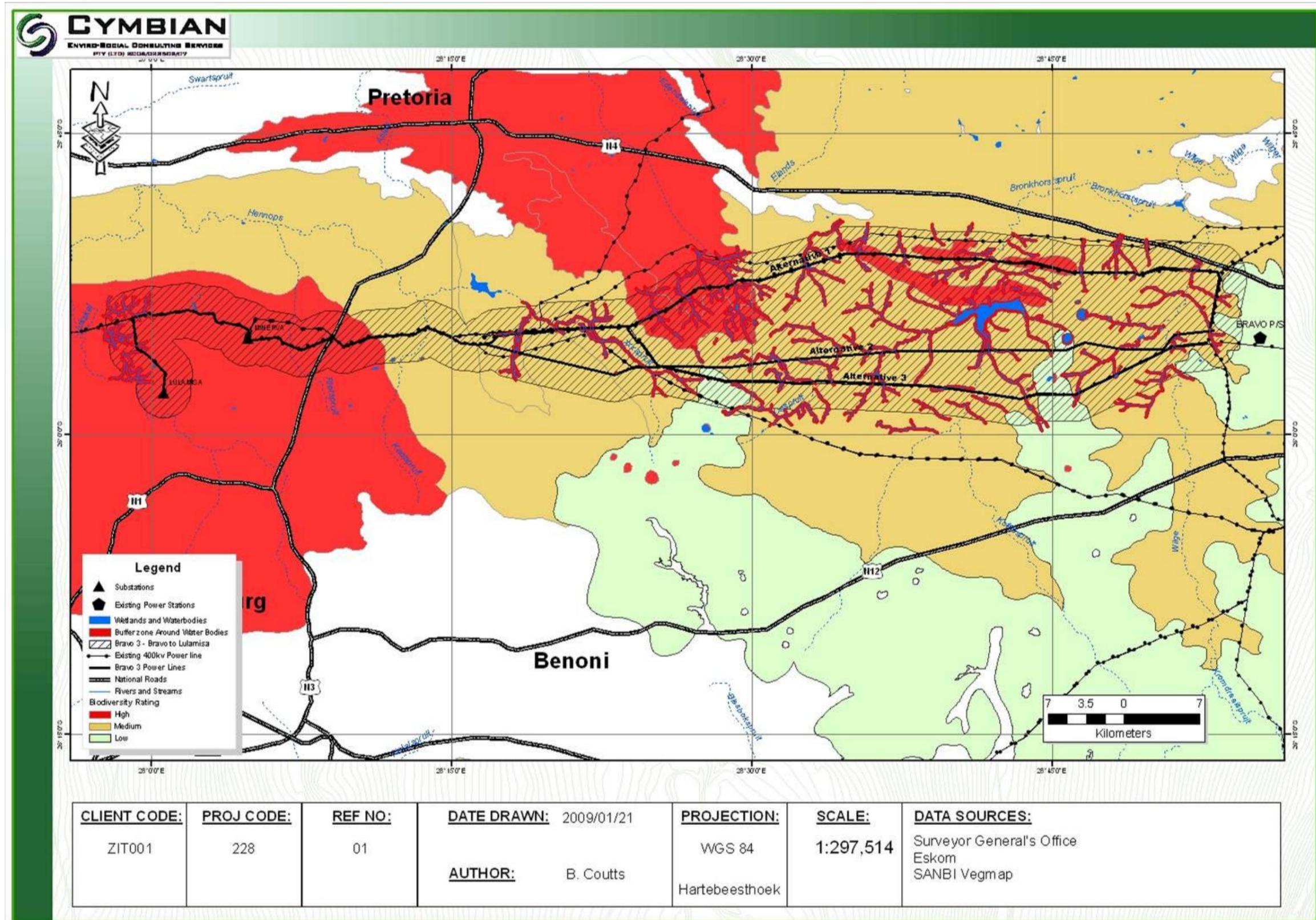


FIGURE 56: BIODIVERSITY RATING MAP

7.1.12 Visual Character

Landscape Character

The landscape character is described in detail above under the Topography section. Figure 57 below illustrates some of the existing power lines on site.



FIGURE 57: VIEW OF THE EXISTING POWER LINE ON SITE

Viewshed

It should be noted that the viewsheds generated are only an approximation for each alternative that has been generated in Figure 58, Figure 59, Figure 60 and Figure 61. Proposed views for the upgraded maybe blocked by buildings, vegetation and changes in local topography. Potential glimpses of the proposed upgrade may be available outside of the generated viewshed maps because of high elevation localities. Each figure represents the visibility of each alternative. The colours indicate the visibility of each alternative from the surrounding landscape. The green represents a low visibility of the proposed upgrade and the red represents a high visibility of the upgrade from the surrounding environment. From Lulamisa to Minerva shows a low visibility from the surrounding area, which may be false because of the land use around and near the Lulamisa substation. Located around the area is a high informal residential area, which is not taken into account in the generating the viewshed.

Notable features of the viewshed are summarised by the following points:

- The viewshed extends a great distance south of the proposed upgrade
- To the north the viewshed is limited by a ridge, which Alternative 1 will run along
- To the west the viewshed has a higher visibility due to the locality of Pretoria, Johannesburg and Midrand
- The viewshed to the west extends approximately 60 km to the west

Impact Assessment

The visual simulations prepared by Cymbian illustrate the extent to which the upgrade will be visible from key observation points (static and dynamic views).

The vertical form/dimensions of the buildings/structures would be hidden by their location among existing buildings and within a well vegetated area. The visual contrast is increased by the “shape” and scale of the buildings/structures, which generally will not be viewed along the skyline.

Static Views

The upgrade would potentially be visible from the Bronkhortspruit, and Bapsfotein areas with respect to viewshed Alternatives 1, 2 and 3. The visibility would potentially be low because the farmlands in the area are sparsely populated. These views would differ greatly depending on locality from the upgrade and the local topography. Site specific conditions need to be taken into account, such as vegetation, buildings and fences, which may hinder ones view of the power line upgrade.

Dynamic Views

The power lines will potentially be visible from the N4 highway mainly to those travelling along this route. The power lines cross over the N1 highway and at this stage will be visible for motorists travelling along this route for approximately 0.25 seconds travelling at 120 km/h. other roads that intersect the power lines is the R42, R25, 515, R21, R55 and the R28, which all would have similar visibility to motorists. The traffic the road carries has to be taken into account. National roads, such as the N1 and N4 carry higher volumes of traffic resulting in higher visibility of the power lines. Surrounding atmospheric conditions would also affect the visibility of the power lines. Rainy days will result in a lower visibility. Table 25 gives a summary of the dynamic impacts. This is similar for both route Alternatives

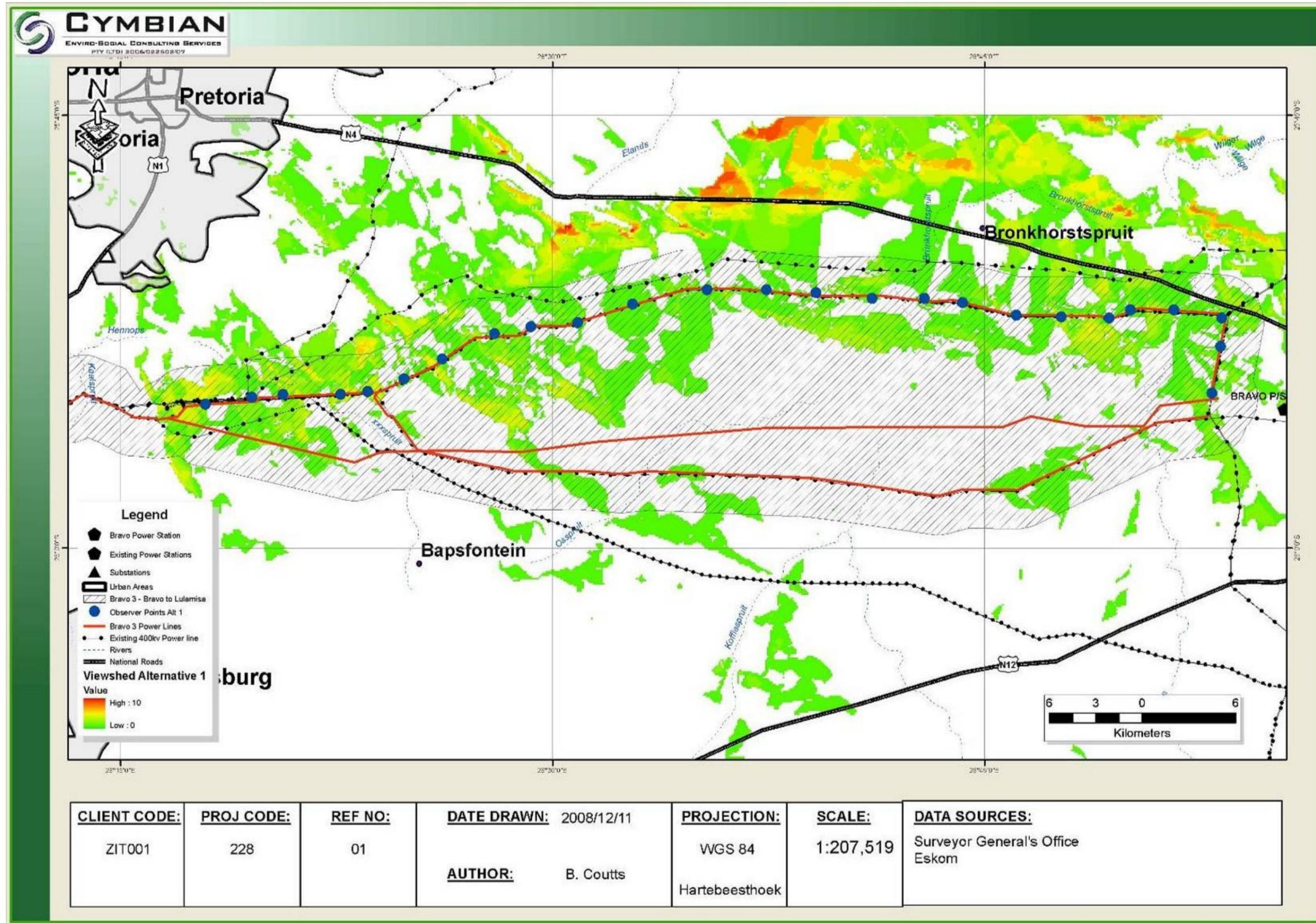


FIGURE 58: VIEWSHED FROM THE ALTERNATIVE 1 ALIGNMENT

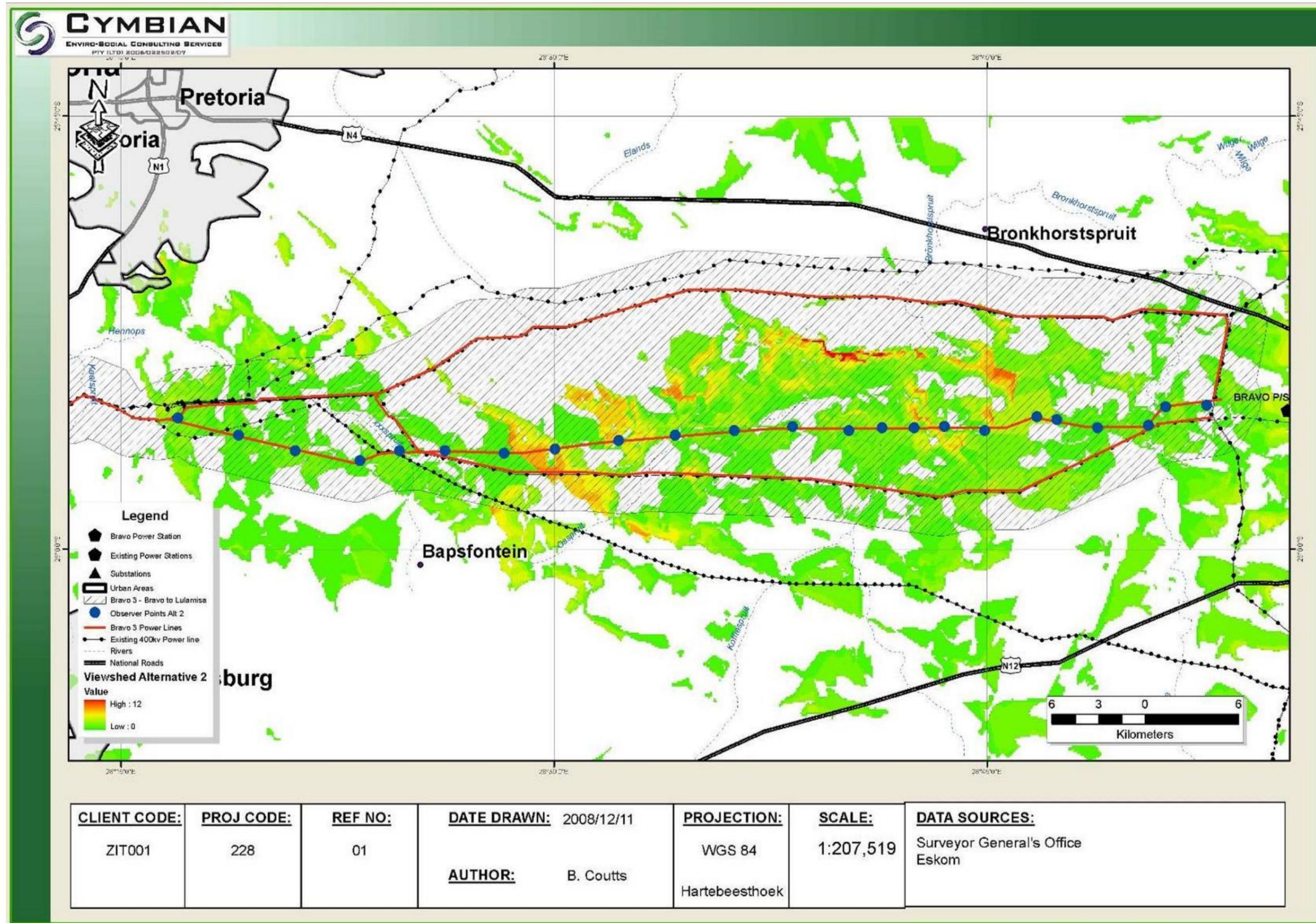


FIGURE 59: VIEWSHED FROM THE ALTERNATIVE 2 ALIGNMENT

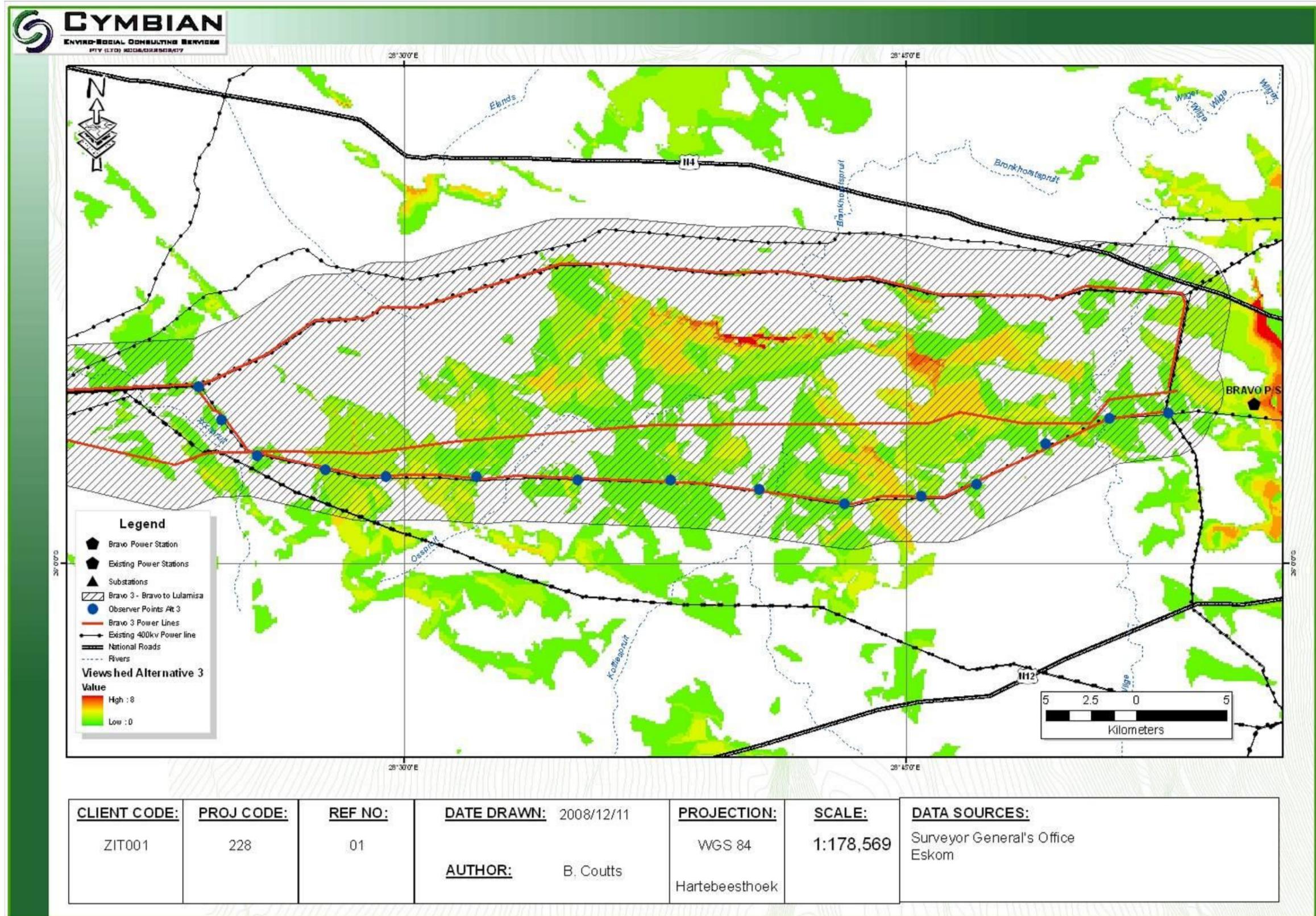


FIGURE 60: VIEWSHED FROM THE ALTERNATIVE 3 ALIGNMENT

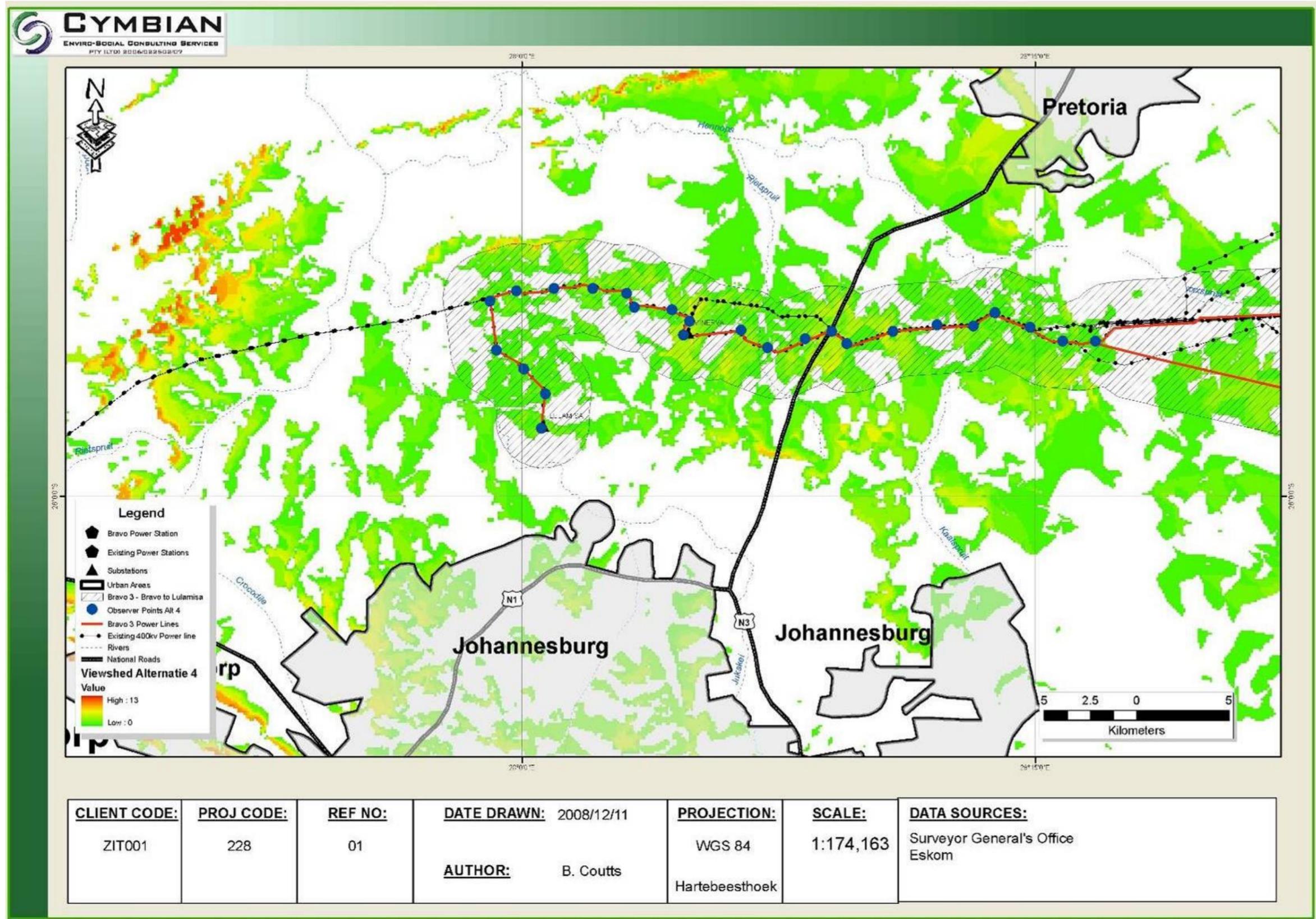


FIGURE 61: VIEWSHED FROM THE ALTERNATIVE 4 ALIGNMENT