Willowbrook Soil Form

Willowbrook soils are characterised by Melanic A-horizon over a G-horizon. The G-horizon is invariably firm or very firm and it's characteristics are described above. The Melanic horizon has several unique diagnostic criteria as a horizon, namely:

- Has dark colours in the dry state.
- Lack slickensides that are diagnostic of vertic horizons.
- Has les organic carbon than required for diagnostic organic O horizon.
- Has structure that is strong enough so that the major part of the horizon is not both massive and hard or very hard when dry.

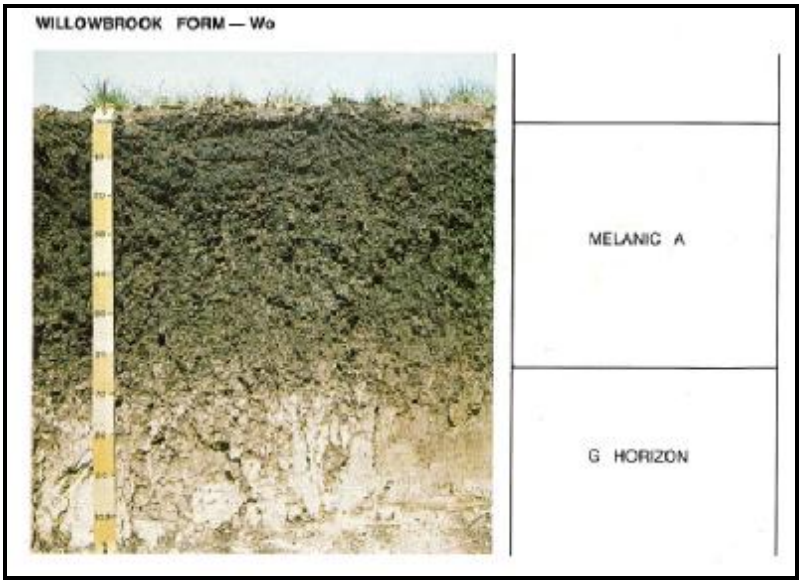


FIGURE 37: WILLOWBROOK SOIL FORM (SOIL CLASSIFICATION 1991)

7.1.6 Land Capability

Data Collection

A literature review was conducted in order to obtain any relevant information concerning the area, including information from the Environmental Potential Atlas (ENPAT), Weather Bureau and Department of Agriculture. Results from the soil study were taken into account when determining the land capability of the site.

The land capability assessment methodology as outlined by the National Department of Agriculture was used to assess the soil's capability on site.

Regional Description

The region has historically been used for cultivation of crops and grazing of livestock, because of the arable soils present. Some of the areas have been used for mining, industrial areas and urban zones and therefore the land capability in those areas have been changed permanently.

Site Description

The soils identified on site were classified according to the methodology proposed by the Agricultural Research Council – Institute for Soil, Climate and Water (2002). Factors evaluated are tabled below.

The soils on site were identified to have a land capability of being good arable soils. From Figure 38, Figure 39 and Figure 40 below it is clear that large sections of the site are made up of good arable soils. This indicates that these soils are good to cultivate a variety of crops such as maize. Approximately 30% of the area is used for agricultural purposes; such crops as maize are grown in these areas because of the good quality of the soils. Approximately 50% of the Transitional soils are used for mixed land use; such as grazing for livestock and other crops besides maize.

TABLE 10: LAND CAPABILITY OF THE SOILS ON SITE FOR AGRICULTURAL USE

Soil	Cultivated	Transitional	Rocky	Clay	Disturbed
% on Site	26	53	6	8	7
Rock Complex			X		X
Flooding Risk	F1	F1	F1	F4	F4
Erosion Risk	E2	E5	E5	E1	E4
Slope %	3.9	3.7	4.0	0.5	10-30
Texture	T2	T2	T2	T1	T3
Depth	D1	D2	D4	D4	D4
Drainage	W2	W4	W2	W4	W2
Mech Limitations	MBO	MBO	MB3	MBO	MB3
pH	P2	P1	P1	P1	P1
Soil Capability	II	III	VI	V	VII
Climate Class	C2	C2	C2	C2	C2
Land Capability	II	III	VI	V	VII

No limitation	Low to Moderate	Moderate	High	Very Limiting

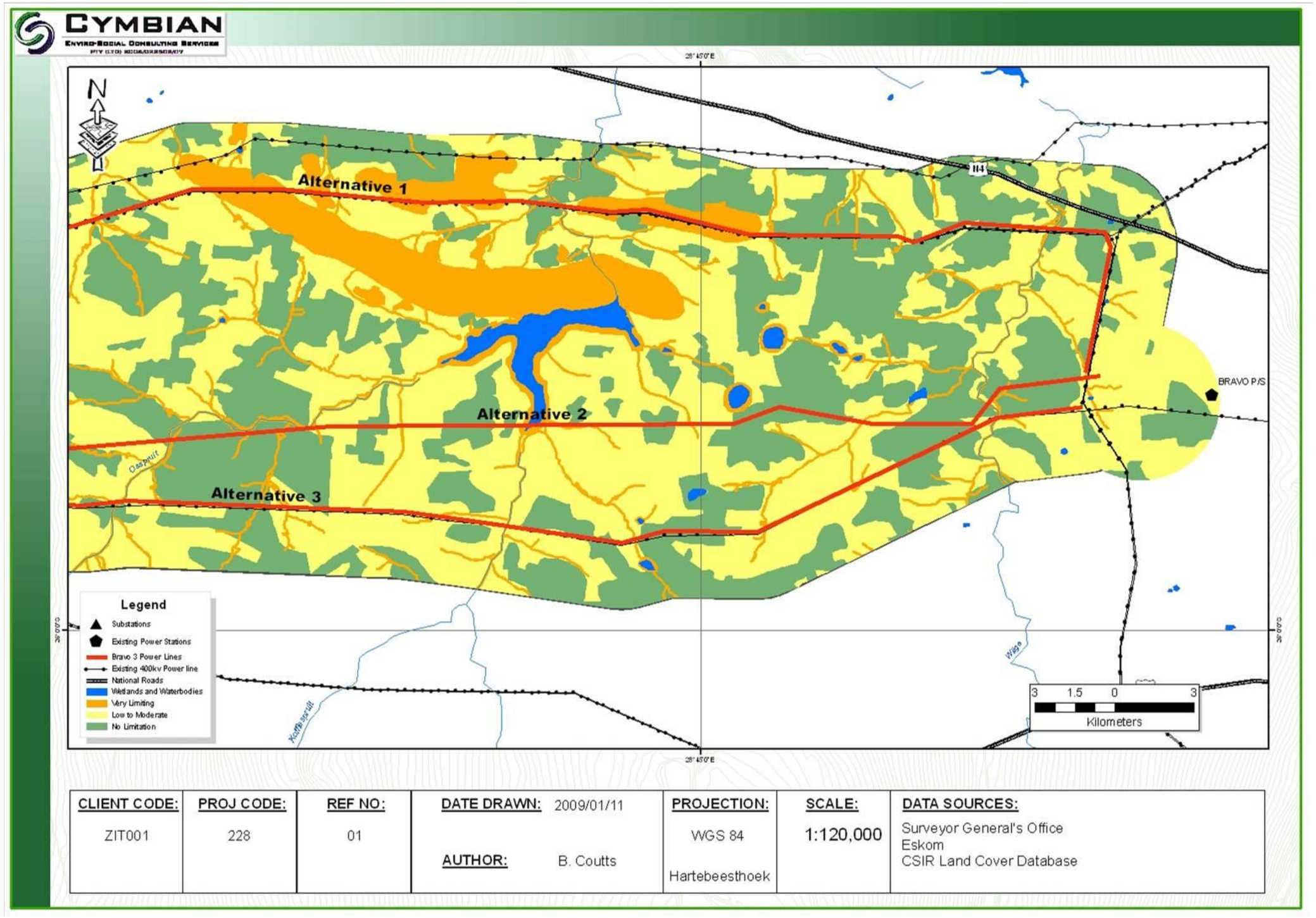


FIGURE 38: EASTERN LAND CAPABILITY MAP

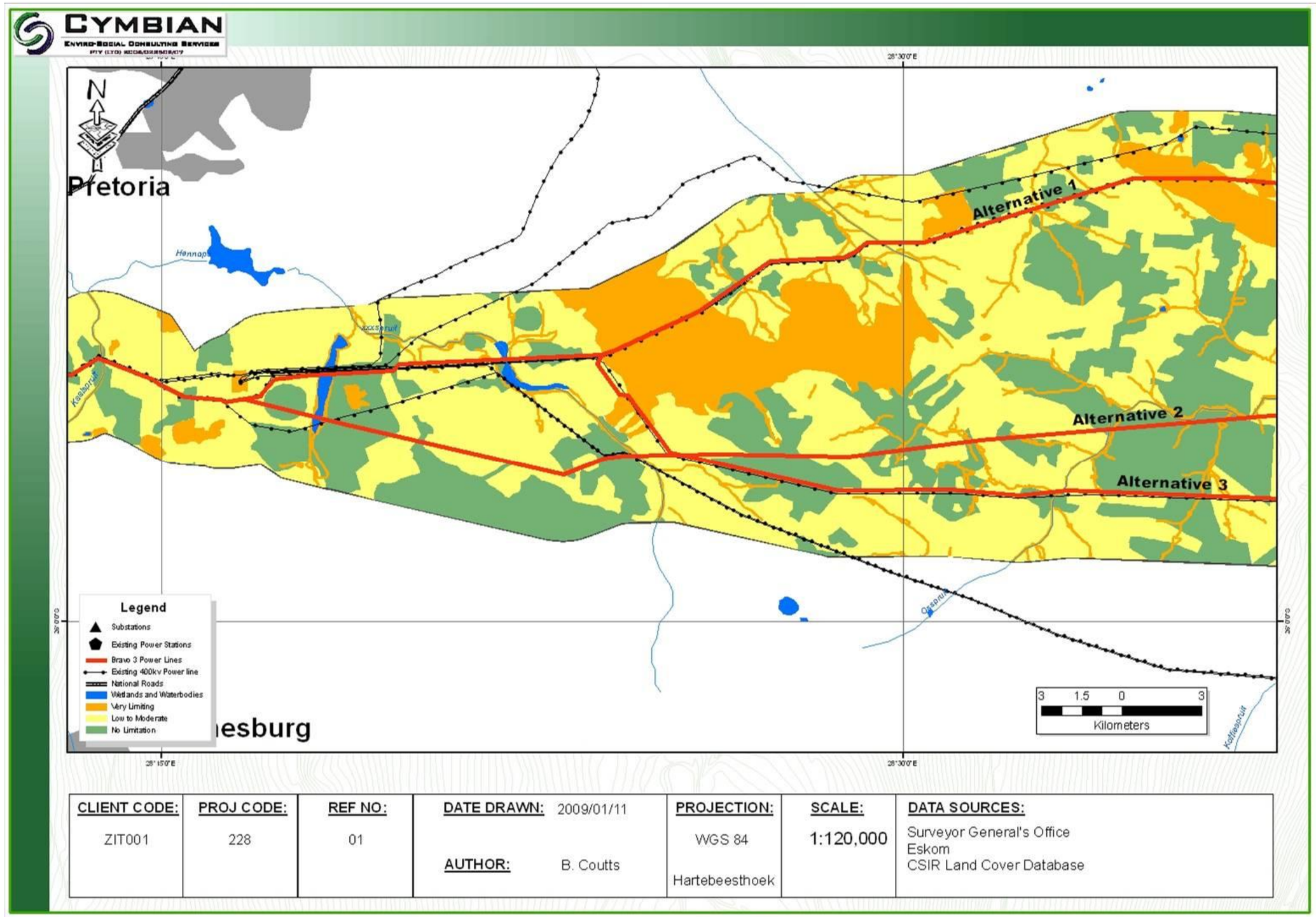
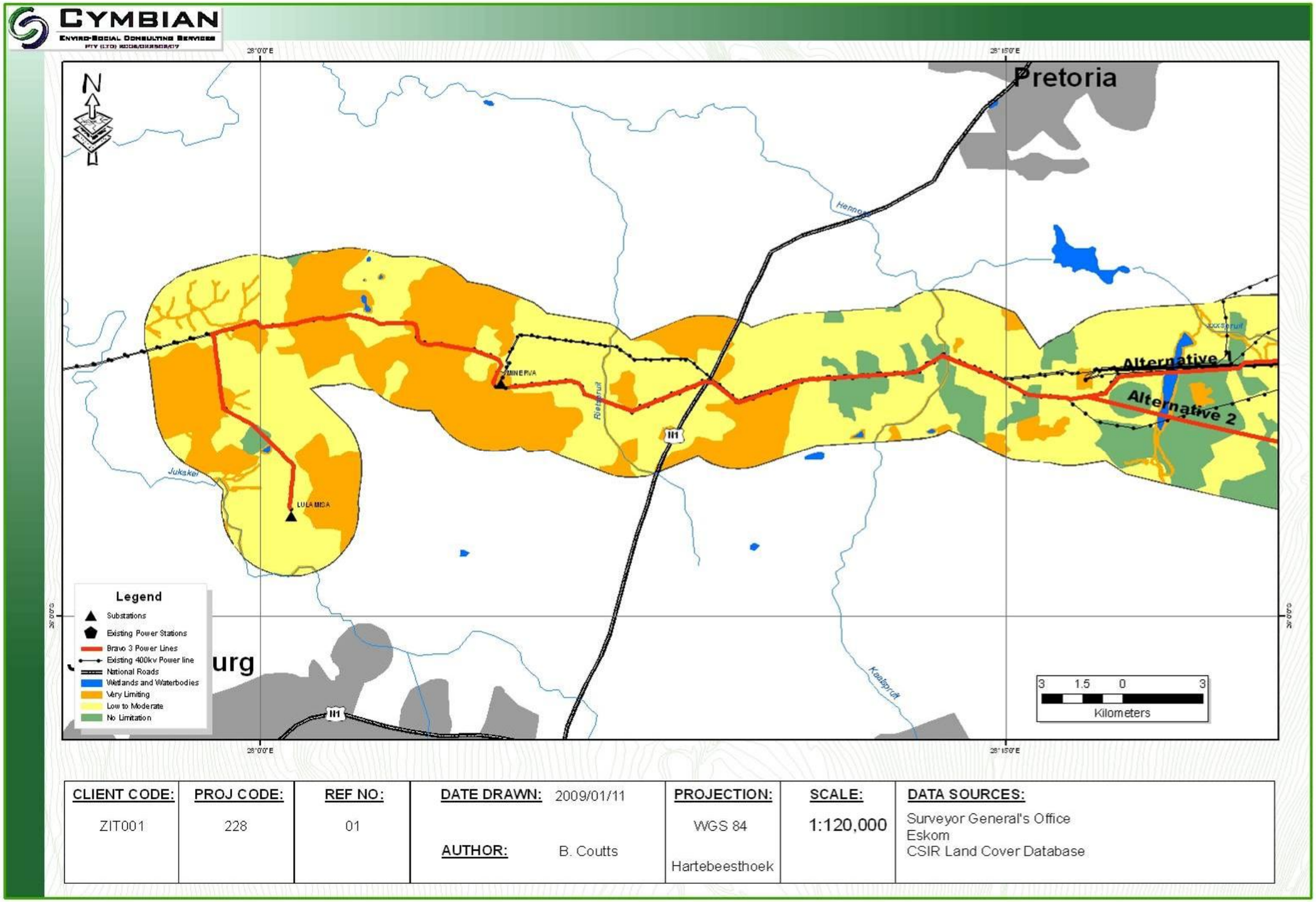


FIGURE 39: CENTRAL LAND CAPABILITY MA



CLIENT CODE:	PROJ CODE:	REF NO:	DATE DRAWN: 2009/01/11	PROJECTION:	SCALE:	DATA SOURCES:
ZIT001	228	01	AUTHOR: B. Coutts	WGS 84 Hartebeesthoek	1:120,000	Surveyor General's Office Eskom CSIR Land Cover Database

FIGURE 40: WESTERN LAND CAPABILITY MAP

7.1.7 Land Use

Data Collection

Land Use was determined utilizing a GIS desktop study and confirmed during the site investigations conducted on the 28th-29th February 2008. The site investigation involved ground truthing the Land Use according to the maps produced using the desktop analysis. The data was obtained from the Council for Scientific Investigation and Research (CSIR). Their Land Cover database was used create the desktop maps.

Regional Description

The land use for the region is illustrated in Figure 41 below and the land used have been grouped into urban, cultivation, grassland/plantations, mines/erosion and water bodies/wetlands. From the map it is clear that the Gauteng area is dominated by urban developments, and upon moving to the east the dominance moves towards farming (grazing and cultivation) and open grasslands. Almost 80 % of the power line corridors cover areas used for farming or grasslands while the section of the corridor west of the N1 Highway moves into the urban areas.

Site Description

When focusing on site specific descriptions the potential sensitivities arise due to the land use along the power line corridor. These sensitivities originate from two areas. Firstly public perception of power lines is often negative, and hence the "sensitivity" to power lines is usually higher in areas of higher population densities. The main sensitivities in this regard are the informal settlements located in Diepsloot and Olivienhoutbosch, the residential estate of Midrand Estates and a couple of planned developments just south-east of Pretoria (Celtic Village and Blue Crane Country Estate).

Secondly sensitivity can arise from current land use, where the land use itself poses a threat to the new power lines. This is the case in areas of mining, quarrying and water bodies. Immediately Alternative 2 has to be highlighted here, as the proposed alignment traverses over the Bronkhorstspruit Dam. The area around Bronkhorstspruit dam needs to be avoided during the detailed route planning of the power line alignments in the corridors. Not only is this of financial concern, but of aesthetics. On the ridge location adjacent to Bronkhorstspruit Dam there are upmarket houses built. Having a power line running through this area is of financial concern and destroys the aesthetics of the area; due to upmarket residential houses around the dam. The sentiment from residents could be negative, especially if the relatively pristine view of the dam is compromised by the proposed power line.

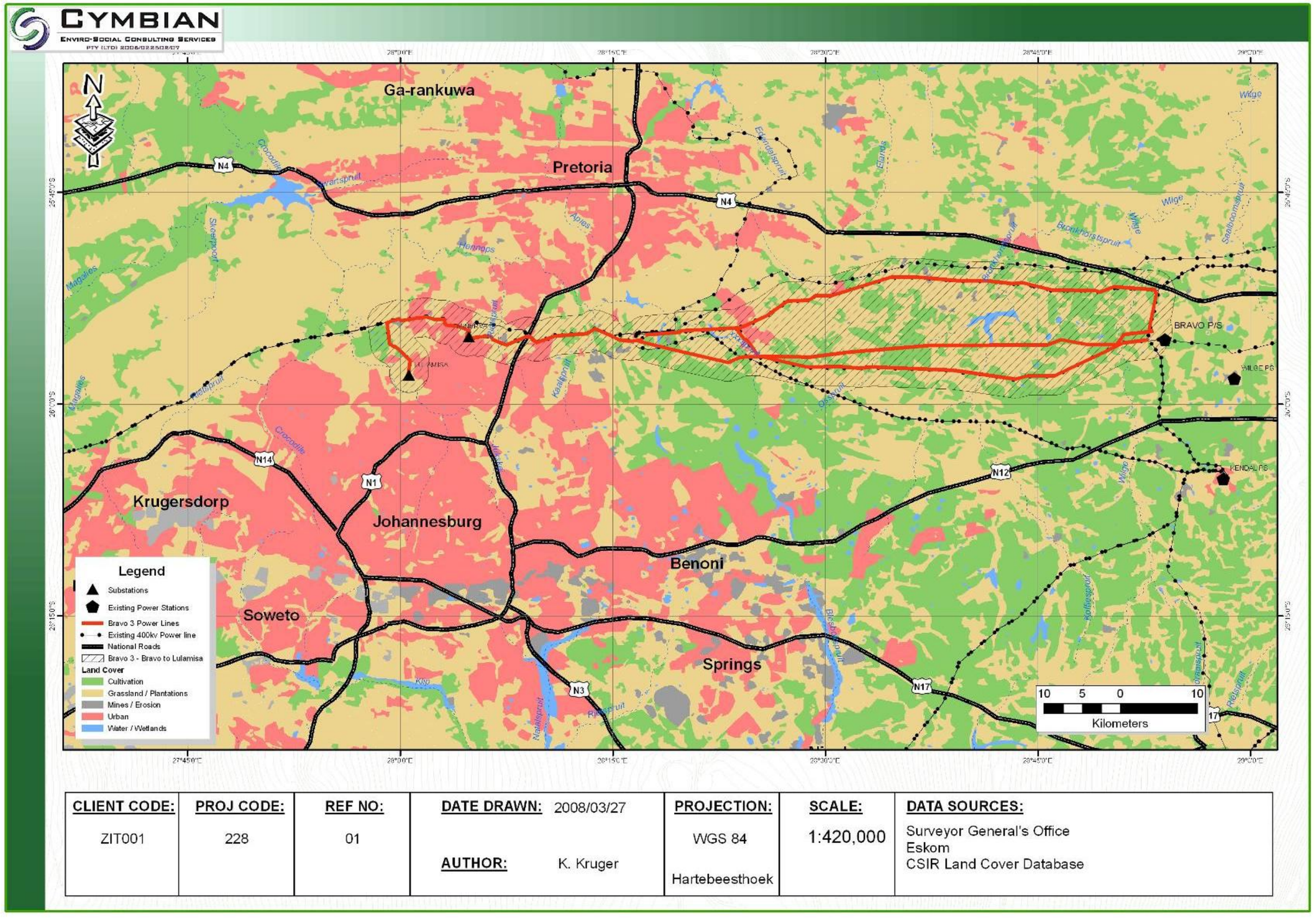


FIGURE 41: LAND USE MAP

In addition to the sensitivities noted above, it was observed during the site assessment that a number of the servitudes are located within an area of existing development, to such an extent that placing another power line along the existing lines might be impossible. This was particularly evident in the Midrand area between Olivienhoutbosch and Midstream estates. In addition the crossing of the N1 highway is already severely congested and will pose additional challenges. Further along the route to the west, adjacent to the N14 highway, the route traverse through Highveld Mushroom's property and thereafter crosses over the highway, onto land that is currently being mined for sand. In both these areas space is also limited. Lastly the informal settlements of Diepsloot and Olivienhoutbosch have a history of people trying to build houses in the existing servitudes and once again, space for additional lines is limited.

Even though these limitations exist, it does not influence the alternative selection, as this section of the route has only one alternative available. It is however, recommended that a detailed route analysis be undertaken by Eskom, as this report is part of an application for the entire corridor, more detailed work will be required.

7.1.8 Vegetation

Data Collection

The floral study involved extensive fieldwork, a literature review and a desktop study utilizing GIS. The site was investigated during two one week site visits, conducted from the 10th-14th March and from the 17th-20th of November 2008, in late summer and early spring respectively. The area within the servitude was sampled using transects placed at 300 m intervals. At random points along the transect an area of 20 m x 20 m were surveyed. All species within the 20 m x 20 m quadrant were identified, photographed and their occurrence noted. Sensitive features such as ridges or wetlands were sampled by walking randomly through the area concerned and identifying all species within the area.

The floral data below is taken from The Vegetation of South Africa, Lesotho and Swaziland (Mucina and Rutherford 2006). Also, while on site, the following field guides were used:

- Guide to Grasses of Southern Africa (Frits van Oudtshoorn, 1999);
- Field Guide to Trees of Southern Africa (Braam van Wyk and Piet van Wyk, 1997);
- Field Guide to the Wild Flowers of the Highveld (Braam van Wyk and Sasa Malan, 1998);
- Problem Plants of South Africa (Clive Bromilow, 2001); and
- Medicinal Plants of South Africa (Ben-Erik van Wyk, Bosch van Oudtshoorn and Nigel Gericke, 2002).

The occurrence of the species was described as either:

- Very common (>50 % coverage);
- Common (10 – 50 % coverage);
- Sparse (5 – 10 % coverage); and

- Individuals (< 5 % coverage).

Regional Description

The area under investigation straddles two Biomes, namely the Savanna and the Grassland Biomes. Each biome comprises several bioregions which in turn has various vegetation types within the bioregion. The Grassland Biome is represented by Dry Highveld Grassland bioregion and Mesic Highveld Grassland bioregion, while the Savanna Biome is represented by Central Bushveld bioregion. Each of these bioregions is described below. These descriptions are adapted from Mucina and Rutherford, 2006.

Dry Highveld Grassland

Dry Highveld Grassland prevails in the western region of the Grassland Biome where the annual rainfall is below 600 mm per annum. These grasslands fall within the "sweet" grassland type with a predominance of chloridoid grasses.

In terms of conservation and disturbance, 44 % of the vegetation type is already transformed by cultivation, plantations, mines, and urbanisation. No serious alien invasion, but *Acacia mearnsii* can dominate in certain areas.

Eastern Highveld Grassland

Highveld grasslands are found on the extensive central plateau of South Africa with its flat to undulating topography. The major environmental factors controlling vegetation patterns and the recognition of different vegetation types is annual rainfall, which forms an east to west gradient of decreasing moisture across the Highveld.

Mesic Highveld Grassland

Mesic Highveld Grassland is found mainly in the eastern, high rainfall regions of the Highveld, extending all the way to the northern escarpment. These are considered to be "sour" grasslands and are dominated by primarily andropogonoid grasses. The different grassland types are distinguished on the basis of geology, elevation, topography and rainfall. Shrublands are found on outcrops of rock within the bioregion, where the surface topography creates habitat in which woody vegetation is favoured above grasses.

Central Bushveld

The savanna bioregions in South Africa are distinguished by location. The Central Bushveld extends from the northern sections of the Gauteng Province northwards into the Limpopo Province. The savanna is typified by an herbaceous layer dominated by grasses and a discontinuous to open tree layer.

As mentioned above the corridors were visited for a lengthy period of time and the following vegetation types were identified along the route:

- 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

Although the above mentioned vegetation types occur, the vegetation within the corridors were often severely transformed with few remaining patches of natural vegetation. The routes are also heavily invaded by species such as *Eucalyptus* and black wattle (*Acacia mearnsii*), the latter forming dense stands throughout the site. The vegetation types identified on site are indicated in Figure 42, Figure 43 and Figure 44 below and described in detail in the site description taking into account areas that had been transformed.