VISUAL IMPACT ASSESSMENT REPORT

FOR THE

KEBRAFIELD ROODEPOORT COLLIERY NATIONAL ENVIRONMENTAL MANAGEMENT ACT APPLICATION FOR AUTHORISATION REF:17/2/3N-289 & INTEGRATED WATER USE LICENSE APPLICATION

Department: Minerals Resources Ref: MP 30/5/1/2/2/479 MR

REPORT

2014

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TABLE OF CONTENTS

LIST OF ABBREVIATIONS

DEA	National Department of Environmental Affairs
DWA	Department of Water Affairs
CSP	Concentrating Solar Power
CPV	Concentrating Photovoltaic
CLFR	Compact Linear Fresnel Reflectors
DMR	Department of Mineral Resources
EIA	Environmental Impact Assessment
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
Km	Kilometres
SLR	Single Lens Reflex
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VT	Vegetation Type

GLOSSARY OF TERMS

Critical viewpoints:

Important points from where viewers will be able to view the proposed or actual development and from where the development may be significant.

Field of view:

The field of view is the angular extent of the observable world that is seen at any given moment. Humans have an almost 180º forward-facing field of view. Note that human stereoscopic (binocular) vision only covers 140º of the field of view in humans; the remaining peripheral 40º have no binocular vision due to the lack of overlap of the images of the eyes. The lower the focal length of a lens (see below), the wider the field of view.

Mitigation (in the context of Visual Impact Assessment):

Any action taken or not taken in order to avoid, minimise, rectify, reduce, eliminate, or compensate for actual or potential adverse visual impacts.

Focal length:

The focal length of a lens is a measure of how strongly the lens converges (focuses) or diverges (defocuses) light. Focal length refers to the "strength" of a lens, in other words how many times the lens magnifies an image (brings it closer) or widens an image (makes it look further away). The standard lens on most SLR cameras has a focal length of 50 mm. Using a 50 mm lens as a start, a 200 mm lens will magnify an image four times (i.e. 4 x magnification). The focal length of an average human eye is 22 mm.

Scenic value:

Degree of visual quality resulting from the level of variety, harmony and contrast among the basic visual elements.

Sense of place:

The character of a place, whether natural, rural or urban. It is allocated to a place or area through cognitive experience by the user.

View shed:

The theoretical area within which an observer is likely to see a specific structure or area in the landscape. It is generated from a digital terrain model (DTM) made up of 3D contour lines of the landform. Intervening objects, structures or vegetation will modify the view shed at ground level.

Visual absorption capacity (VAC):

The ability of elements of the landscape to "absorb" or mitigate the visibility of an element in the landscape. Visual absorption capacity is based on factors such as vegetation height (the greater the height of vegetation, the higher the absorption capacity), structures (the larger and higher the intervening structures, the higher the absorption capacity) and topographical variation (rolling topography presents opportunities to hide an elements in the landscape and therefore increases the absorption capacity).

Visual character:

The overall impression of a landscape created by the order of the patterns composing it; the visual elements of these patterns are the form, line, colour and texture of the landscape's components. Their interrelationships are described in terms of dominance, scale, diversity and continuity. This characteristic is also associated with land use.

Visual exposure:

Visual exposure is based on distance from the project to selected viewpoints. Visual exposure or visual impact tends to diminish exponentially with distance.

Visual quality:

Subjective evaluation of the visible components of the environment by viewers.

Visually sensitive:

Areas in the landscape from where the visual impact is readily or excessively encountered.

1 INTRODUCTION

Eco Elementum (Pty) Ltd has been appointed by Eyethu on behalf of the applicant Kebrafield (Pty) Ltd to undertake the Visual Impact Assessment as a requirement of the EIA for all the relevant listed activities as discussed further on in this report. The mining right which has been awarded to Kebrafield (Pty) Ltd, MP30/5/1/2/2/479 MR, includes various farms and associated farm portions although for this specific project only the farm Roodepoort 151 IS portion 17 in the vicinity of the town of Pullenshope in Mpumalanga is being applied for.

The project falls within the district municipality of the Nkangala District while the local authority is the Steve Tshwete Local Municipality. This report entails an application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010, and falls within the jurisdiction of the Department: Economic Development, Environment and Tourism, Mpumalanga Provincial Government.

The proposed project relate to the opencast mining of approximately 800 000tons of high grade coal over a period of approximately three years. When coal seams are near the surface, it may be economical to extract the coal using open cut (also referred to as open cast, open pit, or strip) mining methods. Open cast coal mining recovers a greater proportion of the coal deposit than underground methods, as more of the coal seams in the strata may be exploited. The activity will cover approximately 50 hectares and is situated next to the town of Pullenshope downstream of the Eskom Hendrina Power Station.

1.1 SCOPE OF WORK

The scope of work included in this Visual Impact Assessment:

- Describe the existing visual characteristics of the proposed site and its environs.
- Determine the area from which the proposed mining area will be visible.
- Propose possible mitigation measures.
- The overall objective of the Visual Impact Assessment (VIA) is to assess the significance of the visual impacts that will be caused by the mining activities.

1.2 METHODOLOGY AND APPROACH TO STUDY

The following sequence was employed in this Visual Assessment Report:

- The desktop survey made use of the 1:50 000 map and 1:10 000 aerial photographs. These were used to identify landforms and landscape patterns, as well as to determine the view shed of

the area. The view shed for the development based on the maximum height of the mine soil stockpile (proposed development of maximum 15 m).

- In order to model the decreasing visual impact of the mine activities, concentric radii zones of 1km to 15km from the mine activities were superimposed on the view shed to determine the level of visual exposure. The closest zone to the mine activities indicates the area of most significant impact, and the zone further than 10km from the mine activities indicates the area of least impact. The visual exposure ratings of the zones have been defined as follows:

    - <1 km (very high);
    - 1 - 2 km (high);
    - 2 - 5 km (moderate);
    - 5 -10 km (low); and
    - > 15 km (insignificant)

- An extensive photographic survey of the site and surrounding areas was conducted which determine the visibility of the mining activities from various viewpoint.
- Potential visual impacts were identified using standard criteria such as geographic view shed and viewing distance, as well as qualitative criteria such as importance to surrounding land users and compatibility with the existing landscape.
- Possible mitigation measures were identified.

1.3 ASSUMPTIONS

- The core study area can be defined as an area with a radius of not more than 10 km from the mine activities and a total study area with a radius of 15 km from the mine activities. This is because the visual impact of structures beyond a distance of 10km would be so reduced that it can be considered negligible even if there is direct line of sight. The total study areas are extended to 15 km to include the closes town (Pullenshope).

- It is assumed that there are no alternative locations for the mine activities and that the visual assessment, therefore, assessed only the proposed site.

- It is assumed that the no-go (no development) alternative is not a feasible and reasonable alternative.

- The height of the VIA is based on the high of the soil stockpile of 15m, the high can be more or less than 15m depending on the mining operations.

1.4 LIMITATIONS

- Visual perception is by nature a subjective experience, as it is influenced largely by personal values. For instance, what one-viewer experiences as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. In order to limit such subjectivity, a combination of quantitative and qualitative assessment methods has been used. A high degree of reliance has been placed on GIS-based analysis view shed and visibility analysis, and on making transparent assumptions and value judgements, where such assumptions or judgements are necessary.

- The view shed generated in GIS is not 100% accurate and has therefore been ground truth during the site visit. Some viewpoints, which are indicated on the view shed as being inside of the view shed, can be outside of the view shed. This is due to the modification of the natural environment by surrounding mining activities and other activities. Natural vegetation also plays a significant role and can have a positive or negative influence on the view shed.

1.5 LEGAL REQUIREMENTS

There are no specific legal requirements for visual impact assessment in South African. Visual impacts are, however required to be assessed by implication when the provisions of relevant acts governing environmental impacts management are considered.

2 DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 KEY PROJECT INFORMATION

Table 1: Key Project Information

Key Project Information	
Project Title:	Kebrafield Roodepoort Colliery
Farm Description:	Roodepoort 151 IS Portion 17
SG Code:	T0IS000000000115100017
Mining Right Reference Number:	MP30/5/1/2/2/479 MR
District Municipality:	Nkangala District
Local Authority:	Steve Tshwete Local Municipality
Nearest Town:	Pullenshope
Site Midpoint Coordinates:	26° 0'25.87"S 29°34'41.21"E

Project applicant:	Kebrafield (Pty) Ltd		
Trading name (if any):	Kebrafield		
Contact person:	Wayne van der Burgh c/o Burgh Group Holdings (Pty) Ltd		
Physical address:	54 Guinea Fowl Str, Silver Lakes, Pretoria		
Postal address:	P.O. Box 71986, Die Wilgers		
Postal code:	0041	**Cell:**	
Telephone:	012 807 0229	**Fax:**	012 807 0339
EAP:	Ilze Ueckermann for Eco Elementum (Pty) Ltd		
Contact person:	Henno Engelbrecht (Project Manager)		
Postal address:	26 Greenwood Crescent, Lynnwood Ridge, Pretoria		
Postal code:	0040	**Cell:**	082 6909 105
Telephone:	012 348 5214	**Fax:**	086 714 5399
E-mail:	henno@ecoelementum.co.za / info@ecoelementum.co.za		
Qualifications & relevant experience	Masters Degree specializing in Environmental Management 10 Years' experience in Environmental Consultancy		
Professional affiliation(s) (if any)	Chartered Environmental Assessment Practitioner South Africa (CEAPSA)		
Landowner:	Joseph Christiaan van Wyk - ID 7604145228088		
Contact person:	Van Wyk Attorneys, 48 Mouton Street, Hendrina, 1095		
Postal address:	PO Box 22, Hendrina		
Postal code:	1095	**Cell:**	
Telephone:	013 293 0505	**Fax:**	013 293 0530

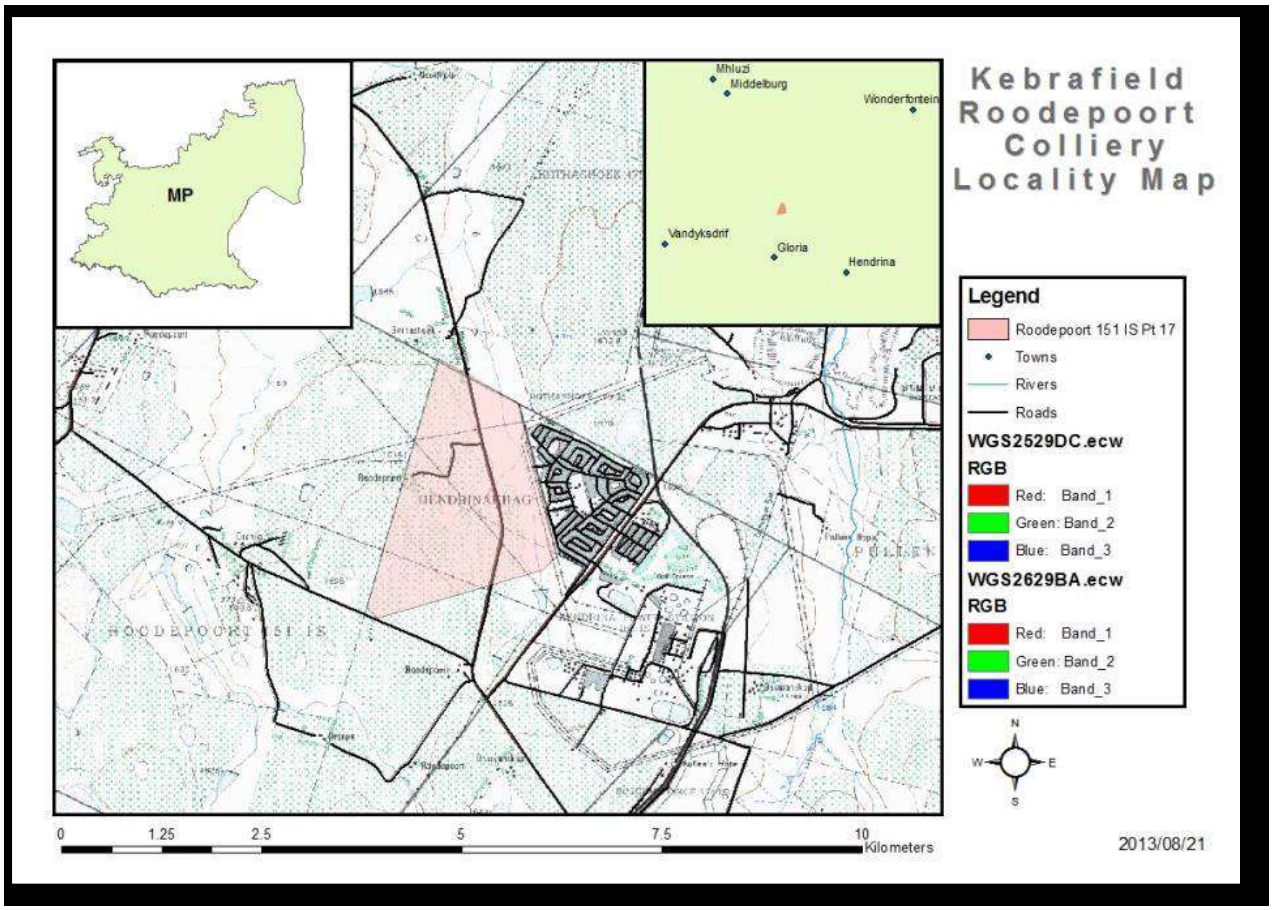


Figure 1: Locality map of the Kebrafield Roodepoort mining area

2.2 DESCRIPTION OF THE PROPOSED PROJECT

The Kebrafield Roodepoort Colliery will be an opencast mine producing 800 000tons of high grade Bituminous Coal found in a single coal seam (2.5 -3.0m thick) of the Witbank Coal Field at depths varying from 6.5m to 28m deep. The colliery will be covering an extent of approximately 60ha of the 410ha Portion 17 of Roodepoort 151 IS farm (approximately 15% of the farm). The extent of the mining area is predetermined by the extent of the coal seam as has been determined during the prospecting phase of the project. The mining right with reference MP30/5/1/2/2/479 MR has already been awarded to Kebrafield (Pty) Ltd and the Mining Right EIA and EMPR has been approved and stamped on 2011-06-06. An application for the Water Use License is being made concurrently with this EIA to ensure authorisation can be granted at the same time (expected authorisation end 2014) to enable the project to commence.

The larger extent of the mining right entails a life of mine of 30 years and covers various farm portions, although for this particular EIA authorisation only the first phase of the project is being applied for with an estimated life of mine of approximately three years. Future applications for the remainder of the reserve as approved in the

Mining Right will be lodged with the Department as separate applications due to the size and extent of the operation making it very difficult to apply for everything at once. The scope and extent of the Kebrafield Roodepoort Colliery therefore has been limited to 60ha on Portion 17 of the Farm Roodepoort 151 IS.

Mining methods vary widely and depend on the location, type and size of mineral resources. Surface mining methods are most economical in situations where mineral deposits occur close to the surface (e.g. coal, salts and other evaporate deposits or road quarry material) or form part of surface deposits (e.g. alluvial gold and diamonds, and heavy mineral sands). For this specific project the mining of coal by means of surface mining methods are viable due to the fact that the resource is situated close enough to the surface to make it economically mineable. Typical surface mining methods include: strip mining and open pit mining, as well as dredge, placer and hydraulic mining in riverbeds, terraces and beaches. The Kebrafield Roodepoort Colliery will be mined by means of open pit or also known as opencast mining methods following a roll over rehabilitation sequence. These activities always disrupt the surface and this, in turn, affect soils, surface water and near-surface ground water, fauna, flora and all alternative types of land-use (Fuggle & Rabie, 1996; Ashton, 1999).

Besides the rate and method of mining, the location, variety and scale of mine infrastructure also influences the nature and extent of impacts. The Kebrafield Roodepoort Colliery will be mined relatively quickly in a period of one year compared to other mining operations that could last for several years and/or even decades. The fast mining sequence will ensure impact duration during mining is short. Typical mine infrastructure includes: haul roads and spoil dumps; surface facilities (e.g. offices, workshops, car parks and warehouses); tailings and waste rock disposal areas; transport and service corridors (e.g. railway lines, roads, pipelines, conveyers, power and water corridors); product stockpiles; chemicals and fuel storage and housing facilities (Australian Environmental Protection Agency, 1995-1996; Fuggle & Rabie, 1996; Ashton, 1999; Weaver & Caldwell, 1999).

The figures below give an overview of the mine planning as is currently anticipated. This layout will change as specialist investigations and studies are completed and also according to the requirements of the final Record of Decision for both the NEMA and WULA processes. The images below is one technical design drawing which was created based merely on exploration drilling results, while the second image includes an initial high level wetland study and aerial image overlay. Which can be noted already is that a section of opencast has been indicated within the wetland area to the east, although this was initial planning and will be examined by a wetland specialist team to determine the viability of this section of mining. The anticipated result is that the section of boxcut indicated to the east of the main mining layout will not be included in the mine plan as this is too close to the sensitive receptor. The wetland specialist team and ecologists will make their recommendations regarding the required buffer distances which must be adhered to when mining in proximity of sensitive receptors and therefore has been acknowledged in this Draft Scoping report as an element to be studied further during the Environmental Impact Assessment phase.

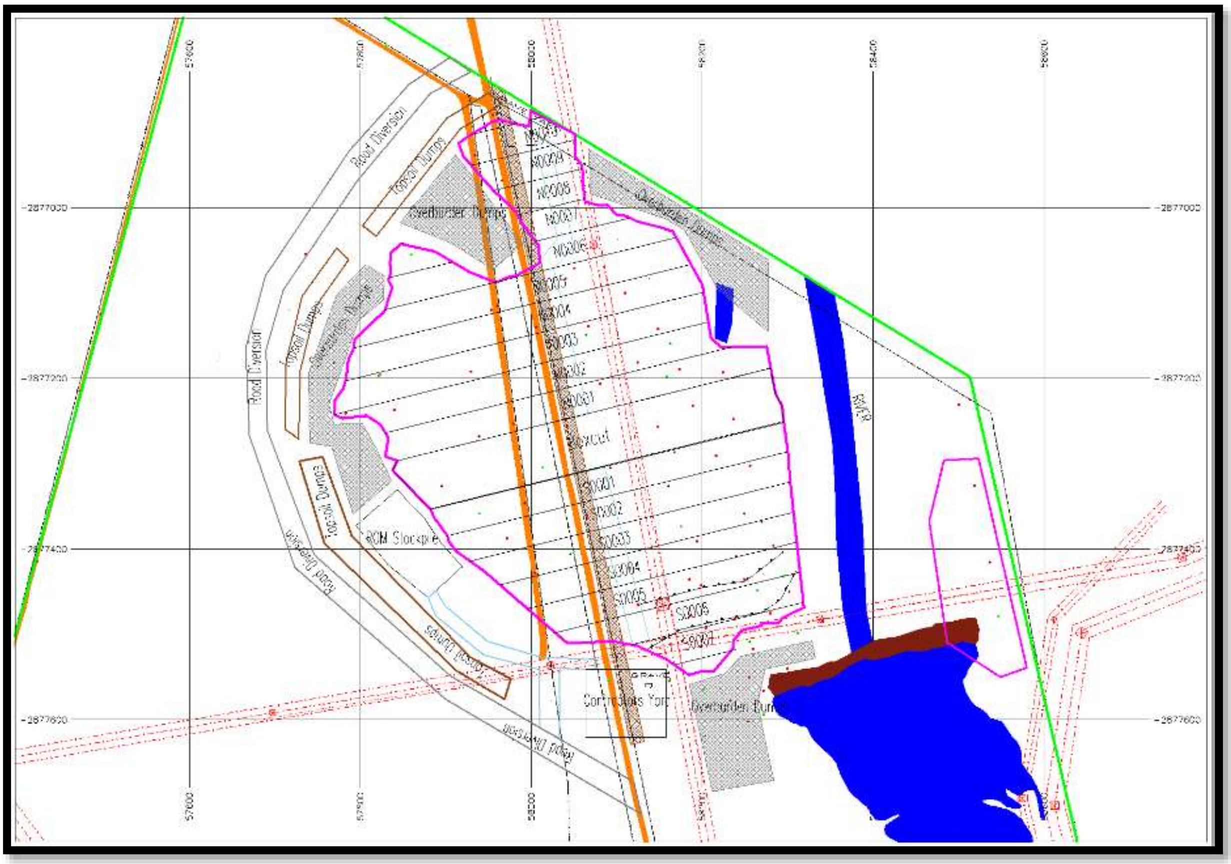


Figure 2: Mine planning layout according to the exploration drilling results

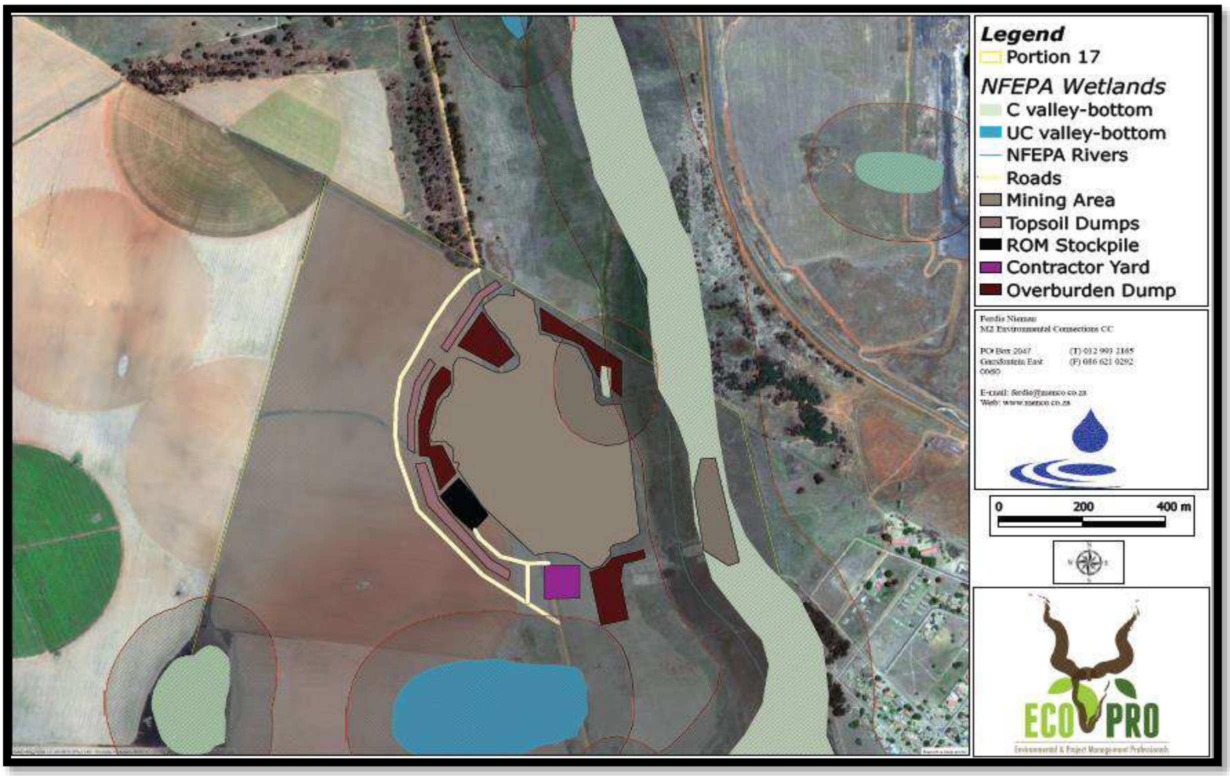


Figure 3: Mine planning layout with aerial imagery overlay

As a summary the following activities will be established and are associated with the proposed Kebrafield Roodepoort Colliery;

- Site preparation;
- Box cut opencast mining with a roll over rehabilitation sequence;
- Crushing and screening of the ROM coal;
- Access road, haul road construction and road diversion of the existing road;
- Semi temporary site offices and security office;
- Semi temporary sanitation and change house;
- Stores and store yard;
- Workshop and maintenance area;
- Bulk fuel storage;
- Pollution control facility/dam(s) (evaporation and dust suppression use);
- Clean and dirty water separation system;
- Trenching;
- Fencing;
- Mine fleet hard park;
- Staff and visitors parking;
- Drilling, blasting and explosives handling;
- Topsoil, subsoil, overburden, discard and ROM stockpiles;
- Weighbridge;
- Waste management;
- Mine closure and rehabilitation.

3 CRITERIA USED IN THE ASSESSMENT OF VISUAL IMPACTS

3.1 VIEW POINTS AND VIEW CORRIDORS

Viewpoints have been selected based on prominent viewing positions in the area. The selected viewpoints and view corridors are used as a basis for determining potential visual ability and visual impacts of the proposed mine activities. Three viewpoints were identified based on sensitivity and visual impact of the area.

3.2 VISUAL EXPOSURE

Visual exposure is based on distance from the project to selected viewpoints. Visual exposure or visual impact tends to diminish exponentially with distance. The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if the proposed mine activities and

associated infrastructure were not visible, no visual impact would occur. Visual exposure is determined by the view shed or the view catchment being the area within which the proposed development will be visible.

3.3 VISUAL SENSITIVITY

Visual sensitivity can be determined by a number of factors in combination, such as prominent topographic or other scenic features, including:

- High points, ridges and spurs (visible from a greater distance and determines the horizon effects);
- Steep slopes (tends to be more prominent and visible from a distance);
- Axial vistas.

3.4 LANDSCAPE INTEGRITY

Landscape integrity is visual qualities represented by the following qualities, which enhance the visual and aesthetic experience of the area:

- Intactness of the natural and cultural landscape;
- Lack of visual intrusions or incompatible structures;
- Presence of a 'sense of place'.

3.5 DETERMINE THE VISUAL ABSORPTION CAPACITY (VAC)

The VAC is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing, sparse and patchy vegetation will have a low VAC. Topography and built forms have the capacity to 'absorb' visual impact. The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate potential visual absorption capacity (VAC). It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover, topography and structures.

4 DESCRIPTION OF AFFECTED AREA AND ENVIRONMENT

This section of the report provides a description of the current status of the environment. This provides a baseline context for assessment of the proposed mine activities.

4.1 SURROUNDING AREA

Figure 4: Surrounding area, exotic plantation to the North of the site

Figure 5: Old mine discard dumps and Optimum Mine in the distance

Figure 6: South East, Pullenshope Town and Hendrina Power Station in the far distance

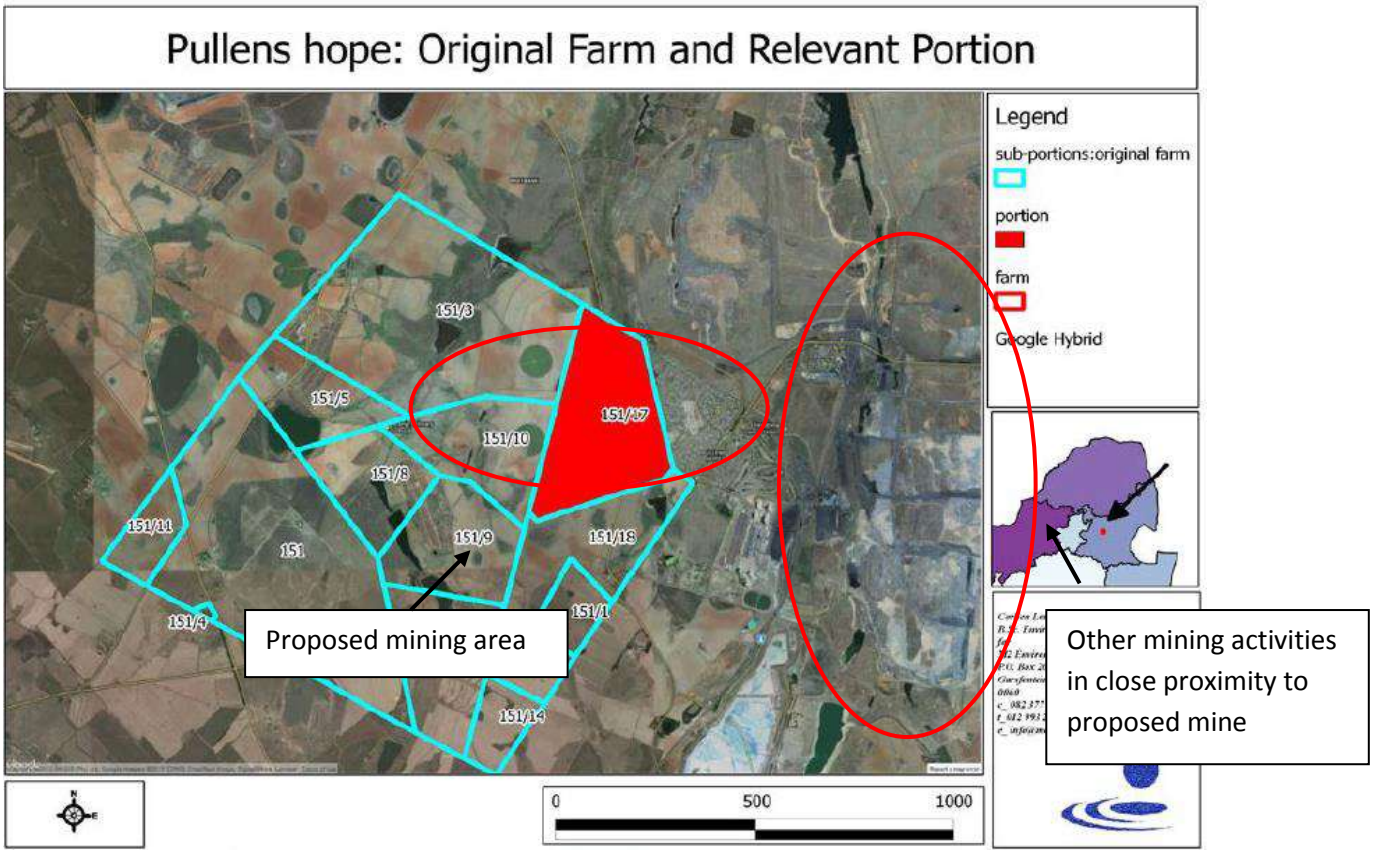


Figure 7: Surrounding infrastructure

Mineral Deposit:	Bituminous coal found in the coal seams of the Witbank Coal Field
Mineable Product:	Coal from a single coal seam horizon will be mined with an estimated thickness of 2.5m – 3.0m at a depth varying from 6.5m to 28m deep.
Reserves:	The estimated mineable in situ resource within the coal seam of the Kebrafield Roodepoort Colliery situated on Portion 17 of the Farm Roodepoort 151IS is 800 000tons of high grade coal.
Mining Method:	Opencast Mining following a roll-over concurrent rehabilitation methodology
Production Rate:	The entire estimated reserve of 800 000tons of high grade coal is proposed to be mined within the three year period at a rate of minimum 50 000tons per month
Planned life of mine:	Three years
Estimated Job Creation:	100 direct employment opportunities

Table 2: Mineral deposit table

The proposed activities are primarily surrounded by agricultural small holdings, power generation and neighbouring mining operations. Major residential areas in the region include Middelburg (~25km northwest), eMalahleni (~35km west-northwest), Bethal (~45 km southwest) and Ermelo (~60km southeast). Smaller residential areas in the region include Arnot (~20 km northeast), Pullen's Hope (~1 km east), Komati (~12 km southwest), KwaZamokuhle (~17 km southeast) and Hendrina (~17 km southeast) which may include schools and hospitals/clinics. Individual residences (i.e. farm houses) are also in the immediate vicinity of the proposed operation.

4.2 TOPOGRAPHY

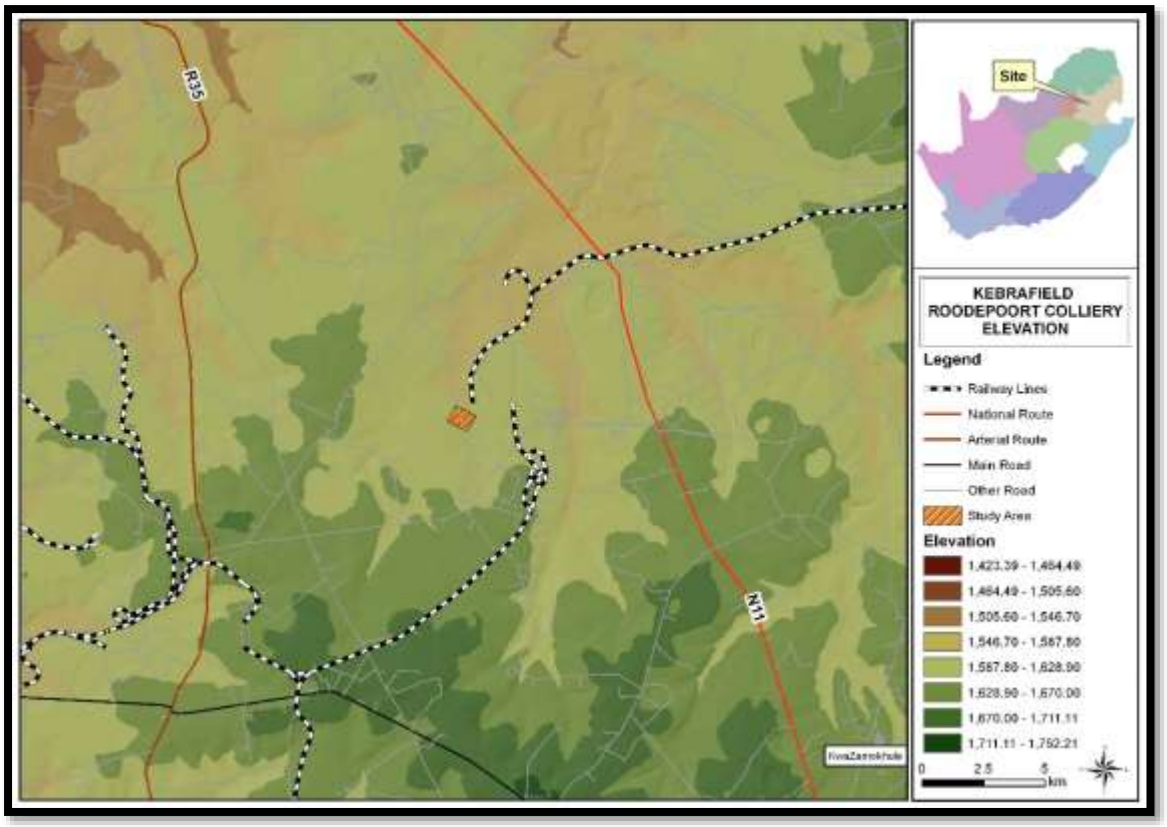


Figure 8: Elevation Map

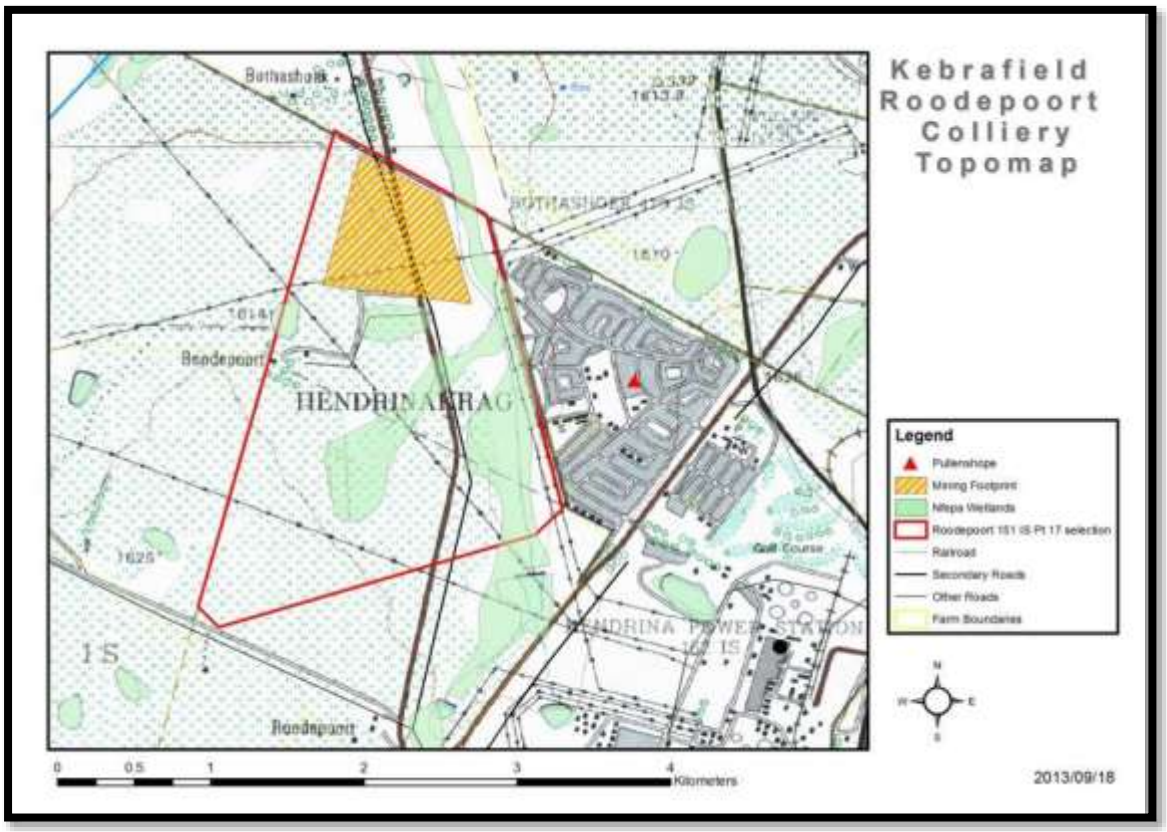


Figure 9: Topography of the area

The surface topography of the area is typical of the Mpumalanga Highveld, mainly a gently undulating plateau, varying between approximately 1680 mamsl underneath Ash Dam 4 to 1600 mamsl along the Woest-Alleen Spruit (East) and the lower reaches of the Woest-Alleen Spruit (West). The mining area is situated between the contour lines of the 1600 mamsl to 1610 mamsl. Several man-made features are also of significance at the site. Numerous dams have been constructed for a variety of purposes, the most obvious of which is the man made dam to the east of the study area, situtated right in the middle of a wetland. Various Eskom power lines transect the proposed mining area while there is a gravel road that runs straight through the middle of the mining footprint. These features are indicated in the figure below, 1:50 000 topographical map.

4.3 LAND COVER

The land cover of the proposed mining site as indicated in the figure below is mainly grasslands and cultivated commercial areas. The study area (yellow diagonal lines in the image below) covers only the northern portion of portion 17 of the Farm Roodepoort 151IS (indicated as a red polygon in the image below). A NFEPA wetland is situated to the east of the proposed study area. The large yellow polygon to the north and east of the study area has been classified according to the ENPAT data set as “Mining and Quarries”. Various previous studies conducted in the study region have acknowledged the fact that the catchment has already been largely transformed by mining activities. The proposed Kebrafield Roodepoort Colliery intends to keep clear of the wetland areas while adhering to a 100m buffer as proposed by the Wetland specialists during an initial prefeasibility study. The majority of the area to the east has been built up by the previous Hendrina Power Station Village, which today has become known as the town of Pullenshope as the majority of land ownership vest with private persons/entities.

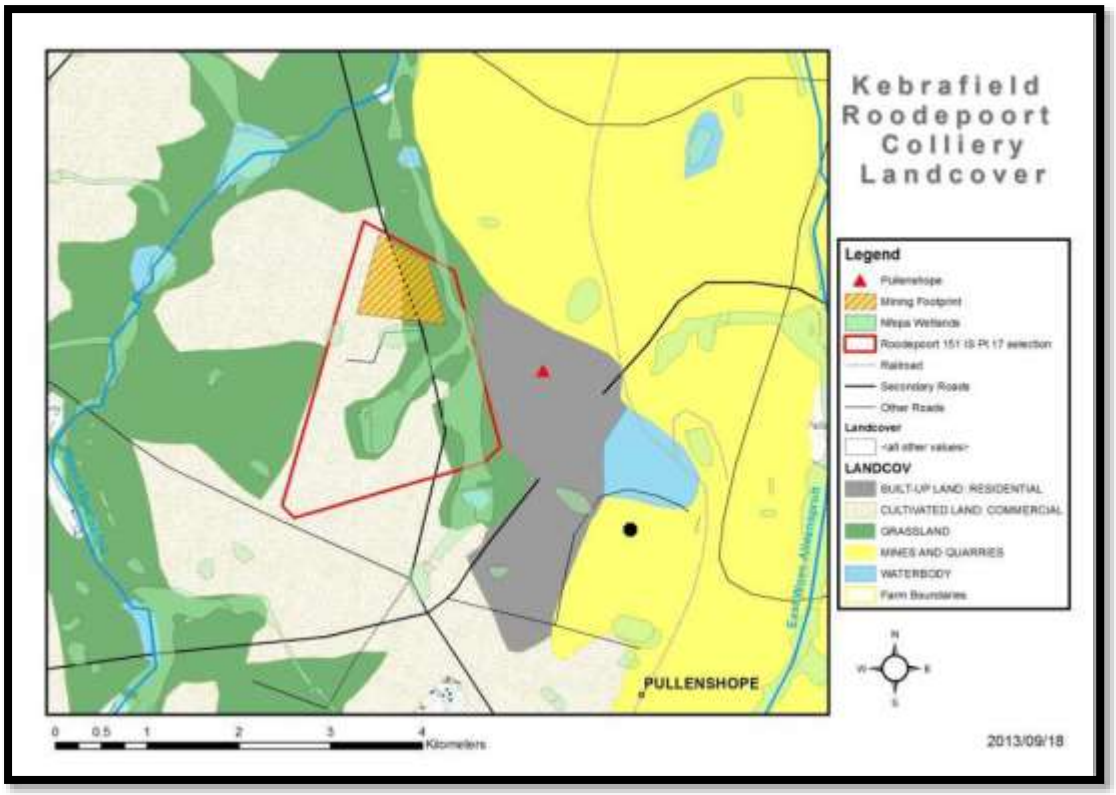


Figure 10: Land Cover map indicating overall land-cover of the study area (NFEPA and ENPAT data sets)

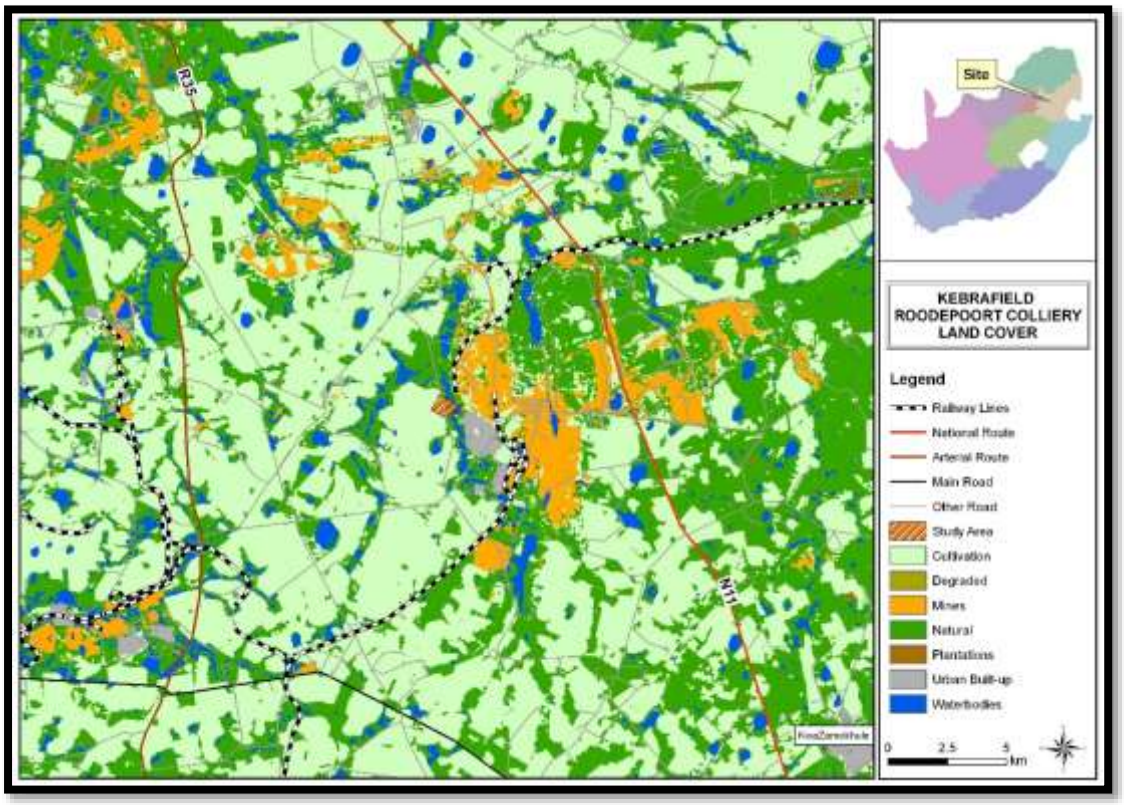


Figure 11: Land Cover Map

Land cover categories are presented in above. For the purpose of this assessment, land cover are loosely categorised into classes that represent natural habitat and land use categories that contribute to habitat degradation and transformation on a local or regional scale. Areas that are characterised by high levels of transformation and habitat degradation is generally accepted as being suitable for development purposes as it is unlikely that biodiversity attributes of sensitivities will be present or affected by development. Conversely, areas that are characterised by extensive untransformed and pristine habitat are generally not regarded suitable options for development purposes.

The status of natural habitat does however have bearing on the suitability of a site. The region comprises extensive transformed habitat that resulted from agriculture and mining, rendering remaining habitat fragmented and isolated and ultimately relatively sensitive. Little natural grassland habitat remains in the area, the majority being around streams and rivers where ploughing is not possible or soils are poor in nutrients. One of the shortfalls of the Environmental Potential Atlas database (ENPAT) is that it does not reflect the current status of natural habitat within the study area. At this stage of the process it is therefore assumed that all areas indicated to comprise of natural grassland is representative of the regional vegetation types and are in a good condition. While this assumption is unlikely to hold true for most of the study area, an assessment of the actual ecological status of grasslands within the study area is beyond the scope of this report and will only be compiled during the EIA phase.

4.4 SENSE OF PLACE

The concept of “a Sense of Place” does not equate simply to the creation of picturesque landscapes or pretty buildings, but to recognize the importance of a sense of belonging. Embracing uniqueness as opposed to standardization attains quality of place. In terms of the natural environment, it requires the identification, a response to and the emphasis of the distinguishing features and characteristics of landscapes. Different natural landscapes suggest different responses.

The sense of place is created by the grassland, meandering landscape and sandstone outcrops. Coal mining and Power stations plays an important role in the sense of place that has been created. Coal mining has taken place in the areas since the 19th century and continues to be one of the largest economic drivers of the area and the country. The Highveld is known for Power stations and coal mines.

5 VIEWSHED

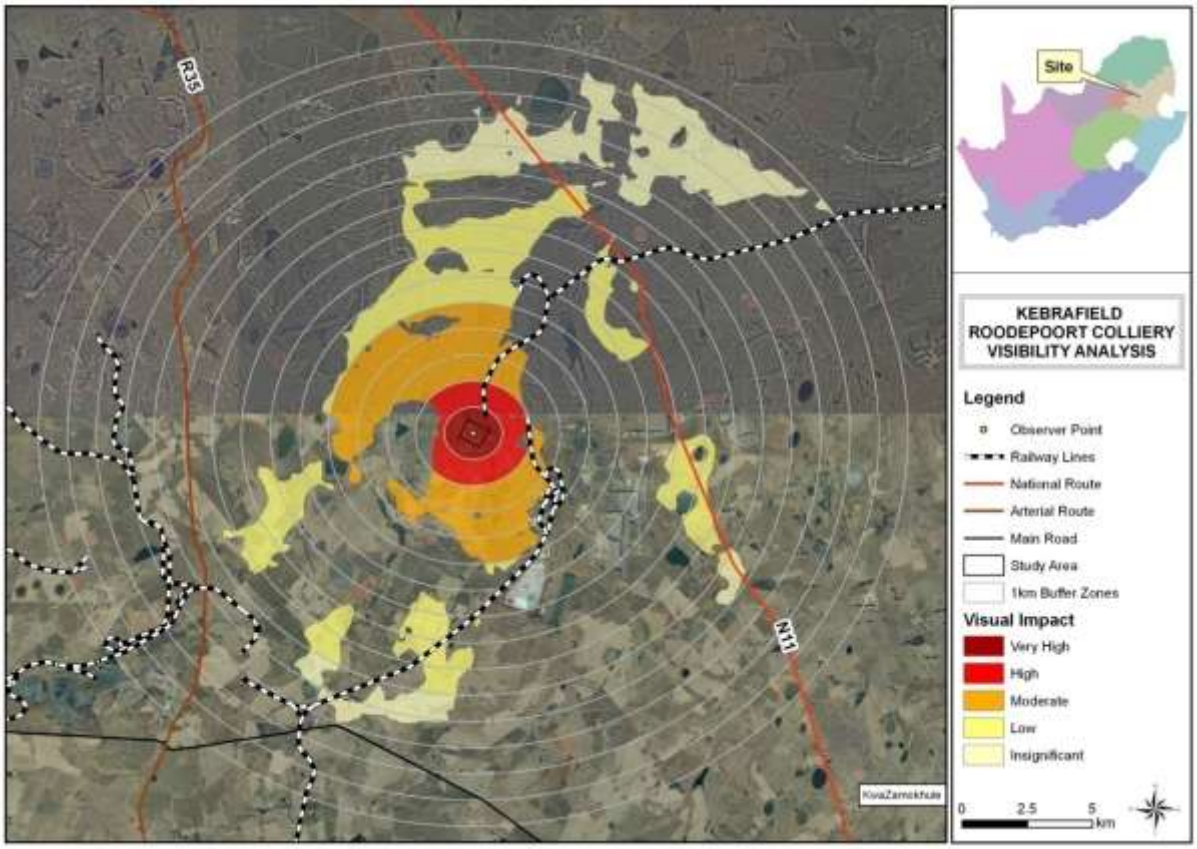


Figure 12: Viewshed of the proposed development showing the theoretical visible areas

The view shed of the mine activities, which is based on the maximum height 15 m of the soil stock piles (see **Error! Reference source not found.**), which is associated with the opencast mining activities. The visible area is indicated in **Error! Reference source not found.**, as the coloured area. These areas are the areas that can be classified as areas that would have a direct line of sight to the mining activities (i.e. the areas from which the Stockpile would theoretically be visible, solely based on topography and not taking vegetation and manmade structure into consideration). View shed does not take modification of topography, buildings or vegetation into consideration. For this reason, photographic methods (viewpoint) are, use to verify or correct the view shed.

5.1 VIEW SHED VISIBILITY

For the assessment of the visibility of the area, the view shed is divided into four quadrants (i.e. North, East, South, and West). These quadrants are then assessed for the percentage visibility within the 15 km buffer zones. **Error! Reference source not found.** is the rating used for the assessment of the visibility of the activity.

Table 3: Visibility of quadrants of the proposed development

Visibility rating		
Quadrants	Rating	
North	0 - 1 km:	Very high
	0 – 2 km	Very high
	2 – 3 km:	High Medium
	3 – 5 km:	Medium
	5 – 10 km:	Low
	10 – 15 km:	Very low
East	0 - 1 km:	Very high
	0 – 2 km	Very high
	2 – 3 km:	Medium high
	3 – 5 km:	Low
	5 – 10 km:	None
	10 – 15 km:	None
South	0 - 1 km:	Very High
	0 – 2 km	Very high
	2 – 3 km:	High Medium
	3 – 5 km:	Medium
	5 – 10 km:	Low
	10 – 15 km:	Very Low
West	0 - 1 km:	Very high
	0 – 2 km	High
	2 – 3 km:	High
	3 – 5 km:	Medium
	5 – 10 km:	Medium low
	10 – 15 km:	Low

Table 4: Visibility rating

Visibility Rating	
None	Not visibility
Very low	0 – 12.5 % visibility
Low	12.5 – 25 % visibility
Medium low	25 – 37.5 % visibility
Medium	37.5 – 50 % visibility
Medium High	50 – 62.5 % visibility
High Medium	62.5 – 75 % visibility
High	75 – 87.5 % visibility
Very High	87.5 – 100 % visibility

5.2 PROPOSED LAYOUT

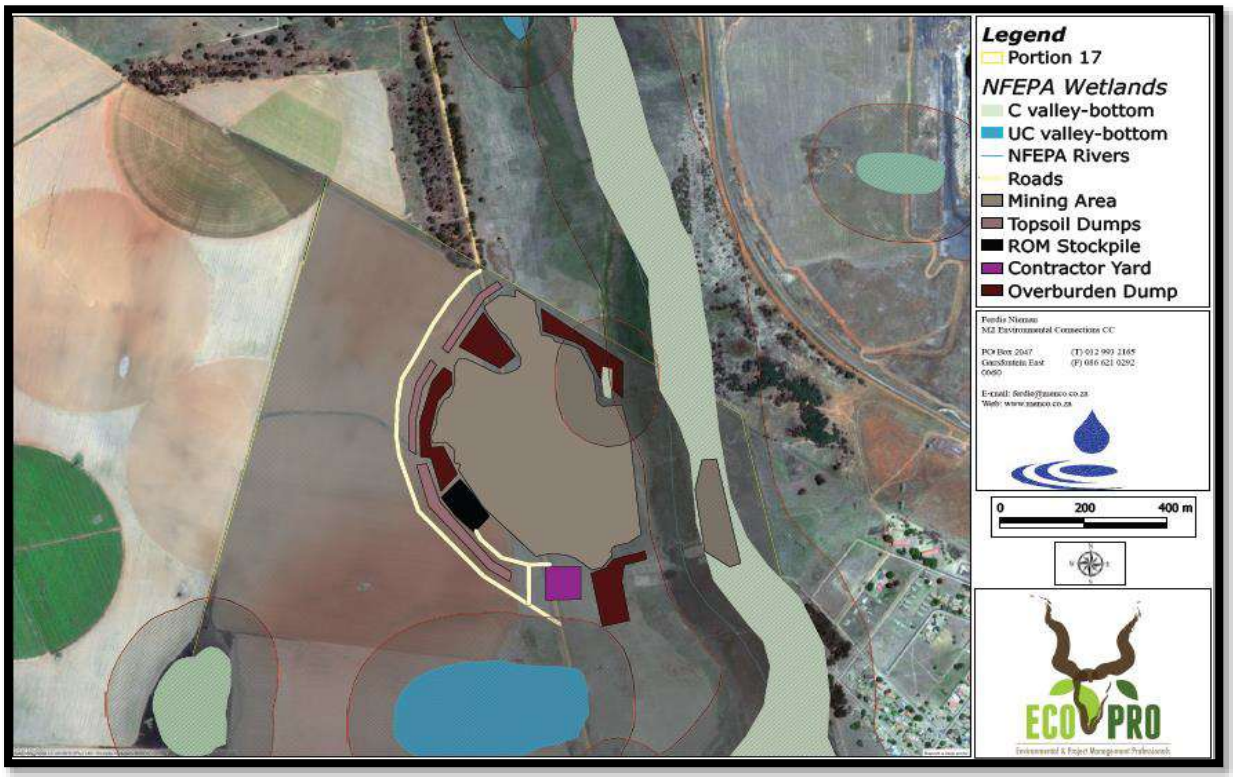


Figure 13: Proposed Layout

The mining will be restricted to the eastern part of the site where all infrastructure associated with mining will be located. **Error! Reference source not found.** indicated the proposed layout of the mining area.

5.3 VIEW POINTS

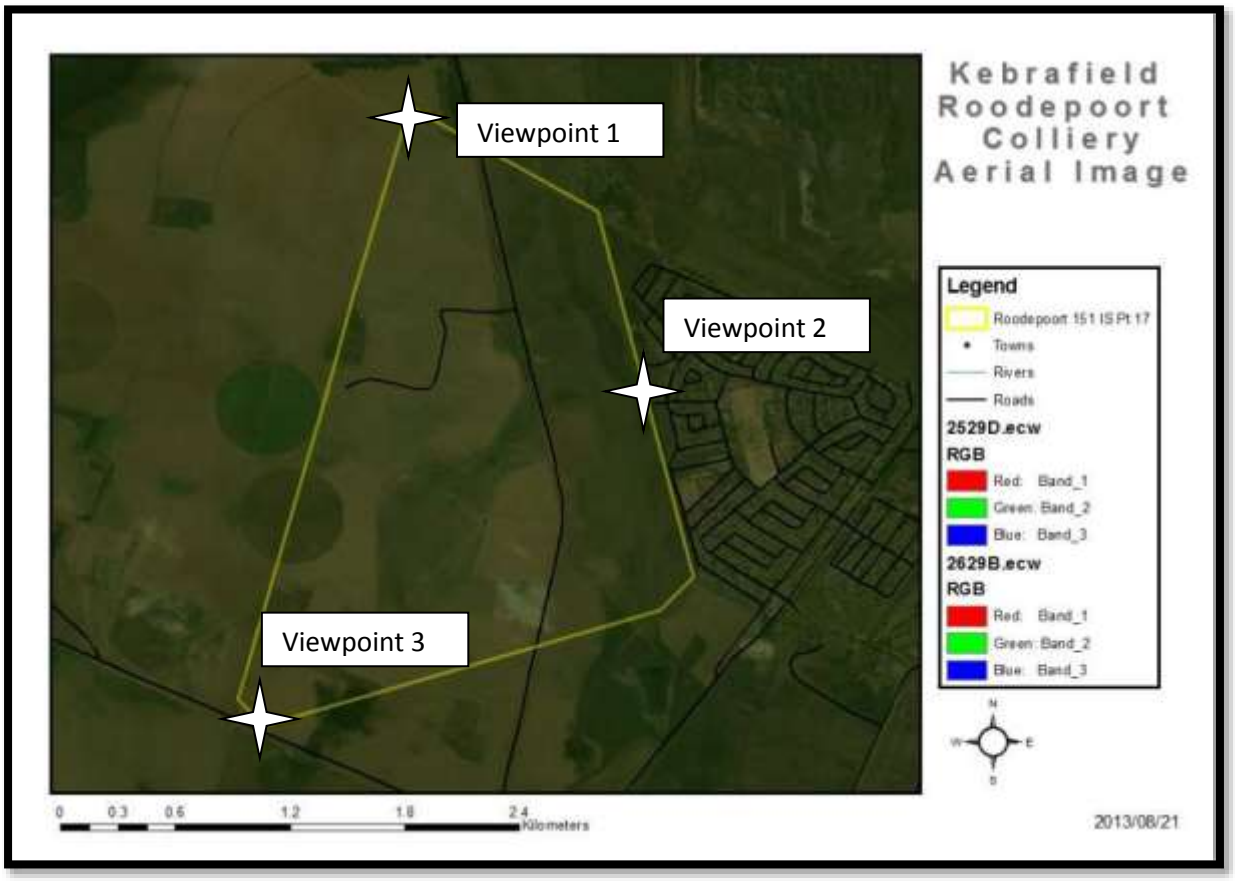
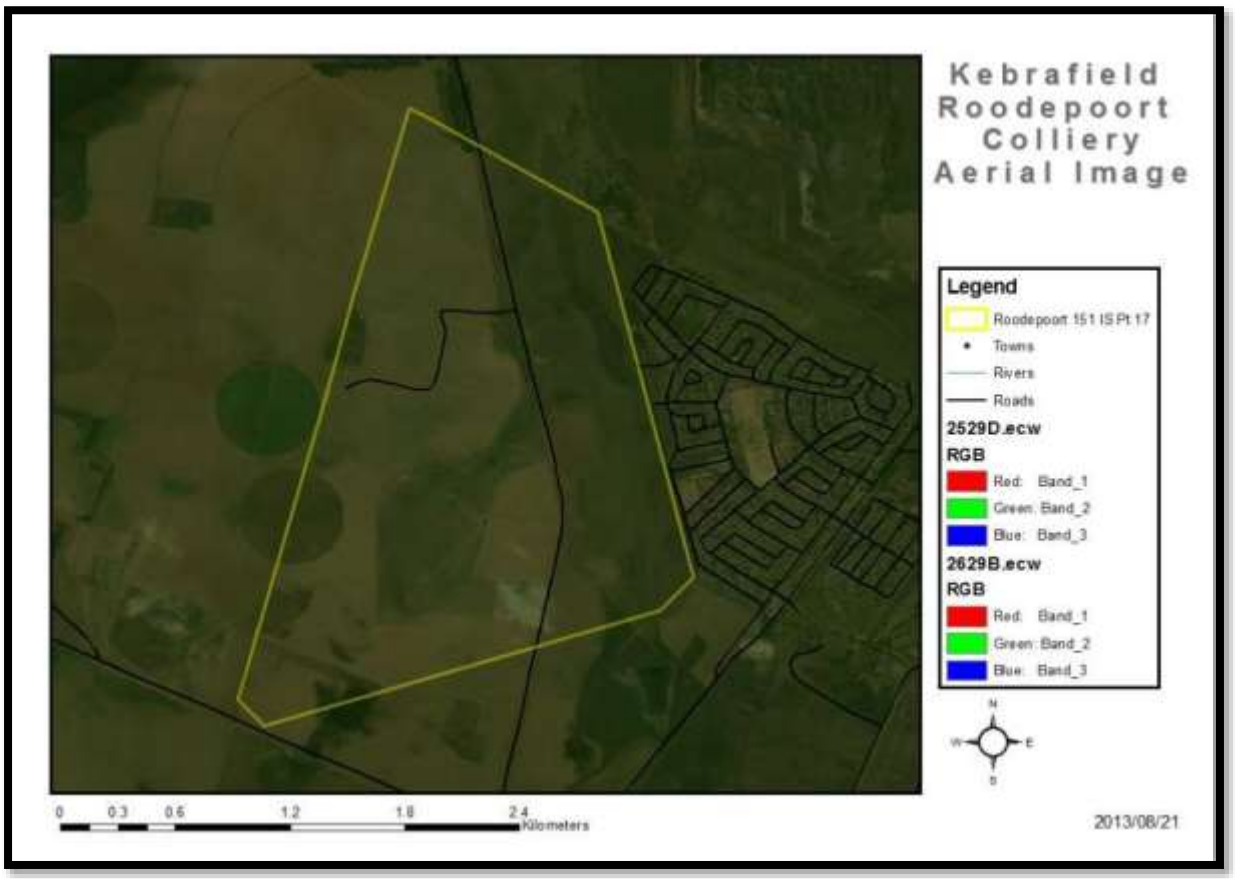


Figure 14: Viewpoints

Due to fact that topographic modification has taken place by agricultural, vegetation and other mining activities, the view shed is only a theoretical study. For this VIA to be more accurate viewpoint of sensitivity have be identified and then a visual inspection (photographic inspection) have be conducted from these points to identify the severity of the visual impact of the activities. As indicated in



, four viewpoints have been identified from where photographic inspections were conducted.

The viewpoints have been identified based on the sensitivity of the areas to visual disturbance and areas that can be negatively impacted by the mine related activities.

5.4 VISUAL EXPOSURE

Viewpoint 1:

Viewpoint 1 is located on the gravel road at the North Western corner of the site. The viewpoint represents the road users, farming to the west and exotic plantation to the north.

Figure 15: Visibility for Viewpoint 1

Viewpoint 2:

Viewpoint 2 is located on the South East corner of the site where there is a clear visibility towards the edge of Pullenshope and in the far distance the Hendrina Power station.

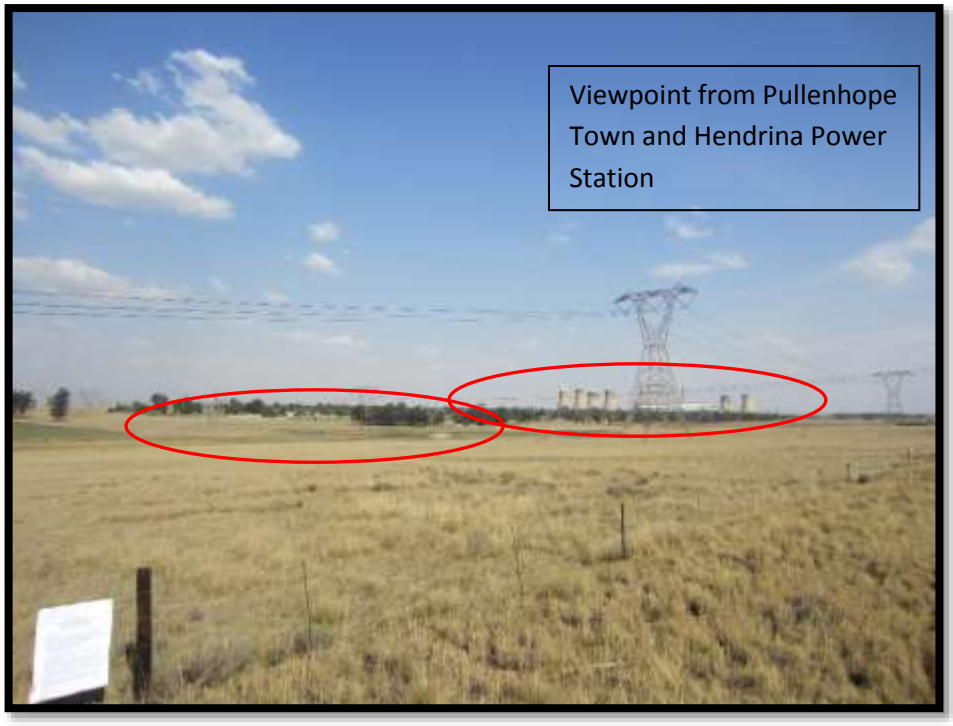


Figure 16: Visibility for Viewpoint 2

Viewpoint 3:

Viewpoint 3 is located North East of the site on the gravel road about a kilometre from the intersection with the R555 road. This viewpoint represents the local community travelling along this road, the farmhouses and the informal settlements in close proximity to the site.

Figure 17: Visibility for Viewpoint 3

5.5 VISUAL IMPACT CRITERIA

Table 5: Criteria for Visual Impact Assessment

Intensity (Magnitude)	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it has a significant, moderate or insignificant, visual impacted.	
(I)nsignificant	The visual impact of the development will not have a negative effect on the surrounding environment and land users
(M)oderate	The development will have an effect on the environment and land users, but will not be significant
(V)ery High	The development will have a significant impact on the environment and land users.
Duration	
The lifetime of the impact, that is measure in relation to the lifetime of the proposed development.	

(T)emporary	The impact either will disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
(S)hort term	The impact will be relevant through to the end of a construction phase (1.5 – 2 years)
(M)edium term	The impact will last up to the end of the development phases, where after it will be entirely negated.
(L)ong term	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.
(P)ermanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact is transient.
Spatial Scale	
Classification of the physical and spatial aspect of the impact	
(F)ootprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
(S)ite	The impact could affect the whole, or a significant portion of the site.
(R)egional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
(N)ational	The impact could have an effect that expands throughout the country (South Africa).
(I)nternational	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
Probability	
This describes the likelihood of the impact actually occurring. The impact may occur for any length of time during the life cycle of the activity. The classes are rated as follows:	
(I)mprobable	The possibility of the Visual Impact occurring is none, due to the circumstances or design. The chance of this Visual Impact occurring is zero (0%)
(P)ossible	The possibility of the Visual Impact occurring is very low, due either to the circumstances or design. The chance of this Visual Impact occurring is defined as 25% or less
(L)ikely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of the Visual Impact occurring is defined as 50%
(H)ighly	It is most likely that the Visual Impacts will occur at some stage of the

Likely	development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
(D)efinite	The Visual impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

Table 6: Assessment Criteria and Ranking Scale

PROBABILITY		MAGNITUDE	
Description Meaning	Score	Description Meaning	Score
Definite / don't know	5	Very high / don't know	10
Highly likely	4	High	8
Likely	3	Moderate	6
Possible	2	Low	4
Improbable	1	Insignificant	2
DURATION		SPATIAL SCALE	
Description Meaning	Score	Description /Meaning	Score
Permanent	5	International	5
Long Term	4	National	4
Medium	3	Regional	3
Short term	2	Local/Site	2
Temporary	1	Footprint	1/0

Equation 1: Significant Rating

Significant Rating (SR) = (Extent + Intensity + Duration) x Probability

Table 7: Significant Rating Scale without mitigation

SR < 30	LOW (L)	Visual Impact with little real effect and which should not have an influence on or require modification of the project design or alternative mitigation. No mitigation is required.

30 > SR < 60	MEDIUM (M)	Where Visual Impact could have an influence on the decision unless it is mitigated. An impact or benefit, which is sufficiently important to require management. Of moderate significance - could influence the decisions about the project if left unmanaged.
SR > 60	HIGH (H)	Impact is significant, mitigation is critical to reduce impact or risk. Resulting impact could influence the decision depending on the possible mitigation. An impact, which could influence the decision about whether or not to proceed with the project.

Table 8: Significant Rating Scale with mitigation

SR < 30	LOW (L)	The Visual Impact is mitigated to the point where it is of limited importance.
30 > SR < 60	MEDIUM (M)	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative visual impacts to acceptable levels, the negative visual impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
SR > 60	HIGH (H)	The visual impact is of major importance. Mitigation of the visual impact is not possible on a cost-effective basis. The visual impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. The visual impact is regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

6 VISUAL IMPACT ASSESSMENT

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

6.1 POTENTIAL VISUAL IMPACT OF THE MINING ACTIVITIES

Potential visual impact on the Viewpoint 1 (see section 5.4) is expected to have a MEDIUM impact before mitigation and LOW significance after mitigation, as indicated in the table below. Although the Mine Activities will be meduim visible from Viewpoint 1, the time of exposure is minimal and thus the impact on the users will be LOW.

Table 9: Impact table summarizing the significance of visual impacts on users of public road and farm

Nature of impact:
The gravel road at the North Western corner of the site. The viewpoint represents the road users, farming to the west and exotic plantation to the north.

	No Mitigation	With Mitigation
	Proposed	Proposed
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Likely (3)	Likely (3)
Significance Rating (SR)	Medium (33)	Low (27)
Status (positive, neutral or negative)	Negative	
Reversibility	Yes	
Irreplaceable loss of resources	Yes	
Can impact be mitigated	Yes	
Mitigation:	The visual impact can be minimized by the creation of a visual barrier. The area will be rehabilitated after mining is concluded and thus the visual impact will be removed and the area will be restored.	

Potential impact of Viewpoint 2 will be HIGH before mitigations and MEDUIM after mitigations have been implemented. The Impact on the Farmes and land users will be minimal due to the fact that the mining activity will only be visible for a short time period. The impact on the Pullenshope residents will be more significant but can still be seen as medium because of the short time extent the proposed activity will be undertaken. Although the mine activities will be highly visible, the time of exposure is minimal and thus the impact on the users will be low after mitigation.

Table 10: Impact table summarizing the significance of visual impacts on the road infrastructure and land users

Nature of impact: Viewpoint 2 is located on the South East corner of the site where there is a clear visibility towards the edge of Pullenshope and in the far distance the Hendrina Power station.		
	No Mitigation	With Mitigation
	Proposed	Proposed
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Likely (3)	Likely (3)
Significance Rating	Medium (33)	Low (27)

(SR)		
Status (positive, neutral or negative)	Negative	
Reversibility	Yes	
Irreplaceable loss of resources	Yes	
Can impact be mitigated	Yes	
Mitigation:	The visual impact can be minimized by the creation of a visual barrier. The area will be rehabilitated after mining is concluded and thus the visual impact will be removed and the area will be restored.	

Potential visual impact on the residential properties South West of the site and gravel road users. The visual impact on Viewpoint 3 is expected to be of MEDIUM significance before mitigation and LOW after mitigation, as illustrated in table below.

Table 11: Impact table summarizing the significance of visual impacts on Viewpoint 3

Nature of impact: Potential visual impact on the land users, farmers and gravel road users, Viewpoint 3		
	No Mitigation	With Mitigation
	Proposed	Proposed
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Likely (3)	Likely (3)
Significance Rating (SR)	Medium (33)	Low (27)
Status (positive, neutral or negative)	Negative	
Reversibility	Yes	
Irreplaceable loss of resources	Yes	
Can impact be mitigated	Yes	
Mitigation:	The visual impact can be minimized by the creation of a visual barrier. The area will be rehabilitated	

	after mining is concluded and thus the visual impact will be removed and the area will be restored.

6.2 MITIGATION MEASURES

Mitigation measures may be considered in two categories:

Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered. Mine closure is one of the concepts that are used. The mine closure and rehabilitation, final landform and land-use must be planned before the opencast mining is initiated.

Secondary measures designed to specifically address the remaining negative effects of the final development proposals.

Primary measures that will be implemented will mainly be measures that will minimise the visual impact by softening the visibility of the mining activities by "blending" with the surrounding areas. Such measures will include rehabilitation of the mining area by re-vegetation of the mining site and surrounding area.

Secondary measures will include final rehabilitation, after care and maintenance of the vegetation and to ensure that the final landform is maintained.

In addition the following measures are recommended:

- Dust from Stockpile areas, roads and other activities must be managed by means of dust suppression to prevent excessive dust.
- Blasting must be done under controlled conditions (i.e. Windy days must be avoided) and must be done in such a way that dust is minimised.
- Blasting should not take place before 08:00 and after 16:00.
- Stockpiles should not exceed 15m in height.
- Rehabilitation of the area must be done as the mining is completed.

6.3 CONCLUSION

The construction and operation of the Kebrafield Roodepoort Mine related activities and its associated infrastructure will have a visual impact on the natural scenic resources and the topography. However, with the correct mitigation measures the impact can be decreased to a point where the visual impact can be seen as insignificant.

The moderating factors of the visual impact of the facility in the close range are the following:

- Short exposure time of road users
- The time the structure will be visual due to roll-over mining
- Number of human inhabitants located in the area
- Natural topography and vegetation
- Mitigation measures that will be implemented such as the establishment of barriers or screens
- The size of the operation
- Medium to high absorption capacity of the landscape

In light of the above mentioned factors that reduce the impact of the facility, the visual impact is assessed as **LOW VISUAL IMPACT** after mitigation measures have been implemented.

Table 12: The overall Assessment of the Visual Impact

Nature of impact: The overall Assessment of the Visual Impact of the area.		
	No Mitigation	With Mitigation
	Proposed	Proposed
Extent	Regional (3)	Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Likely (3)	Likely (3)
Significance Rating (SR)	Medium (33)	Low (27)
Status (positive, neutral or negative)	Negative	
Reversibility	Yes	
Irreplaceable loss of resources	Yes	
Can impact be mitigated	Yes	
Mitigation:	The visual impact can be minimized by the creation of a visual barrier. The area will be rehabilitated after mining is concluded and thus the visual impact will be removed and the area will be restored.	

The Visual Impact that will occur due to the Mining activities and associated infrastructure can be seen as having Medium impact on the surrounding environment and inhabitants before mitigation measures are implemented. After mitigation has taken place, the visual impact can be seen as Low.

The visual impact that will occur from the mining activities can be sufficiently mitigated to a point where it can be seen as insignificant. Thus, mitigation measures are very important and one of the most significant mitigation measures are the rehabilitation of the area after mining has been concluded. If the rehabilitation of the impact is

not done correctly and the final landform do not fit into the surrounding area then the visual impact will remain high and thus become of concern. However, with correct rehabilitation, the impact will be minimal and there should be no visual impact after the landform has been restored.