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ENVIRONMENTAL

Environmental Authorisation for Klipspruit Extension: Weltevreden

Topography and Visual Impact Assessment Report

Project Number:

BHP2690

Prepared for:

BHP Billiton Energy Coal South Africa (Pty) Limited (BECSA)

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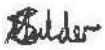
Stephanie Mulder	Report Writer		January 2015
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EXECUTIVE SUMMARY

Digby Wells Environmental (Digby Wells) has been appointed by BECSA as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Impact Assessment (EIA) according to the NEMA, including the associated specialist studies for the opencast development at KPSX: Weltevreden, and the required Public Participation Process (PPP). The environmental considerations for the impact assessment phase of the EIA included a T&VIA for the proposed KPSX: Weltevreden Project.

The proposed KPSX: Weltevreden Project is an extension of the existing BECSA Klipspruit Colliery in the Witbank Coalfield area. This region is characterised by agriculture interspersed with coal mines and power stations. The project area falls within the Emalahleni Local Municipality and the Nkangala District Municipality. The nearest settlement is Minnaar which falls within the project area. The nearest town is Phola which borders the project area on the west. The nearest city is Emalahleni (formerly known as Witbank) situated approximately 13.4 km north-east of the project area.

The topography of the project area and surrounds is undulating with numerous small ridges and valleys. The topographical model indicates that the elevation of the project area decreases from 1 612 metres above mean sea level (m.a.m.s.l.) in the south, to 1 482 m.a.m.s.l. in the north. The majority of the project area has gentle slopes of less than 4°. Isolated slopes of between 4° and 11.3° occur along the sides of the ridges and river valleys. Due to the undulating topography, the slope aspect / direction of the project area is not in any specific direction. The mildly undulating topography is expected to only provide minimal screening of the proposed development. The receiving environment is characterised by agriculture and mining with little of the natural vegetation (Eastern Highveld Grassland, Rand Highveld Grassland and Eastern Temperate Freshwater Wetlands) remaining. The proposed project is expected to partially blend in with the surrounding mining activity. The agricultural and natural grassland vegetation will only provide minimal screening of the proposed development.

A viewshed is a geographical area, defined by the topography, within which a particular feature will be visible (Oberholzer, 2005). The viewshed model for the proposed KPSX: Weltevreden Project was refined to a buffer of 10 km around the proposed infrastructure and divided into areas that are likely to experience different categories of visual exposure. Due to the nature of the receiving environment it is unlikely that the proposed infrastructure will be visible beyond this 10 km buffer. The viewshed model depicts the area from which the proposed KPSX: Weltevreden Project is likely to be visible. This viewshed covers an area of 562.2 km².

The viewshed model for this study was based on assumptions as the infrastructure heights for the proposed KPSX: Weltevreden Project were not available. It is recommended that a more accurate viewshed model be run when these infrastructure heights are available. Ideally the viewshed model for the proposed KPSX: Weltevreden Project should be

compared to the viewshed model for the existing BECSA Klipspruit Colliery to identify areas of additional visual disturbance to determine the nett increased impact. It is recommended that a viewshed comparison be done when the infrastructure layouts and heights for the existing BECSA Klipspruit Colliery are available.

The proposed KPSX: Weltevreden Project has a high visibility and moderate visual exposure as it is will be visible from a large area and will be recognisable to the viewer. The proposed project has a moderate visual intrusion as it partially fits into the surroundings, but will be clearly noticeable. Although the proposed KPSX: Weltevreden Proejct is an extension of an existing mine, it covers a much larger area than the existing BECSA Klipspruit Colliery and will therefore have a significant impact on the receiving environment. The receiving environment and receptors of the proposed KPSX: Weltevreden Project have a moderate sensitivity. The receiving environment has a low VAC because there is little screening by the topography or vegetation. The proposed KPSX: Weltevreden Project will therefore have a high visual impact on the receiving environment.

The proposed KPSX: Weltevreden Project will have negative topographic and visual impacts on the receiving environment, but these impacts can be reduced by implementing various mitigation measures. The most important of these is rehabilitation with the emphasis being on re-contouring the site and reconstructing the surface water and drainage lines. The success of this rehabilitation will influence the overall long term impact of the proposed project on the topography and visual / aesthetic character of the receiving environment.

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Abbreviations and Acronyms

BECSA	BHP Billiton Energy Coal South Africa
CD: NGI	Chief Directorate: National Geospatial Information
CV	Curriculum Vitae
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ELC	European Landscape Convention
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EIA	Environmental Impact Assessment
Eskom	Eskom Holdings SOC Limited
GIS	Geographic Information System
IFC	International Finance Corporation
IWWMP	Integrated Water and Waste Management Plan
km	Kilometres
KPS	Klipspruit
KPSX: South	Klipspruit Extension: South
KPSX: Weltevreden	Klipspruit Extension: Weltevreden
LoM	Life of Mine
m	Metres
m.a.m.s.l.	Metres above mean sea level
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
NEMA	National Environmental Management Act 107 of 1998

NEM: PAA	National Environmental Management: Protected Areas Act 57 of 2003
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PCD	Pollution Control Dam
PPP	Public Participation Process
ROM	Run of Mine
SANRAL	South African National Roads Agency Limited
T&VIA	Topography and Visual Impact Assessment
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
WULA	Water Use Licence Application

1 Introduction

Topography is the study of the earth's surface. It includes both natural and man-made features. The Collins English Dictionary (2003) describes topography as:

- The study or detailed description of the surface features of a region (Earth Sciences / Physical Geography);
- The detailed mapping of the configuration of a region (Earth Sciences / Physical Geography);
- The landforms or surface configuration of a region (Earth Sciences / Physical Geography);
- The surveying of a region's surface features (Mathematics & Measurements / Surveying); and
- The study or description of any object.

For the purpose of this study, the topography will be conceptualised as the landforms and surface configuration of the landscape.

"Visual, scenic and cultural components of the environment can be seen as a resource, much like any other resource, which has a value to individuals, to society and to the economy of the region" (Oberholzer, 2005). A Topography and Visual Impact Assessment (T&VIA) is a combined specialist study performed to identify the topographical and visual impacts of the proposed project on the receiving environment.

This report describes the current topography and visual / aesthetic character of the receiving environment and the expected topographical and visual impacts of the proposed Klipspruit Extension: Weltevreden (KPSX: Weltevreden) Project. The impacts are described and rated, and mitigation measures to reduce the negative impacts and enhance the benefits of the proposed project are also discussed in this T&VIA.

A study was conducted to identify and evaluate the surface features using ArcGIS 3D Analyst Extension to create a topographical model, and the resultant slope intensity, slope aspect and viewshed model.

2 Project Description

BHP Billiton Energy Coal South Africa Propriety Limited (BECSA) is the holder of an approved Mining Right (Ref No. MP 30/5/1/2/2/125 MR) and Environmental Management Programme (EMPr) for Klipspruit Colliery (KPS), located near Ogies, Mpumalanga Province. The KPS EMPr was approved in 2003 in terms of Section 39 of the Minerals Act, 1991 (Act No. 50 of 1991) and in 2009 was subsequently updated to meet the requirements of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) (MPRDA).

BECSA is proposing to extend the Life of Mine (LoM) of its operations by implementing the Klipspruit Extension (KPSX) Project which incorporates Klipspruit South (KPSX: South), as

well as BECSA's three neighbouring Prospecting Rights to the north east, collectively referred to as Weltevreden (KPSX: Weltevreden). The Mining Right for KPS incorporates the Klipspruit Main Pit, the Smaldeel Mini-pit, Bankfontein and KPSX: South. The KPSX: Weltevreden Project will extend the KPS LoM by at least another twenty (20) years. The regional and local setting of KPSX: Weltevreden is depicted in Plan 1 and Plan 2 in Appendix A.

In addition to the approved EMPr, an application for a Water Use Licence Application (WULA) will be submitted to the Department of Water and Sanitation (DWS) for various water uses at KPSX: Weltevreden. An Integrated Water and Waste Management Plan (IWWMP) will be developed to manage the water resources and waste streams produced during the mining operations.

Associated with the proposed mining activities at KPSX: Weltevreden, is the possible relocation of its dragline from the KPS operations to the KPSX: Weltevreden Project site. The transportation of the dragline will require the construction of a dragline walkway from KPS to KPSX: Weltevreden and will involve the diversion of numerous roads, including the N12 national road which is owned and maintained by the South African National Roads Agency Limited (SANRAL), as well as 132 kV power lines owned and maintained by Eskom Holdings SOC Limited (Eskom).

BECSA has applied for an amendment to the Mining Right and the Mining Work Programme for KPS in terms of the provisions of Section 102 of the MPRDA to incorporate the KPSX: Weltevreden resource. In addition, a Section 102 EIA/EMPr Amendment Report will be submitted to the Department of Mineral Resources (DMR). The WULA will be submitted to the Department of Water and Sanitation (DWS) according to Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA). In addition, environmental authorisation is required for listed activities triggered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). This specialist impact assessment report is compiled in support of the above mentioned environmental authorisation and will be submitted to the relevant competent authorities.

3 Terms of Reference

Digby Wells Environmental (Digby Wells) has been appointed by BECSA as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Impact Assessment (EIA) according to the NEMA, including the associated specialist studies for the opencast development at KPSX: Weltevreden, and the required Public Participation Process (PPP). The environmental considerations for the impact assessment phase of the EIA included a T&VIA for the proposed KPSX: Weltevreden Project.

4 Relevant Legislation

The following international, national and regional documents form part of the legislative and policy framework of the T&VIA.

4.1 International Conventions

The European Landscape Convention (ELC) created by the Council of Europe, was the first international convention to focus exclusively on landscapes. The purpose of this convention is to promote effective management and planning of landscapes. It was signed by the United Kingdom government in 2006 and became binding from 2007. Public documents that explore the impacts of large scale developments, as defined in the ELC, on any landscape should take into account the effects of these developments. A landscape means “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” i.e. the natural, visual and subjectively perceived landscape, (Contesse, 2011; European Landscape Convention, 2007).

There is no regional or local scale legislation pertaining to mining activities and Visual Impact Assessments (VIAs) exclusively but VIAs are relevant to the International Finance Corporation’s (IFC) Performance Standards and this will be treated as a best practice guideline.

IFC Performance Standard 3: Resource Efficiency and Pollution Prevention is applicable to the VIA. Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional and global levels. For the purposes of this Performance Standard, the term ‘pollution’ is used to refer to both hazardous and non-hazardous chemical pollutants in the solid, liquid, or gaseous phases, and includes other components such as pests, pathogens, thermal discharge to water, GHG emissions, nuisance odours, noise, vibration, radiation, electromagnetic energy and the creation of potential visual impacts including light (IFC, 2012).

The Environmental, Health and Safety Guidelines for Mining therefore need to be considered (World Bank, 2007):

“Mining operations, and in particular surface mining activities, may result in negative visual impacts to resources associated with other landscape uses such as recreation or tourism. Potential contributors to visual impacts include high walls, erosion, discoloured water, haul roads, waste dumps, slurry ponds, abandoned mining equipment and structures, garbage and refuse dumps, open pits, and deforestation. Mining operations should prevent and minimise negative visual impacts through consultation with local communities about potential post-closure land-use, incorporating visual impact assessment into the mine reclamation process. Reclaimed lands should, to the extent feasible, conform to the visual aspects of the surrounding landscape. The reclamation design and procedures should take into consideration the proximity to public viewpoints and the visual impact within the context of the viewing distance. Mitigation measures may include strategic placement of screening materials including trees and use of appropriate plant species in the reclamation phase as well as modification of the placement of ancillary and access roads.”

4.2 National Legislation and Policy

At a national level, the following legislative documents potentially apply to the T&VIA:

- Regulations in Chapter 5 (Integrated Environmental Management) of the NEMA and the Act in its entirety. The Act states that “the State must respect, protect, promote and fulfil the social, economic and environmental right of everyone…” Landscape is both moulded by, and moulds, social and environmental features;
- Section 23(1)(d) of the MPRDA, where it is mentioned that a mining right will be granted if “the mining will not result in unacceptable pollution, ecological degradation or damage to the environment”. Visual pollution is a form of environmental pollution and therefore needs to be considered under this section. Holders of rights granted in terms of the MPRDA must at all times give effect to the general objectives of integrated environmental management laid down in Chapter 5 of the NEMA. The Regulations promulgated in terms of the NEMA, with which holders of rights must comply, provide for the assessment and evaluation of potential impacts, and the setting of management plans to mitigate such impacts.
- The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) and related provincial regulations – in some instances there are policies or legislative documents that give rise to the protection of listed sites. The NHRA states that it aims to promote “good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed for future generations”. A holistic landscape whose character is a result of the action and interaction and/or human factors has strong cultural associations as societies and the landscape in which they live are affected by one another in many ways; and
- Section 17 of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM: PAA) sets out the purposes of the declaration of areas as protected areas which includes the protection of natural landscapes. Landscapes are defined by the natural, visual and subjectively perceived landscape; these aspects of a landscape are intertwined to form a holistic landscape context.

5 Project Area

The proposed KPSX: Weltevreden Project is an extension of the existing BECSA Klipspruit Colliery in the Witbank Coalfield area. This region is characterised by agriculture interspersed with coal mines and power stations. Plan 1 (Appendix A) illustrates the regional setting of the project area.

The project area falls within the Emalahleni Local Municipality and the Nkangala District Municipality. The nearest settlement is Minnaar which falls within the project area. The nearest town is Phola which borders the project area on the west. The nearest city is Emalahleni (formerly known as Witbank) situated approximately 13.4 km north-east of the project area.

The closest towns and settlements, as well as their direct distance and direction from the project area are summarised in Table 1. All distances are straight line distances measured from the edge of the project area to the centre of the towns / settlements unless otherwise stated.

Table 1: Closest Towns and Settlements

Name	Type	Direct Distance	Direction
Minnaar	Settlement	0 km	N/A
Phola	Settlement	0.6 km	W
Ogies	Secondary Town	1.4 km	SW
Clewer	Other Town	4.6 km	NE
Coalville	Other Town	6.1 km	E
Kendal	Other Town	8.1 km	WSW
KwaGuqa	Major Town	10.2 km	NE
Balmoral	Settlement	11.5 km	NW
Emalahleni	City	13.4 km	NE
Rietspruit	Settlement	16.0 km	SE
Kromdraai	Other Town	20.8 km	N
Argent	Settlement	21.1 km	WSW
Vandyksdrif	Other Town	22.3 km	ESE
Kriel	Secondary Town	27.9 km	SE

The N12 national road and the R555 regional road run through the southern part of the project area. The R555 regional road then turns and runs along the eastern boundary of the project area. The railway line from Coalville through Minnaar to Ogies runs through the southern part of the project area.

The project area and surrounds have a largely agricultural sense of place interspersed with mining and industry. The Anglo American Thermal Coal Greenside Colliery borders the project area on the north-east, while the Glencore Goedgevonden, Boschmans and Waterpan Collieries border the project area on the south and east. The HCI Nokuhle Colliery Anglo American Thermal Coal Zibulo Colliery and the BECSA Klipspruit Colliery border the project area on the south-west. The nearest power stations are the Kendal Power Station

situated 8.9 km south-west and the Kusile Power Station situated 12.4 km north-west of the project area. Plan 2 (Appendix A) illustrates the local setting of the project area. Figure 1 is a photograph taken from the south-western boundary of the project area in a south-westerly direction. The BECSA Klipspruit Colliery is visible in the foreground at a distance of 1.7 km with the Kendal Power Station visible in the background at a distance of 11.6 km.

Figure 1: View of the BECSA Klipspruit Colliery and Kendal Power Station from the Project Area

The proposed KPSX: Weltevreden Project covers an area of 7353.9 hectares. The coordinates for the centre of the project area are 25° 59’ 14.527” S and 29° 5’ 2.450” E. The project area is situated on portions of the farms Prinshof 2 IS, Oggiesfontein 4 IS, Grootpan Distribution Station 6 IS, Grootpan 7 IS, Zwaaiwater 11 IS, Weltevreden 324 JS, Hartebeestlaagte 325 JS, Wildebeestfontein 327 JS and Tweefontein 328 JS.

The project area falls within the Olifants River Catchment. The Grootspruit River has its source in the centre of the project area and drains the project area in a northerly direction. A tributary of the Tweefonteinspruit River drains the south-eastern corner of the project area. The Saalklapspruit River runs to the west of the project area and several of its tributaries drain the project area in a north-westerly direction. There are numerous small dams in the project area. Valley bottom wetlands occur along the streams and there is a large pan in the southern part of the project area. The surrounding area is interspersed with streams and wetlands.

The project area consists of agricultural land, the settlement of Minnaar and numerous farmsteads. The surrounding area is characterised by agriculture and mining. Little of the natural grassland vegetation remains. Plan 3 (Appendix A) illustrates the project area.

6 Expertise of the Specialist

A Curriculum Vitae (CV) and declaration of independence is attached in Appendix B.

7 Aims and Objectives

The aim of this T&VIA is to determine the nature of the project area and the impact of the proposed KPSX: Weltevreden Project on the topography and visual / aesthetic character of the surrounding landscape. The following objectives have been identified to achieve this aim:

- Examine aerial photography available for the project area (CD: NGI, 2012);
- Create and examine topographical, slope intensity, slope aspect and viewshed models in ArcGIS;
- Describe the topography and visual / aesthetic character of the receiving environment;
- Determine the size of the viewshed area;
- Identify potential receptors within the viewshed area;
- Determine the potential topographical and visual impacts; and
- Recommend measures to mitigate impacts and enhance benefits.

8 Knowledge Gaps

A VIA is open to subjectivity. This subjectivity is due to the different opinions receptors have of a proposed project. A receptor may be partial to the fact that the proposed project is occurring in an area, which becomes a source of economic upliftment for a community, whereas another receptor may view a proposed project as a negative factor which could hamper tourism or recreational activities.

Many factors can enhance or reduce the visual impact of the proposed project. Vegetation near a receptor's viewpoint can greatly reduce that receptor's view of the proposed project. Other factors such as weather / climatic conditions and seasonal change can also affect a receptor's view of the proposed project. The effect of weather / climatic conditions is illustrated in Figure 2 and Figure 3 below. These photographs were both taken from the same location at a distance of 14.2 km from Kendal Power Station and 16.5 km from Kusile Power Station respectively. The hazy conditions largely hide the Kendal Power Station from view while the Kusile Power Station is more visible.

Figure 2: View of Kendal Power Station from the Project Area

Figure 3: View of Kusile Power Station from the Project Area

It is, therefore, difficult to determine the visual impact of the proposed project from the viewpoint of each individual receptor. Consequently, this report focuses on the size of the viewshed area.

Infrastructure heights were not available for this study and assumptions were made. These assumptions were based on the heights of infrastructure from similar projects.

Ideally the viewshed model for the proposed KPSX: Weltevreden Project should be compared to the viewshed model for the existing BECSA Klipspruit Colliery and the areas where these models differ should be highlighted. The areas of difference would indicate the areas from which the existing BECSA operations are not visible but from which the proposed KPSX: Weltevreden Project will potentially be visible, i.e. areas of additional visual disturbance. This report could then highlight receptors within the areas of additional visual disturbance. This comparison was not possible as the infrastructure layouts and heights for the existing BECSA Klipspruit Colliery were not available for this study.

9 Methodology

The T&VIA was performed using surveyed geographically referenced information and aerial photography, together with the professional opinion of an experienced topography and visual impact assessor.

9.1 Characterisation of Visual Impacts

The expected visual impact of the proposed KPSX: Weltevreden Project was categorised based on the type of receiving environment and the type of development as detailed in Table 2 (Oberholzer, 2005). This table provides an indication of the visual impacts that can typically be expected for different types of developments in relation to the nature of the receiving environment. According to Oberholzer (2005), the proposed KPSX: Weltevreden Project is classified as a Category 5 development (Table 3). The receiving environment can be described as having **medium scenic, cultural or historical significance** and it is therefore expected that the proposed KPSX: Weltevreden Project will have a **high visual impact** on the environment. This will be verified in the investigation to follow.

Table 2: Categorisation of Expected Visual Impact (adapted from Oberholzer, 2005)

Type of Environment	Type of Development (Low to High Intensity)				
	Category 1 Development	**Category 2 Development**	**Category 3 Development**	**Category 4 Development**	**Category 5 Development**
Protected / wild areas of international, national or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high, scenic, cultural or historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	**High visual impact expected**
Areas or routes of low scenic, cultural or historical significance	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

Table 3: Key to Categorisation of Development (adapted from Oberholzer, 2005)

Type of Development	Examples of Development
Category 1	Nature reserves, nature related recreation, camping, picnicking, trails and minimal visitor facilities
Category 2	Low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure
Category 3	Low density resort / residential type development, golf or polo estates, low to medium-scale infrastructure
Category 4	Medium density residential development, sports facilities, small-scale commercial facilities / office parks, one-stop petrol stations, light industry, medium-scale infrastructure
Category 5	High density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. **Quarrying and mining activities with related processing plants**

9.2 Visual / Aesthetic Character and Topography

A desktop study was conducted to evaluate the topography of the receiving environment and Chief Directorate: National Geospatial Information (CD: NGI) aerial photography (flown in 2012) of the area was examined to determine the surface features. The available vector GIS data were used to determine the relative location of the features surrounding the project area.

A topographical model was created using ArcGIS 3D Analyst Extension. The model was created using 5 metre contour relief data with spot height data to increase the accuracy of the topographical model.

The resultant topographical model was then used to create slope intensity and slope aspect models using the Slope and Aspect Tools of the ArcGIS 3D Analyst Extension. The slope model indicates the slope degree and was classified using the Jenks Natural Breaks method.

The information gathered from the above desktop study was verified with a site visit. The combined information from the desktop study and the site visit forms the basis of this report.

9.3 Viewshed Analysis

The resultant topographical model was used to create a viewshed model using the Viewshed Tool of the ArcGIS 3D Analyst Extension. This viewshed model illustrates the areas from

which the proposed project will potentially be visible taking into account the estimated height of the proposed infrastructure (Table 4). The viewshed modelling tool does not work with negative infrastructure heights so all below ground infrastructure (pits and trenches) has been modelled with a height of 0 metres. The infrastructure listed in Table 4 is illustrated on Plan 4.

Table 4: Infrastructure Height Assumptions for Viewshed Modelling

Infrastructure	Height
High Mast Radio Communication Tower	50 m
Proposed Overburden Stockpile	40 m
Proposed Topsoil Strip Stockpile	25 m
Tip Area	15 m
Building	10 m
New Raw Water Elevated Tank	10 m
Proposed Curved Conveyor Option 1	10 m
Proposed Curved Conveyor Option 2	10 m
Substation	5 m
PCD	2 m
Pit BD	0 m
Pit H	0 m
Proposed Access Road	0 m
Proposed Haul Road	0 m
Proposed Road Diversion	0 m
Trench	0 m

The concept of viewshed modelling is depicted in Figure 4. The topography denotes whether or not a development will be visible from a receptor. In Figure 4 below the development is only visible from the receptors within the valley and on the slopes of the hills facing it. The development will be hidden from all receptors beyond the first hills.

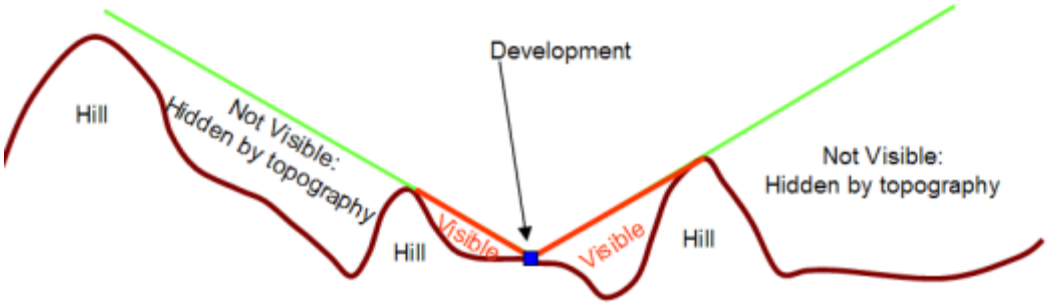

Figure 4: Theoretical Background of Viewshed Modelling

A viewshed model was created. This viewshed model is based on the topography only and does not take the screening effect of vegetation into account. The natural Eastern Highveld Grassland and Rand Highveld Grassland, and agricultural vegetation is not expected to provide noticeable screening of the proposed development. The viewshed model was then refined by dividing the viewshed area into areas that are likely to experience different categories of visual exposure. Visual exposure and visual impact of a development diminishes exponentially with distance (Oberholzer, 2005).

The findings of the site visit were used to determine these categories. In Figure 5 a nearby mine is visible on the horizon approximately 5.5 km from where the photograph was taken. The mine infrastructure and dumps are still clearly noticeable at this distance. The following categories were used for the viewshed model:

- 0 – 3 km: Potentially high visual exposure;
- 3 – 6 km: Potentially moderate visual exposure; and
- 6 – 10 km: Potentially low visual exposure.

Figure 5: View of a Mine from the Project Area

10 Findings

10.1 Visual / Aesthetic Character and Topography

This section provides the results obtained from the analysis of the topographical, slope intensity and slope aspect models created in ArcGIS.

The topography of the project area and surrounds is undulating with numerous small ridges and valleys. The topographical model indicates that the elevation of the project area decreases from 1 612 metres above mean sea level (m.a.m.s.l.) in the south, to 1 482 m.a.m.s.l. in the north. Plan 5 (Appendix A) illustrates the topographical model and features of the project area.

The majority of the project area has gentle slopes of less than 4°. Isolated slopes of between 4° and 11.3° occur along the sides of the ridges and river valleys. Plan 6 (Appendix A) illustrates the slope model of the project area.

Due to the undulating topography, the slope aspect / direction of the project area is not in any specific direction. The sides of the ridges and valleys slope in various different directions as illustrated by the aspect model of the project area (Plan 7, Appendix A).

The project area and surrounds have an undulating topography. There is a ridge running in an east west direction in the southern part of the project area. The Grootspruit River has its

source in the centre of the project area and drains the project area in a northerly direction. A tributary of the Tweefonteinspruit River drains the south-eastern corner of the project area. The Saalklapspruit River runs to the west of the project area and several of its tributaries drain the project area in a north-westerly direction. Mining activities may affect the flow of these rivers. Soil erosion may occur as a result of the mining activities and this could result in sedimentation downstream.

The mildly undulating topography is expected to only provide minimal screening of the proposed development. Figure 6 illustrates the view across the project area from east to west. From this photograph it is evident that large distances are visible within the landscape.

Figure 6: View across the Project Area from East to West

The receiving environment is characterised by agriculture and mining with little of the natural vegetation (Eastern Highveld Grassland, Rand Highveld Grassland and Eastern Temperate Freshwater Wetlands) remaining. The proposed project is expected to partially blend in with the surrounding mining activity. The agricultural and natural grassland vegetation will only provide minimal screening of the proposed development. Figure 7 illustrates the vegetation in the project area with natural grassland in the foreground and agricultural fields in the background.

Figure 7: Vegetation in the Project Area

10.2 Viewshed Model

A viewshed is a geographical area, defined by the topography, within which a particular feature will be visible (Oberholzer, 2005). The viewshed model for the proposed KPSX: Weltevreden Project is illustrated in Plan 8 (Appendix A). This model was refined to a buffer of 10 km around the proposed infrastructure and divided into areas that are likely to experience different categories of visual exposure. Due to the nature of the receiving environment it is unlikely that the proposed infrastructure will be noticeable beyond this 10 km buffer. The viewshed model depicts the area from which the proposed KPSX: Weltevreden Project is likely to be visible. This viewshed covers an area of 562.2 km². The viewshed areas for the categories are listed in Table 5 below.

Table 5: Viewshed Area per Category

Category	Impact	Viewshed Area
0 – 3 km	Potentially High Visual Exposure	187.2 km²
3 – 6 km	Potentially Moderate Visual Exposure	158.0 km²
6 – 10 km	Potentially Low Visual Exposure	217.0 km²

10.3 Sensitive Receptors

The receptors identified within the viewshed include residents of Minnaar, Phola, Ogies, Clewer, Kendal and the suburbs of KwaGuqa as well as the farm residences on the farms within the viewshed area. Roads users on the N12 national road, R545, R547 and R555 regional roads and the secondary and farm rods within the viewshed area will also have views of the proposed KPSX: Weltevreden Project.

Table 6: Farms within the Viewshed Area

Farms		
Vlakvarkfontein 213 IR	Waterpan 8 IS	Doornrug 302 JS
Heuvelfontein 215 IR	Zondagsvlei 9 IS	Rondebult 303 JS
Bankfontein 216 IR	Goedgevonden 10 IS	Schoongezicht 308 JS
Schoongezicht 218 IR	Zwaaiwater 11 IS	Elandsfontein 309 JS
Leeuwfontein 219 IR	Springboklaagte 33 IS	Blaauwkrans 323 JS
Henma 291 IR	Cologne 34 IS	Weltevreden 324 JS
Smaldeel 1 IS	Eenzaamheid 534 JR	Hartebeestlaagte 325 JS
Prinshof 2 IS	Honinggrantz 536 JR	Roodepoort 326JS
Klipfontein 3 IS	Klipfontein 566 JR	Wildebeestfontein 327 JS
Oggiesfontein 4 IS	Klipfontein 568 JR	Tweefontein 328 JS
Kleinzuikerboschplaat 5 IS	Vlakfontein 569 JR	Vlaglaagte 330 IS
Grootpan Distribution Station 6 IS	Nooitgedacht 300 JS	Groenfontein 331 JS
Grootpan 7 IS		

11 Discussion

11.1 Topography

A change in the land use from agricultural activities and natural grassland to mining will change the topography. Mining involves changing the natural features and adding man-made features to the topography and will therefore have a negative impact on the topography of the project area. Changing the topography of an area will cause negative impacts on the other environmental, social and cultural aspects of the receiving environment. The removal of topsoil and vegetation will change the topography / surface. This will affect

surface water flow and if not managed correctly could result in soil erosion. Vegetation removal will result in biodiversity and habitat loss. The greatest impact on the topography will be from the open pits, overburden and topsoil stockpiles. These cover a large area and will dramatically change the slope of the topography. This will affect surface and groundwater flows. The construction of mining infrastructure will have a lesser impact on the topography as it only covers a small part of the project area. Topography change as a result of mining will degrade the visual aesthetic of the area.

11.2 Visual

The proposed KPSX: Weltevreden Project will have a negative visual impact on the receiving environment. The greatest visual impact will be from the open pits, overburden and topsoil stockpiles as these cover a large area. The height of the overburden and topsoil stockpiles will also increase the visual impact. The construction of surface infrastructure will have a lesser visual impact as it only covers a small part of the project area.

11.2.1 Visibility of the Project

The visibility of the project refers to the viewshed area. Oberholzer (2005) describes this as “the geographic area from which the project will be visible”. The visibility of the project is also related to the number of receptors affected. The proposed KPSX: Weltevreden Project has a **high visibility** as it is visible from a large area (viewshed of approximately 562.2 km²) with numerous visual receptors.

11.2.2 Visual Exposure

Visual exposure is “based on the distance from the project area to selected viewpoints” and “tends to diminish exponentially with distance” (Oberholzer, 2005). The proposed KPSX: Weltevreden Project has a **moderate exposure** as it will be recognisable to the viewer. This is due to the large area covered by the open pits and the height of the overburden and topsoil stockpiles.

11.2.3 Visual Sensitivity of the Area

The visual sensitivity of the area refers to “the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement pattern” (Oberholzer, 2005). The receiving environment of the proposed KPSX: Weltevreden Project has a **moderate visual sensitivity** as there are moderately visible areas in the landscape.

11.2.4 Visual Sensitivity of Receptors

The visual sensitivity of receptors is dependent on the nature of the receptors. Receptors in residential areas or nature reserves have a high sensitivity while receptors in industrial or mining areas have a low sensitivity. The identified receptors (residents of Minnaar, Phola, Ogies,Clewer and Kendal, farm residents and road users) of the proposed KPSX:

Weltevreden Project have a **moderate sensitivity** as there is a combination of residential, agricultural, natural, industrial, mining and degraded areas situated in moderately scenic areas.

11.2.5 Visual Absorption Capacity (VAC)

The visual absorption capacity (VAC) refers to "the potential of the landscape to conceal the proposed project" (Oberholzer, 2005). The receiving environment of the proposed KPSX: Weltevreden Project has a **low VAC** because there is little screening by the topography or vegetation.

11.2.6 Visual Intrusion

The visual intrusion of the project refers to "the level of compatibility or congruence of the project with the particular qualities of the area, or its sense of place". Visual intrusion is "related to the idea of context and maintaining the integrity of the landscape or townscape" (Oberholzer, 2005). The proposed KPSX: Weltevreden Project has a **moderate visual intrusion** as it partially fits into the surroundings, but will be clearly noticeable. Although the proposed KPSX: Weltevreden Proejct is an extension of an existing mine, it covers a much larger area than the existing BECSA Klipspruit Colliery and will therefore have a significant impact on the receiving environment.

12 Impact Assessment

12.1 Assessment Methodology

The methodology utilised to assess the significance of potential social and heritage impacts is discussed in detail below. The significance rating formula is as follows:

Significance = Consequence x Probability

Where

Consequence = Type of Impact x (Intensity + Spatial Scale + Duration)

And

Probability = Likelihood of an Impact Occurring

In addition, the formula for calculating consequence:

***Type of Impact** = **+1** (Positive Impact) or **-1** (Negative Impact)*

The weight assigned to the various parameters for positive and negative social and heritage impacts is provided for in the formula and is presented in Table 7. The probability consequence matrix for social and heritage impacts is displayed in Table 8, with the impact significance rating described in Table 9.

Table 7: Impact Assessment Parameter Ratings

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	***Positive Impacts (Type of Impact = +1)***			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or ecosystem. Persistent severe damage. Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.	<u>International</u> The effect will occur across international borders.	<u>Permanent: No Mitigation</u> The impact will remain long after the life of the Project.	<u>Certain / Definite.</u> There are sound scientific reasons to expect that the impact will definitely occur.
6	Significant impact on highly valued species, habitat or ecosystem. Irreparable damage to highly valued items of cultural significance or breakdown of social order.	Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment.	<u>National</u> Will affect the entire country.	<u>Beyond Project Life</u> The impact will remain for some time after the life of a Project.	<u>Almost Certain / Highly Probable</u> It is most likely that the impact will occur.

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	***Positive Impacts (Type of Impact = +1)***			
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread positive benefits to local communities which improves livelihoods, as well as a positive improvement to the receiving environment.	Province / Region Will affect the entire province or region.	Project Life The impact will cease after the operational life span of the Project.	Likely The impact may occur.
4	Serious medium term environmental effects. Environmental damage can be reversed in less than a year. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense social benefits to some people. Average to intense environmental enhancements.	Municipal Area Will affect the whole municipal area.	Long Term 6-15 years.	Probable Has occurred here or elsewhere and could therefore occur.

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	***Positive Impacts (Type of Impact = +1)***			
3	Moderate, short-term effects but not affecting ecosystem function. Rehabilitation requires intervention of external specialists and can be done in less than a month. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some.	Local Extending across the site and to nearby settlements.	Medium Term 1-5 years.	Unlikely Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility that the impact will occur.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by very few of population.	Limited Limited to the site and its immediate surroundings.	Short Term Less than 1 year.	Rare / Improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.

Rating	Intensity		Spatial Scale	Duration	Probability
	Negative Impacts (Type of Impact = -1)	***Positive Impacts (Type of Impact = +1)***			
1	Limited damage to minimal area of low significance that will have no impact on the environment. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level social and environmental benefits felt by very few of the population.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly Unlikely / None Expected never to happen.

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Table 8: Probability Consequence Matrix for Impacts

Probability	Significance																																					
7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	-21	**-20**	**-19**	**-18**	**-17**	**-16**	**-15**	**-14**	**-13**	**-12**	**-11**	**-10**	**-9**	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
	Consequence																																					

Table 9: Significance Threshold Limits

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change.	**Major (positive)**
73 to 108	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the Project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	Minor (negative)

Score	Description	Rating
-73 to -108	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects.	Major (negative)

12.2 Identification of Project Activities

The activities associated with the KPSX: Weltevreden Project are listed in Table 10 below. The activities highlighted in red are applicable to this T&VIA.

Table 10: Project Activities

Activity No.	Activity
Construction Phase	
1	The recruitment, procurement and employment of construction workers, engineers and contractors.
2	The transportation of construction material to the project site via national, provincial and local roads.
3	Storage of fuel, lubricant and explosives in temporary facilities for the duration of the construction phase. These substances are classified as hazardous in terms of the Hazardous Substances Act, 1973 (Act No. 15 of 1973) and will be managed accordingly.
4	Site clearance and topsoil removal prior to the commencement of physical construction activities, as well as the open pit mining. This activity refers to the conversion of undeveloped, vacant land into industrial use.
5	Construction of surface infrastructure will take place, including the offices and fuel bay, haul roads, PCDs, coal tip and conveyor belt, pipelines and clean water canals and a high mast radio communication tower.
6	The construction of stockpiles, including topsoil, overburden and discard and emergency coal stockpiles.
7	The establishment of the initial boxcut and access ramps to the open pit mining areas.

Activity No.	Activity
Operational Phase	
8	Limited employment of skilled and unskilled labour will be required for the operation of the mine and support infrastructure.
9	Storage of fuel in diesel tanks, as well as lubricant and explosives in facilities for the duration of Project. These substances are classified as hazardous in terms of the Hazardous Substances Act, 1973 (Act No. 15 of 1973) and will be managed accordingly.
10	Drilling and blasting of the overburden rock for easy removal by excavators and dump trucks.
11	Coal removal by truck and shovel methods from the exposed coal seams. The coal is removed with shovels and transported to the plant by conveyor belt or by trucks.
12	Vehicular activity on the proposed haul roads. Mining equipment will utilise the haul roads to access open pit areas, as well as to transport coal from the opencast pit to the plant and conveyor belt. The haul road will consist of wetland and stream crossings.
13	Mine water, or dirty water that is located within the opencast pits will need to be diverted by channels and berms to the PCDs to prevent clean water resources from being contaminated. Pipelines will pump the dirty water from the KPSX: Weltevreden PCDs to the KPS PCD.
14	Use of conveyor belts to transport the coal to the stockpiles at the KPS plant.
15	The PCDs will store all dirty water that has come into contact with the opencast pit, overburden stockpiles or emergency coal stockpile.
16	Operation and maintenance of the stockpiles, including topsoil, overburden and discard and ROM coal stockpiles.
17	Waste and sewage generation and disposal. All domestic, industrial and hazardous waste is produced during the mining process. Waste includes cans, plastics, used tyres and oil which must be disposed of in an appropriate manner by a contractor at a licensed waste disposal site. Sewage produced from the office buildings and ablutions will be treated at a sewage plant, septic tank or French drain system.
18	Concurrent replacement of overburden and topsoil and the re-vegetation of mined out strips. The mined strip will be backfilled with the overburden and compacted. Subsequently, the topsoil will be placed on top of the overburden and the area will be vegetated.

Activity No.	Activity
Decommissioning Phase	
19	Retrenchment of mine employees and staff will take place following the cessation of the mining operations and coal beneficiation activities.
20	Demolition of infrastructure will take place and includes the PCDs, haul roads, coal tip and conveyor belts, pipelines, high mast radio communication tower, fuel bay and mine offices and workshop.
21	Removal of fuel, lubricant and explosives will be required following the cessation of the mining activities to ensure that there is no health and safety risk to the environment and to people.
22	Final replacement of overburden and topsoil and the establishment of vegetation on the final opencast void. Overburden will be backfilled into the final void and compacted. Subsequently, topsoil will be placed and the area vegetated.
23	Waste handling of scrap metal and used oil as a result of the decommissioning phase will be undertaken.
Post-Closure Phase	
24	Post-closure monitoring and rehabilitation will determine the level of success of the rehabilitation, as well as to identify any additional measures that have to be undertaken to ensure that the mining area is restored to an adequate state. Monitoring will include surface water, groundwater, soil fertility and erosion, natural vegetation and alien invasive species and dust generation from the coal discard dumps.

12.3 Topography Impact Assessment

The project activities listed in Table 10 will be rated according to the impact they will have on the receiving environment, i.e. the environment before development. Negative impacts change the topography from the pre-development topography to the post-development topography. Neutral impacts assist to minimise the long term effects of the negative impacts on the topography. Positive impacts rarely occur as they require that the topography be returned to a state better than the pre-development topography.

12.3.1 Construction Phase

The construction phase is characterised by site development and infrastructure construction. This includes transportation of construction material, temporary storage of fuel, lubricant and explosives, site clearance and topsoil removal, construction of surface infrastructure,

construction of stockpiles and establishment of the initial boxcut and access ramps to the open pit mining areas. The construction phase will have negative impacts on the topography. The transportation of construction material and the temporary storage of fuel, lubricants and explosives will have a minor negative impact on the topography. The site clearance and topsoil removal will occur over large parts of the project area and will have a moderate negative impact on the topography. The surface infrastructure is relatively small-scale and will have a moderate negative impact on the topography. The construction of stockpiles will have a major negative impact on the topography. The most significant impact during the construction phase is the establishment of the initial boxcut and access ramps to the open pit mining areas. This negative impact will result in a permanent and irreversible change to the topography.

Activity No. 2: The transportation of construction material to the project site via national, provincial and local roads.					
Criteria	**Details / Discussion**				
Description of Impact	Vehicular activity to transport construction material to the project site could damage the surface of the roads and impact on the topography.				
Mitigation Required	■ Liaise with local authorities to ensure that roads are well maintained.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	4	3	-3	5	-50
Post-Mitigation	4	3	-2	4	-36

Activity No. 3: Storage of fuel, lubricant and explosives in temporary facilities for the duration of the construction phase. These substances are classified as hazardous in terms of the Hazardous Substances Act, 1973 (Act No. 15 of 1973) and will be managed accordingly.					
Criteria	**Details / Discussion**				
Description of Impact	The temporary storage of fuel, lubricants and explosives will add features to the topography thereby changing it.				
Mitigation Required	■ Limit the footprint area of the temporary storage facilities where possible.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	3	-2	5	-35
Post-Mitigation	1	3	-2	4	-24

Activity No. 4: Site clearance and topsoil removal prior to the commencement of physical construction activities, as well as open pit mining. This activity refers to the conversion of undeveloped, vacant land into industrial use.					
Criteria	**Details / Discussion**				
Description of Impact	The removal of vegetation and topsoil for site clearance will change the surface of the project area and therefore the topography. Vegetation and topsoil should only be removed when and where necessary to prevent unnecessary soil erosion.				
Mitigation Required	■ Only clear vegetation when and where necessary; ■ Only remove topsoil when and where necessary; ■ Topsoil stockpiles should be vegetated where possible; ■ Ensure topsoil is stockpiled away from surface water and drainage lines; ■ Where possible, limit the height of topsoil stockpiles to 3 metres to prevent the soil from becoming compacted; and ■ Ensure topsoil stockpiles are contoured and not too steep (18° or less) to prevent slope failure.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 5: Construction of surface infrastructure will take place, including the offices and fuel bay, haul roads, PCDs, coal tip and conveyor belt, pipelines and clean water canals and a high mast radio communication tower.					
Criteria	**Details / Discussion**				
Description of Impact	The construction of surface infrastructure will add features to the topography thereby changing it. This surface infrastructure includes offices and fuel bay, haul roads, a PCD and stormwater catchment dams, coal tip and conveyor belt, pipelines and clean water canals. The construction of water management infrastructure will change the surface water flow of the project area and surrounds thereby changing the topography.				
Mitigation Required	■ Limit the footprint area of surface infrastructure where possible; ■ Store construction materials away from surface water and drainage lines; ■ Access and haul roads should be contoured appropriately to limit erosion due to surface water runoff; ■ Do not create numerous haul roads alongside each other; ■ Ensure that access and haul roads follow the topography and do not cross surface water and drainage lines where possible; ■ Ensure canals and berms keep clean water away from the mining area; and ■ Ensure berms direct dirty water towards the PCD.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	5	-3	7	-70
Post-Mitigation	2	5	-3	6	-60

Activity No. 6: The construction of stockpiles, including topsoil, overburden and discard and emergency coal stockpiles.					
Criteria	**Details / Discussion**				
Description of Impact	The construction of topsoil, overburden and emergency coal stockpiles will add features to the surface thereby changing the topography.				
Mitigation Required	■ Only remove topsoil and overburden when and where necessary; ■ Topsoil stockpiles should be vegetated where possible; ■ Where possible, limit the height of topsoil stockpiles to 3 metres to prevent the soil from becoming compacted; ■ Stockpile topsoil, overburden and emergency coal away from surface water and drainage lines; and ■ Ensure stockpiles are contoured and not too steep (18° or less) to prevent slope failure.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 7: The establishment of the initial boxcut and access ramps to the open pit mining areas.					
Criteria	**Details / Discussion**				
Description of Impact	The establishment of the initial boxcut and access ramps to the open pit mining areas will significantly change the topography of the project area. This involves drilling and blasting to remove overburden to create the boxcut and expose the coal. This will result in a void in the topography.				
Mitigation Required	■ Only remove overburden when and where necessary; and ■ Ensure the access ramps are not too steep.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-6	7	-105
Post-Mitigation	3	5	-5	7	-91

12.3.2 Operational Phase

The operational phase is characterised by mining of coal, water management, waste management and concurrent rehabilitation. This phase will have both negative and neutral impacts on the topography; however, the negative impacts far outweigh the neutral impacts. Waste management will have a minor impact on the topography. Water management will have a moderate impact on the topography. The diversion channels and berms will change the drainage lines and affect surface water flow. The most significant impact during the operational phase is the mining of coal. Drilling and blasting of the overburden rock and the removal of coal will have a major negative impact on the topography. The resultant open pit will have a permanent and irreversible negative impact on the topography. Concurrent rehabilitation by replacement of overburden and topsoil, as well as re-vegetation will have a moderate neutral impact on the topography. It is a step in the right direction but will not significantly affect the overall negative impact of open pit mining.

Activity No. 10: Drilling and blasting of the overburden rock for easy removal by excavators and dump trucks.					
Criteria	**Details / Discussion**				
Description of Impact	The removal of overburden by drilling and blasting will increase the size of the void and significantly change the topography of the project area. Overburden stockpiling involves adding to the surface and will thereby change the topography.				
Mitigation Required	■ Only remove overburden when and where necessary; ■ Stockpile overburden away from surface water and drainage lines; ■ Limit the footprint area of overburden stockpiles where possible; and ■ Ensure overburden stockpiles are contoured and not too steep (18° or less) to prevent slope failure.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-6	7	-105
Post-Mitigation	3	5	-5	7	-91

Activity No. 11: Coal removal by truck and shovel methods from the exposed coal seams. The coal is removed with shovels and transported to the plant by conveyor belt or by trucks.					
Criteria	**Details / Discussion**				
Description of Impact	The mining process to remove coal will significantly change the topography.				
Mitigation Required	■ Stockpile Run of Mine (ROM) coal away from surface water and drainage lines; ■ Limit the quantity and time of ROM coal stored on site; and ■ Ensure ROM coal stockpiles are contoured and not too steep (18° or less) to prevent slope failure.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-6	7	-105
Post-Mitigation	3	5	-5	7	-91

Activity No. 12: Vehicular activity on the proposed haul roads. Mining equipment will utilise the haul roads to access open pit areas, as well as to transport coal from the opencast pit to the plant and conveyor belt. The haul road will consist of wetland and stream crossings.					
Criteria	**Details / Discussion**				
Description of Impact	Vehicular activity on the haul roads will damage the surface of the roads and impact on the topography. Maintenance of the roads may involve the acquisition of additional material from borrow pits which will increase the size of these pits and change the topography. The natural surface water flow and drainage lines of the project area will be affected where the haul roads cross the wetlands and streams.				
Mitigation Required	■ Haul roads should be contoured appropriately to limit erosion due to surface water runoff; ■ Do not create numerous haul roads alongside each other; and ■ Ensure that haul roads follow the topography.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-2	5	-50
Post-Mitigation	3	5	-2	4	-40

Activity No. 13: Mine water, or dirty water that is located within the opencast pits will need to be diverted by channels and berms to the PCDs to prevent clean water resources from being contaminated. Pipelines will pump the dirty water from the KPSX: Weltevreden PCDs to the KPS PCD.					
Criteria	**Details / Discussion**				
Description of Impact	Water management will change the surface water flow of the project area and surrounds, thereby impacting on the topography.				
Mitigation Required	■ Ensure canals and berms keep clean water away from the mining area; and ■ Ensure berms direct dirty water towards the PCD.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 16: Operation and maintenance of the stockpiles, including topsoil, overburden and discard and ROM stockpiles.					
Criteria	**Details / Discussion**				
Description of Impact	Operation and maintenance of the topsoil, overburden and discard and ROM stockpiles involves adding to the surface and will thereby change the topography.				
Mitigation Required	■ Only remove topsoil and overburden when and where necessary; ■ Topsoil stockpiles should be vegetated where possible; ■ Ensure stockpiles are located away from surface water and drainage lines; ■ Limit the height of topsoil stockpiles to 3 metres to prevent the soil from becoming compacted; ■ Ensure stockpiles are contoured and not too steep (18° or less) to prevent slope failure; and ■ Limit the quantity and time of ROM stored on site.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 17: Waste and sewage generation and disposal. All domestic, industrial and hazardous waste is produced during the mining process. Waste includes cans, plastics, used tyres and oil which must be disposed of in an appropriate manner by a contractor at a licensed waste disposal site. Sewage produced from the office buildings and ablutions will be treated at a sewage plant, septic tank or French drain system.					
Criteria	**Details / Discussion**				
Description of Impact	Storing waste on site will add features to the surface thereby changing the topography.				
Mitigation Required	■ Limit the footprint area of waste management facilities where possible; ■ Ensure waste is stored away from surface water and drainage lines; and ■ Limit the quantity and time of waste stored on site.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	5	-2	5	-45
Post-Mitigation	1	5	-2	4	-32

Activity No. 18: Concurrent replacement of overburden and topsoil and re-vegetation of mined out strips. The mined strip will be backfilled with the overburden and compacted. Subsequently, the topsoil will be placed on top of the overburden and the area will be vegetated.					
Criteria	**Details / Discussion**				
Description of Impact	Concurrent rehabilitation by replacement of overburden and topsoil as well as re-vegetation as mining progresses will change the topography of the project area. This will have a neutral impact on the topography and will assist to return the topography to a free-draining topography. Backfilling of the open pit with overburden will change the topography. Overburden removed from the void of the current mining strip will be used to partly fill the mined out void in the previously mined strip. Once backfilling commences, overburden should no longer be added to the overburden stockpiles. Spreading of topsoil will change the topography of the project area. Re-vegetation of the backfilled areas will change the topography and assist to prevent soil erosion.				
Mitigation Required	■ Backfill as much of the open pit area as possible; ■ Spread topsoil over the backfilled area; and ■ Re-vegetate the backfilled area.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-6	7	-105
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

12.3.3 Decommissioning Phase

The decommissioning phase is characterised by demolition of infrastructure and rehabilitation of the final open void. This phase will have neutral impacts on the topography. The spreading of topsoil and re-vegetation will assist to prevent soil erosion. Profiling and contouring will assist to recreate the natural drainage lines and surface water flow. These will have a moderate neutral impact on the topography. Rehabilitation of the final open void will have a neutral impact on the topography. The open pit will be partly filled with overburden. There will not be enough overburden to fill the pit entirely so a void will always remain. The drainage lines and surface water flowing near the open pit will never be returned to their pre-mining state. Although this partial rehabilitation of the final open void will have a neutral impact, the remaining void will have an extremely significant, permanent and irreversible negative impact on the topography.

Activity No. 20: Demolition of infrastructure will take place and includes the PCDs, haul roads, coal tip and conveyor belts, pipelines, high mast radio communication tower, fuel bay and mine offices and workshop.					
Criteria	**Details / Discussion**				
Description of Impact	Demolition of infrastructure will remove features from the surface and thereby change the topography. This will have a neutral impact on the topography as it will help to reverse some of the changes that occurred when the infrastructure was constructed.				
Mitigation Required	■ Ensure that all unnecessary infrastructure is demolished; ■ Ensure that all demolished infrastructure is removed from the project area; and ■ Rehabilitate all areas where infrastructure has been removed.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	5	-3	7	-70
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

Activity No. 22: Final replacement of overburden and topsoil and the establishment of vegetation on the final opencast void. Overburden will be backfilled into the final void and compacted. Subsequently, topsoil will be placed and the area vegetated.					
Criteria	**Details / Discussion**				
Description of Impact	The rehabilitation of the final open void will change the topography of the project and will have a neutral impact on the topography. The aim of rehabilitation is to create a free-draining topography. Once coal has been removed from the open pit, there will be insufficient overburden to fill the void completely. Due to this material imbalance, a permanent void will remain. Spreading topsoil, and profiling and contouring will change the topography of the project area and assist to restore surface water flow and drainage lines to create a free-draining topography. Re-vegetation of the rehabilitated areas will change the topography and assist to prevent soil erosion.				
Mitigation Required	■ Backfill as much of the final void as possible; ■ Ensure that the final void is as small as practically possible; ■ Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; ■ Spread topsoil over the rehabilitated area; ■ Ensure that surface water and drainage lines are rehabilitated to create a free-draining topography; and ■ Re-vegetate the rehabilitated areas.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-6	7	-105
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

Activity No. 23: Waste handling of scrap metal and used oil as a result of the decommissioning phase will be undertaken.					
Criteria	**Details / Discussion**				
Description of Impact	Storing waste on site will add features to the surface thereby changing the topography.				
Mitigation Required	■ Limit the footprint area of waste management facilities where possible; ■ Ensure waste is stored away from surface water and drainage lines; and ■ Limit the quantity and time of waste stored on site.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	3	-2	5	-35
Post-Mitigation	1	3	-2	4	-24

12.3.4 Post-Closure Phase

The post-closure phase is characterised by continuous monitoring and rehabilitation. This phase will have a neutral impact on the topography. A free-draining topography needs to be created. The most significant impact on the topography will be the open pit. This will cause a permanent and irreversible change to the topography. Once coal has been removed, the overburden should be used to backfill the open pit, however, the overburden will not fill the open pit completely and a void will remain.

Activity No. 24: Post-closure monitoring and rehabilitation will determine the level of success of the rehabilitation, as well as identify any additional measures that have to be undertaken to ensure that the mining area is restored to an adequate state. Monitoring will include surface water, groundwater, soil fertility and erosion, natural vegetation and alien invasive species and dust generation from the coal discard dumps.					
Criteria	**Details / Discussion**				
Description of Impact	The post-mining topography will never be the same as the pre-mining topography. There will be a permanent and irreversible change to the topography of the project area. Post-closure monitoring and rehabilitation will have a neutral impact on the topography and will help to reverse some of the negative impacts of mining. This phase is essential to limit the negative impact of the proposed KPSX: Weltevreden Project on the topography. The surface water flow and drainage lines need to be rehabilitated to create a free-draining topography. Continuous monitoring and rehabilitation is essential to manage the risk of soil erosion.				
Mitigation Required	■ Ensure that the post-mining topography is rehabilitated to a free-draining topography; ■ Ensure that surface water and drainage lines are rehabilitated to create a free-draining topography; and ■ Carefully monitor the rehabilitated areas to ensure that rehabilitation is successful and soil erosion is prevented.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-6	7	-105
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

12.4 Visual Impact Assessment

The project activities listed in Table 10 will be rated according to the impact they will have on the receiving environment, i.e. the environment before development. Negative visual impacts decrease the visual character of the pre-development environment while positive visual impacts increase the visual character of the pre-development environment. Neutral visual impacts assist to minimise the negative visual impacts of a development but don't result in a positive visual impact. A positive visual impact only occurs when an area is rehabilitated to a state that is better than the state of the pre-development environment, e.g. a mining area on previously agricultural land is rehabilitated to an area of natural vegetation and all visible signs of agriculture and mining area removed. Positive visual impacts rarely occur.

12.4.1 Construction Phase

The construction phase is characterised by site development and infrastructure construction. This includes transportation of construction material, temporary storage of fuel, lubricant and explosives, site clearance and topsoil removal, construction of surface infrastructure, construction of stockpiles and establishment of the initial boxcut and access ramps to the open pit mining areas. The establishment of infrastructure and the related construction activities will draw attention to the project area making receptors aware of the development. The construction phase will have negative visual impacts on the receiving environment. The transportation of construction material and the temporary storage of fuel, lubricants and explosives will have a minor visual impact. The site clearance and topsoil removal will occur over large parts of the project area and will have a moderate visual impact. The surface infrastructure is relatively small-scale and will have a moderate visual impact. The most significant impact during the construction phase is the establishment of the initial boxcut and access ramps to the open pit mining areas and the construction of stockpiles. This will result in a permanent scar on the landscape.

Activity No. 2: The transportation of construction material to the project site via national, provincial and local roads.					
Criteria	**Details / Discussion**				
Description of Impact	The transportation of construction material will have a negative visual impact on the receiving environment. Vehicular activity and the resulting dust will draw attention to the project area. These visual impacts are temporary and will only occur during the construction phase.				
Mitigation Required	■ Roads should be wetted frequently by means of a water bowser to suppress dust; and ■ Vehicles must be roadworthy and obey the recommended speed limits at all times.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	3	-2	5	-40
Post-Mitigation	3	3	-1	5	-35

Activity No. 3: Storage of fuel, lubricant and explosives in temporary facilities for the duration of the construction phase. These substances are classified as hazardous in terms of the Hazardous Substances Act, 1973 (Act No. 15 of 1973) and will be managed accordingly.					
Criteria	**Details / Discussion**				
Description of Impact	The temporary storage of fuel, lubricants and explosives will have a negative visual impact on the receiving environment. These visual impacts are temporary and will only occur during the construction phase.				
Mitigation Required	■ Limit the footprint area of the temporary storage facilities where possible.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	3	-2	5	-35
Post-Mitigation	1	3	-2	4	-24

Activity No. 4: Site clearance and topsoil removal prior to the commencement of physical construction activities, as well as open pit mining. This activity refers to the conversion of undeveloped, vacant land into industrial use.					
Criteria	**Details / Discussion**				
Description of Impact	The removal of vegetation and topsoil for site clearing will have a negative visual impact on the receiving environment. The project area will become noticeable to the nearby receptors as it will contrast the surrounding areas.				
Mitigation Required	■ Vegetation and topsoil should only be removed when and where necessary; and ■ Topsoil stockpiles should be vegetated and positioned to reduce visual disturbance where possible.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 5: Construction of surface infrastructure will take place, including the offices and fuel bay, haul roads, PCDs, coal tip and conveyor belt, pipelines and clean water canals and a high mast radio communication tower.					
Criteria	**Details / Discussion**				
Description of Impact	The construction of surface infrastructure will have a negative visual impact on the receiving environment. This surface infrastructure includes offices and fuel bay, haul roads, a PCD and stormwater catchment dams, coal tip and conveyor belt, pipelines and clean water canals. The surface infrastructure will change the sense of place of the project area from an agricultural sense of place to an industrial sense of place. These visual impacts will occur for the life of the project. Construction area lighting at night will have a negative visual impact on the receiving environment. The construction area lighting will be visible from afar and will draw attention to the project area. This will also have a negative impact on the sense of place. The visual impacts from the construction area lighting will occur during the construction phase.				
Mitigation Required	■ Do not create numerous haul roads alongside each other; ■ Limit the height and footprint area of surface infrastructure where possible; ■ Surface infrastructure should be painted natural hues so as to blend into the surrounding landscape where possible; ■ Pylons and metal structures should be galvanised so as to weather to a matt grey finish rather than be painted silver. If the pylons and metal structures are painted, it is recommended that a neutral matt finish be used; ■ Construction of vegetation berms must be implemented close to infrastructure so that vegetation can be established; and ■ Avoid construction activities at night if possible, thereby avoiding the use of construction area lighting. If construction activities take place at night, down lighting should be implemented to minimise light pollution.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	5	-3	7	-70
Post-Mitigation	2	5	-3	6	-60

Activity No. 6: The construction of stockpiles, including topsoil, overburden and discard and emergency coal stockpiles.					
Criteria	**Details / Discussion**				
Description of Impact	Stockpiling topsoil, overburden and emergency coal will have a negative visual impact on the receiving environment. Dust from the stockpiles will also have a negative visual impact. These visual impacts will occur for the life of the project.				
Mitigation Required	■ Topsoil should only be removed when and where necessary; ■ Limit the height of soil stockpiles to 3 metres to prevent the soil from becoming compacted and to reduce the visual impact; ■ Topsoil stockpiles should be vegetated so as to blend into the surrounding landscape; ■ Overburden should only be removed when and where necessary; ■ Topsoil, overburden and emergency coal stockpiles should be positioned to reduce visual disturbance where possible; ■ Reduce the height of overburden and emergency coal stockpiles where possible; ■ Limit the height and footprint area of topsoil, overburden and emergency coal stockpiles where possible; ■ Limit the quantity and time of emergency coal stored on site; ■ Apply dust suppression techniques to limit the dust from stockpiles; ■ Plant fast-growing endemic vegetation in areas where it can conceal the stockpiles; and ■ Ensure vegetation screens are built and maintained.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 7: The establishment of the initial boxcut and access ramps to the open pit mining areas.					
Criteria	**Details / Discussion**				
Description of Impact	The establishment of the initial boxcut and access ramps to the open pit mining areas will have a negative visual impact on the receiving environment. Drilling and blasting to develop the initial boxcut for mining will result in noise and dust thereby attracting attention to the project area. The boxcut will dramatically contrast the surrounding agricultural area. This will leave a permanent scar on the landscape. The visual impact of the boxcut and access ramps will be permanent and irreversible. Dust from the blasting will also have a negative visual impact. This visual impact will occur for the life of the project.				
Mitigation Required	■ Only remove overburden when and where necessary; and ■ Apply dust suppression techniques to limit the dust created by blasting.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-5	7	-98
Post-Mitigation	3	5	-5	6	-78

12.4.2 Operational Phase

The operational phase is characterised by mining of coal, water management, waste management and concurrent rehabilitation. This phase will have both negative and neutral visual impacts; however, the negative impacts far outweigh the neutral impacts. Waste management will have a minor visual impact. Water management will have a moderate visual impact.

The most significant visual impact during the operational phase is the mining of coal. Drilling and blasting of the overburden rock and the removal of coal will have a major negative visual impact. The resultant open pit will have a permanent and irreversible negative visual impact. Concurrent rehabilitation by replacement of overburden and topsoil, as well as re-vegetation will have a minor neutral impact on the receiving environment. It is a step in the right direction but will not significantly affect the overall negative visual impact of opencast mining.

Activity No. 10: Drilling and blasting of the overburden rock for easy removal by excavators and dump trucks.					
Criteria	**Details / Discussion**				
Description of Impact	The removal of overburden by drilling and blasting will have a continual negative visual impact on the receiving environment. This visual impact will be permanent and irreversible. Overburden stockpiling will have a negative visual impact on the receiving environment. Dust from the blasting and from stockpiles will also have a negative visual impact. These visual impacts will occur for the life of the project.				
Mitigation Required	■ Only remove overburden when and where necessary; ■ Overburden stockpiles should be positioned to reduce visual disturbance where possible; ■ Plant fast-growing endemic vegetation in areas where it can conceal stockpiles; ■ Ensure vegetation screens are built and maintained; ■ Limit the height and footprint area of overburden stockpiles where possible; and ■ Apply dust suppression techniques to limit the dust created by blasting and from the stockpiles.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-5	7	-98
Post-Mitigation	3	5	-5	6	-78

Activity No. 11: Coal removal by truck and shovel methods from the exposed coal seams. The coal is removed with shovels and transported to the plant by conveyor belt or by trucks.					
Criteria	**Details / Discussion**				
Description of Impact	The removal of coal will have a continual negative visual impact on the receiving environment. This visual impact will be permanent and irreversible. Infrastructure and mine area lighting will be visible at night resulting in a negative visual impact on the receiving environment. This visual impact will occur for the life of the project.				
Mitigation Required	■ ROM stockpiles should be positioned to reduce visual disturbance where possible; ■ Limit the quantity and time of ROM stored on site; and ■ Avoid operational and mining activities at night if possible, thereby avoiding the use of infrastructure and mine area lighting. If operational and mining activities take place at night, down lighting should be implemented to minimise light pollution.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-5	7	-98
Post-Mitigation	3	5	-5	6	-78

Activity No. 12: Vehicular activity on the proposed haul roads. Mining equipment will utilise the haul roads to access open pit areas, as well as to transport coal from the opencast pit to the plant and conveyor belt. The haul road will consist of wetland and stream crossings.					
Criteria	**Details / Discussion**				
Description of Impact	Vehicular activity on the haul roads will have a negative visual impact on the receiving environment. Dust from vehicular activity will also have a negative visual impact. These visual impacts will occur for the life of the project.				
Mitigation Required	■ Do not create numerous haul roads alongside each other; ■ Roads should be wetted frequently by means of a water bowser to suppress dust; and ■ Vehicles must be roadworthy and obey the recommended speed limits at all times.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-2	5	-50
Post-Mitigation	3	5	-2	4	-40

Activity No. 16: Operation and maintenance of the stockpiles, including topsoil, overburden and discard and ROM stockpiles.					
Criteria	**Details / Discussion**				
Description of Impact	Operation and maintenance of the topsoil, overburden and discard and ROM stockpiles will have a negative visual impact on the receiving environment. Dust from the stockpiles will also have a negative visual impact on the receiving environment. These visual impacts will occur for the life of the project.				
Mitigation Required	■ Topsoil and overburden should only be removed when and where necessary; ■ Limit the height of soil stockpiles to 3 metres to prevent the soil from becoming compacted and to reduce the visual impact; ■ Topsoil stockpiles should be vegetated so as to blend into the surrounding landscape; ■ Stockpiles should be positioned to reduce visual disturbance where possible; ■ Limit the height and footprint area of stockpiles where possible; ■ Apply dust suppression techniques to limit the dust from stockpiles; ■ Plant fast-growing endemic vegetation in areas where it can conceal the stockpiles; ■ Ensure vegetation screens are built and maintained. ■ Limit the quantity and time of ROM stored on site; and ■ Avoid operational and mining activities at night if possible, thereby avoiding the use of infrastructure and mine area lighting. If operational and mining activities take place at night, down lighting should be implemented to minimise light pollution.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	5	-4	7	-84
Post-Mitigation	3	5	-4	6	-72

Activity No. 17: Waste and sewage generation and disposal. All domestic, industrial and hazardous waste is produced during the mining process. Waste includes cans, plastics, used tyres and oil which must be disposed of in an appropriate manner by a contractor at a licensed waste disposal site. Sewage produced from the office buildings and ablutions will be treated at a sewage plant, septic tank or French drain system.					
Criteria	**Details / Discussion**				
Description of Impact	Waste storage on site will have a negative visual impact on the receiving environment. This visual impact will occur until the waste is removed from the site.				
Mitigation Required	■ Limit the footprint area of the waste storage area where possible; and ■ Limit the quantity and time of waste stored on site.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	5	-2	5	-45
Post-Mitigation	1	5	-2	4	-32

Activity No. 18: Concurrent replacement of overburden and topsoil and re-vegetation of mined out strips. The mined strip will be backfilled with the overburden and compacted. Subsequently, the topsoil will be placed on top of the overburden and the area will be vegetated.					
Criteria	**Details / Discussion**				
Description of Impact	Concurrent rehabilitation by replacement of overburden and topsoil as well as re-vegetation as mining progresses will have a neutral visual impact on the receiving environment. The aim of rehabilitation is to return the project area to a state similar to the pre-mining state. Rehabilitation will assist to reduce the negative visual impact of mining on the receiving environment. Backfilling of the open pit with overburden will use rock removed from the void of the current mining strip to partly fill the mined out void in the previously mined strip. Once backfilling commences, overburden should no longer be added to the overburden stockpiles. This will have a neutral visual impact on the receiving environment. Spreading of topsoil and re-vegetation of the backfilled areas will have neutral visual impacts on the receiving environment.				
Mitigation Required	■ Backfill as much of the open pit area as possible; ■ Spread topsoil over the backfilled area; and ■ Re-vegetate the backfilled area.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-5	7	-98
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

12.4.3 Decommissioning Phase

The decommissioning phase is characterised by demolition of infrastructure and rehabilitation of the final void. This phase will have mainly neutral visual impacts on the receiving environment. The surface infrastructure is relatively small scale and its demolition and removal will have a minor neutral impact. The spreading of topsoil, profiling and contouring, and re-vegetation will have a moderate neutral impact. Rehabilitation of the final void will have a neutral visual impact. The open pit will be partly filled with overburden. There will not be enough overburden to fill the pit entirely so a void will always remain. This partial rehabilitation of the final void will have a neutral visual impact.

Activity No. 20: Demolition of infrastructure will take place and includes the PCDs, haul roads, coal tip and conveyor belts, pipelines, high mast radio communication tower, fuel bay and mine offices and workshop.

Criteria	Details / Discussion				
Description of Impact	Demolition and removal of infrastructure will have a neutral visual impact on the receiving environment. This will help to reverse some of the changes that occurred when the infrastructure was constructed.				
Mitigation Required	■ Ensure that all unnecessary infrastructure is demolished and removed from the site.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	5	-3	7	-70
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

Activity No. 22: Final replacement of overburden and topsoil and the establishment of vegetation on the final opencast void. Overburden will be backfilled into the final void and compacted. Subsequently, topsoil will be placed and the area vegetated.					
Criteria	**Details / Discussion**				
Description of Impact	Rehabilitation of the final open void (where possible) by replacement of overburden and topsoil will have a neutral visual impact on the receiving environment and will assist to return the project area to a state similar to the pre-mining state. Once coal has been removed from the open pit, there will be insufficient overburden to fill the void completely. Due to this material imbalance, a permanent void will remain. Spreading of topsoil, and profiling and contouring to create a free-draining topography will have a neutral visual impact. Re-vegetation of the rehabilitated areas will have a neutral visual impact. These visual impacts will be permanent. Rehabilitation will assist to reduce the negative visual impact of mining on the receiving environment.				
Mitigation Required	■ Backfill as much of the final void as possible; ■ Ensure that the final void is as small as practically possible; ■ Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; ■ Spread topsoil over the rehabilitated area; ■ Ensure that surface water and drainage lines are rehabilitated to create a free-draining topography; and ■ Re-vegetate the rehabilitated areas.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-5	7	-98
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

Activity No. 23: Waste handling of scrap metal and used oil as a result of the decommissioning phase will be undertaken.					
Criteria	**Details / Discussion**				
Description of Impact	Waste storage on site will have a negative visual impact on the receiving environment. This visual impact will occur until the waste is removed from the site.				
Mitigation Required	■ Limit the footprint area of the waste storage area where possible; and ■ Limit the quantity and time of waste stored on site.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	2	3	-2	5	-35
Post-Mitigation	1	3	-2	4	-24

12.4.4 Post-Closure Phase

The post-closure phase is characterised by continuous monitoring and rehabilitation. This phase will have a neutral visual impact on the receiving environment. The project area needs to be returned to a state similar to the pre-mining state.

Activity No. 24: Post-closure monitoring and rehabilitation will determine the level of success of the rehabilitation, as well as identify any additional measures that have to be undertaken to ensure that the mining area is restored to an adequate state. Monitoring will include surface water, groundwater, soil fertility and erosion, natural vegetation and alien invasive species and dust generation from the coal discard dumps.					
Criteria	**Details / Discussion**				
Description of Impact	Post-closure monitoring and rehabilitation is essential to limit the impact of the proposed KPSX: Weltevreden Project on the receiving environment. This is a neutral impact that will help to reverse some of the negative impacts.				
Mitigation Required	■ Ensure that all disturbed areas are rehabilitated to a state as close as possible to the pre-mining state; and ■ Carefully monitor the rehabilitated areas to ensure that rehabilitation is successful.				
Parameters	*Spatial Scale*	*Duration*	*Intensity*	*Probability*	*Significance Rating*
Pre-Mitigation	3	6	-5	7	-98
Post-Mitigation	*This is a positive impact with a neutral net benefit.*				

13 Cumulative Impacts

The Witbank Coalfield area is characterised by agriculture, mining and industry with little natural grassland vegetation remaining. The proposed KPSX: Weltevreden Project is bordered on the north-east by the Anglo American Thermal Coal Greenside Colliery, on the south and east by the Glencore Goedgevonden, Boschmans and Waterpan Collieries, and on the south-west by the HCI Nokuhle Colliery, Anglo American Thermal Coal Zibulo Colliery and the BECCSA Klipspruit Colliery. The Glencore Witcons Colliery is situated 1.7 km south, the BECSA Khutala Colliery is situated 4.8 km south-west, the Kendal Power Station is situated 8.9 km south-west, the Kusile Power Station is situated 12.4 km north-west and the proposed BECSA KPSX: South Project is situated 2.2 km south-west of the proposed KPSX: Weltevreden Project (Plan 9, Appendix A).

The numerous nearby mines and power stations have begun altering the agricultural sense of place to one of mining and industry. The visibility of these large developments has resulted in a loss of scenic character and it is expected that the proposed KPSX: Weltevreden Project will add to these existing impacts by increasing the visual disturbance on the receiving environment.

14 Mitigation Measures and Management Plan

The Environmental Management Plan (EMP) has been described according to the project activities to provide an understanding of what objectives and recommended management measures are required to minimise the environmental impacts arising from these activities. The management measures are described in Table 11.

Table 11: Mitigation and Management Plan

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Construction Phase										
Activity 2: The transportation of construction material to the project site via national, provincial and local roads.	Topography	■ To minimise topography change.	■ Liaise with local authorities to ensure that roads are well maintained.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Minor	Minor
	Visual	■ To minimise the negative visual impact caused by vehicular activity to transport construction material.	■ Roads should be wetted frequently by means of a water bowser to suppress dust; and ■ Vehicles must be roadworthy and obey the recommended speed limits at all times.	Weekly	N/A	Mining Plan Air Quality Plan	Construction	Mining Contractor	Minor	Minor
Activity 3: Storage of fuel, lubricant and explosives in temporary facilities for the duration of the construction phase. These substances are classified as hazardous in terms of the Hazardous Substances Act, 1973 (Act No. 15 of 1973) and will be managed accordingly.	Topography	■ To minimise topography change.	■ Limit the footprint area of the temporary storage facilities where possible.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Minor	Negligible
	Visual	■ To minimise the negative visual impact caused by the temporary storage of fuel, lubricants and explosives.	■ Limit the footprint area of the temporary storage facilities where possible.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Minor	Negligible

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Activity 4: Site clearance and topsoil removal prior to the commencement of physical construction activities, as well as open pit mining. This activity refers to the conversion of undeveloped, vacant land into industrial use.	Topography	■ To minimise topography change, disruption of surface water flow; and ■ To minimise soil erosion and topsoil loss.	■ Only clear vegetation when and where necessary; ■ Only remove topsoil when and where necessary; ■ Topsoil stockpiles should be vegetated where possible; ■ Ensure topsoil is stockpiled away from surface water and drainage lines; ■ Where possible, limit the height of topsoil stockpiles to 3 metres to prevent the soil from becoming compacted; and ■ Ensure topsoil stockpiles are contoured and not too steep (18° or less) to prevent slope failure.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Moderate	Moderate
	Visual	■ To minimise the negative visual impact caused by vegetation and topsoil removal.	■ Vegetation and topsoil should only be removed when and where necessary; and ■ Topsoil stockpiles should be vegetated and positioned to reduce visual disturbance where possible.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Moderate	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Activity 5: Construction of surface infrastructure will take place, including the offices and fuel bay, haul roads, PCDs, coal tip and conveyor belt, pipelines and clean water canals and a high mast radio communication tower.	Topography	■ To minimise topography change, disruption of surface water flow and pollution of clean water; and ■ To minimise soil erosion.	■ Limit the footprint area of surface infrastructure where possible; ■ Store construction materials away from surface water and drainage lines; ■ Access and haul roads should be contoured appropriately to limit erosion due to surface water runoff; ■ Do not create numerous haul roads alongside each other; ■ Ensure that access and haul roads follow the topography and do not cross surface water and drainage lines where possible; ■ Ensure canals and berms keep clean water away from the mining area; and ■ Ensure berms direct dirty water towards the PCD.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Moderate	Minor

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
	Visual	■ To minimise the negative visual impact caused by the construction of surface infrastructure; and ■ To minimise the negative visual impact caused by construction area lighting at night.	■ Do not create numerous haul roads alongside each other; ■ Limit the height and footprint area of surface infrastructure where possible; ■ Surface infrastructure should be painted natural hues so as to blend into the surrounding landscape where possible; ■ Pylons and metal structures should be galvanised so as to weather to a matt grey finish rather than be painted silver. If the pylons and metal structures are painted, it is recommended that a neutral matt finish be used; ■ Construction of vegetation berms must be implemented close to infrastructure so that vegetation can be established; and ■ Avoid construction activities at night if possible, thereby avoiding the use of construction area lighting. If construction activities take place at night, down lighting should be implemented to minimise light pollution.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Moderate	Minor

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Activity 6: The construction of stockpiles, including topsoil, overburden and discard and emergency coal stockpiles.	Topography	■ To minimise topography change and disruption of surface water flow; and ■ To minimise soil erosion and topsoil loss.	■ Only remove topsoil and overburden when and where necessary; ■ Topsoil stockpiles should be vegetated where possible; ■ Where possible, limit the height of topsoil stockpiles to 3 metres to prevent the soil from becoming compacted; ■ Stockpile topsoil, overburden and emergency coal away from surface water and drainage lines; and ■ Ensure stockpiles are contoured and not too steep (18° or less) to prevent slope failure.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Moderate	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
	Visual	■ To minimise the negative visual impact caused by stockpiling topsoil, overburden and emergency coal.	■ Topsoil should only be removed when and where necessary; ■ Limit the height of soil stockpiles to 3 metres to prevent the soil from becoming compacted and reduce the visual impact; ■ Topsoil stockpiles should be vegetated so as to blend into the surrounding landscape; ■ Overburden should only be removed when and where necessary; ■ Topsoil, overburden and emergency coal stockpiles should be positioned to reduce visual disturbance where possible; ■ Reduce the height of overburden and emergency coal stockpiles where possible; ■ Limit the height and footprint area of topsoil, overburden and emergency coal stockpiles where possible; ■ Limit the quantity and time of emergency coal stored on site; ■ Apply dust suppression techniques to limit the dust from stockpiles; ■ Plant fast-growing endemic vegetation in areas where it can conceal the stockpiles; and ■ Ensure vegetation screens are built and maintained.	Weekly	N/A	Mining Plan Air Quality Plan	Construction	Mining Contractor	Moderate	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Activity 7: The establishment of the initial boxcut and access ramps to the open pit mining areas.	Topography	■ To minimise topography change and disruption of surface water flow.	■ Only remove overburden when and where necessary; and ■ Ensure the access ramps are not too steep.	Weekly	N/A	Mining Plan	Construction	Mining Contractor	Major	Moderate
	Visual	■ To minimise the negative visual impacts caused by the establishment of the initial boxcut and access ramps to the open pit mining areas.	■ Only remove overburden when and where necessary; and ■ Apply dust suppression techniques to limit the dust created by blasting.	Weekly	N/A	Mining Plan Air Quality Plan	Construction	Mining Contractor	Major	Moderate
Operational Phase										
Activity 10: Drilling and blasting of the overburden rock for easy removal by excavators and dump trucks.	Topography	■ To minimise topography change and disruption of surface water flow.	■ Only remove overburden when and where necessary; ■ Stockpile overburden away from surface water and drainage lines; ■ Limit the footprint area of overburden stockpiles where possible; and ■ Ensure overburden stockpiles are contoured and not too steep (18° or less) to prevent slope failure.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Major	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
	Visual	■ To minimise the negative visual impact caused by the removal of overburden by drilling and blasting; ■ To minimise the negative visual impact caused by overburden stockpiling; and ■ To minimise the negative visual impact caused by dust from the blasting of overburden.	■ Only remove overburden when and where necessary; ■ Overburden stockpiles should be positioned to reduce visual disturbance where possible; ■ Plant fast-growing endemic vegetation in areas where it can conceal stockpiles; ■ Ensure vegetation screens are built and maintained; ■ Limit the height and footprint area of overburden stockpiles where possible; and ■ Apply dust suppression techniques to limit the dust created by blasting and from the stockpiles.	Weekly	N/A	Mining Plan Air Quality Plan	Operational	Mining Contractor	Major	Moderate
Activity 11: Coal removal by truck and shovel methods from the exposed coal seams. The coal is removed by shovels and transported to the plant by conveyor belt or by trucks.	Topography	■ To minimise topography change.	■ Stockpile Run of Mine (ROM) coal away from surface water and drainage lines; ■ Limit the quantity and time of ROM coal stored on site; and ■ Ensure ROM coal stockpiles are contoured and not too steep (18° or less) to prevent slope failure.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Major	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
	Visual	■ To minimise the negative visual impact caused by the removal of coal; and ■ To minimise the negative visual impact caused by infrastructure and mining area lighting at night.	■ ROM stockpiles should be positioned to reduce visual disturbance where possible; ■ Limit the quantity and time of ROM stored on site; and ■ Avoid operational and mining activities at night if possible, thereby avoiding the use of infrastructure and mine area lighting. If operational and mining activities take place at night, down lighting should be implemented to minimise light pollution.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Major	Moderate
Activity 12: Vehicular activity on the proposed haul roads. Mining equipment will utilise the haul roads to access open pit areas, as well as to transport coal from the opencast pit to the plant and conveyor belt. The haul road will consist of wetland and stream crossings.	Topography	■ To minimise topography change and disruption of surface water flow.	■ Haul roads should be contoured appropriately to limit erosion due to surface water runoff; ■ Do not create numerous haul roads alongside each other; and ■ Ensure that haul roads follow the topography.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Minor	Minor
	Visual	■ To minimise the negative visual impact caused by vehicular activity on the haul roads; and ■ To minimise the negative visual impact caused by dust from vehicular activity.	■ Do not create numerous haul roads alongside each other; ■ Roads should be wetted frequently by means of a water bowser to suppress dust; and ■ Vehicles must be roadworthy and obey the recommended speed limits at all times.	Weekly	N/A	Mining Plan Air Quality Plan	Operational	Mining Contractor	Minor	Minor

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Activity 13: Mine water, or dirty water that is located within the opencast pits will need to be diverted by channels and berms to the PCDs to prevent clean water resources from being contaminated. Pipelines will pump the dirty water from the KPSX: Weltevreden PCDs to the KPS PCD.	Topography	■ To minimise topography change, disruption of surface water flow and pollution of clean water.	■ Ensure canals and berms keep clean water away from the mining area; and ■ Ensure berms direct dirty water towards the PCD.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Moderate	Moderate
Activity 16: Operation and maintenance of the stockpiles, including topsoil, overburden and discard and ROM coal stockpiles.	Topography	■ To minimise topography change and disruption of surface water flow.	■ Only remove topsoil and overburden when and where necessary; ■ Topsoil stockpiles should be vegetated where possible; ■ Ensure stockpiles are located away from surface water and drainage lines; ■ Limit the height of topsoil stockpiles to 3 metres to prevent the soil from becoming compacted; ■ Ensure stockpiles are contoured and not too steep (18° or less) to prevent slope failure; and ■ Limit the quantity and time of ROM stored on site.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Moderate	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
	Visual	■ To minimise the negative visual impact caused by stockpiling or topsoil, overburden and discard and ROM coal; ■ To minimise the negative visual impact caused by dust from the stockpiles; and ■ To minimise the negative visual impact caused by infrastructure and mining area lighting at night.	■ Topsoil and overburden should only be removed when and where necessary; ■ Limit the height of soil stockpiles to 3 metres to prevent the soil from becoming compacted and to reduce the visual impact; ■ Topsoil stockpiles should be vegetated so as to blend into the surrounding landscape; ■ Stockpiles should be positioned to reduce visual disturbance where possible; ■ Limit the height and footprint area of stockpiles where possible; ■ Apply dust suppression techniques to limit the dust from stockpiles; ■ Plant fast-growing endemic vegetation in areas where it can conceal the stockpiles; ■ Ensure vegetation screens are built and maintained. ■ Limit the quantity and time of ROM stored on site; and ■ Avoid operational and mining activities at night if possible, thereby avoiding the use of infrastructure and mine area lighting. If operational and mining activities take place at night, down lighting should be implemented to minimise light pollution.	Weekly	N/A	Mining Plan Air Quality Plan	Operational	Mining Contractor	Moderate	Moderate

Project Activities	Receiving Environment	Objectives	Management and Mitigation Measures	Frequency	Legal Requirements	Recommended Action Plans	Duration	Responsible Person	Significance Before Mitigation	Significance After Mitigation
Activity 17: Waste and sewage generation and disposal. All domestic, industrial and hazardous waste is produced during the mining process. Waste includes cans, plastics, used tyres and oil which must be disposed of in an appropriate manner by a contractor at a licensed waste disposal site. Sewage produced from the office buildings and ablutions will be treated at a sewage plant, septic tank or French drain system.	Topography	■ To minimise topography change.	■ Limit the footprint area of waste management facilities where possible; ■ Ensure waste is stored away from surface water and drainage lines; and ■ Limit the quantity and time of waste stored on site.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Minor	Negligible
	Visual	■ To minimise the negative visual impact caused by waste stored on site.	■ Limit the footprint area of the waste storage area where possible; and ■ Limit the quantity and time of waste stored on site.	Weekly	N/A	Mining Plan	Operational	Mining Contractor	Minor	Negligible
Activity 18: Concurrent replacement of overburden and topsoil and the re-vegetation of mined out strips. The mined strip will be backfilled with the overburden and compacted. Subsequently, the topsoil will be placed on top of the overburden and the area will be vegetated.	Topography	■ To rehabilitate the topography; and ■ To minimise soil erosion and topsoil loss.	■ Backfill as much of the open pit area as possible; ■ Spread topsoil over the backfilled area; and ■ Re-vegetate the backfilled area.	Monthly	N/A	Rehabilitation Plan	Operational	Environmental Officer	Major	*This is a positive impact with a neutral net benefit.*
	Visual	■ To increase the neutral visual impact caused by the replacement of overburden and topsoil, as well as re-vegetation as mining progresses.	■ Backfill as much of the open pit area as possible; ■ Spread topsoil over the backfilled area; and ■ Re-vegetate the backfilled area.	Monthly	N/A	Rehabilitation Plan	Operational	Environmental Officer	Major	*This is a positive impact with a neutral net benefit.*

Decommissioning Phase										
Activity 20: Demolition of infrastructure will take place and includes the PCDs, haul roads, coal tip and conveyor belts, pipelines, high mast radio communication tower, fuel bay and mine offices and workshop.	Topography	■ To rehabilitate the topography.	■ Ensure that all unnecessary infrastructure is demolished; ■ Ensure that all demolished infrastructure is removed from the project area; and ■ Rehabilitate all areas where infrastructure has been removed.	Monthly	N/A	Rehabilitation Plan	Decommissioning	Environmental Officer	Moderate	*This is a positive impact with a neutral net benefit.*
	Visual	■ To increase the neutral visual impact caused by the removal of infrastructure.	■ Ensure that all unnecessary infrastructure is demolished and removed from the site.	Monthly	N/A	Rehabilitation Plan	Decommissioning	Environmental Officer	Moderate	*This is a positive impact with a neutral net benefit.*
Activity 22: Final replacement of overburden and topsoil and the establishment of vegetation on the final opencast void. Overburden will be backfilled into the final void and compacted. Subsequently, topsoil will be placed and the area vegetated.	Topography	■ To rehabilitate the topography; ■ To recreate the natural drainage lines and surface water flow; ■ To create a free-draining topography; and ■ To minimise soil erosion and topsoil loss.	■ Backfill as much of the final void as possible; ■ Ensure that the final void is as small as practically possible; ■ Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; ■ Spread topsoil over the rehabilitated area; ■ Ensure that surface water and drainage lines are rehabilitated to create a free-draining topography; and ■ Re-vegetate the rehabilitated areas.	Monthly	N/A	Rehabilitation Plan	Decommissioning	Environmental Officer	Major	*This is a positive impact with a neutral net benefit.*

	Visual	■ To increase the neutral visual impact caused by rehabilitation of the final void; ■ To increase the neutral visual impact caused by the spreading of topsoil; ■ To increase the neutral visual impact caused by profiling and contouring to create a free-draining topography; and ■ To increase the neutral visual impact caused by re-vegetation of the rehabilitated areas.	■ Backfill as much of the final void as possible; ■ Ensure that the final void is as small as practically possible; ■ Ensure that the rehabilitated area is re-contoured and profiled to create a free-draining topography; ■ Spread topsoil over the rehabilitated area; ■ Ensure that surface water and drainage lines are rehabilitated to create a free-draining topography; and ■ Re-vegetate the rehabilitated areas.	Monthly	N/A	Rehabilitation Plan	Decommissioning	Environmental Officer	Major	*This is a positive impact with a neutral net benefit.*
Activity 23: Waste handling of scrap metal and used oil as a result of the decommissioning phase will be undertaken.	Topography	■ To minimise topography change.	■ Limit the footprint area of waste management facilities where possible; ■ Ensure waste is stored away from surface water and drainage lines; and ■ Limit the quantity and time of waste stored on site.	Monthly	N/A	Rehabilitation Plan	Decommissioning	Environmental Officer	Minor	Negligible

	Visual	■ To minimise the negative visual impact caused by waste stored on site.	■ Limit the footprint area of the waste storage area where possible; and ■ Limit the quantity and time of waste stored on site.	Monthly	N/A	Rehabilitation Plan	Decommissioning	Environmental Officer	Minor	Negligible
Post-Closure Phase										
Activity 24: Post-closure monitoring and rehabilitation will determine the level of success of the rehabilitation, as well as to identify any additional measures that have to be undertaken to ensure that the mining area is restored to an adequate state. Monitoring will include surface water, groundwater, soil fertility and erosion, natural vegetation and alien invasive species and dust generation from the coal discard dumps.	Topography	■ To rehabilitate the topography; ■ To recreate the natural drainage lines and surface water flow; ■ To create a free-draining topography; and ■ To minimise soil erosion.	■ Ensure that the post-mining topography is rehabilitated to a free-draining topography; ■ Ensure that surface water and drainage lines are rehabilitated to create a free-draining topography; and ■ Carefully monitor the rehabilitated areas to ensure that rehabilitation is successful and soil erosion is prevented.	Monthly	N/A	Rehabilitation Plan	Post-Closure	Environmental Officer	Major	*This is a positive impact with a neutral net benefit.*
	Visual	■ To increase the neutral visual impacts of post-closure rehabilitation.	■ Ensure that all disturbed areas are rehabilitated to a state as close as possible to the pre-mining state; and ■ Carefully monitor the rehabilitated areas to ensure that rehabilitation is successful.	Monthly	N/A	Rehabilitation Plan	Post-Closure	Environmental Officer	Major	*This is a positive impact with a neutral net benefit.*

14.1 General Mitigation

According to Bush et al (1979), vegetation screening is the best mitigation measure to conceal a development. Figure 8 illustrates the screening effect of vegetation. It is recommended that any vegetation which may potentially conceal the proposed development be left undisturbed, especially on the project boundary and around infrastructure. Vegetation left undisturbed along the perimeter of the project has the ability to conceal the proposed infrastructure from nearby receptors. Figure 9 illustrates the effect of cleared vegetation allowing direct views of the proposed infrastructure.

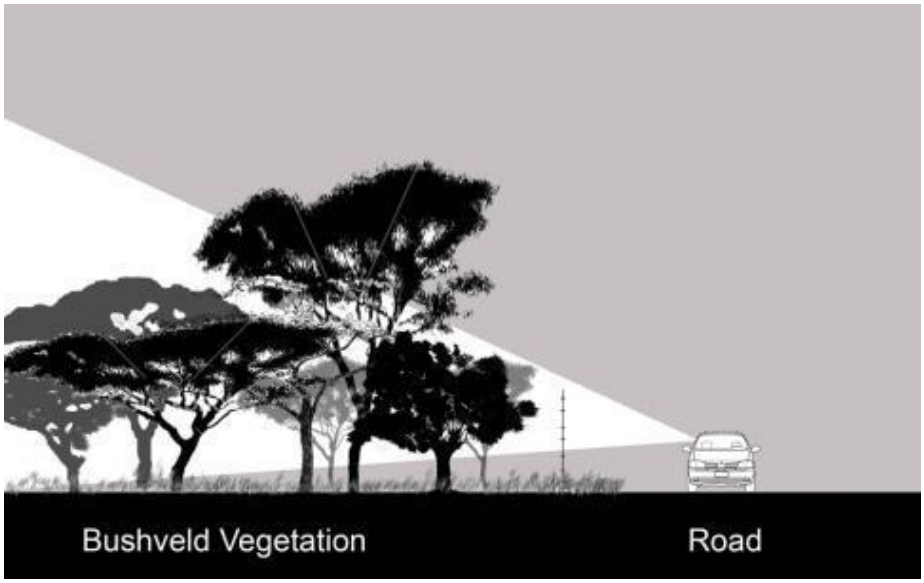

Figure 8: Screening Effect of Vegetation

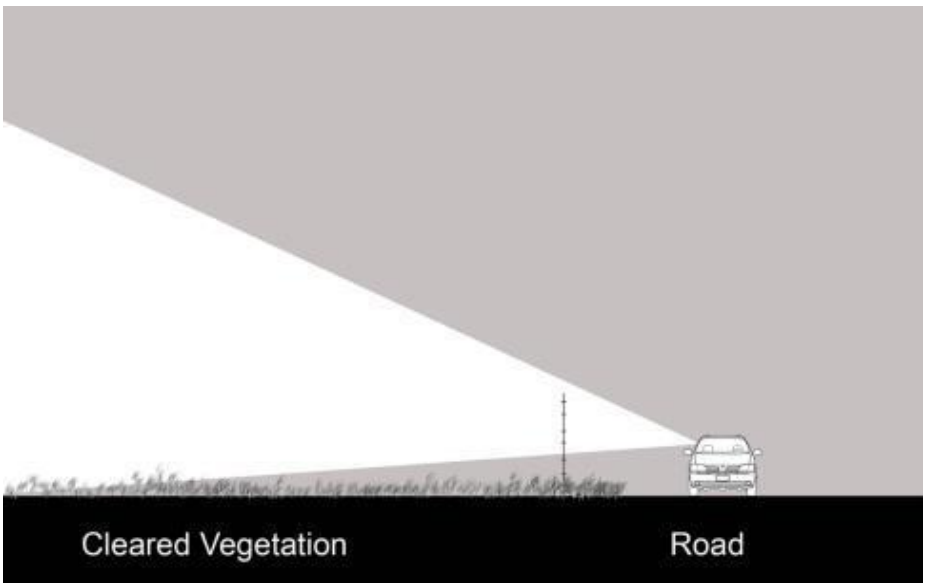

Figure 9: Effect of Cleared Vegetation

Other general mitigation measures that should be implemented where possible include:

- As much existing vegetation as possible should be retained, specifically bushes and trees if present. This will assist to conceal the development;
- Areas susceptible to dust should be frequently wetted by means of a water bowser. It is extremely important to suppress the visual aspects of dust to avoid creating the impression of a polluting industry;
- Vehicles should keep to the recommended speed limit, so as to reduce the creation of dust and attention;
- Down lighting should be implemented to minimise light pollution at night; and
- Grievances from receptors relating to topographical and visual aspects should be monitored and addressed.

15 Monitoring Programme

The following monitoring activities should be undertaken on a monthly basis for the life of the project:

- Dust monitoring as per the Air Quality Monitoring Plan;
- Vegetation screens need to be maintained and protected against fire and utilisation of the vegetation for fire wood, etc.; and
- Grievances from receptors must be monitored and addressed through a Grievance Mechanism.

16 Recommendations

Infrastructure heights were not available for this study and assumptions were made. Tehse assumptions were based on the heights of infrastructure from similar projects. It is recommended that a more accurate viewshed model be run when the infrastructure heights for the proposed KPSX: Weltevreden Project are available.

Ideally the viewshed model for the proposed KPSX: Weltevreden Project should be compared to the viewshed model for the existing BECSA Klipspruit Colliery and the areas where these models differ should be highlighted. The areas of difference would indicate the areas from which the existsing BECSA operations are not visible but from which the proposed KPSX: Weltevreden Project will potentially be visible, i.e. areas of additional visual disturbance. This comparison was not possible as the infrastructure layouts and heights for the existing Klipspruit Colliery were not available for this study. It is recommended that this viewshed comparison be done when the infrastructure layouts and heights for the existing BECSA Klipspruit Colliery are available.

It is recommended that the mitigation measures detailed in Table 11 above are implemented to reduce the impact that the proposed KPSX: Weltevreden Project will have on the

topography and visual character of the receiving environment. Vegetation and topsoil should only be removed when and where necessary to avoid exposing larger areas for longer periods of time which could result in soil erosion and increase the visual disturbance. Infrastructure and operations should be kept out of surface water and drainage lines as far as possible and it is essential to implement berms and PCDs to separate clean and dirty water on site.

The most important mitigation aspect is the rehabilitation of the site. The success of this rehabilitation will influence the overall long term impacts of the project. The open pit should be filled with overburden. It is of utmost importance that the topography of the site be re-contoured and profiled to create a free-draining topography that resembles the pre-mining topography as closely as possible. It is also essential to reconstruct all pre-development surface water and drainage lines to ensure that a free-draining surface is created and that the surface water flow returns to its original state. After re-contouring and profiling the site, it should be covered with topsoil and re-vegetated to complete the rehabilitation process.

The stockpiles will stand out in the surrounding area and will have a long term visual impact. If the stockpiles could be spread to reduce the height, the visual impact could be reduced. In addition, rehabilitation (vegetating) of these large features can significantly reduce the visual impacts.

17 Conclusion

The proposed KPSX: Weltevreden Project will have negative topographic and visual impacts on the receiving environment, but these impacts can be reduced by implementing various mitigation measures. The most important of these is rehabilitation with the emphasis being on re-contouring the site and reconstructing the surface water and drainage lines. The success of this rehabilitation will influence the overall long term impact of the proposed project on the topography and visual / aesthetic character of the receiving environment.

The receiving environment of the proposed KPSX: South Project has a moderate visual sensitivity as there are moderately visible areas in the landscape. The topography of the project area and surrounds is undulating with numerous small ridges and valleys. The mildly undulating topography is expected to only provide minimal screening of the proposed development. The receiving environment is characterised by agriculture and mining with little of the natural vegetation (Eastern Highveld Grassland, Rand Highveld Grassland and Eastern Temperate Freshwater Wetlands) remaining. The proposed project is expected to partially blend in with the surrounding mining activity. The agricultural and natural grassland vegetation will only provide minimal screening of the proposed development.

The viewshed model for the proposed KPSX: Weltevreden Project was refined to a buffer of 10 km around the proposed infrastructure and divided into areas that are likely to experience different categories of visual exposure. Due to the nature of the receiving environment it is unlikely that the proposed infrastructure will be visible beyond this 10 km buffer. The

viewshed model depicts the area from which the proposed KPSX: Weltevreden Project is likely to be visible. This viewshed covers an area of 562.2 km².

The viewshed model for this study was based on assumptions as the infrastructure heights for the proposed KPSX: Weltevreden Project were not available. It is recommended that a more accurate viewshed model be run when these infrastructure heights are available. Ideally the viewshed model for the proposed KPSX: Weltevreden Project should be compared to the viewshed model for the existing BECSA Klipspruit Colliery to identify areas of additional visual disturbance. It is recommended that a viewshed comparison be done when the infrastructure layouts and heights for the existing BECSA Klipspruit Colliery are available.

The proposed KPSX: Weltevreden Project has a high visibility and moderate visual exposure as it is will be visible from a large area and will be recognisable to the viewer. The proposed project has a moderate visual intrusion as it partially fits into the surroundings, but will be clearly noticeable. Although the proposed KPSX: Weltevreden Proejct is an extension of an existing mine, it covers a much larger area than the existing BECSA Klipspruit Colliery and will therefore have a significant impact on the receiving environment. The receiving environment and receptors of the proposed KPSX: Weltevreden Project have a moderate sensitivity. The receiving environment has a low VAC because there is little screening by the topography or vegetation. The proposed KPSX: Weltevreden Project will therefore have a high visual impact on the receiving environment.

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Appendix A: Plans

Plan 1: Regional Setting

Plan 2: Local Setting

Plan 3: Project Area

Plan 4: Infrastructure Layout

Plan 5: Topography

Plan 6: Slope Model

Plan 7: Aspect Model

Plan 8: Viewshed Model

Plan 9: Development Context

Plan 1

KPSX Weltevreden

Regional Setting

Legend

- Project Area
- City
- Major Town
- Secondary Town
- Other Town
- Settlement
- Power Station
- Main Road
- National Road
- Railway Line
- River
- Dam
- Local Municipal Boundary

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Central Meridian: 29°E	Date: 11/06/2014

N

0 2.5 5 10

Kilometres

1:200 000

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Plan 2

KPSX Weltevreden

Local Setting

Legend

- Project Area
- Secondary Town
- Other Town
- Settlement
- Power Station
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan / Stream
- Perennial Pan
- Wetland

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Projection: Transverse Mercator	Ref #: scm.BHP2690.201406.036
Datum: WGS 1984	Revision Number: 1
Central Meridian: 29°E	Date: 11/06/2014

N

0 1 2 4

Kilometres

1:80 000

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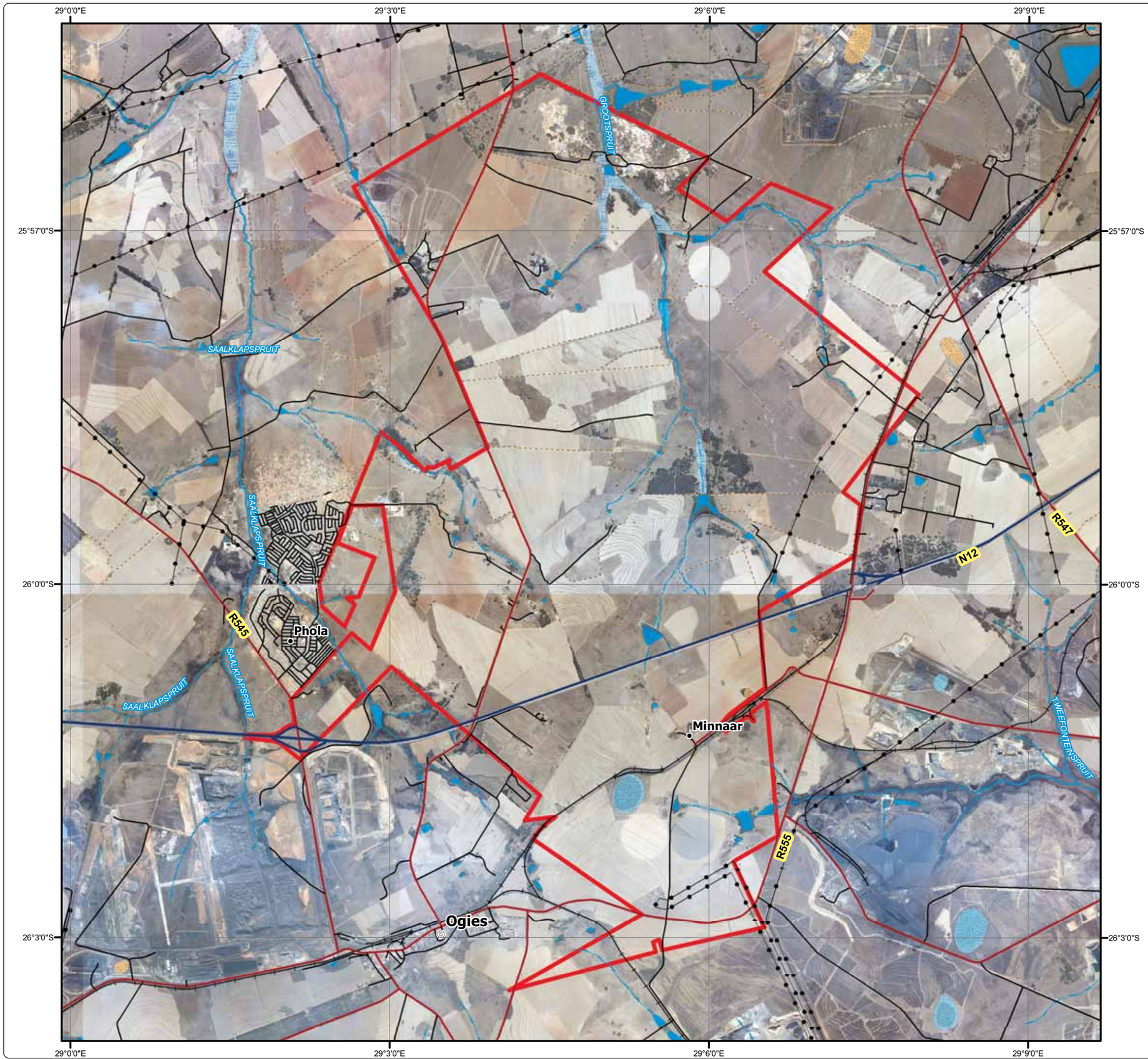
Plan 3

KPSX Weltevreden

Project Area



Legend

- Project Area
- Secondary Town
- Settlement
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Track
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan / Stream
- Perennial Pan
- Wetland

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Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 29°E

Ref #: scm.BHP2690.201406.037
Revision Number: 1
Date: 11/06/2014

N

0 0.5 1 2 3

Kilometres

1:60 000

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Plan 4

KPSX Weltevreden

Infrastructure Layout

29°0'0"E 29°3'0"E 29°6'0"E 29°9'0"E

25°57'0"S

26°0'0"S

26°3'0"S

GROOTSPRUIT

SAALKLAPSPRUIT

R547

R545

Phola

N12

Minnaar

R555

Ogies

Infrastructure

- High Mast Radio Communication Tower
- Proposed Access Road
- Proposed Curved Conveyor Option 1
- Proposed Curved Conveyor Option 2
- Proposed Haul Road
- Proposed Maintenance Road
- Proposed Road Diversion
- Stormwater Berm
- Trench
- Pit BD
- Pit H
- PCD
- Boxcut
- Proposed Overburden Stockpile
- Proposed Topsoil Strip Stockpile
- New Raw Water Elevated Tank
- Tip Area
- Building
- Substation

Legend

- Project Area
- Secondary Town
- Settlement
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Track
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan / Stream
- Perennial Pan
- Wetland

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Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 29°E

Ref #: scm.BHP2690.201502.006
Revision Number: 1
Date: 02/02/2015

N

0 0.5 1 2 3

Kilometres

1:60 000

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Plan 5

KPSX Weltevreden

Topography

28°57'0"E 29°0'0"E 29°3'0"E 29°6'0"E 29°9'0"E 29°12'0"E

25°54'0"S 25°57'0"S 26°0'0"S 26°3'0"S 26°6'0"S

Clewer
Phola
Minnaar
Coalville
Ogies
Kendal
Kendal Power Station

N4 N12 R545 R555 R547

SAALBOOMSPRUIT
SAALKLAPSPRUIT
GROOTSPRUIT
TWEEFONTEINSPRUIT
SAAIWATERSPRUIT
KLIPPOORTJIESPRUIT

Legend

- Project Area
- Secondary Town
- Other Town
- Settlement
- Power Station
- Trig Beacon
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Track
- Railway Line
- Contour (20 m)
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan / Stream
- Perennial Pan
- Wetland

Topographical Model Elevation (m.a.m.s.l.)

High : 1642.89

Low : 1434.39

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Projection: Transverse Mercator	Ref #: scm.BHP2690.201406.038
Datum: WGS 1984	Revision Number: 1
Central Meridian: 29°E	Date: 11/06/2014

N

0 1.25 2.5 5

Kilometres

1:100 000

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Plan 6

KPSX Weltevreden

Slope Model

Legend

- Project Area
- Secondary Town
- Other Town
- Settlement
- Power Station
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan / Stream
- Perennial Pan
- Wetland

Slope Model

Degree (°)

- 0 - 1.1
- 1.2 - 2.7
- 2.8 - 4.9
- 5 - 8.6
- 8.7 - 14.4
- 14.5 - 22.8
- 22.9 - 56.3

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Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 29°E

Ref #: scm.BHP2690.201406.039
Revision Number: 1
Date: 11/06/2014

N

0 1.25 2.5 5

Kilometres

1:100 000

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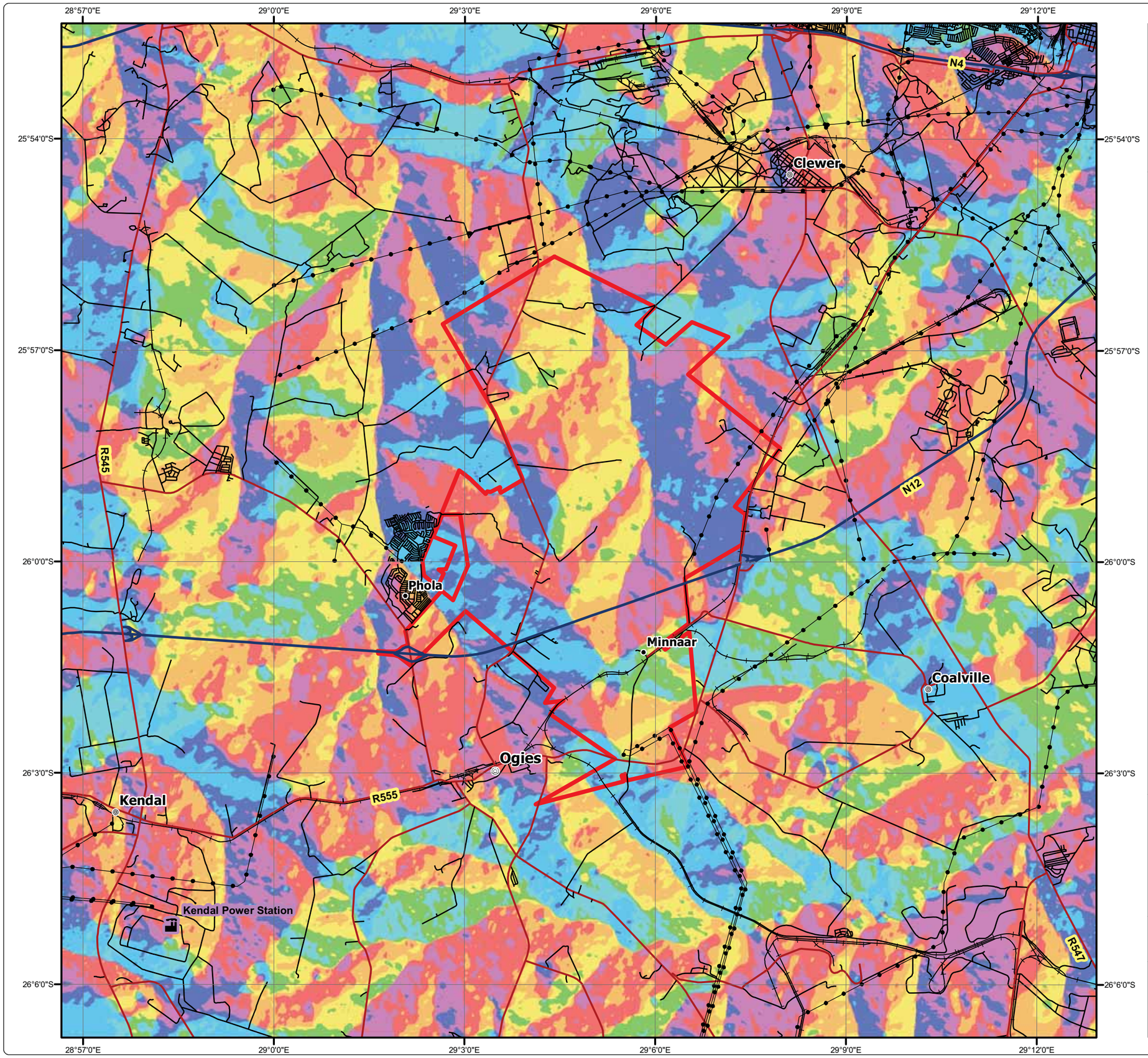
Plan 7

KPSX Weltevreden

Aspect Model



Legend

- Project Area
- Secondary Town
- Other Town
- Settlement
- Power Station
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Railway Line

Aspect Model

- Flat (-1)
- North (0-22.5)
- Northeast (22.5-67.5)
- East (67.5-112.5)
- Southeast (112.5-157.5)
- South (157.5-202.5)
- Southwest (202.5-247.5)
- West (247.5-292.5)
- Northwest (292.5-337.5)
- North (337.5-360)

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Projection: Transverse Mercator
Datum: WGS 1984
Central Meridian: 29°E

Ref #: scm.BHP2690.201406.040
Revision Number: 1
Date: 11/06/2014

N

0 1.25 2.5 5

Kilometres

1:100 000

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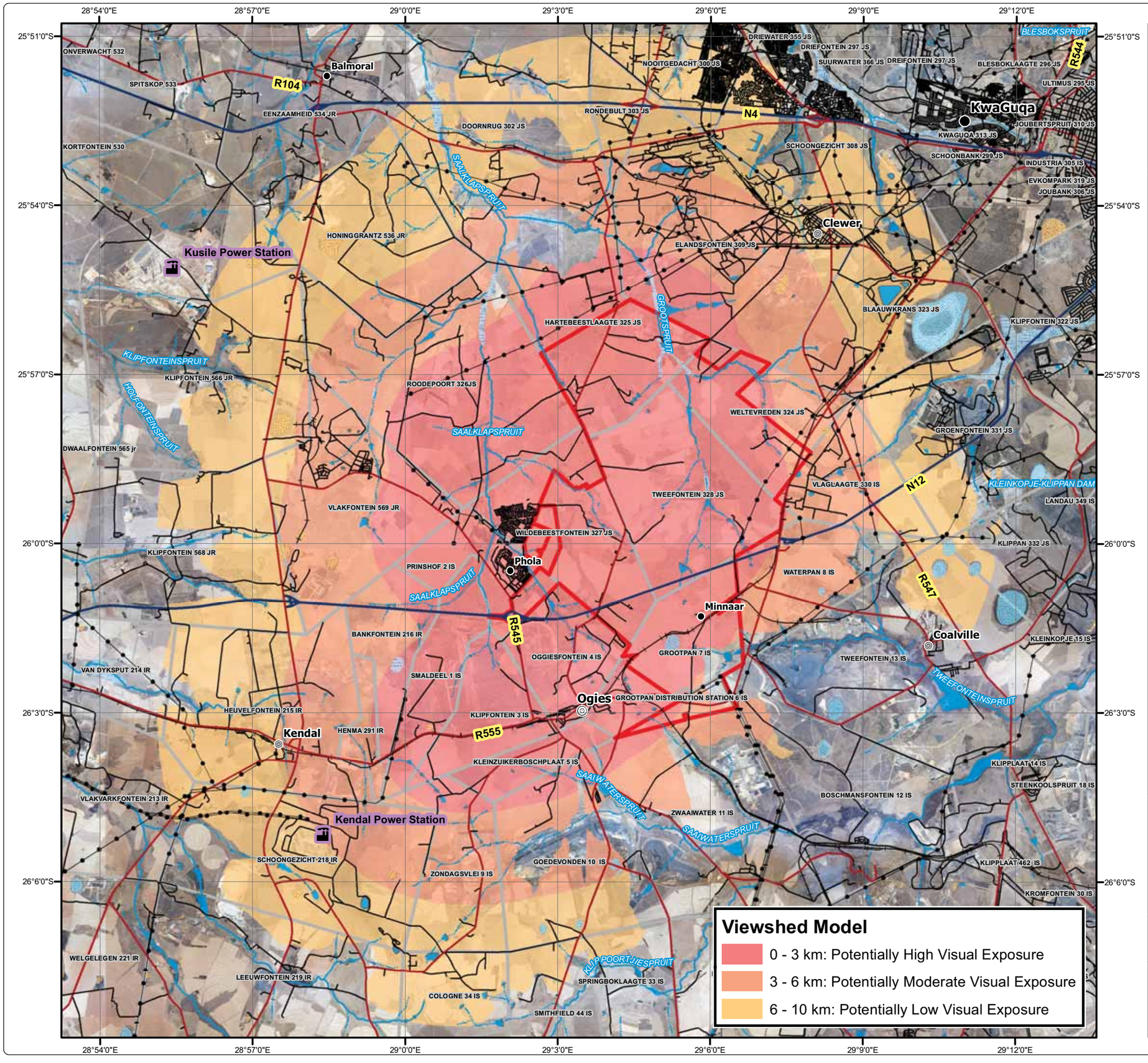
Plan 8

KPSX Weltevreden

Viewshed Model



Legend

- Project Area
- Major Town
- Secondary Town
- Other Town
- Settlement
- Power Station
- Power Line
- Arterial / National Route
- Main Road
- Minor Road
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan / Stream
- Perennial Pan
- Wetland
- Farm Boundary

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Projection: Transverse Mercator	Ref #: scm.BHP2690.201502.003
Datum: WGS 1984	Revision Number: 2
Central Meridian: 29°E	Date: 18/02/2015

N

0 1 2 4 6

Kilometres

1:125 000

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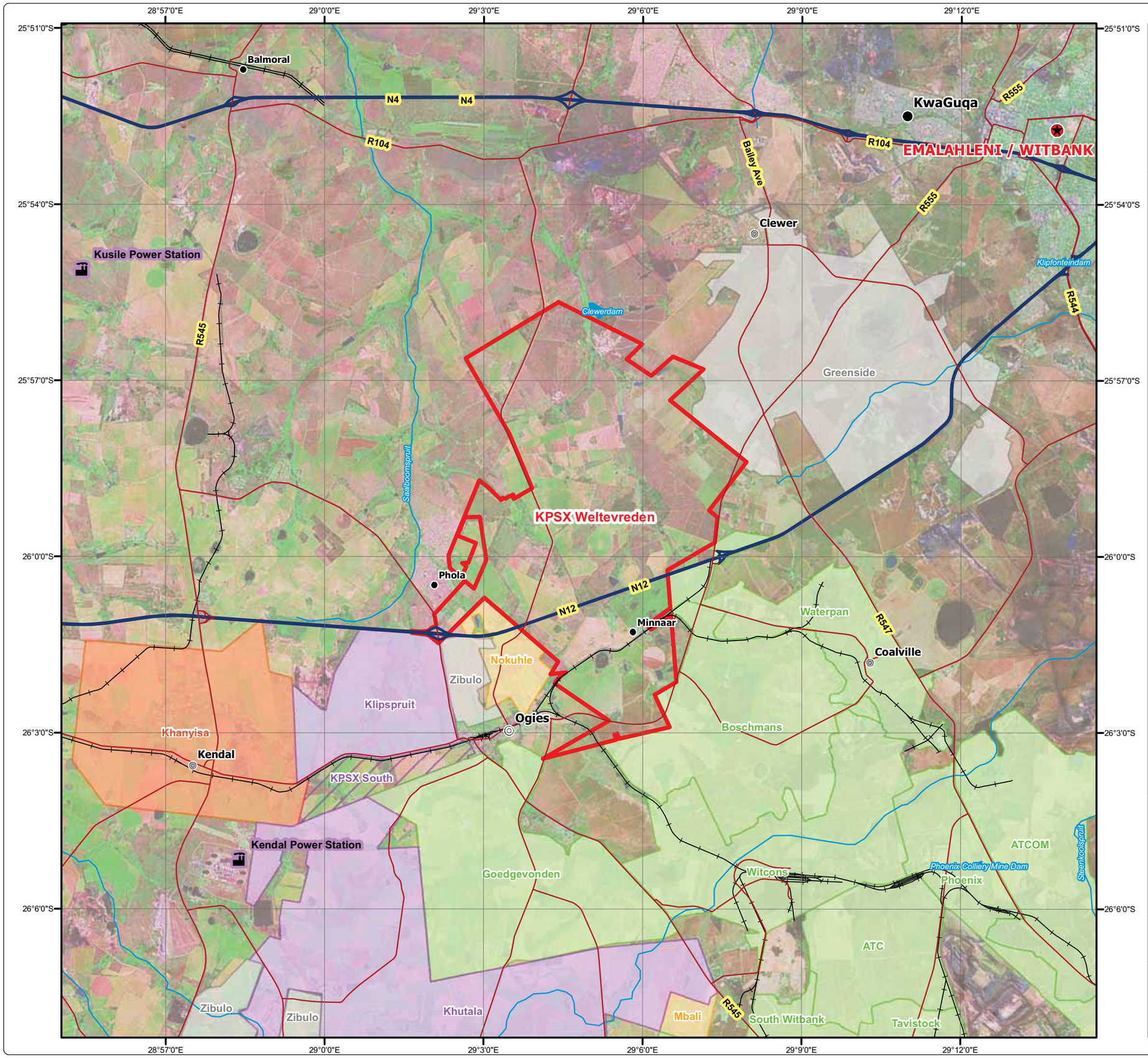
Plan 9

KPSX Weltevreden

Development Context



Legend

- KPSX Weltevreden Project Area
- City
- Major Town
- Secondary Town
- Other Town
- Settlement
- Power Station
- Main Road
- National Road
- Railway Line
- River
- Dam

Existing Mines

- Anglo Coal
- BHP Billiton
- Glencore
- HCI
- Wescoal

Proposed Mines

- BHP Billiton

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• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator	Ref #: scm.BHP2690.201406.041
Datum: WGS 1984	Revision Number: 2
Central Meridian: 29°E	Date: 28/01/2015

N

0 1 2 4 6

Kilometres

1:120 000

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Appendix B: CV and Declaration of Independence

STEPHANIE MULDER

Mrs Stephanie Mulder

Unit Manager: GIS

Digby Wells Environmental

1 EDUCATION

2006: BSc (Hons) Geography (cum laude) at University of Johannesburg

Major subjects: Philosophy and Research Methodology; Strategic Environmental Planning; Geographic Information Systems (GIS); Urban Geography; Geomorphology

2003 to 2005: BSc Geography and Informatics with Financial Orientation at University of Johannesburg

Major subjects: Geography; Informatics

Ancillary subjects: Mathematics, Analytical Techniques, Financial Management, Accounting, Business Management

2 TRAINING

2012: Diplôme D'Études en Langue Française – DELF A1 (La Commission Nationale du DELF et du DALF)

2011: ArcPad for ArcGIS (ESRI)

2011: Mining for Non-Miners (Snowden)

2009: Emerging Management Development Programme (EMDP) (University of Pretoria in association with the Public Administration Leadership and Management academy (PALAMA) and the School of Public Management and Administration)

2008: Building Geodatabases (ESRI)

2008: Geodatabase Design Concepts (ESRI)

2007: Introduction to ArcGIS I (ESRI)

3 LANGUAGE SKILLS

English (excellent)

Afrikaans (good)

French (intermediate)

4 PROFESSIONAL AFFILIATIONS

Geographic Information Society of South Africa (GISSA)

International Association of Impact Assessment South Africa (IAIASA)

5 EMPLOYMENT

September 2009 to present:	Digby Wells Environmental
January 2007 to August 2009:	Statistics South Africa

6 EXPERIENCE

I have experience in using Geographic Information Systems (GIS) as a digital cartographic and spatial analytical tool. As a GIS Specialist at Statistics South Africa I was responsible for maintaining the geodatabase and I gained experience working with vector data, aerial photography and satellite imagery. I was responsible for the data preparation and mapping for the Community Survey 2007 Digital Atlas CD. I assisted with map production for surveys and user requests for spatial data. I also worked on the Dwelling Frame Project, Placename and Enumerator Area Demarcation.

My responsibilities at Digby Wells currently include but are not limited to:

- Management of the GIS unit;
- Generation of maps for projects;
- Conducting Topography and Visual Impact Assessments (T&VIAs);
- Review of GIS maps and T&VIA Reports;
- Assisting with the maintenance of the GIS databases by storing all electronic files in a well organised structure;
- Expanding and improving the GIS databases by identifying gaps and sources of additional mapping data;
- The production of spatial information in map format;
- Application of GPS technology, aerial photo and satellite images.
- Assessing digital databases to ensure a high level of accuracy of data available at all times; and
- Spatial analyses relating to environmental projects.

7 PROJECT EXPERIENCE

My project experience at Digby Wells includes but is not limited to:

Year	Client	Project	Responsibility	Location
2013	Amara Sega	Cluff Sega RAP	Data compilation Mapping	Burkina Faso
2013	Anglo American Thermal Coal	Dalyshope Coal Mine EIA	Topography and Visual Impact Assessment Mapping	Limpopo, South Africa
2013	Aureus Mining Inc	New Liberty Gold Mine RAP	Questionnaire design Data compilation and analysis Mapping	Liberia
2013	Glencore Xstrata	GIS Phase 2 Project	Project Manager	Mpumalanga, South Africa
2013	Glencore Xstrata	Closure Cost Assessment 2013	3D modelling and closure calculations Supervise mapping	Mpumalanga, South Africa
2013	Platreef Resources	Platreef EIA	Topography and Visual Impact Assessment Mapping	Limpopo, South Africa
2013	Rhodium Reefs	Rhodium Reefs EIA	Topography and Visual Impact Assessment	Limpopo, South Africa
2013	Vedanta	Vedanta IPP EIA	Topography and Visual Scoping Study Mapping	Limpopo, South Africa
2012	Bokoni Platinum Mine	Bokoni Water Balance	Mapping	Limpopo, South Africa
2012	Platreef Resources	Platreef Agricultural Survey	Project Manager Data compilation Mapping	Limpopo, South Africa
2012	Platreef Resources	Platreef Skills and Business Survey	Project Manager Digital survey methodology	Limpopo, South Africa

			Data compilation and analysis	
2012	Xstrata Coal	Closure Cost Assessment 2012	3D modelling and closure calculations Supervise mapping	Mpumalanga, South Africa
2012	Xstrata Coal	Consolidated EIA EMP for Tavistock	Mapping	Mpumalanga, South Africa
2011	DRD Gold	Crown Knights Reclamation of Sand Dump 4/A/6 (Lycaste)	Topography and Visual Impact Assessment Mapping	Gauteng, South Africa
2011	DRD Gold	Crown Pipeline Audit	Mapping	Gauteng South Africa
2011	DRD Gold	Crown Consolidated EMP	Mapping	Gauteng, South Africa
2011	Koidu	Koidu RAP	Questionnaire design Data compilation and analysis	Sierra Leone
2011	Rand Gold	Gounkoto RAP	Fieldwork Mapping	Mali
2011	ResGen	Boikarabelo Railway EIA	Topography and Visual Impact Assessments	Limpopo, South Africa
2011	ResGen	Boikarabelo Power Station EIA	Topography Impact Assessment Mapping	Limpopo, South Africa
2011	Temo Coal	Temo Coal Mine EIA	Topography and Visual Impact Assessments	Limpopo, South Africa
2011	Universal Coal	Brakfontein Social and Environmental Screening Study	Mapping	Mpumalanga, South Africa
2011	Universal Coal	Roodekop EIA	Mapping	Mpumalanga, South Africa
2011	Xstrata Coal	Closure Cost Assessment 2011	3D modelling and closure calculations Mapping	Mpumalanga, South Africa
2011	Xstrata Alloys	Lesedi Power Station EIA	Topography Impact	Mpumalanga,

			Assessment Mapping	South Africa
2010	DRD Gold	Crown Pipeline EIA	Mapping	Gauteng, South Africa
2010	DRD Gold	Crown City Deep Reclamation of Slimes Dam 4/L/2	Mapping	Gauteng, South Africa
2010	DRD Gold	Crown City Deep Reclamation of Slimes Dams 3/L/40 & 3/L/42	Mapping	Gauteng, South Africa
2010	Galaxy Gold	Galaxy Gold Mine EIA	Topography and Visual Impact Assessments Mapping	Mpumalanga, South Africa
2010	HCI Coal	Nokuhle Colliery EIA	Topography Impact Assessment Mapping	Mpumalanga, South Africa
2010	HCI Coal	Palesa Extension EIA	Topography and Visual Impact Assessments Mapping	Mpumalanga, South Africa
2010	Mmamabula	Mookane Domestic Power Project	Mapping	Botswana
2010	ResGen	Boikarabelo Coal Mine EIA	Mapping	Limpopo South Africa
2010	Xstrata Coal	Closure Cost Assessment 2010	3D modelling and closure calculations Mapping	Mpumalanga, South Africa
2010	Xstrata Coal	Zonnebloem Colliery EIA	Mapping	Mpumalanga, South Africa
2009	BHP Billiton	Naudesbank & Vaalbank Baseline Studies	Mapping	Mpumalanga, South Africa
2009	MSA	Nkwe Social Survey	Mapping	Limpopo, South Africa
2009	Sasol Mining	Syferfontein Colliery EIA	Mapping	Mpumalanga, South Africa
2009	Universal Coal	Kangala Coal Mine EIA	Mapping	Mpumalanga, South Africa

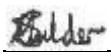
2009	Xstrata Coal	Community Baseline Survey	Data analysis Mapping	Mpumalanga, South Africa
2009	Xstrata Coal	Tavistock EMPR	Mapping	Mpumalanga, South Africa

SPECIALIST DECLARATION OF INDEPENDENCE

I, **Stephanie Mulder**, declare that I –

- Act as the independent specialist for the undertaking of a specialist section for the proposed project: **Topography and Visual Impact Assessment for the Proposed Klipspruit Extension: Weltevreden Project**;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2006;
- Do no have nor will have a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the Environmental Impact Assessment Regulations, 2006;

Stephanie Mulder
Name of specialist


Signature of the specialist

Digby Wells Environmental
Name of company

2015/04/21
Date