BAKUBUNG PLATINUM MINE

AMENDMENT PROJECT

FINAL VISUAL IMPACT ASSESSMENT REPORT

MAY 2021

Prepared by:

Yonanda Martin (*Pri. Sci. Nat*)

Environmental Assessment Practitioner

GENERAL INFORMATION

Report name:	Final Visual Impact Assessment Report for the Bakabung Platinum Mine Environmental Authorisation and Waste Management License Amendments Revision 02
Specialist:	Green Tree Environmental Consulting 7 Dublin Street Rangeview Ext 2 Krugersdorp Gauteng 082 409 0405 yonanda@gtec.net.za
Client:	Bakubung Minerals (Pty) Ltd
Environmental Consultant:	Knight Piésold (Pty) Ltd
Report Compiled by:	Yonanda Martin CV attached as Annexure A
Date of the Site Visit:	5 January 2021
Date of Draft Report:	15 January 2021 – Draft VIA Report
Date of Final Report:	17 May 2021 – Final Report

DECLARATION OF INDEPENDENCE

I, Yonanda Martin, appointed specialist responsible for compiling the Visual Impact Assessment Report declare that I: -

- act as an independent consultant, my conclusions are formed independently and without influence from external parties;
- I will perform the work relating to this report in an objective manner, even if the results and findings are not favourable to the applicant.
- have no financial interest in Bakubung Minerals (Pty) Ltd or Knight Piésold (Pty) Ltd or any of its subsidiaries;
- do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed;
- undertake to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document. and
- based on information provided to me by the project proponent, and in addition to information obtained during the course of this study and the site visit, will present the results and conclusion within the associated document to the best of my professional judgment.

Signed:

Date: 2021/01/05

SPECIALIST REPORTING REQUIREMENTS

Specialist Reporting Requirements According to Appendix 6 of the National Environmental Management Act (Act 107 of 1998), Environmental Impact Assessment Regulation 2014 (as amended on 7 April 2017)	
Requirement	**Relevant section in report**
Details of the specialist who prepared the report	Appendix A
The expertise of that person to compile a specialist report including a curriculum vitae	Appendix A
A declaration that the person is independent in a form as may be specified by the competent authority	Page iii
An indication of the scope of, and the purpose for which, the report was prepared;	Page 1
An indication of the quality and age of base data used for the specialist report;	N/A
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Page 11 and 33
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 6
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Page 6
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure	Page 21 - 32
An identification of any areas to be avoided, including buffers	Page 21
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Page 3 - 4
A description of any assumptions made and any uncertainties or gaps in knowledge;	Page 1
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Page 21 - 32
Any mitigation measures for inclusion in the EMPr;	Page 28
Any conditions for inclusion in the environmental authorisation	Page 28
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Page 28

A reasoned opinion whether the proposed activity, activities or portions thereof should be authorised regarding the acceptability of the proposed activity or activities; and	Page 33
If the opinion is that the proposed activity, or activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Page 33
A description of any consultation process that was undertaken during the course of carrying out the study	Page 10
A summary and copies if any comments that were received during any consultation process	Page 10
Any other information requested by the competent authority.	N/A

ABBREVIATIONS, ACORNYMS AND GLOSSARY

BPM	Bakubung Platinum Mine
DHSWS	Department of Human Settlements, Water and Sanitation
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
MPRDA	Minerals and Petroleum Resources Development Act, Act 28 of 2002
NEMA	National Environmental Management Act, Act No. 107 of 1998
PCD	Pollution Control Dam
RoM	Run of Mine
TSF	Tailings Storage Facility
SACLAP	South African Council for the Landscape Architectural Profession
SACNASP	South African Council for Natural Scientific Profession
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
WRD	Waste Rock Dump

Change in Landscape	*Fundamental change* – dominates the view frame and experience of the receptor; *Noticeable change* – clearly visible within the view frame and experience of the receptor; *Some change* – recognisable feature within the view frame and experience of the receptor; *Limited change* – not particularly noticeable within the view frame and experience of the receptor; *Generally compatible* – Practically not visible, or blends in with the surroundings.
Cumulative Effects	The summation of effects that result from changes caused by a development in conjunction with the other past, present or reasonably foreseeable actions.
Landscape Character	The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, woods, trees, water bodies, buildings and roads. They are generally quantifiable and can be easily described.
Landscape Impact	Landscape effects derive from changes in the physical landscape, which may give rise to changes in its character and how this is experienced (Institute of Environmental Assessment & The Landscape Institute, 1996).
Landscape Integrity	The compatibility or similarity of the project with the qualities of the existing landscape or the 'sense of place'.
Study area	For the purposes of this report the Project Study area refers to the proposed project footprint / project site as well as the 'zone of potential influence' (the area defined as the radius about the centre point of the project beyond which the visual impact of the most visible features will be insignificant) which is a 5,0km radius surrounding the proposed project footprint / site.
Project Footprint / Site	For the purposes of this report the Project *site* / *footprint* refers to the actual footprint of the new TSF and associated infrastructure as per the amendment application.
Sense of Place (genius loci)	Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. *A genius locus literally means* 'spirit of the place'.
Sensitive Receptors/ Viewers	Sensitivity of visual receptors (viewers) to a proposed development.

Viewshed analysis/ Line of Sight	The two-dimensional spatial pattern created by an analysis that defines areas, which contain all possible observation sites from which an object would be visible. The basic assumption for preparing a viewshed/line of sight analysis is that the observer eye height is 1,8m above ground level. This analysis is based on worst-case scenario and doesn't take vegetation buffers or other structures into consideration.
Visual Absorption Capacity	The potential of the landscape to conceal the proposed project. VAC depends upon general topography, aspect, tree cover or other visual obstruction, elevation and distance.
Visual Exposure of the area	The geographic area from which the project will be visible, or view catchment area.
Visual Impact	Visual effects relate to the changes that arise in the composition of available views because of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity.
Visibility	The visibility of the project is based on distance from the project to selected viewpoints.
Worst-case Scenario	Principle applied where the environmental effects may vary, for example, seasonally to ensure the most severe potential effect is assessed.
Zone of Potential Visual Influence	By determining the zone of potential visual influence, it is possible to identify the extent of potential visibility and views which could be affected by the proposed development. Its maximum extent is the radius around an object beyond which the visual impact of its most visible features will be insignificant primarily due to distance.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Green Tree Environmental Consulting was appointed to conduct a Visual Impact Assessment (VIA) for the proposed amendment to the Environmental Authorisation and Waste Management Licence for the Bakabung Platinum Mine, located to the south of the small town Ledig, North West Province (Figure 1 and 2).

Bakubung Minerals (Pty) Ltd is the owner of Bakubung Platinum Mine (BPM), currently operating on the farm Frischgewaagd 96JQ (Portions 3, 4 and 11). Bakubung Minerals (Pty) Ltd holds the mining right for BPM. The mine is located near Ledig, 2 km south of the Pilanesberg Game Reserve and Sun City in the North West Province, Rustenburg and Moses Kotane Local Municipalities, Bojanala District Municipality (Figure 1 and 2).

The mine received its mining right with approval of its Environmental Impact Assessment (EIA) in 2009 and a Water Use Licence from the Department of Human Settlements, Water and Sanitation (DHSWS) in 2010. Subsequently, the mine has applied for other authorisations and amendments.

This amendment by Knight Piésold (Pty) Ltd is based on BMPs wish to re-optimize the process in order to make its operations financially viable. The mine capacity was authorised for 3 MT/annum, but BPM wishes to approach this capacity in a phased approach - 1 Mt/annum (immediate) and 2 MT/annum (by 2024). The amendment will therefore include the capacity change from 3 MT/annum to 1 MT/annum and 2 MT/annum and the construction of an additional Tailings Storage Facility (TSF) on Frischgewaagd Farm (hereafter referred to the proposed Project), refer to Figure 3 for the proposed layout of the additional TSF.

This VIA Report will form part of the environmental amendment process in order to obtain authorisation for the proposed Project.

Objective of the Specialist Study

The main aim of the study is to ensure that the visual/aesthetic consequences of the proposed Project is understood and adequately considered in the impact assessment process. The VIA Report will be compiled in terms of Appendix 6 of the National Environmental Management Act (Act 107 of 1998): Environmental Impact Assessment Regulations 2014 (amended 2017).

Terms and Reference

A specialist study is required to assess the potential visual impacts arising from the proposed amendment of the Environmental Authorisation and the Waste Management License and therefore the following terms of reference was established:

- Conduct a field survey of the proposed project area and photograph the area from sensitive viewing points (site visit was undertaken on 5 January 2021);
- Describe the potential visual impact of the proposed Project and its cumulative effects;
- Make a reasoned opinion whether the proposed activity, activities or portions thereof should be authorised regarding the acceptability of the proposed activity or activities;
- Propose mitigation measures that can be included as part of the revised Environmental Management Programme (EMPr).

Assumption, Uncertainties and Limitations

The following assumptions limitations have been made in the study:

- The extent of the study area is determined by the zone of potential influence, which in this study relates to a radius of 5,0km around the Project site. At 5,0km and beyond the Project would recede into background views and or be screened by existing buildings, vegetation or infrastructure;
- It was assumed that the residential dwellings surrounding the proposed Project was occupied, unless otherwise confirmed during the site visit;
- The line of sight/ viewshed analysis is based on worst-case scenario and therefore doesn't take vegetation cover or other structures such as buildings in to consideration;
- The description of project components is as per the information provided by the Environmental Assessment Practitioner.

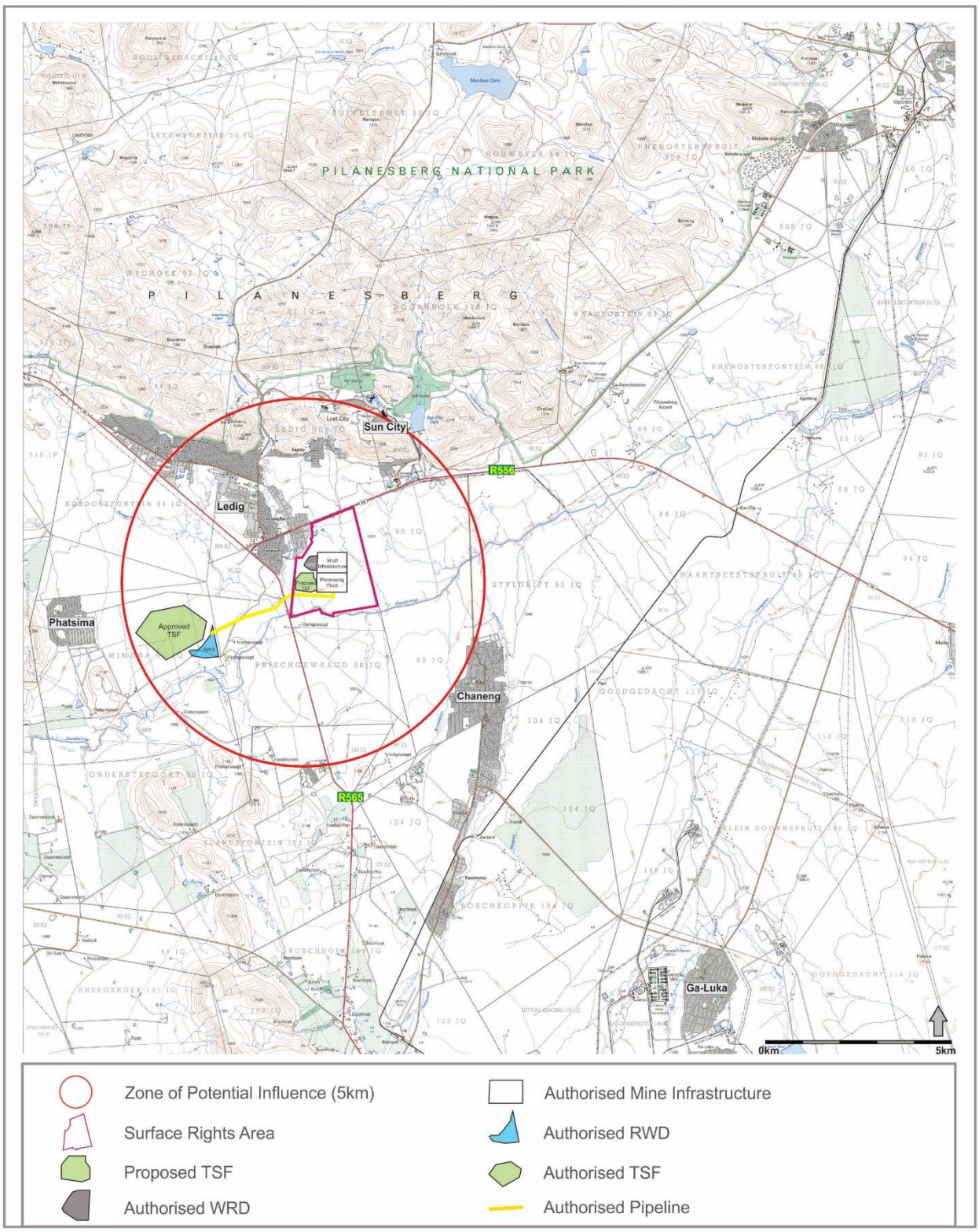


Figure 1: LOCALITY MAP

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

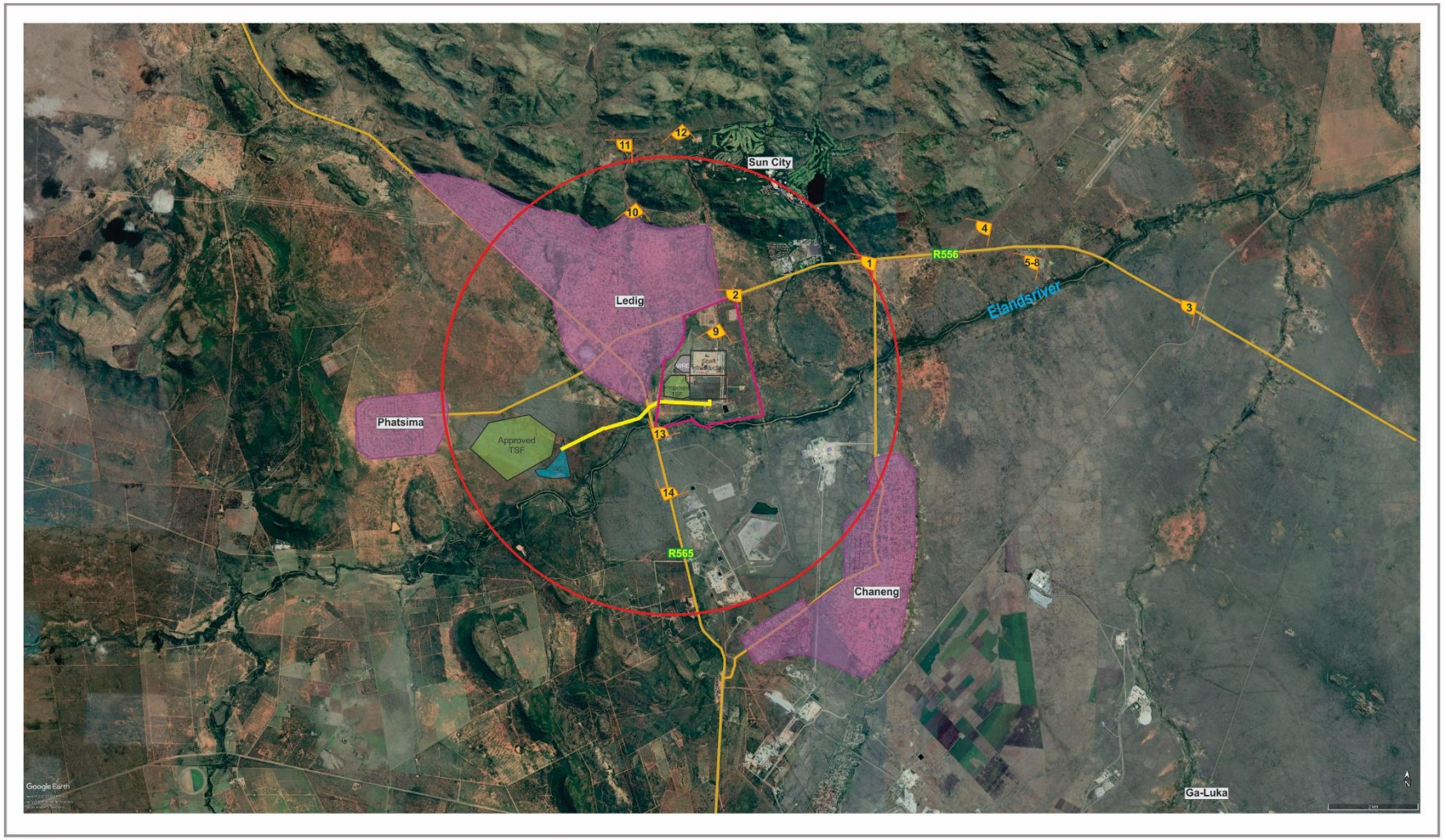


Figure 2: POTENTIAL SENSITIVE VIEWERS & VIEWPOINTS

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

LEGISLATION AND GUIDELINES

This report adheres to the following legal requirements and guideline documents.

National Environmental Management Act (Act 107 of 1998), EIA Regulations

The specialist report is in accordance to the specification on conducting specialist studies as per Government Gazette (GN) R 982 of the National Environmental Management Act (NEMA) Act 107 of 1998. The mitigation measures as stipulated in the specialist report can be used as part of the Environmental Management Programme (EMPr) and will be in support of the Environmental Impact Assessment (EIA) and Appendix 6 of the EIA Regulations 2014 (amended 2017).

The National Heritage Resources Act (25 of 1999)

The Act is applicable to the protection of heritage resources and includes the visual resources such as cultural landscapes, nature reserves, proclaimed scenic routes and urban conservation areas.

Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Processes Edition 1 (CSIR, 2005)

Although the guidelines were specifically compiled for the Province of the Western Cape, they provide guidance that is appropriate for any EIA process. The Guideline document also seeks to clarify instances when a visual specialist should get involved in the EIA process.

METHODOLOGY AND APPROACH

Methodology

The following method was used:

- Site visit: A field survey was undertaken (5 January 2021) in order to document the receiving environment.
- Project components: The physical characteristics of the project components will be described and illustrated based on information supplied by the Environmental Assessment Practitioner.
- The landscape character of the study area will be described. The description of the landscape focused on the nature and character of the landscape rather than the response of a viewer.
- The visual resource/ scenic quality of the area will be determined by looking at the quality of the landscape.
- The sense of place of the study area will be described as to the uniqueness and distinctiveness of the landscape.
- The visual impact will be determined looking at the sensitivity of the visual receptors/ viewers, the visual exposure, visibility and the visual absorption capacity.
- The significance of the visual impact will be determined by using the criteria provided by the Environmental Assessment Practitioner.
- Photo simulations will be generated in order to illustrate the intrusiveness of the proposed project.
- A line of sight/ viewshed analysis will be generated in order to illustrate the visibility and visual exposure of the proposed project.
- Mitigation measures will be suggested that will form part of the EMPr.

Approach

The approach used for this visual impact assessment report is based on the recommendations made in the Guideline, as issued by Western Cape Department of Environmental Affairs & Development Planning (2005), the Approach and Methodology as created by Graham Young, and also on the step-by-step approach used by The Landscape Institute with the Institute of Environmental Management and Assessment (2002) to determine the Landscape and Visual Impact. Refer to the Approach as created by Graham Young, Appendix B.

PROJECT DESCRIPTION

Bakubung Minerals (Pty) Ltd is the owner of Bakubung Platinum Mine (BPM), the mine received its mining right with approval of its Environmental Impact Assessment (EIA) in 2009 and a Water Use Licence from the Department of Human Settlements, Water and Sanitation (DHSWS) in 2010. Subsequently, the mine has applied for other authorisations and amendments.

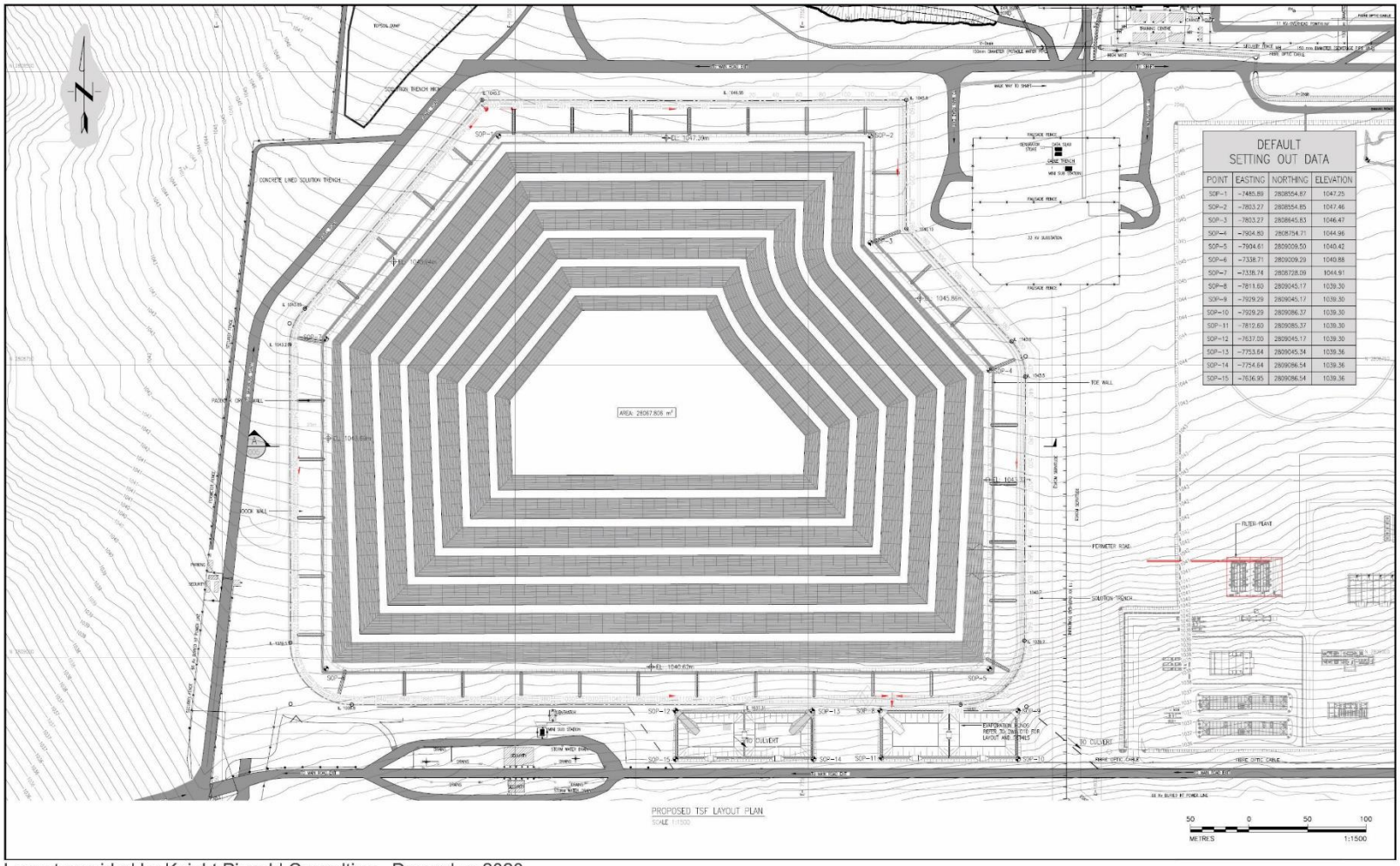
This amendment by Knight Piésold (Pty) Ltd is based on BMPs wish to re-optimize the process in order to make its operations financially viable. The mine capacity was authorised for 3 MT/annum, but BPM wishes to approach this capacity in a phased approach - 1 Mt/annum (immediate) and 2 MT/annum (by 2024). The amendment will therefore include the capacity change from 3 MT/annum to 1 MT/annum and 2 MT/annum, the construction of an additional Tailings Storage Facility (TSF) on Frischgewaagd Farm and the change of liner for stock pad area (hereafter referred to the proposed Project), refer to Figure 3 for the proposed layout of the additional TSF.

The main visual concern is the new TSF. The following design information, provided by Knight Piésold (Pty) Ltd, was used to establish the visual impact of the TSF:

- A 1 m high toe wall comprising of compacted selected material excavated from the basin of the TSF to provide containment during the early deposition into the facility;
- A network of seepage collection drains constructed in the basin of the TSF and immediately upstream of the toe wall;
- Toe paddocks to contain runoff and silt eroded from the outer slopes of the facility;
- A concrete lined solution trench to channel filter discharge and runoff from the outer slopes to the evaporation pond;
- An evaporation pond with two compartments positioned at the lowest point of the solution trenches situated at the South Eastern side of the TSF to contain the seepage discharge;
- A perimeter access road to allow suitable access around site;
- A stone pitched clean water diversion channel to divert clean stormwater around the TSF;
- The TSF will be constructed in 7 m lifts until the final height is reached. The equipment will stack the tailings and the tailings will be spread and compacted using mobile equipment. To achieve the required capacity a total of seven lifts will be required. Each lift will have a 7 m wide bench;
- The new TSF will be the first constructed TSF in order to cater for the 1Mt/annum capacity, once the capacity has been increased to 2Mt/annum the already authorised TSF site will be used.

Table 1: TSF Size Parameters

Infrastructure	Description
Area within the toe wall	22 Ha
Final elevation of TSF	1 089 mamsl
Area of TSF at final elevation	2.8 Ha
Height of TSF above lowest point	±50 m
Storage capacity available	7 Mt @ 1 089 mamsl



Layout provided by Knight Piesold Consulting - December 2020

Figure 3: PROPOSED TSF LAYOUT
Bakubung Platinum Mine - Amendment Project
May 2021

VISUAL CONCERNS

The public participation process was conducted by Knight Piésold (Pty) Ltd and the following concerns were received regarding the visual impact of the amendment project. The concerns listed below is just a summary of the letters received, refer to the Amendment Report as issued by Knight Piésold for the detailed description of the concerns received.

The public is concerned about the following:

- The new TSF will bring a change in the ‘sense of place’ of the area;
- The new TSF will contribute to the accumulative impacts on ‘sense of place’;
- The new TSF will bring a change to the natural topography of the area and will therefore have an impact on the landscape and visual character of the area;
- The visual impact will have a negative impact on the main economic sector in the area which is tourism.

VISUAL CHARACTER

The Study Area

The study site is located in an area that is characterised by several land uses, including; mining, tourism, human settlements (townships), grazing and agricultural fields. The study area has a slightly rolling topography that is created by the Elands River. Other rivers that contribute to the rolling topography of the surrounding areas are the Leragane, Bonwakgogo and Matlapyane Rivers, the Pilanesberg is located to the north of the study site, to the south and the east of the study area are several koppies and mountains. Refer to Figures 4-6 for panoramas illustrating the character and nature of the study area and Figure 2, which indicates the location of the viewing points.

The study area falls within the Savanna Biome and is classified as the Zeerust Thornveld (SVcb 3) according to Mucina and Rutherford (2006). The conservation status for the vegetation unit is least threatened and approximately 16% of the land has been transformed primarily by cultivation and urban or built-up areas. Mining has also drastically altered the character of this landscape in this Biome. The area, pre-mining, was largely dominated by natural vegetation, open to short thorny woodland with an herbaceous layer of mainly grasses.

Current Land Use

The primary land-uses within the study area are described in the table below.

Table 2: Land Use within the Study Area

Land Use	Description
Residential	The residential component of the study area mainly consists of formal and informal settlements/ townships. The nearest settlement is Ledig which basically surrounds the mining property on the northern and western boundary. Chaneng is located to the south-east of the study area and Phatisma to the west. Rustenburg is located approximately 30km to the south of the study site.
Industrial/ Mining	Mining activities within the study area includes the Royal Bafokeng Maseve Mine Complex to the south of the study site. Other mining activities within the surrounding area includes the Impala Shafts to the south-east of the site and the Bafokeng Rasimone Platinum Mine further south.
Infrastructure	The main infrastructure activities within the study area comprise roads (local roads, the R565 which gives access to Rustenburg and the R556

	which is the main access road from Sun City to Johannesburg), rail, the overhead power lines and associated substations.
Institutional/Recreational	There are no known institutional or recreational activities located within the Zone of Potential Influence.
Tourism	There are no known tourism activities located within the Zone of Potential Influence but there are several tourist attractions located in the surrounding area. The Pilanesberg is located to the north of the study area and there are several lodges and camping areas within the mountains/ game reserve. Sun City is located within the Pilanesberg and is approximately 5.5km north of the study site. The Kingdom resort is located approximately 8km to the north-east and Predator World approximately 9km north-east of the study site.

Landscape Character Types

Landscape character types are landscape units refined from Mucina and Rutherford (2009) vegetation types, the regional physiographic and cultural data derived from 1:50 000 topographical maps, aerial photographs and information gathered on the site visit. Dominant landform and land use features (e.g., hills, rolling plains, valleys and mining areas) of similar physiographic and visual characteristics, typically define landscape character types.

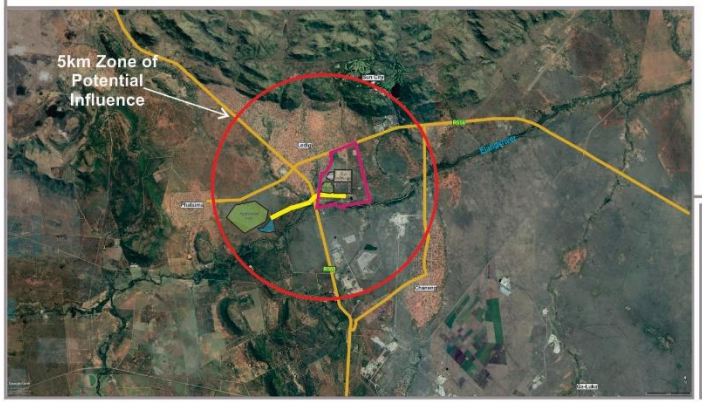
Photographic panoramas are presented in Figures 4 - 11 to illustrate the nature and character of the study area's landscape. Figure 2 illustrates the location of the viewing points and Figure 12 shows the spatial distribution of the various landscape types identified within the study area. These are:

- Rivers
- Mountains
- Agricultural and grazing fields
- Settlements
- Existing mining and industrial activities
- Infrastructure (roads, railway and power lines)

The landscape types are discussed in terms of their visual appeal in the Section below to determine the baseline (i.e. quality of the visual resource) of the study area.

View 1: From the main access to Chaneng, approximately 5.3km north-east of the proposed TSF site.

View 2: From a local road (R556), approximately 2.5km north-east of the proposed TSF site.



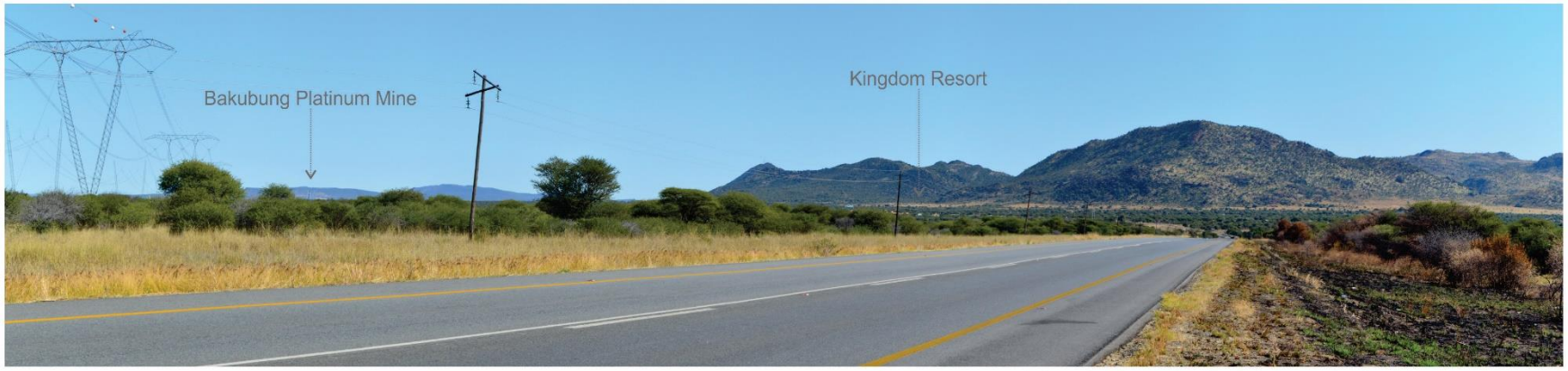
Refer to Figure 2 for the location of the viewpoints

Figure 4: LANDSCAPE CHARACTER

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405



View 3: From the R556 towards the Kingdom Resort.

View 4: From the local road (Pilanesburg Airport) towards the project.

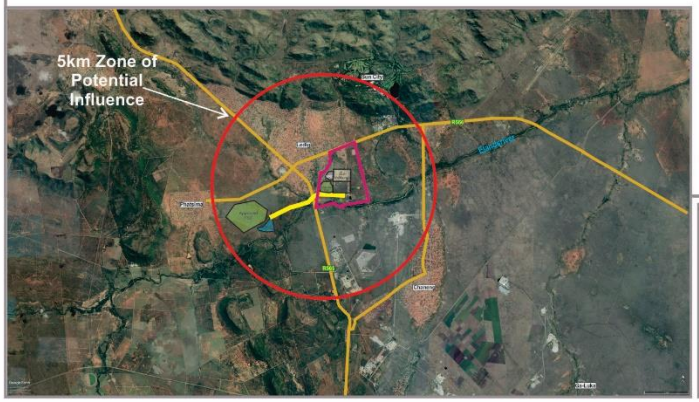


Figure 5: LANDSCAPE CHARACTER

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

View 5: From the main entertainment area within Kingdom Resort.

View 6: From within Kingdom Resort.

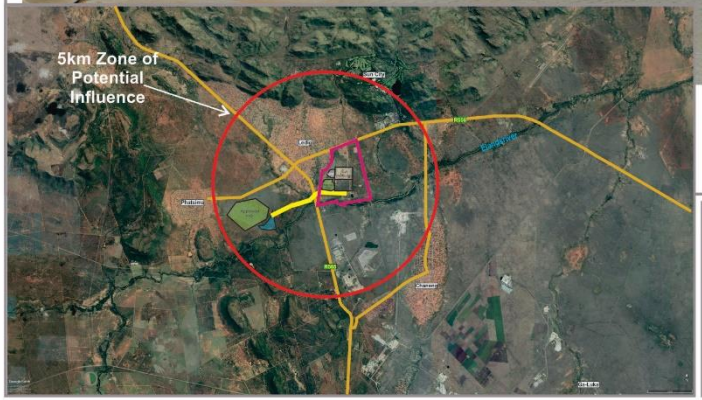


Figure 6: LANDSCAPE CHARACTER

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

View 7: From one of the accommodation units within the Kingdom Resort.

View 8: From the small berm within the Kingdom Resort.

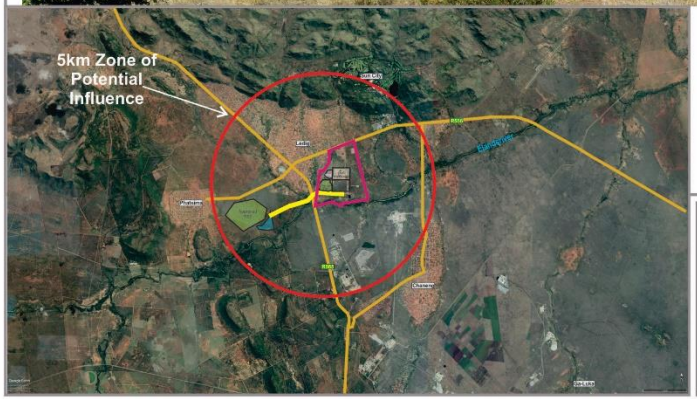


Figure 7: LANDSCAPE CHARACTER

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

View 9: From the R556, just outside Ledig, towards the project.

View 10: From the local road (Bakubung Bush Lodge) towards the project.

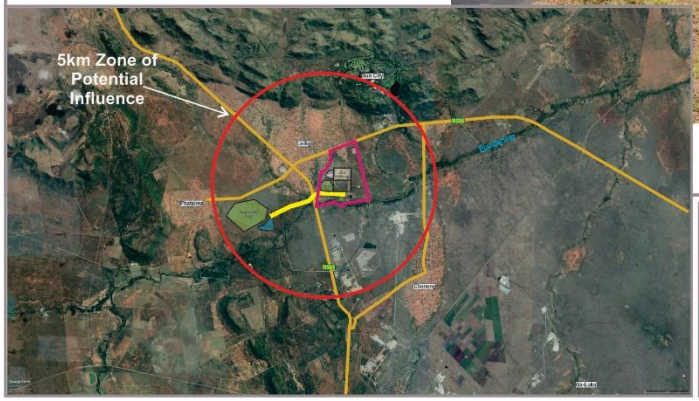


Figure 8: LANDSCAPE CHARACTER

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

View 11: From the local road between Bakubung Bush Lodge and the Lost City, towards the Bakubung Pilanesburg Gate and Bakubung Bush Lodge.

View 12: From the local road between Bakubung Bush Lodge and the Lost City, towards the project.

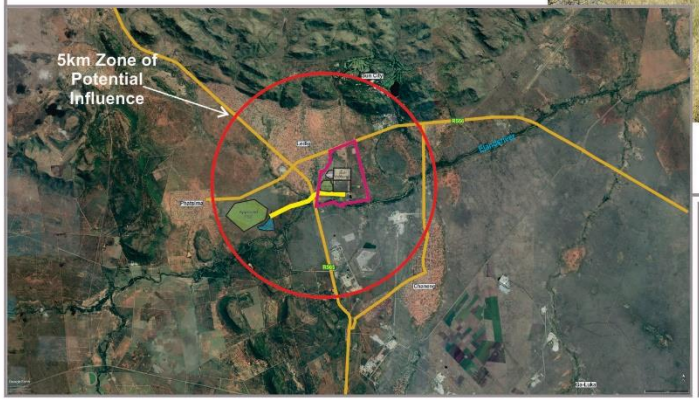


Figure 9: LANDSCAPE CHARACTER

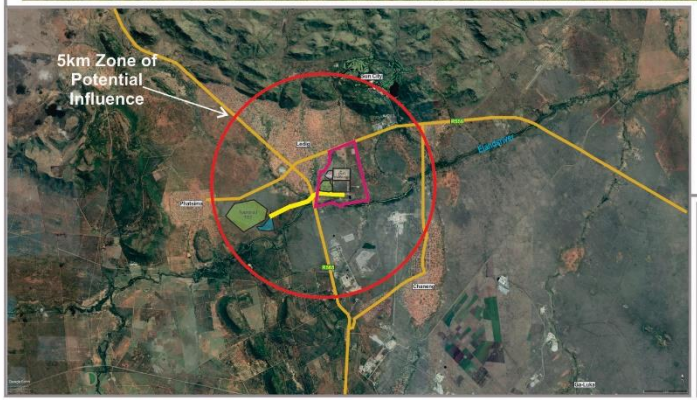
Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

View 13a: From a Elandriver Bridge (R565), approximately 0.7km south-west of the proposed TSF site.

View 13b: From a local road (R565), approximately 1.5km south of the proposed TSF site.



Refer to Figure 2 for the location of the viewpoints

Figure 10: LANDSCAPE CHARACTER

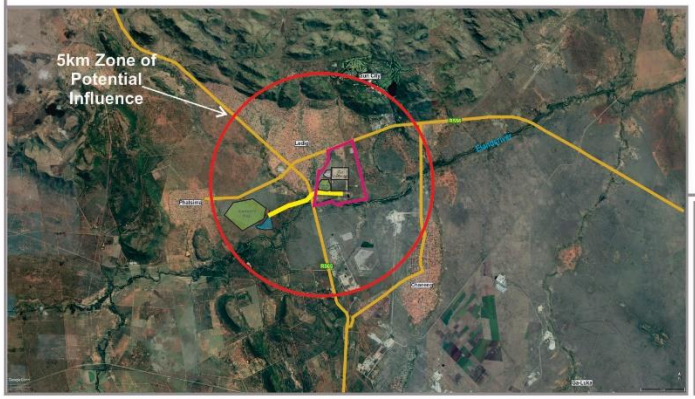
Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

View 14: From a local road (R565), approximately 2.5km south of the proposed TSF site.

View of the Authorised TFS site, photo taken from the Elandriver Bridge (R565).



Refer to Figure 2 for the location of the viewpoints

Figure 11: LANDSCAPE CHARACTER
Bakubung Platinum Mine - Amendment Project
May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

VISUAL RESOURCE

Visual Resource Value / Scenic Quality

The scenic quality of the study area is primarily derived from the combination of land-uses described in the section above as well as the landscape character (topography, vegetation cover, mountains and rivers), as illustrated in Figures 4-11. The area is characterised by mining activities not just within the study area but within the general area as well as settlements and tourist attractions, the natural component includes the Pilanesberg Mountains, the koppies, Elands River and the woodlands, refer to Figure 12.

When considering the criteria as listed in Table 3 below, an overall rating of *moderate* is allocated to the study area. The once natural/pastoral landscape has been compromised by the intrusion of mining related activities and settlements but the natural features such as the mountains and woodland are still prominent within the study area and the general area and therefore the visual resource value is considered to be *moderate*. A summary of the study area's visual resource values is tabulated in Table 3 below.

Table 3: Value of the Visual Resource

High	Moderate	Low
This landscape type is considered to have a *high* value because it is a: Distinct landscape that exhibits a very positive character with valued features that combine to give the experience of unity, richness and harmony. It is a landscape that may be of particular importance to conserve and which has a strong sense of place. Sensitivity: It is sensitive to change in general and will be detrimentally affected if change is inappropriately dealt with.	**This landscape type is considered to have a *moderate* value because it is a:** **Common landscape that exhibits some positive character, but which has evidence of alteration / degradation/ erosion of features resulting in areas of more mixed character.** **Sensitivity:** **It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with.**	This landscape type is considered to have a *low* value because it is a: Minimal landscape generally negative in character with few, if any, valued features. Sensitivity: It is not sensitive to change in general and change.

(After: The Landscape Institute with the Institute of Environmental Management and Assessment, 2002)

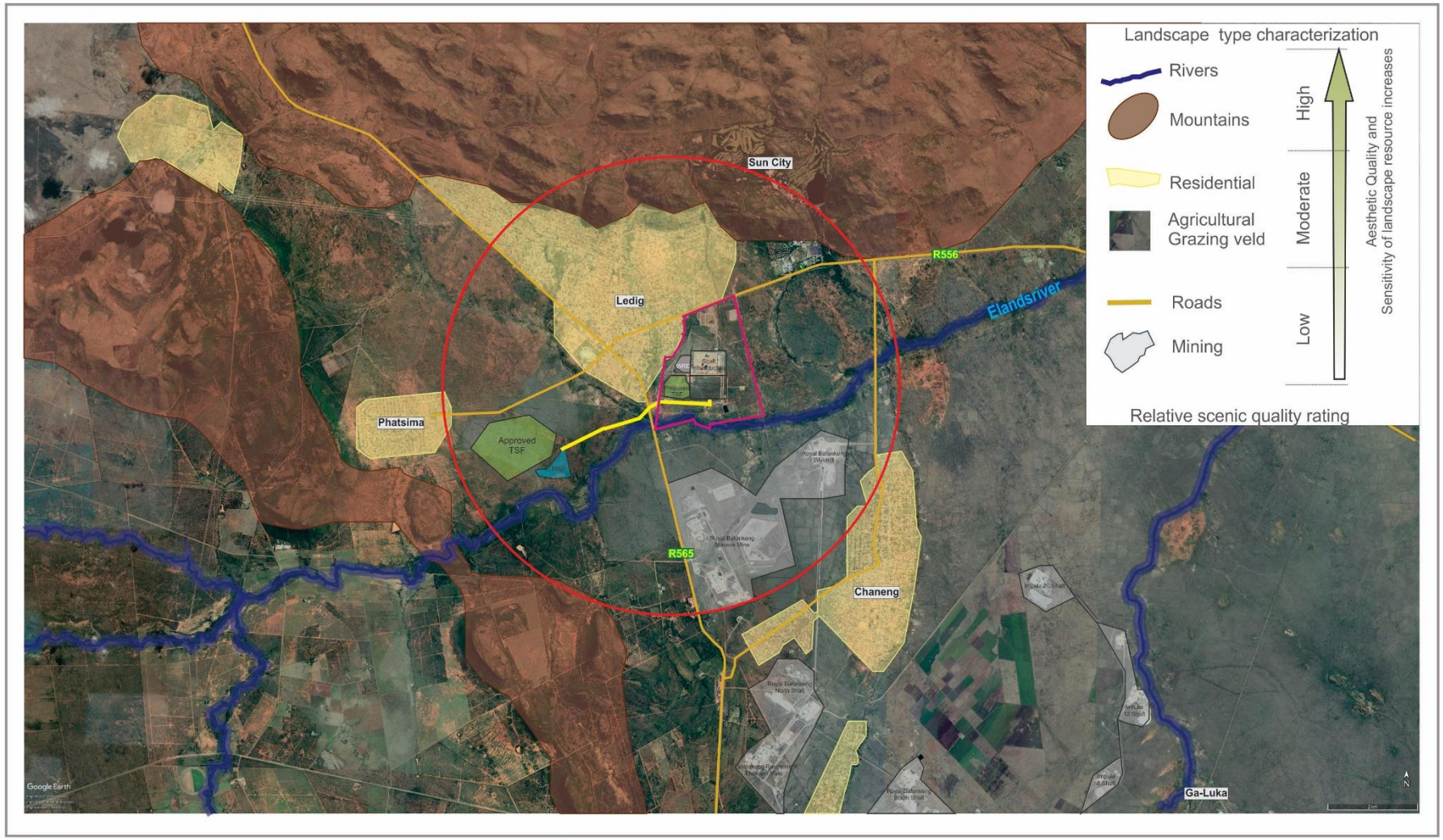


Figure 12: LAND USE MAP

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

Sense of Place

The sense of place for the study area derives from the combination of all landscape types and their impact on the senses. The sense of place of the study area is mainly dominated by the industrial/urban feeling created by the mining activities as well as the settlements within the study area. This sense of places changes when moving outside the study area and can basically be divided into an industrial/urban sense of place for receptors located along the R565 and towards the south of the study area, this sense of place is created by the mining activities, industrial activities and settlements located along the main access road towards Rustenburg. Receptors located towards the north, south-west and east of the study area will experience a more pastoral sense of place created by the natural landscapes.

SENSITIVITY OF VISUAL RECEPTORS/ VIEWERS

The sensitivity of the visual receptors/ viewers is determined by looking at the susceptibility of the visual receptors to the change that the proposed Project will bring to their views. The susceptibility of the visual receptor is a function of:

- Occupation or activity of people experiencing the view at particular locations; and
- The extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations.

The Landscape Institute with the Institute of Environmental Management and Assessment (2002) therefore suggest that the visual receptors most susceptible to change are generally likely to include:

- Residents at home;
- People who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape and or particular views;
- Visitors to heritage assets or other attractions, where views of the surroundings are an important contributor to the experience;
- Communities where views contribute to the landscape setting and enjoyed by residents in the area.

Visual receptors with a moderate susceptibility to change will include:

- Travellers on road, rail or other transport routes.

Visual receptors that are likely less sensitive to change would include:

- People engaged in outdoor sport or recreation which does not involve or depend on appreciation of views of the landscape;
- People at their place of work whose attention may be on their work and not on their surroundings.

When considering the proposed project, the visual receptors identified during the site visit will include:

- Receptors located in the settlements;
- tourist visiting the different tourist attractions/accommodation;
- people travelling along the R565, R556 and other local roads located within the study area;
- people traveling to and from work;
- people visiting the mines.

Sensitive Viewers

Within the context of the study area and the region, the following receptors (Table 4) were identified as potential sensitive viewers during the site visit. It should however be noted that most of the viewers from the settlements and local roads, located within the study area, has been exposed to the mining activities. Refer also to Figure 2, which identifies their location relative to the Project site.

Table 4: Potential Sensitivity of Visual Receptors – the Project

High	Moderate	Low
Resident staying within the settlements (Ledig, Phatsima and Chaneng) that are located within close proximity to the study site (Figure 4, view 2 and Figure 10, view 8). Tourist visiting the various tourist attractions such as Sun City, Pilanesberg and Kingdom Resort (Figure 9, view 11 and 12, Figure 7, view 7 and 8).	Locals and visitors travelling through the study area on the local roads (Figure 5, view 3 and 4).	People working within the study area and travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

VISUAL IMPACT

The visual impact of the proposed project will be determined by first looking at the *severity/magnitude* of the visual impact. This is determined using visibility, visual absorption capacity, landscape integrity, visual exposure and viewer sensitivity criteria. When the *severity/magnitude* of the impact is qualified with spatial, duration and probability criteria the significance of the impact can be predicted. This is done by using the Impact Assessment Criteria as provided by the Environmental Assessment Practitioner.

The visual impact of the project will be caused during the construction, when vegetation is cleared and the base of the TSF is constructed, during the operational phase, when the tailings is deposited, and lastly during the decommissioning/ closure phases. Activities associated with the Project will mostly be visible during day time and at night only the lights associated with the TSF will be visible and not necessarily the TSF itself.

The visual impact assessment will focus on the proposed project with the main concern being the new TSF, as per the amendment application. The rest of the mining activities, as per the authorisations, will not be assessed but will be dealt with as part of the overall cumulative impact of the Bakubung Platinum Mine.

Sensitive Viewers and Locations

The most prominent public views to the Project site would be from the R565, R556 and other local roads connecting the various settlements. These views will vary from open and unobstructed views to views that are obstructed by vegetation, the topography and buildings, refer to Figures 4, view 2, Figure 5, view 3 and 4 and Figure 10, view 13. These viewers are considered to the moderately susceptible since they are exposed to the proposed project for a short period of time and since the backdrop of most of the views from these points are already compromised by existing mining activities.

Viewers with a potentially high sensitivity or high susceptibility to change will include people living within the Ledig settlement, specifically referring to people staying within the houses located along the southern boundary of Ledig since the proposed TSF will be bring a significant change to their foreground view. Other sensitive viewers will include the residents from Chaneng and Phatsima as well as people visiting the tourist attractions and accommodation such as Sun City, lodges located within the Pilanesberg and the Kingdom Resort.

Visibility

The visibility of the proposed project is based on the distance from the proposed project to selected viewpoints. The ‘zone of potential influence’ was established at 5,0km, over 5,0km the impact of the Project’s activities would have diminished as the project will recede into a mining background and/or views to the site would be screened by vegetation, the rolling topography (including the Pilanesberg) and existing mining structures.

In determining the visibility of the Project the proposed height of the TSF was used (50m) and offsets equivalent to the height were used to generate the viewshed/ line of sight as illustrated in Figure 13.
It is clear from Figure 13 that people visiting the tourist attractions, such as Sun City and the lodges within the Pilanesberg will not have a view of the proposed project while staying at the facilities, refer to Figure 9, view 11. The proposed project will however become visible when they travel on the local roads such as the link road between Bakubung Bush Lodge and Sun City, R556 and the R565 or if the viewers/ receptors are on elevated areas such as hiking trails that are facing the project site, refer to Figure 5, view 3 and 4, Figure 9, view 10, Figure 11, view 14. According to the line of sight (Figure 13) the proposed project should be marginally visible for viewers located at the Kingdom Resort, this is mainly due to the distance between the proposed project and the resort but also due to the dense vegetation and the possibility of buildings blocking or screening views within the Kingdom Resort, refer to Figure 6, view 5 and 6, Figure 7, view 7 and 8.

The proposed project will be highly visible for residents staying in Ledig, especially from residential units located in the southern corner of Ledig which borders the proposed site, refer to Figure 8, view 9. Chaneng and Phatsima is located just on the border of the Zone of Potential Visual Influence and the proposed project will be marginally visible from these viewing points, refer to Figure 4, view 1.

In addition to the Line of Sight that is based on a 5km zone of potential influence a Line of Sight was also compiled for a zone of 10km, Figure 14. Viewers located beyond the 5km zone of potential influence will have a partially obstructed or screened view towards the proposed project. The proposed project will also start blending into the background of views located further than 5km from the project site. Viewers located north of the Pilanesberg will not have a view since the views are screened/ blocked by the mountains.

Visual Exposure

Visual exposure is determined by qualifying the visibility with a distance rating to indicate the degree of intrusion and visual acuity. The following criteria was used to describe the visual exposure:

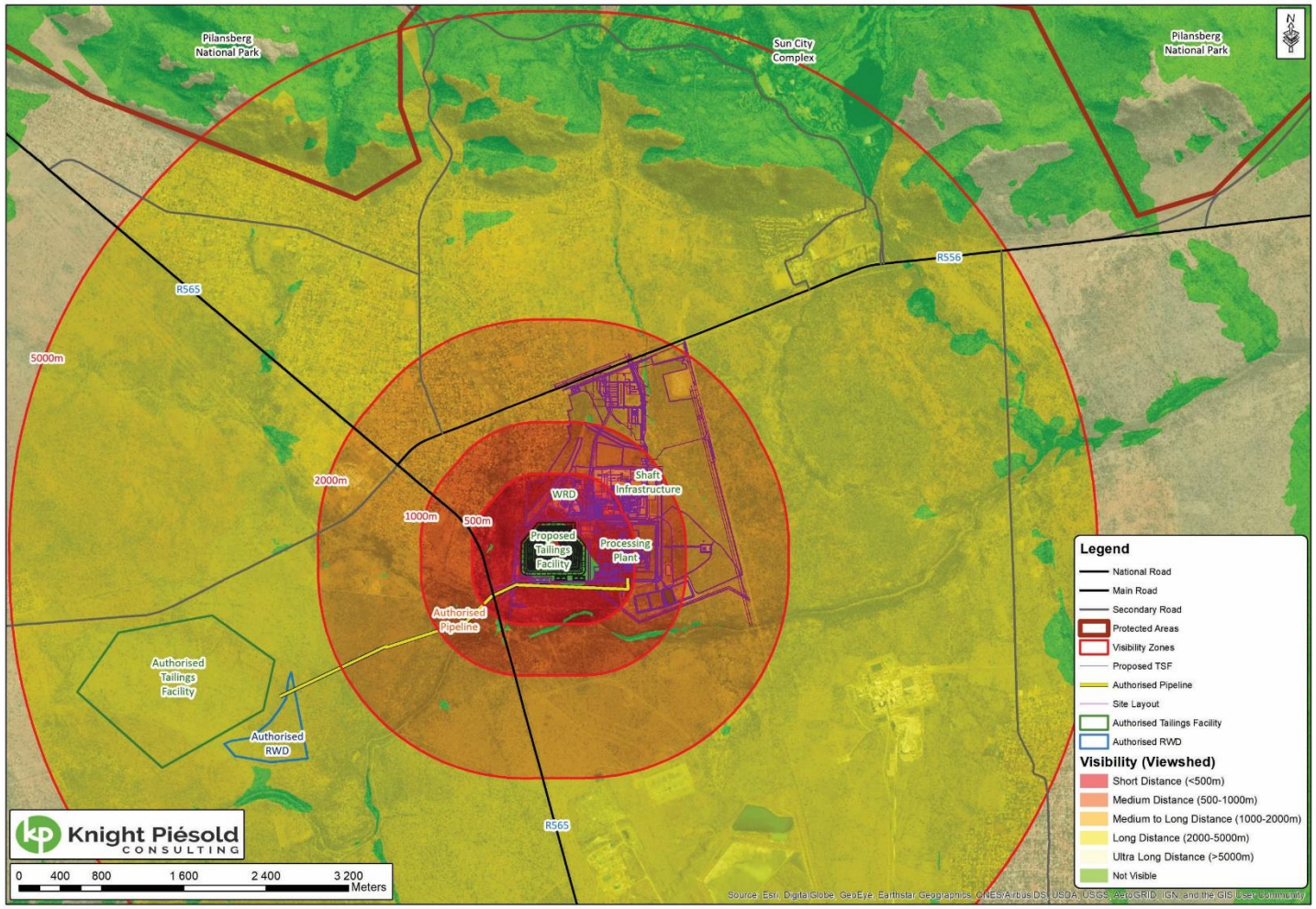
- Highly visible – dominant or clearly noticeable, foreground view (0 – 0.5km)
- Moderately visible – recognisable to the viewer, middle-ground view (0.5km – 2km)
- Marginally visible – not particularly noticeable to the viewer, background view (2km – 5km)

Table 5 below indicates the exposure of the various sensitive viewing areas.

Table 5: Sensitive Receptors – Visual Exposure

	Foreground view i.e. 0 – 500m from Project Site	Middle-ground view i.e.500m to – 2km from Project Site	Background view i.e. 2.0km - 5,0km from Project Site
Ledig	**X partially obstructed**	**X mostly obstructed**	**X mostly obstructed**

Chaneng			**X mostly obstructed**
Phatisma			**X mostly obstructed**
Pilanesberg (Sun City and other lodges)			**X obstructed**
Kingdom Resort			**X mostly obstructed**
Local Road		**X partially obstructed**	
R556 and R565.	**X partially obstructed**	**X partially obstructed**	**X partially obstructed**



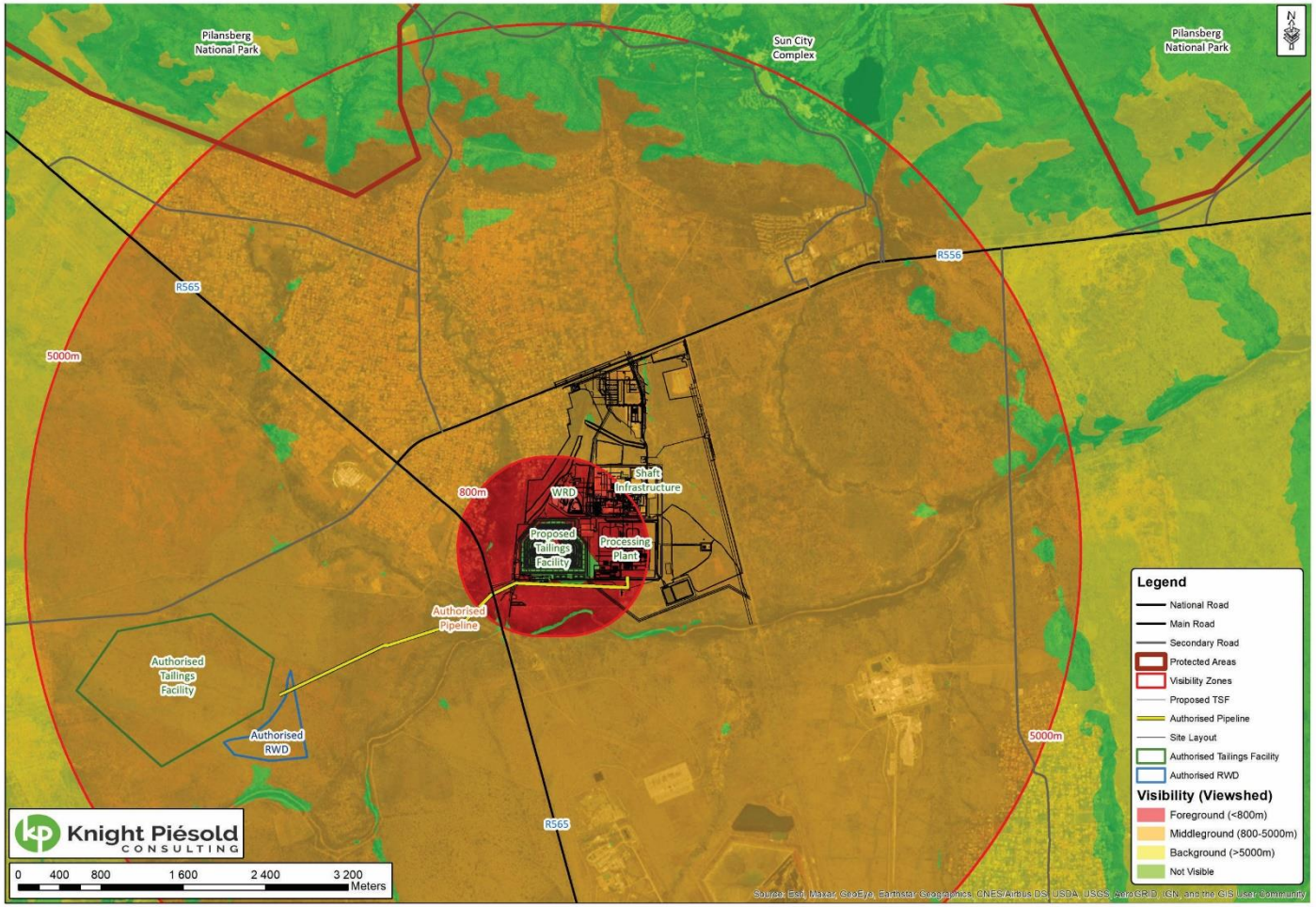
Viewshed provided by Knight Piesold Consulting - January 2021

Figure 13: LINE OF SIGHT/ VIEWSHED ANALYSIS - 5km

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree Environmental Consulting
yonanda@gtec.net.za
082 409 0405



Viewshed provided by Knight Piesold Consulting - May 2021

Figure 14: LINE OF SIGHT/ VIEWSHED ANALYSIS - 10km

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree Environmental Consulting
yonanda@gtec.net.za
082 409 0405

Visual Absorption Capacity (VAC)

The visual absorption capacity is the potential of the landscape to absorb or conceal the proposed project:

- *High VAC* – e.g. effective screening by topography and vegetation;
- *Moderate VAC* - e.g. partial screening by topography and vegetation;
- *Low VAC* - e.g. little screening by topography or vegetation

The topography of the area is slightly rolling with the Pilanesberg located to the north of the study site and a few mountains to the west and south-west of the site. As illustrated in the viewshed/ line of sight, Figure 13 and 14, the Pilanesberg contributes to the effective screening of the proposed project towards viewers and specifically towards sensitive viewers located at the tourist destination within the Pilanesberg, such as Sun City. Motorist travelling between the Bakubung Bush Resort and Sun City (on the back road) will get a glimpse of the proposed project since the mountains form a small gap, refer to Figure 9, view 12.

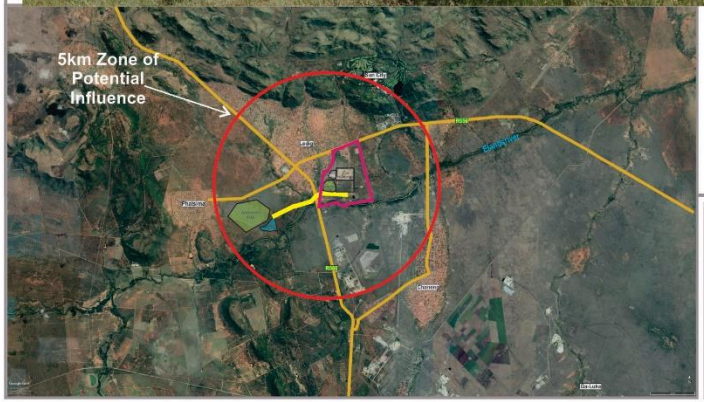
Figures 4 – 11 clearly illustrates the absorption capacity of the vegetation in the study area but also the surrounding areas. The study area forms part of the Marikana Thornveld which is characterised by woodlands. The study area has a dense woodland cover and therefore contributes to the partial screening of the proposed project from sections along the R556, R565, Ledig, Chaneng and Phatisma. It should be noted that in the beginning stage of the TSF the ability of the vegetation to screen the proposed TSF will be high but as the TSF starts to gain height it will cut the vegetation line (tree line) and will therefore become more visible over time.

Landscape Integrity

Landscape integrity refers to the compatibility or similarity of the project with the qualities of the existing landscape, or the 'sense of place'.

- *Low compatibility* – visually intrudes, or is discordant with the surroundings;
- *Medium compatibility* – partially fits into the surroundings, but clearly noticeable;
- *High compatibility* – blends in well with the surroundings.

Although the greater area (this includes the study area and the directly surrounding areas) is characterised by the natural features of the landscape, such as the woodlands and the mountains, this area has been compromised by mining related activities and human settlements. Therefore, when considering the landscape integrity, it can be said that the proposed project will have a high compatibility with the greater area. This is also relevant when considering the study area, the dominant feature within the study area is the Ledig settlement as well as the existing Bakubung Platinum Mine and the Royal Bafokeng Maseve Mine. The landscape integrity becomes highly compatible due to the existing land uses and sense of place created by these activities.



View 2: From a local road (R556), approximately 2.5km north-east of the proposed TSF site.

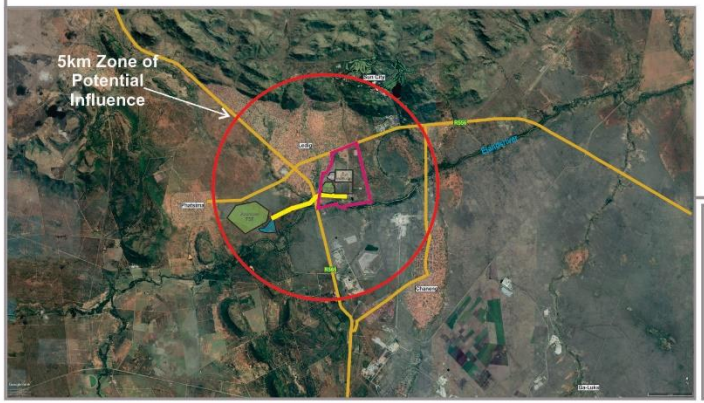
Refer to Figure 2 for the location of the viewpoints

Figure 15: SIMULATIONS

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405



View 14: From a local road (R565), approximately 2.5km south of the proposed TSF site.

Refer to Figure 2 for the location of the viewpoints

Figure 16: SIMULATIONS

Bakubung Platinum Mine - Amendment Project

May 2021

Green Tree
Environmental Consulting
yonanda@gtec.net.za
082 409 0405

Intensity of Impact

Referring to discussions above, the severity/ magnitude of the visual impact of the proposed Project is rated in Table 6 below. To assess the severity/ magnitude of visual impact four main factors are considered.

- *Landscape Integrity:* The compatibility/discord with the landscape and surrounding land use.
- *Visibility:* The area / points from which project components will be visible.
- *Visual exposure:* Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion.
- *Visual absorption capacity:* the ability of the landscape to absorb or conceal the proposed project
- *Sensitivity of the visual receptors:* Sensitivity of visual receptors to the proposed development

In synthesising the criteria used to establish the severity/ magnitude of visual impact, a numerical or weighting system is avoided. Attempting to attach a precise numerical value to qualitative resources is rarely successful, and should not be used as a substitute for reasoned professional judgement (Institute of Environmental Assessment & The Landscape Institute (2002).

According to the results tabulated below in Table 6 the severity/ magnitude of visual impact (based on the worst case scenario) of the proposed Project will be ***moderate*** as it will cause a partial loss to the key elements/features/characteristics of the baseline environment.

Table 6: Severity/ Magnitude of Impact of the proposed Project

High	Moderate	Low	Negligible
Total loss of or major alteration to key elements / features / characteristics of the baseline. i.e. Pre-development landscape or view and / or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving landscape. High scenic quality impacts would result.	Partial loss of or alteration to key elements / features / characteristics of the baseline. i.e. Pre-development landscape or view and / or introduction of elements that may be prominent but may not necessarily be substantially uncharacteristic when set within the attributes of the receiving landscape. Moderate scenic quality impacts would result	Minor loss of or alteration to key elements / features / characteristics of the baseline. i.e. Pre-development landscape or view and / or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape. Low scenic quality impacts would result.	Very minor loss or alteration to key elements/features/ characteristics of the baseline. i.e. Pre-development landscape or view and / or introduction of elements that is not uncharacteristic with the surrounding landscape – approximating the 'no change' situation. Negligible scenic quality impacts would result.

The severity/magnitude of impact is predicted to be ***moderate*** (during operational phase) on sensitive views for the following reasons:

- The proposed Project will have a ***moderate*** negative effect on the visual quality of the landscape and is compatible with the patterns that define the study area's landscape. The study area's visual resource is rated as *moderate*.
- The proposed Project will have a ***moderate*** effect on sensitive viewing areas such as the settlements and the local roads (R556 and R565). The proposed project will however have a ***low effect*** on sensitive viewers such as people visiting Sun City and other tourist facilities within the Pilanesberg since the proposed project will not be visible from these areas.
- The proposed Project is ***highly compatible*** with the existing land use and sense of place and will not change the character of the study area.
- Although the proposed TSF will not be visually intrusive it will be visible due to the height of the TSF and the proximity of the TSF to Ledig and the local roads.

MITIGATION MEASURES

In considering mitigating measures three rules are considered - the measures should be feasible (economically), effective (how long will it take to implement and what provision is made for management / maintenance) and acceptable (within the framework of the existing landscape and land use policies for the area). To address these, the following principles have been established:

- Mitigation measures should be designed to suit the existing landscape character and needs of the locality. They should respect and build upon landscape distinctiveness.
- It should be recognized that many mitigation measures, especially the establishment of planted screens and rehabilitation, are not immediately effective.

The following mitigation measures are suggested and should be included as part of the Environmental Management Programme (EMPr). The following general actions are recommended:

Planning and site development

- With the construction of the Project and associated activities, the minimum amount of existing vegetation and topsoil should be removed, especially the vegetation that forms a buffer between Ledig and the study site as well as the vegetation along the R565 which is currently screening the view towards the proposed project. Ensure, wherever possible, natural vegetation is retained and incorporated into the site rehabilitation. All top-soil that occurs within the proposed footprint of an activity must be removed and stockpiled for later use.

Earthworks

- Earthworks should be executed in such a way that only the footprint and a small 'construction buffer zone' around the proposed activities is exposed. In all other areas, the natural occurring vegetation, more importantly the indigenous vegetation should be retained, especially along the periphery of the site. Dust suppression techniques should be in place always during all phases of the project, where required.

Landscaping and ecological approach

- Should new vegetation be introduced to the site, an ecological approach to rehabilitation and vegetative screening measures, as opposed to a horticultural approach to landscaping should be adopted. For example, communities of indigenous plants enhance biodiversity, as desirable outcome for the area, which is severely depleted in this regard. This approach can significantly reduce long term costs as less maintenance would be required over conventional landscaping methods as well as the introduced landscape being more sustainable.

Lighting

Light pollution is largely the result of bad lighting design, which allows artificial light to shine outward and upward into the sky, where it's not wanted, instead of focusing the light downward, where it is needed. Ill designed lighting washes out the darkness of the night sky and radically alters the light levels in rural areas where light sources shine as 'beacons' against the dark sky and are generally not wanted.

Of all the pollutions faced, light pollution is perhaps the most easily remedied. Simple changes in lighting design and installation yield immediate changes in the amount of light spilled into the atmosphere. The following are measures that must be considered in the lighting design of the Project:

- Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the site.
- Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on illegal entry to the site.
- Minimise the number of light fixtures to the bare minimum, including security lighting.
- With the construction of the proposed tailings storage facilities security lighting should only be used where necessary and carefully directed, preferably away from sensitive viewing areas.

SIGNIFICANCE OF THE IMPACT

The following table summarises the significance of the visual impact, these results are based on worst-case scenario when the impacts of all aspects of the Project are taken together using the impact criteria in Appendix C. The severity/magnitude of the impact, rated in Table 6, is further qualified with *extent*, *duration* and *probability* criteria to determine the *significance* of the visual impact.

Significance = consequence x probability

Table 7: SIGNIFICANCE of Visual Impact

Project activity or issue	Potential impact	Nature of impact		Significance before mitigation							Significance after mitigation as per EMP						
		+ / -	D/I/C	M	R	D	S	P	TOTAL	SP	M	R	D	S	P	TOTAL	SP
Visual impacts																	
Construction (1 year)																	
Clearance of vegetation Increase in heavy vehicles Construction of the base of the TSF	Alteration to the visual quality of the study area due to the physical presence and construction activities. The TSF will have a low impact on key residential and some public road views in the area. Mitigation measures are feasible and would result in a reduction in impact, if the mitigation measures are effectively implemented and managed in the long term.	-	D	2	1	2	2	3	21	**L**	2	1	2	2	2	14	**L**
Operational (7 years)																	

Project activity or issue	Potential impact	Nature of impact		Significance before mitigation							Significance after mitigation as per EMP						
		+ / -	D/I/C	M	R	D	S	P	TOTAL	SP	M	R	D	S	P	TOTAL	SP
The TSF will increase in height. Security lights will be installed	Alteration to the visual quality of the study area due to the physical presence, scale and size of the new TSF. The project becomes more visible for people travelling along the R565 and the R556 as well as residents from Ledig. Mitigation measures are possible but will not be able to hide/screen the proposed activities completely since the upper levels of the TSF will break the tree horizon, which makes it more visible.	-	D	3	1	5	2	5	55	**M**	3	1	5	2	4	44	**M**
Decommissioning/ Rehabilitation (1 - 3 years)																	
Increase in heavy vehicles during the removal of structures and the transport of material for rehabilitation. Preparation of soils.	Creating dust by removal of structures and the movement of vehicles, during the soil preparation for rehabilitation. Mitigation measures are feasible and would result in a drop in impact at closure if they are effectively **implemented** and managed.	-	D	2	1	2	2	3	21	**L**	2	1	2	2	2	16	**L**

Project activity or issue	Potential impact	Nature of impact		Significance before mitigation							Significance after mitigation as per EMP						
		+ / -	D/I/C	M	R	D	S	P	TOTAL	SP	M	R	D	S	P	TOTAL	SP
Removal of structures, planting of vegetation, rehabilitation of the area.	Alteration to the visual quality of the study area by removing structures and rehabilitating the area.	+	D	2	1	2	3	3	24	**L**	2	1	2	3	2	16	**L**

Note: Severity / Magnitude M Reversibility R Duration of impact D Spatial extent S Probability P

CUMULATIVE IMPACT

Cumulative landscape and visual effects (impacts) result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future. They may also affect the way in which the landscape is experienced. Cumulative effects may be positive or negative. Where they comprise a range of benefits, they may be considered to form part of the mitigation measures.

Cumulative effects can also arise from the indivisibility of a range of developments and /or the combined effects of individual components of the proposed development occurring in different locations or over a period of time. The separate effects of such individual components or developments may not be significant, but together they may create an unacceptable degree of adverse effect on visual receptors within their combined visual envelopes. Indivisibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation and distance, as this affects visual acuity, which is also influenced by weather and light conditions (Institute of Environmental Assessment and The landscape Institute (1996)).

Cumulative effect of the Project

The impact of the existing and surrounding mining activities already has a high negative effect on the visual environment and landscape of the area. The physical presence of the proposed Project will increase the visibility of the mining activities, especially for viewers located in Ledig (southern section that borders the project site) or travelling along the R565 and R556, and will therefore contribute to the *negative* impact on the landscape aesthetics of the area.

It should be noted that the overall Bakubung Platinum Mine Project will be implemented in phases and each phase will contribute to the cumulative negative impact of the Bakubung Platinum Mine on the visual resource or scenic quality of the area.

CONCLUSION AND RECOMMENDATIONS

The existing visual condition of the landscape that may be affected by the proposed Project has been described. The study areas scenic quality has been rated *moderate* within the context of the sub-region and sensitive viewing areas and landscape types identified and mapped indicating potential sensitivity to the proposed development within a 5 km radius of the project site.

Impacts to views are the highest when viewers are identified as being sensitive to change in the landscape, and their views are focused on and dominated by the change. Visual impacts occur when changes in the landscape are noticeable to viewers looking at the landscape from their homes or travel routes, and important cultural features and historic sites, especially in foreground views. Sensitivity to the project was considered to be *moderate* primarily due to the existing mining activities taking place within the study area as well as the surrounding areas.

Although there are mining activities taking place in the study area the new TSF will still be visible and intrusive especially for people travelling along the R565 and the R 556 as well as for residents located along the southern boundary of Ledig, this is mainly due to the extent of the TSF and the proximity of the TSF to the sensitive visual receptors/ viewers. The new TSF will however not change the sense of place of the study area since it is compatible with the existing land uses and fits in with the urban/ industrial sense of place that is currently experienced.

Figure 8, the line of sight/ viewshed analysis, indicated that the proposed project will not be visible from the sensitive tourist location such as Sun City and other lodges within the Pilanesberg. This is due to the location of these facilities within the Pilanesberg and the fact that the mountains screen the view towards the proposed Project site. Other tourist facilities such as the Kingdom Resort falls outside the Zone of Potential Influence and the proposed Project will form part of the background view for receptors located in the resort.

During construction the significance of visual impact will be ***low*** but will change to ***moderate*** as the Project enters the operational phase and the TSF begins to protrude above the horizon/ vegetation line. The significance of the Project's visual impact will remain ***moderate*** throughout the operational phase and will not only contribute to the negative cumulative impact on the visual resource/ scenic quality of the study area but will also contribute to the overall negative visual impact of the mining activities within the greater area.

Mitigation measures will be viable during the first phases of construction but as the TSF grows the mitigation measures will be less effective. Good housing keeping will be essential as this will mitigate visual impacts such as dust. During the operational phase the mitigation measures will be difficult and will not reduce the significance of impact. This is mainly due to the scale and the height of the Project components.

REFERENCES

The Landscape Institute with the Institute of Environmental Management and Assessment, 2002. *Guidelines for Landscape and Visual Impact Assessment,* E & FN Spon, London (117)

Mucina, L. & Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia 19*. South African National Biodiversity Institute, Pretoria.

Oberholzer, B., 2005. Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

ANNEXURE A: CV OF INDEPENDENT AUDITOR

YONANDA MARTIN

GREEN TREE ENVIRONMENTAL CONSULTING

7 Dublin Street, Rangeview, Krugersdorp

082 409 0405

Yonanda@gtec.net.za

EXPERIENCE:

2006 – 2012

Environmental Assessment practitioner, **NEWTOWN LANDSCAPE ARCHITECTS**

Responsible for writing up of environmental projects, which includes:

- Basic Assessments,
- Environmental Impact Assessments (Scoping & EIA),
- Environmental Management Programmes (EMPr),
- Environmental Monitoring,
- Water Use Licenses,
- Visual Impact Assessments.

2012 – 2017

Associate and Senior Environmental Assessment Practitioner, **NEWTOWN LANDSCAPE ARCHITECTS**

- Manager of the Environmental Division at NLA
- Management of junior staff
- Management of specialist
- Management of the proposals and invoices of the Environmental Division
- Responsible for writing up of environmental projects, which includes:
- Basic Assessments,
    - Environmental Impact Assessments (Scoping & EIA),
    - Environmental Management Programmes (EMPr),
    - Environmental Monitoring,
    - Water Use Licenses,
    - Visual Impact Assessments.

EDUCATION:

2003

BSc. Environmental Sciences, **NORTH WEST UNIVERSITY – POTCHEFSTROOM CAMPUS**

2007

MSc. Ecological Remediation and Sustainable Utilization, **NORTH WEST UNIVERSITY – POTCHEFSTROOM CAMPUS**

Thesis: Tree vitality along the urbanization gradient in Potchefstroom, South Africa

2016 Environmental Law Training, Business Success Solutions
2016 Invasive Species Training: Module 1 – Introduction to Legislation, South African Green Industries Council (SAGIC)
2016 Invasive Species Training: Module 2 – Developing and Implementing Control Plans, South African Green Industries Council (SAGIC)
2015 Invasive Species Identification Training Workshop, South African Green Industries Council (SAGIC)
2014 Sharpening the Tool: New techniques and methods in Environmental Impact Assessment, SE Solutions
2014 First Aid Level 1, Action Training Academy
2011 Supervisory Management, ISIMBI
2009 Public Participation Course, International Association for Public Participation, Golder Midrand
2008 Wetland Training Course on Delineation, Legislation and Rehabilitation, University of Pretoria
2008 Environmental Impact Assessment: NEMA Regulations – A practical approach, Centre for Environmental Management: University of North West
2008 Effective Business Writing Skills, ISIMBI
2007 Short course in Geographic Information Systems (GIS), Planet GIS

EXPERIENCE:

Environmental Projects

Diepsloot East Residential Development, Diepsloot. Environmental Impact Assessment, Environmental Management Programme, Water Use License and management of specialist.

Lindley Waste Water Treatment Works, Mogale City Local Municipality project located in Lindley / Lanseria. Environmental Screening, Environmental Impact Assessment, Environmental Management Programme and Water Use License Application and management of specialist.

African Leadership Academy, Laser Park, Johannesburg. This project entails the rectification of activities undertaken by ALA as well as the compilation of an overall Environmental Management Programme (EMPr) that addresses current environmental concerns on campus but also future projects such as recycling, rain water harvesting, vegetable gardens and events.

Orchards Extension 50-53, Orchards. The project includes the construction of a residential development. The project includes monitoring of the environmental conditions as well as the appointment of sub-consultants for rehabilitation purposes.

Kareekloof Oxidation Ponds, Suikerbosrand. This project entails the environmental monitoring during construction and rehabilitation of the project

Visual Impact Assessments

Holfontein Integrated Waste Management Facility Project (SLR Consulting (Pty) Ltd), Holfontein, Gauteng Province

Eskom Arnot Ash Dump Project (Environmental Impact Management Services), Rietkuil, Mpumalanga Province

Kalkheuwel Housing Development (ECO Assessments), Kalkheuvel, NorthWest Province

Kyasand Light Industrial Project (Terre Pacis Environmental), Kyasand, Gauteng Province

AFFILIATIONS:

Registered Professional Natural Scientist – 400204/09 (September 2009)

Member of IAIAsa

IAIAsa Gauteng Branch Chair 2016/17, 2017/18 and 2018/19

APPENDIX B: VISUAL IMPACT ASSESSMENT APPROACH

1.1 Approach

The assessment of likely effects on a landscape resource and on visual amenity is complex, since it is determined through a combination of quantitative and qualitative evaluations (The Landscape Institute with the Institute of Environmental Management and Assessment, 2002). When assessing visual impact, the worst-case scenario is considered. Landscape and visual assessments are separate, although linked, procedures.

The landscape, its analysis and the assessment of impacts on the landscape all contribute to the baseline for visual impact assessment studies. The assessment of the potential impact on the landscape is carried out as an impact on an environmental resource, i.e. the physical landscape. Visual impacts, on the other hand, are assessed as one of the interrelated effects on people (i.e. the viewers and the impact of an introduced object into a particular view or scene).

1.1.1 The Visual Resource

Landscape character, landscape quality (Warnock, S. & Brown, N., 1998) and “sense of place” (Lynch, K., 1992) are used to evaluate the visual resource i.e. the receiving environment. A qualitative evaluation of the landscape is essentially a subjective matter. In this study the aesthetic evaluation of the study area is determined by the professional opinion of the author based on site observations and the results of contemporary research in perceptual psychology.

Aesthetic value is the emotional response derived from the experience of the environment with its particular natural and cultural attributes. The response is usually to both visual and non-visual elements and can embrace sound, smell and any other factor having a strong impact on human thoughts, feelings and attitudes (Ramsay, 1993). Thus, aesthetic value is more than the combined factors of the seen view, visual quality or scenery. It includes atmosphere, landscape character and sense of place (Schapper, 1993). Refer also to Appendix B for further elaboration.

Studies for perceptual psychology have shown human preference for landscapes with higher visual complexity, for instance scenes with water or topographic interest. Based on contemporary research, landscape quality increases where:

- Topographic ruggedness and relative relief increase;
- Water forms are present;
- Diverse patterns of grassland and trees occur;
- Natural landscape increases and man-made landscape decreases;
- Where land use compatibility increases (Crawford, 1994).

Aesthetic appeal (value) is therefore considered high when the following are present (Ramsay, 1993):

- Abstract qualities: such as the presence of vivid, distinguished, uncommon or rare features or abstract attributes;
- Evocative responses: the ability of the landscape to evoke particularly strong responses in community members or visitors;
- Meanings: the existence of a long-standing special meaning to a particular group of people or the ability of the landscape to convey special meanings to viewers in general;
- Landmark quality: a particular feature that stands out and is recognized by the broader community.

And conversely, it would be low where:

- Limited patterns of grasslands and trees occur;
- Natural landscape decreases and man-made landscape increases;
- And where land use compatibility decreases (after Crawford, 1994).

In determining the quality of the visual resource, both the objective and the subjective or aesthetic factors associated with the landscape are considered. Many landscapes can be said to have a strong sense of place, regardless of whether they are scenically beautiful but where landscape quality, aesthetic value and a strong sense of place coincide - the visual resource or perceived value of the landscape is considered to be very high. The criteria given in Appendix B are used to assess landscape quality, sense of place and ultimately to determine the aesthetic value of the study area.

1.1.2 Sensitivity of Visual Resource

The sensitivity of a landscape or visual resource is the degree to which a landscape type or area can accommodate change arising from a particular development, without detrimental effects on its character. Its determination is based upon an evaluation of each key element or characteristic of the landscape likely to be affected. The evaluation will reflect such factors such as its quality, value, contribution to landscape character, and the degree to which the element or characteristic can be replaced or substituted (The Landscape Institute with the Institute of Environmental Management and Assessment, 2002).

1.1.3 Sense of Place

Central to the concept of sense of place is that the landscape requires uniqueness and distinctiveness. The primary informant of these qualities is the spatial form and character of the natural landscape, taken together with the cultural transformations and traditions associated with the historic use and habitation of the area. According to Lynch (1992), sense of place "*is the extent to which a person can recognize or recall a place as being distinct from other places – as having a vivid, unique, or at least particular, character of its own*". Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. In some cases, these values allocated to the place are similar for a wide spectrum of users or viewers, giving the place a universally recognized and

therefore, strong sense of place.

Because the sense of place of the study area is derived from the emotional, aesthetic and visual response to the environment, it cannot be experienced in isolation. The landscape context must be considered. The combination of the natural landscape (mountains, streams and the vegetation), together with the manmade structures (residential areas, roads, mining activities and power lines), contribute to the sense of place for the study area. It is these land-uses, which define the area and establish its identity.

1.1.4 Sensitive Landscape and Viewer Locations

The sensitivity of visual receptors and views are dependent on the location and context of the viewpoint, the expectations and occupation or activity of the receptor or the importance of the view. This may be determined with respect to its popularity or numbers of people affected, its appearance in guidebooks, on tourist maps, and in the facilities provided for its enjoyment and references to it in literature or art.

The most sensitive receptors may include: Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape;

- Communities where development results in changes in the landscape setting or valued views enjoyed by the community;
- Occupiers of residential properties with views affected by the development.

Other receptors include:

- People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value);
- People traveling through or past the affected landscape in cars or other transport modes;
- People at their place of work.

1.1.5 Landscape Impact

The landscape impact of a proposed development is measured as the change to the fabric, character and quality of the landscape caused by the physical presence of the proposed development. Identifying and describing the nature and intensity (severity) of change in the landscape brought about by the proposed new mine is based on the professional opinion of the author, supported by photographic simulations. It is imperative to depict the change to the landscape in as realistic a manner as possible (Van Dortmont in Lange, 1994). In order to do this, photographic panoramas were taken from key viewpoints and altered using computer simulation techniques to illustrate the physical nature of the proposed Project in its final form within the context of the landscape setting. The resultant change to the landscape is then observable and an assessment of the anticipated visual intrusion can be made.

1.1.6 Visual Impact

Visual impacts are a subset of landscape impacts. They relate to the changes that arise in the composition of available views as a result of changes to the landscape; to people's responses to the changes; and to the overall effect with respect to visual amenity. Visual impact is therefore measured as the change to the existing visual environment (i.e. views) caused by the intervention and extent to which that change compromises (negative impact); enhances (positive impact); or maintains the visual quality of the scene as perceived by people visiting, working or living in the area. This approach reflects the layman's concerns, which normally are:

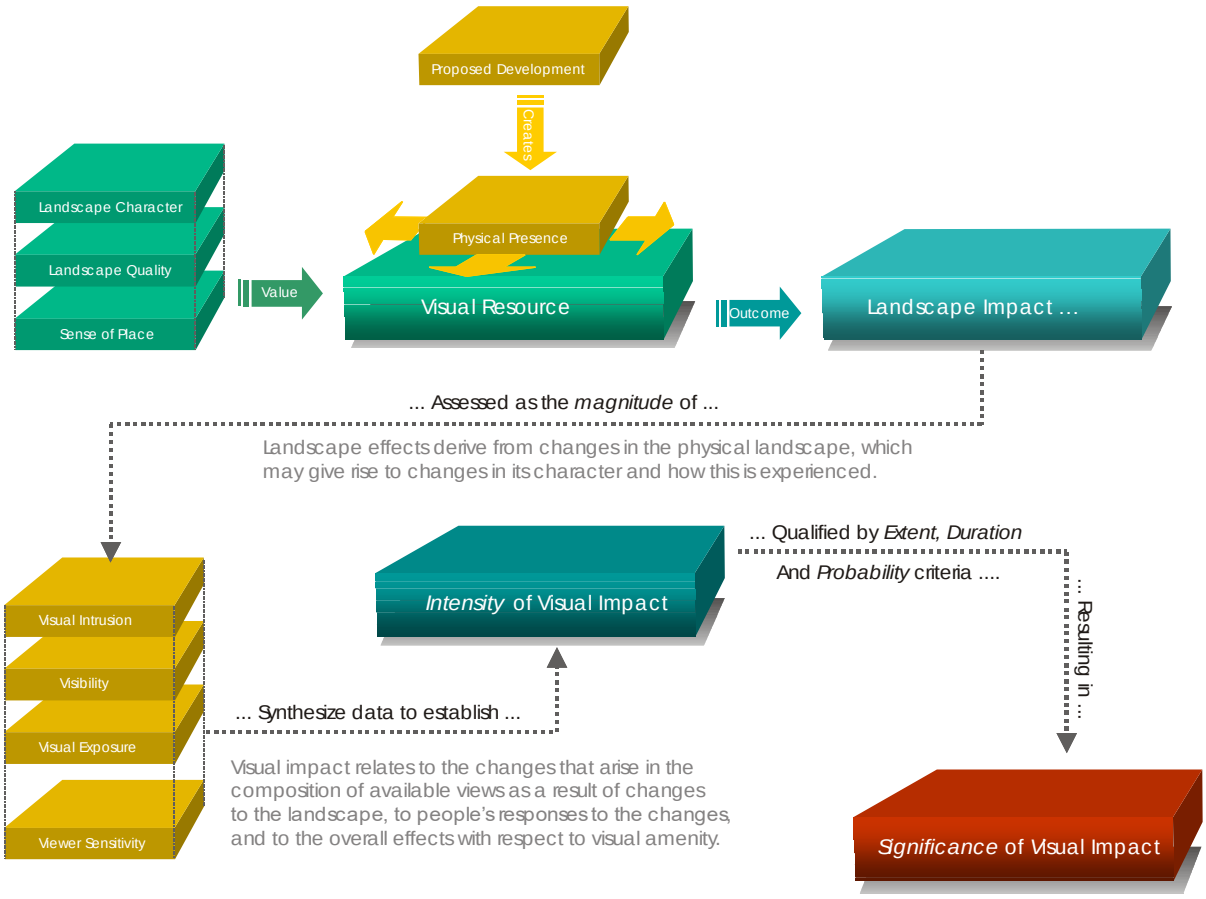
- Will I be able to see the new development?
- What will it look like?
- Will the development affect views in the area and if so, how?

Landscape and visual impacts do not necessarily coincide. Landscape impacts can occur with the absence of visual impacts, for instance where a development is wholly screened from available public views, but nonetheless results in a loss of landscape elements and landscape character within a localized area (the site and its immediate surrounds).

1.1.7 Severity of Visual Impact

The severity of visual impact is determined using visual intrusion, visibility and visual exposure criteria (Hull, R.B. and Bishop, I.E., 1988), qualified by the sensitivity of viewers (visual receptors) towards the proposed development. The severity of visual impact is therefore concerned with:

- The overall impact on the visual amenity, which can range from degradation through to enhancement;
- The direct impacts of the mine upon views of the landscape through intrusion or obstruction;
- The reactions of viewers who may be affected.



1.1.8 Significance of Visual Impact

A combined quantitative and qualitative methodology, as supplied by the Environmental Assessment Practitioner, was used to describe the impacts for: significance, spatial scale, temporal scale, probability and degree of certainty. A summary of each of the qualitative descriptions along with the equivalent quantitative rating scale is given in Annexure C.

APPENDIX C: CRITERIA FOR SIGNIFICANCE OF IMPACT ASSESSMENT

The methodology used to determine the significance of the visual impact was provided by the Environmental Assessment Practitioner.

Defining the Nature of the Impact: An impact is essentially any change to a resource or receptor brought about by the presence of the proposed project component or by the execution of a proposed project related activity. The terminology used to define the nature of an impact is detailed in Table 1 below.

Table 1: Terminology

Term	Definition
Negative	An impact that is considered to represent an adverse change from the baseline or introduces a new undesirable factor.
Positive	An impact that is considered to represent an improvement on the baseline or introduces a positive change.
Direct impact (D)	Impacts that result from a direct interaction between a planned project activity and the receiving environment/receptors (e.g. between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality).
Indirect impact (I)	Impacts that result from other activities that are encouraged to happen as a consequence of the Project (e.g. in-migration for employment placing a demand on resources).
Cumulative impact (C)	Impacts that act together with other impacts (including those from concurrent or planned future third party activities) to affect the same resources and/or receptors as the Project.

Significance of Impact: The significance of an impact can be derived from the following factors:

Severity / magnitude	M
Reversibility	R
Duration of impact	D
Spatial extent	S
Probability	P

Severity / Magnitude (M): The severity of an impact relates to the degree of alteration of the affected environmental component and it may be very low, low, medium, high, or very high.

Reversibility (R): Reversibility deals with the ability of an environmental component to return to its original characteristics, or close to its original characteristics, after a given environmental change has been caused by a project activity. Depending on the nature of the impact, the effects on the environment may be reversible, recoverable or irreversible. A recoverable impact is one where specific action must be taken in order for the impact to be ameliorated. A reversible impact is one where the impact will be reversed without the application of rehabilitation measures.

Duration (D): Duration is defined by how long the impact may prevail.
Spatial extent (S): The extent indicates the geographical scope of the impact over a given environmental or social component. It may be contained to the site only, local, regional, national, or international. A local impact is one that has no immediate or subsequent effect outside of the specific area of the impact. A regional impact is one that has effects outside of the specific area and/or moment of the impact, but within a localised area. A national impact is one that has wide-ranging effects outside of the project area but within a national scope. An international impact is one that has wide-ranging effects that cross international boundaries. Some impacts may transform from one spatial extent to another and be "cumulative".
Probability (P): The probability of occurrence refers to the likelihood of an impact occurring where no mitigation measures have been implemented.
Assessing significance: The Knight Piésold impact significance rating system is based on the following equation:

Significance of Environmental or Social Impact = Consequence x Probability

The consequence of an impact can be derived from the sum of following factors:
• Severity / Magnitude – the degree of change brought about in the environment
• Reversibility – the ability of the receptor to recover after an impact has occurred
• Duration – how long the impact may be prevalent
• Spatial Extent – the physical area which could be affected by an impact.

The severity, reversibility, duration, and spatial extent are ranked using the criteria indicated in Table 2 below and then the overall consequence is determined by adding up the individual scores and multiplying it by the overall probability (the likelihood of such an impact occurring). Once a score has been determined, this is checked against the significance descriptions indicated in Table 3 below.

Table 2: Ranking Criteria

Severity / magnitude (M)	Reversibility (R)	Duration (D)	Spatial extent (S)	Probability (P)
5 – Very high – The impact causes the characteristics of the receiving environment/ social receptor to be altered by a factor of 80 – 100 %	**5 – Irreversible** – *Environmental* - where natural functions or ecological processes are altered to the extent that it will permanently cease. *Social* - Those affected will not be able to adapt to changes and continue to maintain-pre impact livelihoods.	**5 – Permanent** - Impacts that cause a permanent change in the affected receptor or resource (e.g. removal or destruction of ecological habitat) that endures substantially beyond the Project lifetime.	**5 – International** - Impacts that affect internationally important resources such as areas protected by international conventions, international waters etc.	**5 – Definite** - The impact will occur.
4 – High – The impact alters the characteristics of the receiving environment/ social receptor by a factor of 60 – 80 %		**4 – Long term** - impacts that will continue for the life of the Project, but ceases when the Project stops operating.	**4 – National** - Impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences.	**4 – High probability** – 80% likelihood that the impact will occur
3 – Moderate – The impact alters the characteristics of the receiving environment/ social receptor by a factor of 40 – 60 %	**3 – Recoverable** *Environmental* - where the affected environment is altered but natural functions and ecological processes may continue or recover with human input. *Social* - Able to adapt with some difficulty and maintain pre-impact	**3 – Medium term** - Impacts are predicted to be of medium duration (5 – 15 years)	**3 – Regional** - Impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem.	**3 – Medium probability** – 60% likelihood that the impact will occur u

Severity / magnitude (M)	Reversibility (R)	Duration (D)	Spatial extent (S)	Probability (P)
	livelihoods but only with a degree of support or intervention.			
2 – Low – The impact alters the characteristics of the receiving environment/ social receptor by a factor of 20 – 40 %		**2 – Short term** - Impacts are predicted to be of short duration (0 – 5 years)	**2 – Local** - Impacts that affect an area in a radius of 2 km around the site.	**2 – Low probability** - 40% likelihood that the impact will occur
1 – Minor – The impact causes very little change to the characteristics of the receiving environment/ social receptor and the alteration is less than 20 %	**1 – Reversible** *Environmental* - The impact affects the environment in such a way that natural functions and ecological processes are able to regenerate naturally. *Social* - People/ communities are able to adapt with relative ease and maintain pre-impact livelihoods.	**1 – Temporary -** Impacts are predicted to intermittent/ occasional over a short period.	**1 – Site only** - Impacts that are limited to the site boundaries.	**1 – Improbable** - 20% likelihood that the impact will occur

Table 3: Significance of the Impact

Score According to Impact Assessment Matrix	Significance Definitions	Colour Scale Ratings	
		Negative Ratings	Positive Ratings
Between 0 and 29 significance points indicate **Low Significance**	An impact of low significance is one where an effect will be experienced, but the impact magnitude is sufficiently small and well within accepted standards, and/or the receptor is of low sensitivity/value.	**Low**	**Low**
Between 30 and 59 significance points indicate **Moderate Significance**	An impact of moderate significance is one within accepted limits and standards. The impact on the receptor will be noticeable and the normal functioning is altered, but the baseline condition prevail, albeit in a modified state. The emphasis for moderate impacts is on demonstrating that the impact has been reduced to a level that is As Low As Reasonably Practicable (ALARP). This does not necessarily mean that "moderate" impacts have to be reduced to "low" impacts, but that moderate impacts are being managed effectively and efficiently to not exceed accepted standards.	**Moderate**	**Moderate**
60 to 100 significance points indicate **High Significance**	An impact of high significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An impact with high significance will completely modify the baseline conditions. A goal of the ESIA process is to get to a position where the Project does not have any high negative residual impacts, certainly not ones that would endure into the long term or extend over a large area. However, for some aspects there may be high residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive factors, such as employment, in coming to a decision on the Project.	**High**	**High**

Mitigation and Residual Impacts: It is expected that for the identified significant impacts, the project team will work with the client in identifying suitable and practical mitigation measures that are implementable. These measures will be fit for purpose, concise and clearly articulated. Mitigation that can be incorporated into the Project design in order to avoid or reduce the negative impacts or enhance the positive impacts will be developed. A description of these mitigation measures will also be included within the Environmental and Social Management Plan (ESMP).

Residual impacts are those impacts, which remain once the mitigation measures have been designed and applied. Once the mitigation is applied, each impact is re-evaluated (assuming that the mitigation measure is effectively applied) and any remaining impact is rated once again using the process outlined above. The result is a significance rating for the residual impact.