APPENDIX I: VISUAL SPECIALIST STUDY

Draft Visual Impact Assessment Report

Proposed Tharisa Platinum Mine: North Eastern Waste Rock Dump, Elandsdrift, North-West Province

Yonanda Martin (Pri Sci Nat)

Newtown Landscape Architects

PROPOSED THARISA PLATINUM MINE

NORTH EASTERN WASTE ROCK DUMP

ELANDSDRIFT, NORTH WEST PROVINCE

Submitted to:

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NLA Project No:	1833/V14NW
Report Revision No:	0
Date Issued:	June 2014
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Reference:	Tharisa Platinum Mine – North Eastern WRD

Name:	Graham A Young
Qualification:	Pr LArch
Professional Registration:	South African Council for the Landscape Architectural Profession (SACLAP) Institute of Landscape Architects of South Africa (ILASA)
Experience in Years:	30 years
Experience	Graham is a landscape architect with thirty years' experience. He has worked in Southern Africa and Canada and has valuable expertise in the practice of landscape architecture, urban design and environmental planning. He is also a senior lecturer, teaching urban design and landscape architecture at post and under graduate levels at the University of Pretoria. He specializes in Visual Impact Assessments and has won an Institute of Landscape Architects Merit Award for his VIA work.

Name:	Yonanda Martin
Qualification:	MSc. (Env.)
Professional Registration:	Pri. Sci. Nat.
Experience in Years:	4 years
Experience	Yonanda Martin has been doing visual impact assessments for Newtown Landscape Architects since 2006. She has experience in a wide range of visual impact assessments which include visual impacts for game lodges, transmission lines, roads, mines and telecommunication masts. Projects that she worked on include: • **Eskom Ngwedi Substation** (PBAI), North West Province • **NBC Belfast Project** (Exxaro), Mpumalanga • **Tamboti Platinum Mine** (Metago), Limpopo • **De Wittekrans** (GCS), Mpumalanga • **Dorsfontein West Expansion** (GCS (Pty) Ltd), Kriel • **Ferreira Coal Mining** (GCS (Pty) Ltd), Ermelo • **Eskom Honingklip** (Kv3 Engineers), Muldersdrift • **SANRAL PWV3** (Jeffares & Green), Hartbeespoort

Name	Mitha Cilliers
Qualification	Pr LArch
Professional Registration	South African Council for the Landscape Architectural Profession (SACLAP)
Experience in Years	9 years
Experience	Mitha is a landscape architect with nine years experience. She has worked as Landscape Architect in South Africa and Angola and has valuable expertise in the practice of landscape architecture and environmental planning. She has been working on visual impact assessments for Newtown Landscape Architects since 2008. She has experience in a wide range of visual impact assessments which include visual impacts for game lodges, transmission lines, solar parks and mines.

ACRONYMS, ABBREVIATIONS & GLOSSARY

Acronyms & Abbreviations	
CSIR	Council for Scientific and Industrial Research
CTRP	Chrome Tailings Retreatment Plant
DMS	Dense Media Separation
EIA	Environmental Impact Assessment
IFC	International Finance Corporation
NLA	Newtown Landscape Architects
SACLAP	South African Council for the Landscape Architectural Profession
TSF	Tailings Storage Facility
VIA	Visual Impact Assessment
WRD	Waste Rock Dump

Glossary	
Aesthetic Value	Aesthetic value is the emotional response derived from the experience of the environment with its particular natural and cultural attributes. The response can be either to visual or 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 encompasses more than the seen view, visual quality or scenery, and includes atmosphere, landscape character and sense of place (Schapper, 1993).
Aesthetically significant place	A formally designated place visited by recreationists and others for the express purpose of enjoying its beauty. For example, tens of thousands of people visit Table Mountain on an annual basis. They come from around the country and even from around the world. By these measurements, one can make the case that Table Mountain (a designated National Park) is an aesthetic resource of national significance. Similarly, a resource that is visited by large numbers who come from across the region probably has regional significance. A place visited primarily by people whose place of origin is local is generally of local significance. Unvisited places either have no significance or are "no trespass" places. (after New York, Department of Environment 2000).

Aesthetic impact	Aesthetic impact occurs when there is a detrimental effect on the perceived beauty of a place or structure. Mere visibility, even startling visibility of a project proposal, should not be a threshold for decision making. Instead a project, by virtue of its visibility, must clearly interfere with or reduce (i.e. visual impact) the public's enjoyment and/or appreciation of the appearance of a valued resource e.g. cooling tower blocks a view from a National Park overlook (after New York, Department of Environment 2000).
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).
Study area	For the purposes of this report the Tharisa Platinum Mine: North Eastern WRD 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 10km radius surrounding the proposed project footprint / site.
Project Footprint / Site	For the purposes of this report the Tharisa Platinum Mine: North Eastern WRD *site* / *footprint* refers to the actual layout of the project. In this case it will be the actual footprint of the North Eastern Waste Rock Dump.
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. *Genius loci* literally means 'spirit of the place'.

Sensitive Receptors	Sensitivity of visual receptors (viewers) to a proposed development.
Viewshed analysis	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 analysis is that the observer eye height is 1,8m above ground level.
Visibility	The area from which project components would potentially be visible. Visibility depends upon general topography, aspect, tree cover or other visual obstruction, elevation and distance.
Visual Exposure	Visibility and visual intrusion qualified with a distance rating to indicate the degree of intrusion and visual acuity, which is also influenced by weather and light conditions.
Visual Impact	Visual effects 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 effects with respect to visual amenity.
Visual Intrusion	The nature of intrusion of an object on the visual quality of the environment resulting in its compatibility (absorbed into the landscape elements) or discord (contrasts with the landscape elements) with the landscape and surrounding land uses.
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.

EXECUTIVE SUMMARY

Newtown Landscape Architects (NLA) was commissioned by SLR Consulting (Africa) (Pty) Ltd to carry out a Visual Impact Assessment (VIA) for the proposed Tharisa Platinum Mine: North Eastern Waste Rock Dump (WRD) Project, North West Province ("the Project"). The Project would encompass the construction of an additional WRD located on the north eastern boundary of the project property.

The Project site is located along the N4 highway and is approximately 3km to the north-west of Mooinooi. Rustenburg is located approximately 26km to the west and Marikana 3km to the north-west. The R104 is located to the south of the site and Buffelspoort approximately 3.5km south of the R104.

Visual impacts would result from the operation and closure phases of the proposed Tharisa Platinum Mine: north eastern WRD. The proposed Project entails the construction of an additional WRD in the north eastern corner of the mine boundary. Although the visual impact of the proposed north eastern WRD is considered it should be noted that the WRD forms part of a bigger mining project and therefore contributes to the overall visual impact of the Tharisa Platinum Mine.

The dominant land use within the study area is mining and therefore the project will be absorbed into the existing landscape character resulting in a low visual intrusion. The north eastern WRD will be highly visible from sections along the N4, from the local road located along the northern boundary of the project and from the Mamba / Elandsdrift residential area. Viewers located to the south of the site will have an obstructed view towards the north eastern WRD. Successful mitigation measures, such as the vegetation screen and the berm, will lower the visibility of the proposed project from sensitive viewer locations such as the N4 and Mamba / Elandsdrift residential area.

The severity of the visual impact of the project is low and the significance of the visual impact will be medium.

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1. INTRODUCTION

1.1 Project Overview and Background

Newtown Landscape Architects (NLA) was commissioned by SLR Consulting (Africa) (Pty) Ltd to carry out a Visual Impact Assessment (VIA) for the proposed Tharisa Platinum Mine: North Eastern Waste Rock Dump (WRD) Project, North West Province ("the Project"). The Project would encompass the construction of an additional WRD located on the north eastern boundary of the project property.

1.2 Proposed Study area

The Project site is located along the N4 highway and is approximately 3km to the north-west of Mooinooi. Rustenburg is located approximately 26km to the west and Marikana 3km to the north-west. The R104 is located to the south of the site and Buffelspoort approximately 3.5km south of the R104.

The Tharisa Platinum Mine is currently operating and there is therefore existing infrastructure on the proposed site. The Project site is surrounded to the north, east and west by mines and to the south are agricultural small holdings.

Refer to Figure 1 below for the locality map.

1.3 Objective of the Specialist Study

The main aim of the visual impact specialist study is to ensure that the visual / aesthetic consequences of the proposed project are understood and adequately considered in the environmental planning process. In the final assessment phase, detailed mitigation measures that could reduce the impact of the Project, will be proposed.

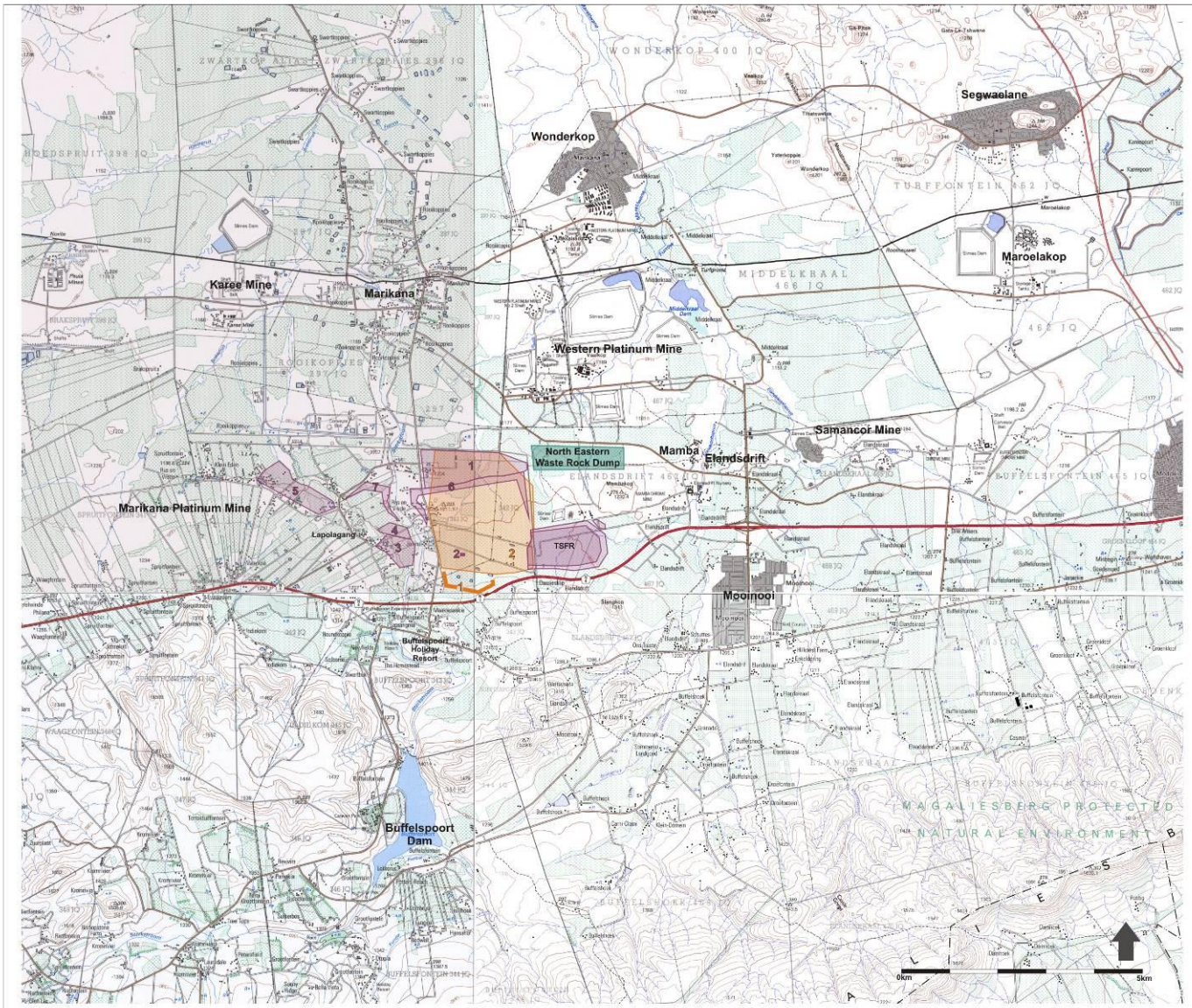
1.4 Terms and Reference

Based on the general requirements, the following terms of reference were established for the baseline phase.

1.4.1 Baseline Phase – Baseline Survey

For the baseline study, the study area had been visited, photographs taken and data collected. Data collected during the site visit allowed for a comprehensive description and characterization of the receiving environment. Issues that need to be addressed in the impact assessment phase for the selected site will also be identified in this report. The scope of work for this phase will further include:

- **Landscape character description:** the landscape character will be determined and mapped by the field survey and aerial photographic interpretation. The description of the landscape will focus on the nature of the land rather than the response of a viewer.



North Eastern WRD

Proposed changes not constructed
1 Waste Rock Dump (Eastern)
2 Chrome Sand Drying Plant
3 Waste Rock Dump (Western)
4 Topsoil Dump
5 Waste Rock Dump
6 Pit High Wall (Eastern)
7 Pit High Wall (Western

Existing mine infrastructure
1 Topsoil Berms
2 TSF, Plant, WRD and associated infrastructure

Figure 1 **LOCALITY** - Tharisa Platinum Mine: North Eastern WRD Project

- **Landscape quality description:** the quality of the landscape will be calculated and mapped as a measurement of the union of ecological integrity (overall health of the landscape) and aesthetic appeal. Aesthetic appeal will be described using contemporary research in perceptual psychology and the opinion of the specialist as the basis for determining its value.
- **Sense of place description:** sense of place of the study area will be evaluated and mapped as the uniqueness and distinctiveness of the landscape. The primary informant of these qualities is the spatial form, character and the natural landscape together with the cultural transformations and traditions associated with historic and current use of the land.
- **Visual resource description:** landscape character, landscape quality and sense of place will be used to determine the visual resource. These measures are intrinsic to the landscape and thus they enable a value to be placed on the landscape that is independent of the person doing the viewing.
- **Description of the visual characteristics of the components of the project:** a description of the project components in terms of their physical characteristics.
- **Determine potential visual issues that must be addressed in the Assessment Phase:** Based on the baseline survey / analysis, discussions with the project team determine potential visual issues to be investigated in the evaluation phase of the EIA process.

The visual impact assessment process is interactive. Contact with the client's personnel / project team is required to ensure that issues that may affect development plans are identified, raised, and addressed / mitigated early in the process / as soon as they are identified.

1.5 Assumption, Uncertainties and Limitations

In determining the significance of the visual impact of the Project, with mitigation, it is assumed that mitigation measures proposed in the report are correctly and effectively implemented and managed throughout the life of the project.

2. LEGAL REQUIREMENTS AND GUIDELINES

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

2.1 National Guidelines

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 543 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 Plan (EMP) and will be in support of the Environmental Impact Assessment (EIA).

The NEMA Protected Areas Act (57 of 2003)

The main aim of the Act is to identify and protect natural landscapes. According to the 2010 EIA regulations there are specific regulations for compilation of specialist report. This VIA report adheres to these specifications.

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 it provides guidance that will be appropriate for any EIA process. The Guideline document also seeks to clarify instances when a visual specialist should get involved in the EIA process.

2.2 International Guidelines

World Bank's IFC Standards

The World Bank's IFC Standards: Environmental, Health and Safety Guidelines for Mining refers to Visual Impact Assessments by stating that:

"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 minimize 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 in the placement of ancillary facilities and access roads."

The specialists study is in accordance to the IFC Performance Standards (Performance Standard 1: Social and Environmental Assessment and Management Systems) for the undertaking of Environmental Assessments and contributes to the EIA for the proposed Project.

3. APPROACH AND METHODOLOGY

3.1 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 together with the Institute of Environmental Management and Assessment, 2002). When assessing visual impact the worst-case scenario is taken into account. 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).

3.1.1 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. On the basis of 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 considered to be 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.

3.1.2 Sensitivity of Visual Resource

The sensitivity of a landscape or visual resource is the degree to which a particular 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 particular element or characteristic can be replaced or substituted (Institute of Environmental Assessment & The Landscape Institute, 1996:87).

3.1.3 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. With this in mind, 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.

3.1.4 Sensitive 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.

Views from residences and tourist facilities / routes are typically more sensitive, since views from these are considered to be frequent and of long duration.

3.1.5 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.

3.1.6 Visual Impact

Visual impacts are a subset of landscape impacts. Visual impacts 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 the extent to which that change compromises (negative impact) or 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).

3.1.7 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.

For a detailed description of the methodology used in this study, refer to Appendix B, C and D. Image 1 below, graphically illustrates the visual impact process:

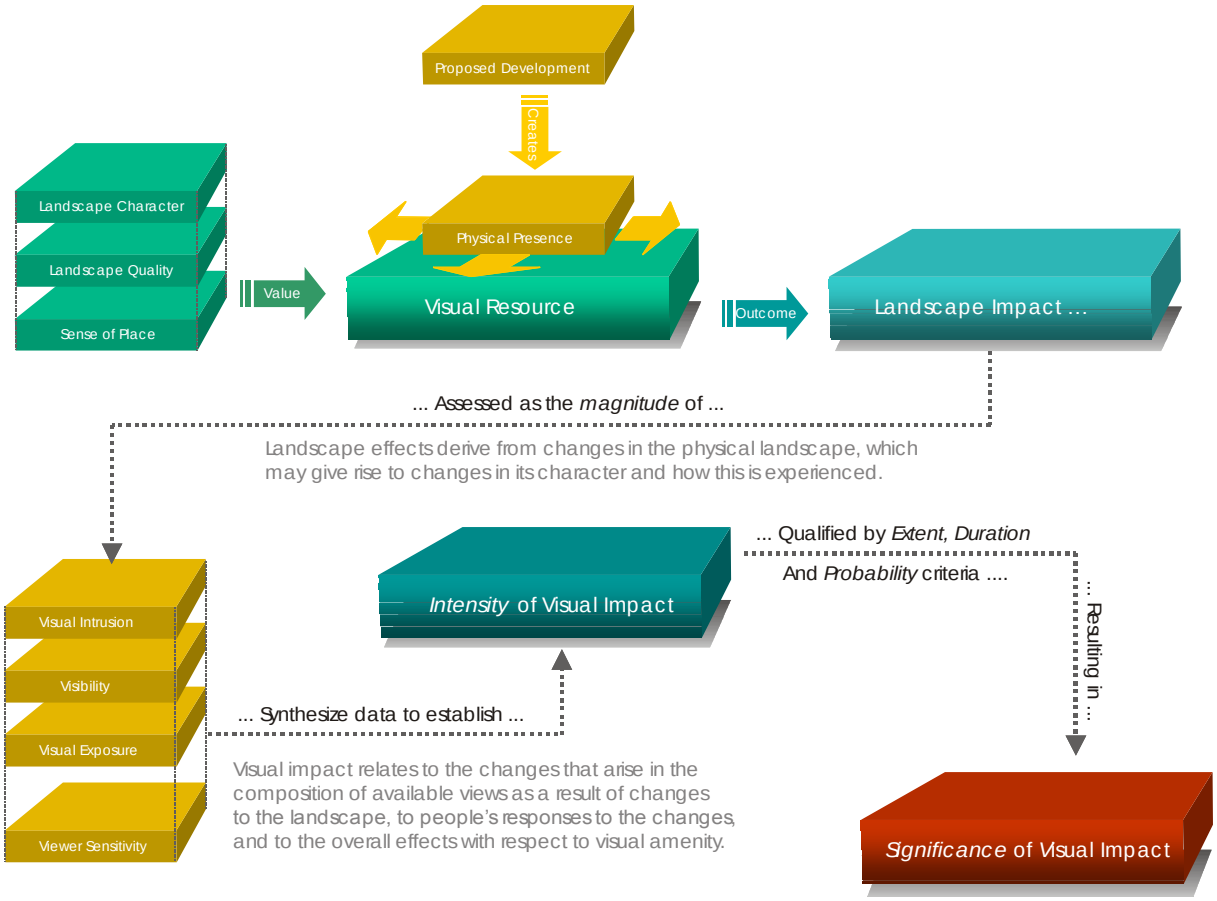


Image 1: Visual Impact Process

3.1.8 Significance of Visual Impact

A combined quantitative and qualitative methodology, as supplied by the Environmental 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 D.

3.2 Methodology

The following method was used:

- Site visit: A field survey was undertaken and the study area scrutinized to the extent that the receiving environment could be documented and adequately described;
- Project components: The physical characteristics of the project components were described and illustrated;
- General landscape characterization: The visual resource (i.e. receiving environment) was mapped using field survey and GIS mapping technology. The description of the landscape focused on the nature of the land rather than the response of a viewer (refer to Appendix B);
- The **landscape character** of the study area was described. The description of the landscape focused on the nature and character of the landscape rather than the response of a viewer;
- The **quality of the landscape** was described. Aesthetic appeal was described using recognized contemporary research in perceptual psychology as the basis;
- The **sense of place** of the study area was described as to the uniqueness and distinctiveness of the landscape. The primary informant of these qualities was the spatial form and character of the natural landscape together with the cultural transformations associated with the historic / current use of the land;
- Illustrations, in very basic **simulations**, of the proposed project were overlaid onto panoramas of the landscape, as seen from nearby sensitive viewing points to give the reviewer an idea of the scale and location of the proposed project within their landscape context;
- **Visual intrusion** (contrast) of the proposed project was determined by simulating its physical appearance from sensitive viewing areas;
- The **visibility** of the proposed project was determined;
- The **impact** on the visual environment and sense of place of the proposed project was rated based on a professional opinion and the method described below; and
- Measures that could mitigate the negative impacts of the proposed project were recommended.

4. DESCRIPTION OF THE PROJECT

Since the environmental impact assessment (EIA) process started in 2011 there has been numerous changes to the mine. One of these changes is the addition of a waste rock dump in order to handle the volume of waste rock produced by the open pit mining operations. Instead of initiating a separate EIA process to cater for this change, it was decided to incorporate the new waste rock dump into the current EIA process and as such revise the scoping report.

Due to the above-mentioned changes in the scope of project, the environmental scoping report has been updated and makes provision for the revised project scope. Specialist were appointed to address the impact of the new WRD and these specialist studies will be included as part of the EIA Report. This Visual Impact Assessment Report therefore forms part of the EIA phase of the project and will address the proposed visual impact of the new WRD.

The main project components, located on the farms Kafferskraal 342 JQ and Elandsdrift 467 JQ, comprise the following:

- Deepening of the pit(s) and related additional waste rock and tailings material storage
- A chrome sand drying plant with associated fuel storage facilities, within the concentrator complex
- Changes to the tailings storage facility design
- Re-shaping and re-alignment of waste rock dumps
- Changes to general surface infrastructure layout and operations at the mine.

The project components require authorisations in terms of the Mineral and Petroleum Resources Development Act (MPRDA), 28 of 2002, the National Environmental Management Act (NEMA), 107 of 1998 and the National Water Act (NWA), 36 of 1998. It is expected that any additional approvals/permits needed for the project components will be identified during the course of the environmental assessment process.

The details for the new WRD are listed below.

Project components			**Data from approved 2008 EIA and EMP report**
Component	**Aspect**	**Details**	
Mining			
East Mine waste rock storage	Addition of new north eastern waste rock dump	Coordinates: 25 43’23.370”S; 27 31’16.896”E Elevation: approx. 1180m Footprint: 95ha Height: approx. 70m (in 15m high lifts) Volume: 19.98 million m^3 (45.95 million tons of waste)	None

5. THE ENVIRONMENTAL SETTING

For the following section, refer to the views on Figures 3 - 8 at the end of this section. The locations for panorama views are indicated on Figure 2.

The description of the receiving environment for the proposed Tharisa Platinum Mine: North Eastern WRD project was sourced from desktop studies, aerial photographs, 1:50000 Topographical maps and the observations of the specialist during the site visit on the 20th of May 2014.

5.1 The Site

The current land uses on site is mining with associated structures and infrastructure.

5.2 The Study area

5.2.1 Residential

The residential component of the study area comprise of a small town, Mooinooi (approximately 3km to the south-east), a couple of townships and other settlements (Elandsdrift, or also referred to as Mamba 05km east, Lapolagang 2.5km to the west, Wonderkop 6km to the north, Maroelakop 10km to the north-east, Segwaelane 1.5km to the north-east, Marikana 3km to the north-west, Mooinooi 3km to the south-east and Buffelspoort 5km to the south), mostly accommodating workers to the mines within the area and two large towns, Rustenburg (approximately 26km to the north-west) and Brits (approximately 30km to the north-east) which are located within the broader area.

Another residential component includes the various farmsteads within the study area which are concentrated more to the south of the site.

5.2.2 Agriculture

Most of the agricultural activities are located to the south of the N4 and includes crop production.

5.2.3 Tourism

The study area is located in the near vicinity of the *Hartbeespoort Tourism Hub* as well as near the *Magaliesberg Protected Natural Environment*. These areas are well-known, being visited by both local and international tourists. They are very popular due to their close proximity to the major metropolitan areas of Pretoria and Johannesburg. The N4 is also the route to the well-known Pilanesberg Nature Reserve and Sun City Resort.

The Buffelspoort Holiday Resort is located approximately 1.5km south of the Tharisa Platinum Mine study site and approximately 5km south is the Buffelspoort Dam and other accommodation facilities.

5.2.4 Infrastructure, Industries and Mining

The dominant land use in the study area is mining, with associated structures and related industries. The

mining activities stretch from the R510, west, to the R556, east, and from the N4 / R104 (south) approximately 12km to the north. The mining component of the study area includes; Xstrata Chrome mine located on the southern boundary, Rustenburg Platinum Mine located approximately 2.8km north-west, Klipfontein Tailings Dam (approximately 0.6km east), Marikana Platinum Mine (approximately 4km south-east), Tharisa Platinum Mine (approximately 12km south-east) and the Karee Mine (approximately 7km north-east).

5.2.5 Transportation systems

The N4 and R104 run parallel just to the south of the project site in an east-west orientation. Other roads include local tarred and dirt roads providing access to the mines, settlements and farms within the study area.

Other transportation systems include the railway line which is located to the north of the project site.

5.3 Landscape Character

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

The landscape character consists of slightly rolling plains with singular and clusters of smaller koppies. A major land form is the Magaliesburg mountain range, running east-west and located approximately 7km to the south of the project site. Due to extensive mining over a long time-period, mining activities as well as dumps and storage structures of the mines, have become an integral part of the landscape topographical features and character. The project site is surrounded to the west, north and the east by mining activities with agricultural activities located to the south of the project site. Residential settlements are scattered throughout the study area with farmers concentrated to the south of the N4.

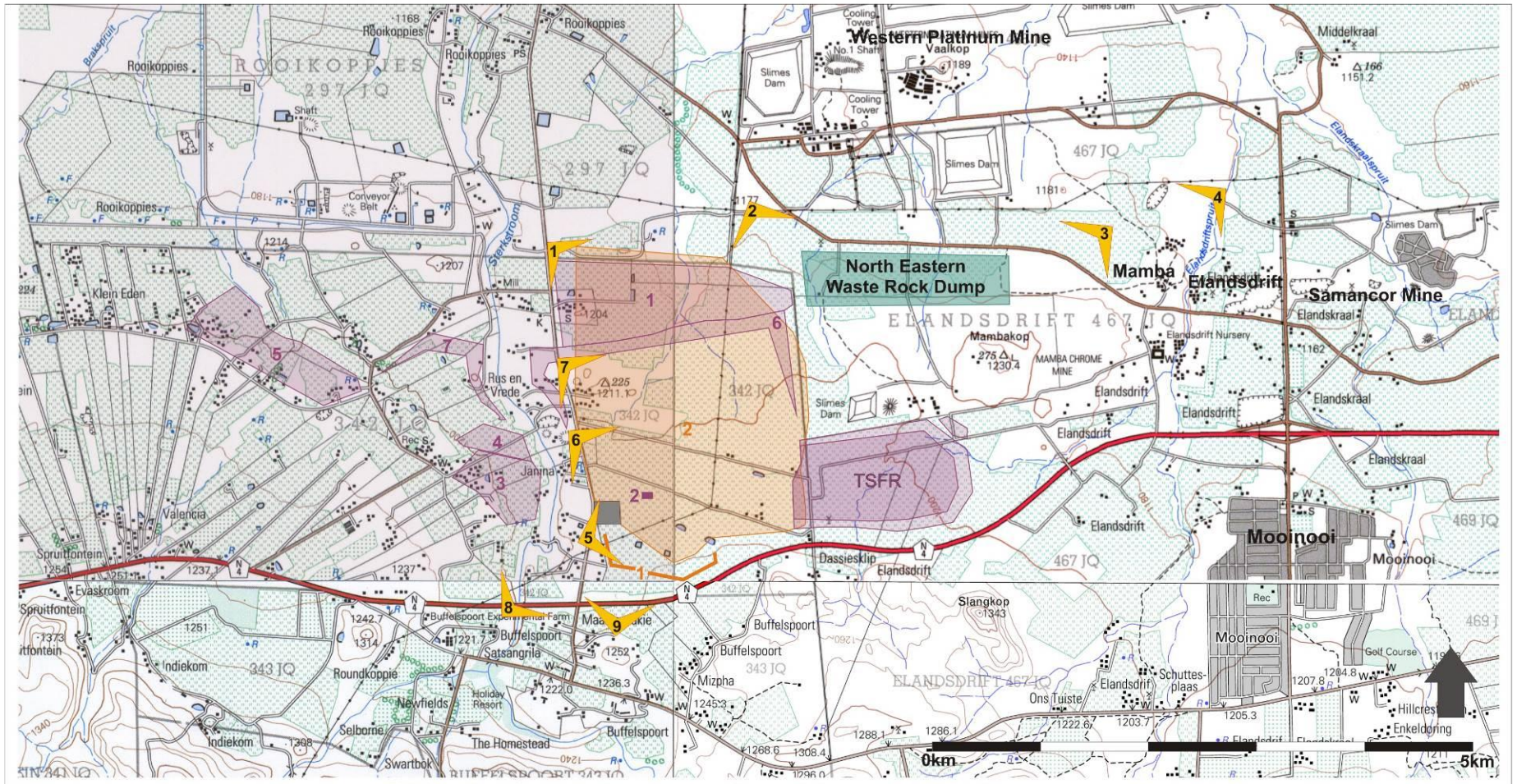


Figure 2 **VIEWS** - Tharisa Platinum Mine: North Eastern WRD Project

View 1: Local mine road towards Marikana Mine, Eastern Waste Rock Dump in the foreground

View 2: Local mine road towards Marikana Mine, proposed site for the North Eastern Waste Rock Dump in the foreground

Refer to Figure 1 for the location of the viewpoints

Figure 3 **LANDSCAPE CHARACTER** - Tharisa Platinum Mine: North Eastern WRD Project

View 1: Local mine road towards Marikana Mine with Mamba / Elandsdrift Residential Area on the left, the proposed site for the Eastern Waste Rock Dump in the foreground

View 2: Local mine road towards Marikana Mine with the Mamba / Elandsdrift Residential Area in foreground, proposed site for the North Eastern Waste Rock Dump in the middle-ground

Refer to Figure 1 for the location of the viewpoints

Figure 4 **LANDSCAPE CHARACTER** - Tharisa Platinum Mine: North Eastern WRD Project

View 5a: View towards the substation and the existing Tharisa Platinum Mine infrastructure

View 5b: View towards one of the entrances to the Tharisa Platinum Mine, berm obstruct the view towards the mining infrastructure

Refer to Figure 1 for the location of the viewpoints

Figure 5 **LANDSCAPE CHARACTER** - Tharisa Platinum Mine: North Eastern WRD Project

View 6a: View towards the Tharisa Platinum Mine mining infrastructure

View 6b: View towards the Tharisa Platinum Mine mining infrastructure

Refer to Figure 1 for the location of the viewpoints

Figure 6 **LANDSCAPE CHARACTER** - Tharisa Platinum Mine: North Eastern WRD Project

View 7: View towards the Tharisa Platinum Mine mining infrastructure

View 9: View from the N4 towards the Tharisa Platinum Mine mining infrastructure

Refer to Figure 1 for the location of the viewpoints

Figure 7 **LANDSCAPE CHARACTER -** Tharisa Platinum Mine: North Eastern WRD Project

View 8: View from the N4 towards the Tharisa Platinum Mine, mining infrastructure visible through the gap in the berm

Refer to Figure 1 for the location of the viewpoints

Figure 8 **LANDSCAPE CHARACTER** - Tharisa Platinum Mine: North Eastern WRD Project

6. VISUAL RESOURCE

6.1 Visual Resource Value / Scenic Quality

The spatial distribution of the landscape types discussed in Section 5 is illustrated on Figure 9 'Visual Resource' at the end of this Section. The figure also rates the relative scenic quality of each type and its landscape sensitivity.

Scenic quality ratings (using the scenic quality rating criteria described in Appendix C) were assigned to each of the landscape types defined in Figure 9 'Visual Resource'. The highest value is assigned to the mountains, koppies and rivers. The agricultural fields, farmsteads and residential were assigned with a moderate rating and the mining activities with a low rating.

Table 1: Value of the Visual Resource
(After The Landscape Institute with the Institute of Environmental Management and Assessment (2002))

High mountains, koppies, rivers (Magaliesburg, Mambakop / Elandsdrift, Sterkstroom)	**Moderate** residential farmsteads agricultural fields	**Low** mining activities
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 considered to be of particular importance to conserve and which has a strong sense of place.	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.	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 sensitive to change in general and will be detrimentally affected if change is inappropriately dealt with.	Sensitivity: It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with.	

6.2 Sense of Place

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, or unique, or at least particular, character of its own".

The Project site and its surrounds have a strong sense of place dominated by the mining structures and activities within the study area. Another component is residential which is characterised by more formalised towns such as Mooinooi as well as informal settlements such as Mamba / Elandsdrift. To the south of the N4 highway the character changes with the Magaliesburg as the dominant feature and farmsteads and tourist

facilities scattered throughout this area. The north eastern WRD is however located between mining structures and forms part of the existing mining activities and therefore the sense of place experienced is an industrial / mining sense of place which is associated with a busier feeling.

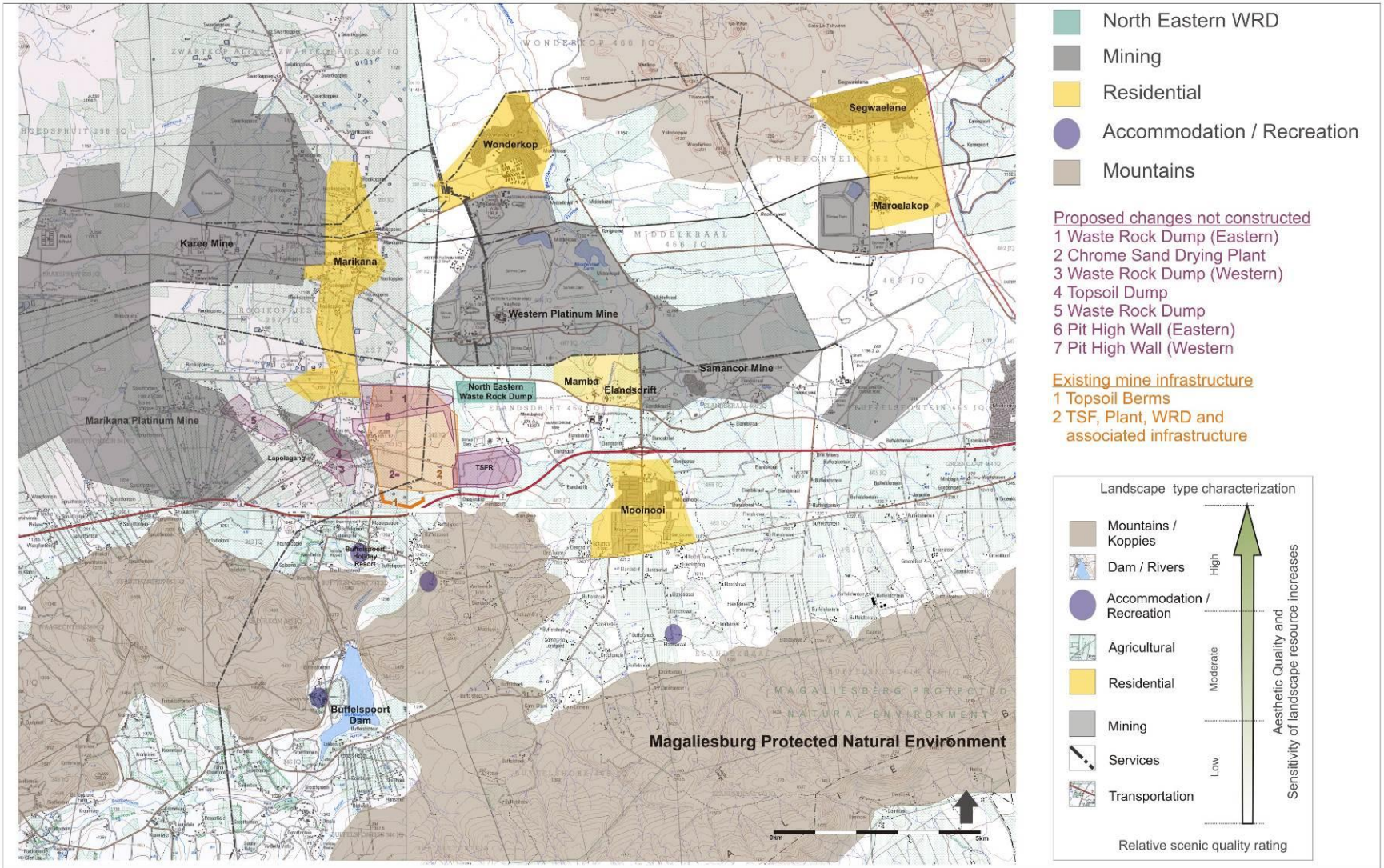


Figure 9 **VISUAL RESOURCE** - Tharisa Platinum Mine: North Eastern WRD Project

7. VISUAL RECEPTORS

7.1 Views

The most prominent views of the proposed project are the following:

- Views along the N4 / R104 from both east- and westbound travellers.
- Views from farmsteads within the study area.
- Views from other local roads affecting local landowners, residents and employees.
- Views from townships and settlements within the study area.
- Views from tourist facilities within the study area.

7.1.1 Potential Sensitivity of the Visual Receptors

Sensitive viewers would typically be classified as farmsteads / residences (static / permanent views) and tourist travellers (momentary / temporary views) along tourist routes. In the case of this project, the views by all the viewers located to the north of the N4, as well as travellers along the N4, already include the current mining activities and structures. Thus, even though they would normally be classified as sensitive viewers with a high sensitivity, their sensitivity had been compromised by the existing land use within the study area. Viewers located to the south of the N4 are mostly exposed to farming or residential activities and their sensitivity has not necessarily been compromised by the mining activities.

Table 2: Potential Sensitivity of Visual Receptors

High Farmsteads, residential and tourist destinations	**Moderate** N4 / R104	**Low** employees of the mining and related industries
Visitors of tourist attractions and travelling along local routes, whose intention or interest may be focused on the landscape; Communities where the 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.	People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value); People travelling through or past the affected landscape in cars, on trains or other transport routes.	Visitors and 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.

8. LANDSCAPE AND VISUAL IMPACT

8.1 Landscape Impact

The *landscape impact* (i.e. the change to the fabric and character of the landscape caused by the physical presence of a development) of the proposed project will be ***moderate*** as the project entails the expansion of the mining structures by adding an additional waste rock dump within the existing Tharisa Platinum Mine footprint. There will therefore not be a significant change to the character of the landscape.

However, as stated in the approach, the physical change to the landscape should be understood in visibility and aesthetic terms within the context of the study area. The following sections discuss the effect that the proposed project activities will have on the visual and aesthetic environment.

8.2 Severity of Visual Impact

The severity of visual impact is determined using visibility, visual intrusion, visual exposure and viewer sensitivity criteria. When the severity of impact is qualified with spatial, duration and probability criteria the significance of the impact can be predicted (refer to Appendix C).

8.2.1 Visual Intrusion

Visual intrusion deals with the notion of contextualism i.e. how well does a project component fit into the cultural aesthetic of the landscape as a whole? As discussed in Section 5.3, the study area is characterised by mining activities located to the north of the N4, residential settlements within the direct vicinity of the Tharisa mine as well as to the south of the N4, agricultural small holdings and tourist destinations to the south of the N4. The natural environment is a combination of bushveld, river systems, kopppies and the Magaliesburg to the south of the Project site. The dominant land use is however mining and most of the views within the study area will therefore include the mining activities.

The addition of the north eastern waste rock dump will take place within the existing Tharisa Platinum Mine footprint and will therefore form part of the existing mining activities. The north eastern waste rock dump will be absorbed by the mining activities and will not change the landscape character of the area.

Table 3 rates and summarises visual intrusion of the project components when the *worst case scenario (no mitigation)* is taken into account.

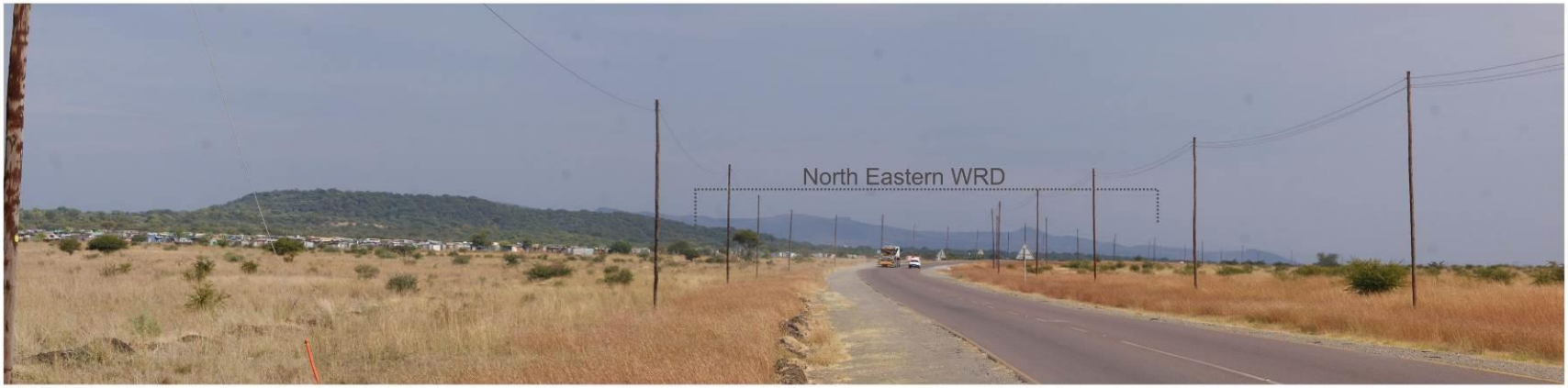
Table 3: Visual Intrusion

High	Moderate	Low	Positive
Because the proposed project: - Has a substantial negative effect on the visual quality of the landscape; - Contrasts dramatically with the patterns or	Because the proposed project: - Has a moderate negative effect on the visual quality of the landscape; - Contrasts with the patterns or elements	Because the proposed project: - **Contrasts minimally with the**	The proposed project: - Has a beneficial effect on the visual quality of the landscape; - Enhances the patterns or elements that define

elements that define the structure of the immediate landscape;	that define the structure of the landscape;	**patterns or elements that define the structure of the landscape;**	the structure of the landscape;
- Contrasts with land use, settlement or enclosure patterns of the immediate environment;	- Is partially compatible with land use (utilities) patterns of the general area;	**- is mostly compatible with land use, (utility) patterns;**	- Is compatible with land use, settlement or enclosure patterns.
- Cannot be 'absorbed' into the landscape from key viewing areas.	- Is partially 'absorbed' into the landscape from key viewing areas.	**- is 'absorbed' into the landscape from key viewing areas.**	
Result: Notable change in landscape characteristics over an extensive area and/or intensive change over a localized area resulting in major changes to key views	*Result:* Moderate change in landscape characteristics over localized area, resulting in a moderate change to key views	***Result*** **Moderate change in landscape characteristics over localized area resulting in a minor change to a few key views.**	*Result* Positive change in key views.

Sections that are placed in bold are applicable to the proposed Project.

In the light of the findings in Table 3 and the discussion above, the visual intrusion of the proposed Project will be ***low*** as the proposed north eastern waste rock dump will contrast minimally with the existing mining structures and will be absorbed into the existing mining environment.



BEFORE

AFTER

View 2: Local mine road towards Marikana Mine with the Mamba / Elandsdrift Residential Area in foreground, proposed site for the North Eastern Waste Rock Dump in the middle-ground

Refer to Figure 1 for the location of the viewpoints

Figure 10 **SIMULATION** - Tharisa Platinum Mine: North Eastern WRD Project

8.2.2 Visibility and Visual Exposure

In determining the visibility of the project the 'zone of potential influence' was established and is regarded to be 10km. Over 10km the impact of the proposed activities would have diminished due to the diminishing effect of distance (the project recedes into the background) and atmospheric conditions (haze) on visibility. Also, at this distance the features would appear in the background of a view and thus begin to be 'absorbed' into the landscape setting.

Visual exposure of the project is determined by the proximity of the viewer to the proposed new project component. The impact of an object in the foreground (0 – 0.8km) is greater than the impact of that same object in the middle ground (0.8km – 3km) which, in turn is greater than the impact of the object in the background (greater than 3km) of a particular scene. Therefore the visibility and visual exposure for viewers within 0.8km of the proposed project will be high, for viewers between 0.8km and 3km it will be moderate and beyond 3km it will be low.

8.2.2.1 Day Time

A viewshed analysis was completed to illustrate the worst case scenario and therefore portrays the project when all the structures are constructed and the waste rock dumps as well as the tailings storage facility has reached its maximum height, refer to Figure 10. As illustrated in the viewshed the north eastern WRD will be highly visible for motorist travelling on the local roads located to the north of the north eastern WRD. The north eastern WRD will be situated very close to the road and will therefore be highly visible. Should mitigation measure be implemented, such as a visual screen, the north eastern WRD will still be visible above the visual screen. View 1, Figure 3, is an illustration of the visibility of the eastern WRD; the north eastern WRD will be similar and will therefore have the same visibility from the local road.

Motorist travelling on the N4 will experience the visibility of the north eastern WRD differently. Motorist travelling in an eastern direction will have a view of the entire Tharisa Platinum Mine and only the sections of the north eastern WRD that protrudes above the rest of the mining structures will be visible. When travelling from the east towards the west the north eastern WRD and the tailings storage facility will be the first structures the motorist will see. There is also no other mining structures in front of the north eastern WRD and therefore the visibility of the north eastern WRD will be higher when viewed from the east.

Mamba / Elandsdrift is the closest residential area and is located approximately 0.4km to the east of the north eastern WRD. The visibility for residents staying there will be high, refer to Figure 10 for the graphic illustration. Although the vegetation between Mamba / Elandsdrift and the north eastern WRD will screen some of the views towards the north eastern WRD, the WRD will protrude above the vegetation and will still result in a high visibility.

Residents staying in Mooinooi fall within the 'medium' zone of potential influence and the visibility are influenced by the atmospheric haze, distance to the north eastern WRD as well as obstacles. Views from Mooinooi will be screened or partially screened by vegetation, the topography (Mambakop) as well as other buildings within Mooinooi.

Views from tourist / recreation facilities that are located to the south of the site will either be too far and therefore the north eastern WRD will not be visible or the north eastern WRD will be screened, resulting in a low visibility.

It should be remembered that the north eastern WRD will form part of the rest of the Tharisa Platinum Mine structures and will not be a standalone structure. The visibility of the north eastern WRD will therefore contribute to the overall visibility of the Tharisa Platinum Mine.

The visibility can therefore be regarded as ***moderate*** as most of the views towards the north eastern WRD will be obstructed by existing mining infrastructure.

Table 4: Visibility of the proposed Project

High	Moderate	Low
Visual Receptors If the project is visible from over half the zone of potential influence, and/or views are mostly unobstructed and / or the majority of viewers are affected.	***Visual Receptors*** **If the project is visible from less than half the zone of potential influence, and / or views are partially obstructed** and or many viewers are affected	*Visual Receptors* If the project is visible from less than a quarter of the zone of potential influence, and / or views are mostly obstructed and or few viewers are affected.

Sections that are placed in bold are applicable to the proposed Project.

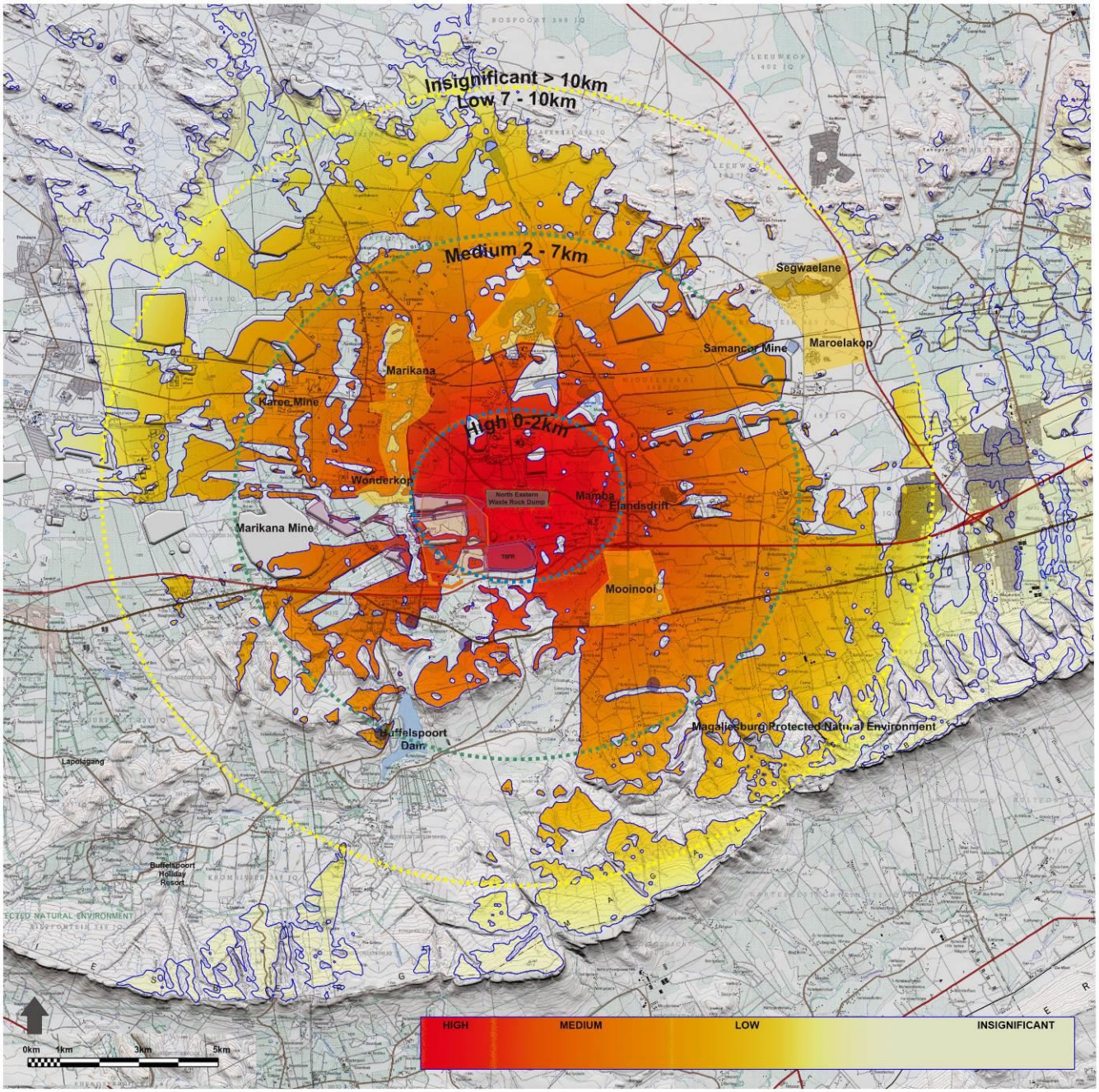
Table 5: Visual Exposure of the proposed Project

	High Exposure (significant contribution to visual impact)	Moderate Exposure (moderate contribution to visual impact)	Low Exposure (minimal influence on visual impact)	Insignificant Exposure (negligible influence on visual impact)
Roads (N4, R104 and local)	**0 – 0.8 km**	**0.8 – 3.0 km**	**3.0 – 10.0 km**	**Over 10.0 km**
Farmsteads	0 – 0.8 km	**0.8 – 3.0 km**	**3.0 – 10.0 km**	**Over 10.0 km**
Residential	**0 – 0.8 km** Mamba / Elandsdrift	**0.8 – 3.0 km** Wonderkop, Mooinooi	**3.0 – 10.0 km** Marikana, Segwaelane	**Over 10.0 km**
Tourist / Recreational Facilities	0 – 0.8 km	**0.8 – 3.0 km**	**3.0 – 10.0 km** Buffelspoort	**Over 10.0 km**

Sections that are placed in bold are applicable to the proposed Project.

8.2.2.2 Night Time

It is not anticipated that the north eastern WRD will result in the increase of the visibility of the project during night time. Should additional lighting be added it will form part of the existing visual impact experienced by viewers and will not increase the visibility or the visual impact experienced by the viewers.



North Eastern WRD
Mining
Residential
Accommodation / Recreation
Mountains

Proposed changes not constructed
1 Waste Rock Dump (Eastern)
2 Chrome Sand Drying Plant
3 Waste Rock Dump (Western)
4 Topsoil Dump
5 Waste Rock Dump
6 Pit High Wall (Eastern)
7 Pit High Wall (Western

Existing mine infrastructure
1 Topsoil Berms
2 TSF, Plant, WRD and associated infrastructure

Zone of Potential Influence
High (0 - 2km)
Moderate (2 - 7km)
Low (7 - 10km)
Insignificant (> 10km)

Figure 11 **VIEWSHED** - Tharisa Platinum Mine: North Eastern WRD Project

8.2.3 Sensitivity of Visual Receptors

When visual intrusion, visibility and visual exposure are incorporated, and qualified by sensitivity (visual receptors) criteria the significance of the visual impact of the proposed project can be determined.

The sensitivity of visual receptors and views will be depended on:

- The location and context of the viewpoint;
- The expectations and occupation or activity of the receptor;
- The importance of the view.

The sensitive visual receptors would include the residents from Mamba / Elandsdrift, farmsteads located to the south of the study site, local roads as well as tourist using the N4 / R104. The north eastern WRD forms part of the Tharisa Platinum Mine which includes other structures such as the plants, TSFs and other dumps and therefore most views towards the north eastern WRD will include mining activities.

Table 6: Sensitivity of Receptors

High Viewers from Mamba / Elandsdrift, farmsteads located to the south of the study site Farms roads N4 / R104 Tourist / Recreational	**Moderate**	**Low** Mining areas Local mine roads
For example when viewed from **residential properties**, **public rights of way**, **tourist routes/attractions** and or the majority of the I&AP's are opposed to the proposed project and take major issue with the visual aspects of the project.	For example when viewed from sporting and recreational facilities and/or there is a split between I&AP's who either support or oppose the proposed project and take moderate issue with the visual aspects of the project.	**For example when viewed from, industrial or mining areas** and/or most I&AP's are either supportive of the proposed project or do not take issue with the visual aspects of the project.

8.2.4 Severity of Visual Impact

In qualifying the criteria used to establish the severity 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, 1996). These results are based on *worst-case scenarios* when the impact of all aspects is taken together and when viewed from the various sensitive viewing points as indicated in Table 7 below.

According to the results tabulated in Table 7 below the *severity* of visual impact will be ***low.***

Table 7: Severity of Impact of the proposed Project

High	Moderate	Low	Negligible
Total loss of or major alteration to key elements / features / characteristics of the baseline.	Partial loss of or alteration to key elements / features / characteristics of the baseline.	**Minor loss of or alteration to key elements / features / characteristics of the baseline.**	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 considered to be totally uncharacteristic when set within the attributes of the receiving landscape.	i.e. Pre-development landscape or view and / or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape.	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.	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.
High scenic quality impacts would result.	Moderate scenic quality impacts would result	**Low scenic quality impacts would result.**	Negligible scenic quality impacts would result.

Sections that are placed in bold are applicable to the proposed Project.

9. MITIGATION MEASURES

In considering mitigating measures there are three rules that were 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 considered:

- 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. It should however be kept in mind that even though the ash dump will be rehabilitated the structure will still be intrusive and visible and therefore the impact after mitigation would not be significantly less than before mitigation.

9.1 Earthworks

- Dust suppression techniques should be in place at all times during the construction, operational, the decommissioning and closure phases.
- Only the footprint and a small 'construction buffer zone' around the proposed Project should be exposed. In all other areas, the natural vegetation should be retained. Specifically referring to the vegetation buffer between Mamba / Elandsdrift and the north eastern WRD as well as the vegetation between the TSFR and Mamba / Elandsdrift.

9.2 Landscaping

- If at all possible the dumps should be shaped in such a way that it could be rehabilitated to blend in with the contours of the surrounding landscape.
- The side slopes should be designed in such a way that they are articulated to form natural shaded areas.
- A registered Professional Landscape Architect could assist with the final design of the ash dump.
- A registered Professional Landscape Architect should be appointed to assist with the rehabilitation plan for the TSF.
- Rehabilitate / restore exposed areas as soon as possible after construction activities are complete.
- Only indigenous vegetation should be used for rehabilitation / landscaping purposes.
- Visual screens, such as berms, can be used along the southern boundary of the mine in order to screen views for motorist travelling on the N4 and the R104 and for residents staying to the south of the N4 / R104. The visual screens must be designed in such a way that it screens the view as far as possible, small gaps in the screen will allow viewers to still see the mining activities, as illustrated in View 8, Figure 8. The visual screens must however be maintained so that it doesn't become the source of the visual impact.

9.3 Access and Haul Roads

During construction, operation, rehabilitation and closure of the Project, access and haul roads will require an effective dust suppression management programme, such as the use of non-polluting chemicals that will retain moisture in the road surface.

9.4 Lighting

Even though the area is already light up at night, light pollution should still be seriously and carefully considered and kept to a minimum. Security lighting should only be used where absolutely necessary and carefully directed.

The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods:

- Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the substation.
- Light public movement areas (pathways and roads) with low level ‘bollard’ type lights and avoid post top lighting
- Avoid high pole top security lighting along the periphery of the substation site and use only lights that are activated on movement at illegal entry to the site.
- Use security lighting at the periphery of the site that is activated by movement and are not permanently switched on.

10. SIGNIFICANCE

The *intensity* of impact, rated in Table 7, is further qualified with *extent*, *duration* and *probability* criteria to determine the *significance* of the visual impact. The methods and formulae used in these tables are summarized in Appendix D. Table 8 summarises the *significance* of the visual impact on views towards the Project.

Table 8: Significance of the Proposed Project

	Management	Extent	Duration	Intensity /Severity	Consequence	Probability	Significance	Status
Operational Phases	Without Mitigation	M	M	L	L	M	**Moderate**	Negative
	With Mitigation *	M	M	L	L	M	**Moderate**	Negative
Closure Phases	Without Mitigation	M	H	L	M	M	**Moderate**	Negative
	With Mitigation *	M	H	L	M	M	**Moderate**	Negative

Note: * This prediction assumes that all mitigating measures are implemented and are effectively managed at all times.

11. CONCLUSION

Visual impacts would result from the operation and closure phases of the proposed Tharisa Platinum Mine: north eastern WRD. The proposed Project entails the construction of an additional WRD in the north eastern corner of the mine boundary. Although the visual impact of the proposed north eastern WRD is considered it should be noted that the WRD forms part of a bigger mining project and therefore contributes to the overall visual impact of the Tharisa Platinum Mine.

The dominant land use within the study area is mining. The Mining activities are spread from the N4 / R104 in a northerly direction and stretches from the R510 in the west to the R556 in the east. The proposed north eastern WRD is therefore not uncharacteristic to the study area and will not only be absorbed into the Tharisa mining activities but will also be absorbed by the mining activities within the study area. The visual intrusion of the WRD will therefore be low. The north eastern WRD will be highly visible from sections along the N4, from the local road located along the northern boundary of the project and from the Mamba / Elandsdrift residential area. Viewers located to the south of the site will have an obstructed view towards the north eastern WRD. Successful mitigation measures, such as the vegetation screen and the berm, will lower the visibility of the proposed project from sensitive viewer locations such as the N4 and Mamba / Elandsdrift residential area.

The severity of the visual impact of the project is low and the significance of the visual impact will be medium. With the correct mitigation measures the significance of the visual impact could be reduced to low for viewers travelling along the N4 or residing south of the N4. This is unfortunately not the case for residents staying in Mamba / Elandsdrift as this residential area is located in very close proximity to the north eastern WRD.

****NLA****

12. REFERENCES

Crawford, D., 1994. Using remotely sensed data in landscape visual quality assessment. *Landscape and Urban Planning.* 30: 71-81.

Hull, R.B. & Bishop, I.E., 1988. Scenic Impacts of Electricity Transmission Towers: The Influence of Landscape Type and Observer Distance. *Journal of Environmental Management.* 27: 99-108.

Institute of Environmental Assessment & The Landscape Institute, 1996. *Guidelines for Landscape and Visual Impact Assessment,* E & FN Spon, London (117)

Ittelson, W.H., Proshansky, H.M., Rivlin, L.g. and Winkel, G.H., 1974. *An Introduction to Environmental Psychology.* Holt, Rinehart and Winston, New York.

Lange, E., 1994. Integration of computerized visual simulation and visual assessment in environmental planning. *Landscape and Environmental Planning.* 30: 99-112.

Lynch, K., 1992. *Good City Form*, The MIT Press, London. (131)

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.

Ramsay, J. (October 1993), Identification and assessment of aesthetic values in two Victorian forest regions. *More than meets the eye: identifying and assessing aesthetic value.* Report of the Aesthetic Value Workshop held at the University of Melbourne.

Sama, J. (2000), Program Policy, *Assessing and Mitigating Visual Impact,* Department of Environmental Conservation. New York.

Schapper, J. (October 1993), The importance of aesthetic value in the assessment of landscape heritage. *More than meets the eye: identifying and assessing aesthetic value.* Report of the Aesthetic Value Workshop held at the University of Melbourne.

Walmsley, B., & Tshipala, K. E. (2007). Handbook on Environmental Assessment Legislation in the SADC Region. Midrand: The Development Bank of South Africa in collaboration with the South African Institute for Environmental Assessment.

Warnock, S. & Brown, N., 1998. Putting Landscape First. *Landscape Design.* 268: 44-46.

In order to reach an understanding of the effect of development on a landscape resource, it is necessary to consider the different aspects of the landscape as follows:

Landscape Elements and Character

The individual elements that make up the landscape, including prominent or eye-catching features such as hills, valleys, savannah, trees, water bodies, buildings and roads are generally quantifiable and can be easily described.

Landscape character is therefore the description of pattern, resulting from particular combinations of natural (physical and biological) and cultural (land use) factors and how people perceive these. The visual dimension of the landscape is a reflection of the way in which these factors create repetitive groupings and interact to create areas that have a specific visual identity. The process of landscape character assessment can increase appreciation of what makes the landscape distinctive and what is important about an area. The description of landscape character thus focuses on the *nature of the land*, rather than the response of a viewer.

Landscape Value – all encompassing (Aesthetic Value)

Aesthetic value is the emotional response derived from the experience of the environment with its particular natural and cultural attributes. The response can be either to visual or 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 encompasses more than the seen view, visual quality or scenery, and includes atmosphere, landscape character and sense of place (Schapper 1993).

Aesthetic appeal (value) is 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 recognised by the broader community.

Sense of Place

Central to the concept of a sense of place is that the place requires uniqueness and distinctiveness. The primary informant of these qualities is the spatial form and character of the natural landscape together with the cultural transformations and traditions associated with historic use and habitation. 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, or 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.

Scenic Quality

Assigning values to visual resources is a subjective process. The phrase, “beauty is in the eye of the beholder,” is often quoted to emphasize the subjectivity in determining scenic values. Yet, researchers have found consistent levels of agreement among individuals asked to evaluate visual quality.

Studies for perceptual psychology have shown human preference for landscapes with a higher visual complexity particularly in scenes with water, over homogeneous areas. On the basis of contemporary research landscape quality increases when:
Topographic ruggedness and relative relief increase;
Where water forms are present;
Where diverse patterns of grasslands and trees occur;
Where natural landscape increases and man-made landscape decreases;
And where land use compatibility increases and land use edge diversity decreases (Crawford 1994).

Scenic Quality - Explanation of Rating Criteria:

(After The Visual Resource Management System, Department of the Interior of the USA Government, Bureau of Land Management)

Landform: Topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, as the Fish River or Blyde River Canyon, the Drakensberg or other mountain ranges, or they may be exceedingly artistic and subtle as certain badlands, pinnacles, arches, and other extraordinary formations.

Vegetation: (Plant communities) Give primary consideration to the variety of patterns, forms, and textures created by plant life. Consider short-lived displays when they are known to be recurring or spectacular (wildflower displays in the Karoo regions). Consider also smaller scale vegetational features, which add striking and intriguing detail elements to the landscape (e.g., gnarled or wind beaten trees, and baobab trees).

Water: That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.

Colour: Consider the overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) as they appear during seasons or periods of high use. Key factors to use when rating "colour" are variety, contrast, and harmony.

Adjacent Scenery: Degree to which scenery outside the scenery unit being rated enhances the overall impression of the scenery within the rating unit. The distance which adjacent scenery will influence scenery

within the rating unit will normally range from 0-8 kilometres, depending upon the characteristics of the topography, the vegetative cover, and other such factors. This factor is generally applied to units which would normally rate very low in score, but the influence of the adjacent unit would enhance the visual quality and raise the score.

Scarcity: This factor provides an opportunity to give added importance to one or all of the scenic features that appear to be relatively unique or rare within one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery - the scarcity factor can be used to recognize this type of area and give it the added emphasis it needs.

Cultural Modifications: Cultural modifications in the landform / water, vegetation, and addition of structures should be considered and may detract from the scenery in the form of a negative intrusion or complement or improve the scenic quality of a unit.

Scenic Quality Inventory and Evaluation Chart

(After The Visual Resource Management System, Department of the Interior of the USA Government, Bureau of Land Management)

Key factors	Rating Criteria and Score		
Landform	High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops, or severe surface variation or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers. **5**	Steep canyons, mesas, buttes, cinder cones, and drumlins; or interesting erosional patterns or variety in size and shape of landforms; or detail features which are interesting though not dominant or exceptional. **3**	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting landscape features. **1**
Vegetation and landcover	A variety of vegetative types as expressed in interesting forms, textures, and patterns. **5**	Some variety of vegetation, but only one or two major types. **3**	Little or no variety or contrast in vegetation. **1**
Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape.	Flowing, or still, but not dominant in the landscape.	Absent, or present, but not noticeable.

	5	**3**	**0**
Colour	Rich colour combinations, variety or vivid colour; or pleasing contrasts in the soil, rock, vegetation, water or snow fields. **5**	Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element. **3**	Subtle colour variations, contrast, or interest; generally mute tones. **1**
Influence of adjacent scenery	Adjacent scenery greatly enhances visual quality. **5**	Adjacent scenery moderately enhances overall visual quality. **3**	Adjacent scenery has little or no influence on overall visual quality. **0**
Scarcity	One of a kind; or unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. National and provincial parks and conservation areas *** 5+**	Distinctive, though somewhat similar to others within the region. **3**	Interesting within its setting, but fairly common within the region. **1**
Cultural modifications	Modifications add favourably to visual variety while promoting visual harmony. **2**	Modifications add little or no visual variety to the area, and introduce no discordant elements. **0**	Modifications add variety but are very discordant and promote strong disharmony. **4**

Scenic Quality (i.e. value of the visual resource)

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 considered to be 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.

When considering both objective and subjective factors associated with the landscape there is a balance between landscape character and individual landscape features and elements, which would result in the values as follows:

Value of Visual Resource – expressed as Scenic Quality
(After The Landscape Institute with the Institute of Environmental Management and Assessment (2002))

High	Moderate	Low
Areas that exhibit a very positive character with valued features that combine to give the experience of unity, richness and harmony. These are landscapes that may be considered to be of particular importance to conserve and which may be sensitive change in general and which may be detrimental if change is inappropriately dealt with.	Areas that exhibit positive character but which may have evidence of alteration to /degradation/erosion of features resulting in areas of more mixed character. Potentially sensitive to change in general; again change may be detrimental if inappropriately dealt with but it may not require special or particular attention to detail.	Areas generally negative in character with few, if any, valued features. Scope for positive enhancement frequently occurs.

A visual impact study analysis addresses the importance of the inherent aesthetics of the landscape, the public value of viewing the natural landscape, and the contrast or change in the landscape from the project.

For some topics, such as water or air quality, it is possible to use measurable, technical international or national guidelines or legislative standards, against which potential effects can be assessed. The assessment of likely effects on a landscape resource and on visual amenity is more 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).

Landscape impact assessment includes a combination of objective and subjective judgements, and it is therefore important that a structured and consistent approach is used. It is necessary to differentiate between judgements that involve a degree of subjective opinion (as in the assessment of landscape value) from those that are normally more objective and quantifiable (as in the determination of magnitude of change). Judgement should always be based on training and experience and be supported by clear evidence and reasoned argument. Accordingly, suitably qualified and experienced landscape professionals carry out landscape and visual impact assessments (The Landscape Institute with the Institute of Environmental Management and Assessment (2002),

Landscape and visual assessments are separate, although linked, procedures. The landscape baseline, its analysis and the assessment of landscape effects all contribute to the baseline for visual assessment studies. The assessment of the potential effect on the landscape is carried our as an effect on an environmental resource, i.e. the landscape. Visual effects are assessed as one of the interrelated effects on population.

Landscape Impact

Landscape impacts derive from changes in the physical landscape, which may give rise to changes in its character and from effects to the scenic values of the landscape. This may in turn affect the perceived value ascribed to the landscape. The description and analysis of effects on a landscape resource relies on the adoption of certain basic principles about the positive (or beneficial) and negative (or adverse) effects of change in the landscape. Due to the inherently dynamic nature of the landscape, change arising from a development may not necessarily be significant (Institute of Environmental Assessment & The Landscape Institute (2002)).

Visual Impact

Visual impacts 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 effects with respect to visual amenity. Visual impact is therefore measured as the change to the existing visual environment (caused by the physical presence of a new development) and the extent to which that change compromises (negative impact) or enhances (positive impact) or maintains the visual quality of the area.

To assess the magnitude of visual impact four main factors are considered.

Visual Intrusion:	The nature of intrusion or contrast (physical characteristics) of a project component on the visual quality of the surrounding environment and its 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.
Sensitivity:	Sensitivity of visual receptors to the proposed development

Visual Intrusion / contrast

Visual intrusion deals with the notion of contextualism i.e. how well does a project component fit into the ecological and cultural aesthetic of the landscape as a whole? Or conversely what is its contrast with the receiving environment. Combining landform / vegetation contrast with structure contrast derives overall visual intrusion/contrast levels of high, moderate, and low.

Landform / vegetation contrast is the change in vegetation cover and patterns that would result from construction activities. Landform contrast is the change in landforms, exposure of soils, potential for erosion scars, slumping, and other physical disturbances that would be noticed as uncharacteristic in the natural landscape. Structure contrast examines the compatibility of the proposed development with other structures in the landscape and the existing natural landscape. Structure contrast is typically strongest where there are no other structures (e.g., buildings, existing utilities) in the landscape setting.

Photographic panoramas from key viewpoints before and after development are presented to illustrate the nature and change (contrast) to the landscape created by the proposed development. A computer simulation technique is employed to superimpose a graphic of the development onto the panorama. The extent to which the component fits or contrasts with the landscape setting can then be assessed using the following criteria.

- Does the physical development concept have a negative, positive or neutral effect on the quality of the landscape?
- Does the development enhance or contrast with the patterns or elements that define the structure of the landscape?
- Does the design of the project enhance and promote cultural continuity or does it disrupt it?

The consequence of the intrusion / contrast can then be measured in terms of the sensitivity of the affected landscape and visual resource given the criteria listed below. For instance, within an industrial area, a new sewage treatment works may have an insignificant landscape and visual impact; whereas in a *valued* landscape it might be considered to be an intrusive element. (Institute of Environmental Assessment & The landscape Institute (1996)).

Visual Intrusion

High	Moderate	Low	Positive
If the project: - Has a substantial negative effect on the visual quality of the landscape; - Contrasts dramatically with the patterns or elements that define the structure of the landscape; - Contrasts dramatically with land use, settlement or enclosure patterns; - Is unable to be 'absorbed' into the landscape.	If the project: - Has a moderate negative effect on the visual quality of the landscape; - Contrasts moderately with the patterns or elements that define the structure of the landscape; - Is partially compatible with land use, settlement or enclosure patterns. - Is partially 'absorbed' into the landscape.	If the project: - Has a minimal effect on the visual quality of the landscape; - Contrasts minimally with the patterns or elements that define the structure of the landscape; - Is mostly compatible with land use, settlement or enclosure patterns. - Is 'absorbed' into the landscape.	If the project: - Has a beneficial effect on the visual quality of the landscape; - Enhances the patterns or elements that define the structure of the landscape; - Is compatible with land use, settlement or enclosure patterns.
Result Notable change in landscape characteristics over an extensive area and/or intensive change over a localized area resulting in major changes in key views.	*Result* Moderate change in landscape characteristics over localized area resulting in a moderate change to key views.	*Result* Imperceptible change resulting in a minor change to key views.	*Result* Positive change in key views.

Visual intrusion also diminishes with scenes of higher complexity, as distance increases, the object becomes less of a focal point (more visual distraction), and the observer's attention is diverted by the complexity of the scene (Hull and Bishop (1988)).

Visibility

A viewshed analysis was carried out to define areas, which contain all possible observation sites from which the development would be visible. The basic assumption for preparing a viewshed analysis is that the observer eye height is 1.8m above ground level. Topographic data was captured for the site and its environs at 10 m contour intervals to create the Digital Terrain Model (DTM). The DTM includes features such as vegetation, rivers, roads and nearby urban areas. These features were 'draped' over the topographic data to complete the model used to generate the viewshed analysis. It should be noted that viewshed analyses are not absolute indicators of the level of significance (magnitude) of the impact in the view, but merely a statement of the fact of potential visibility. The visibility of a development and its contribution to visual impact is predicted using the criteria listed below:

Visibility

High	Moderate	Low
Visual Receptors If the development is visible from over half the zone of potential influence, and/or views are mostly unobstructed and/or the majority of viewers are affected.	*Visual Receptors* If the development is visible from less than half the zone of potential influence, and/or views are partially obstructed and or many viewers are affected	*Visual Receptors* If the development is visible from less than a quarter of the zone of potential influence, and/or views are mostly obstructed and/or few viewers are affected.

Visual Exposure

Visual exposure relates directly to the distance of the view. It is a criterion used to account for the limiting effect of increased distance on visual impact. The impact of an object in the foreground (0 – 800m) is greater than the impact of that same object in the middle ground (800m – 5.0 km) which, in turn is greater than the impact of the object in the background (greater than 5.0 km) of a particular scene.

Distance from a viewer to a viewed object or area of the landscape influences how visual changes are perceived in the landscape. Generally, changes in form, line, colour, and texture in the landscape become less perceptible with increasing distance.

Areas seen from 0 to 800m are considered foreground; foliage and fine textural details of vegetation are normally perceptible within this zone.

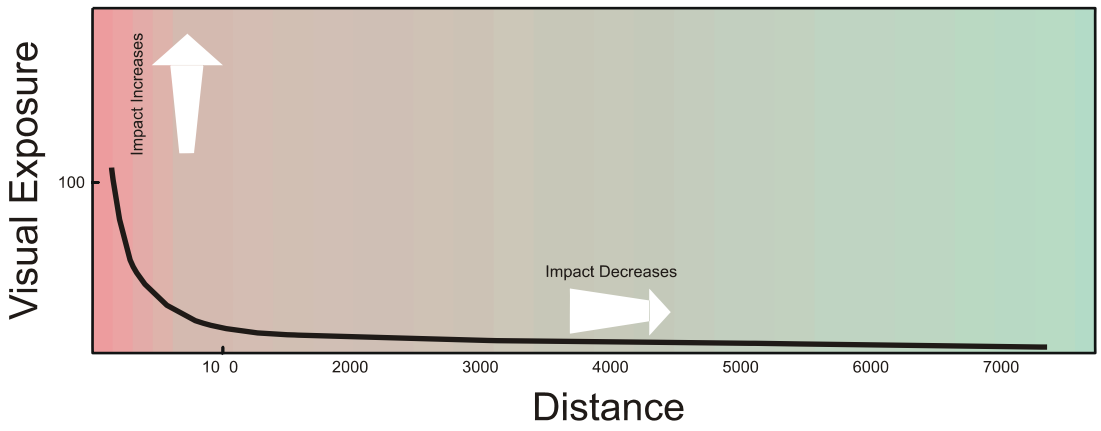
Areas seen from 800m to 5.0km are considered middle ground; vegetation appears as outlines or patterns. Depending on topography and vegetation, middle ground is sometimes considered to be up to 8.0km.

Areas seen from 5.0km to 8.0km and sometimes up to 16km and beyond are considered background. Landforms become the most dominant element at these distances.

Seldom seen areas are those portions of the landscape that, due to topographic relief or vegetation, are screened from the viewpoint or are beyond 16km from the viewpoint. Landforms become the most dominant element at these distances.

The impact of an object diminishes at an exponential rate as the distance between the observer and the object increases. Thus, the visual impact at 1000 m would be 25% of the impact as viewed from 500 m. At 2000 m it would be 10% of the impact at 500 m. The inverse relationship of distance and visual impact is well recognised in visual analysis literature (e.g.: Hull and Bishop (1988)) and is used as an important criteria for the study. This principle is illustrated in the Figure below.

Effect of Distance on Visual Exposure



Sensitivity of Visual Receptors

When visual intrusion, visibility and visual exposure are incorporated, and qualified by sensitivity criteria (visual receptors) the magnitude of the impact of the development can be determined.

The sensitivity of visual receptors and views will be depended on:

- The location and context of the viewpoint;
- The expectations and occupation or activity of the receptor;
- The importance of the view (which may be determined with respect to is 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 the 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.
- These would all be high

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 travelling through or past the affected landscape in cars, on trains or other transport routes;
- People at their place of work.

The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities,

whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

In this process more weight is usually given to changes in the view or visual amenity which are greater in scale, and visible over a wide area. In assessing the effect on views, consideration should be given to the effectiveness of mitigation measures, particularly where planting is proposed for screening purposes (Institute of Environmental Assessment & The Landscape Institute (1996).

Sensitivity of Visual Receptors

High	Moderate	Low
Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape;	People engaged in outdoor sport or recreation (other than appreciation of the landscape, as in landscapes of acknowledged importance or value);	The least sensitive receptors are likely to be people at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view (i.e. office and industrial areas).
Communities where the development results in changes in the landscape setting or valued views enjoyed by the community;	People travelling through or past the affected landscape in cars, on trains or other transport routes;	Roads going through urban and industrial areas
Occupiers of residential properties with views affected by the development.		

Severity of the Visual Impact

Potential visual impacts are determined by analysing how the physical change in the landscape, resulting from the introduction of a project, are viewed and perceived from sensitive viewpoints. 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 from parks, and conservation areas, highways and travel routes, and important cultural features and historic sites, especially in foreground views.

The magnitude of impact is assessed through a synthesis of visual intrusion, visibility, visual exposure and viewer sensitivity criteria. Once the magnitude of impact has been established this value is further qualified with spatial, duration and probability criteria to determine the *significance* of the visual impact.

For instance, the fact that visual intrusion and exposure diminishes significantly with distance does not necessarily imply that the relatively small impact that exists at greater distances is unimportant. The level of impact that people consider acceptable may be dependent upon the purpose they have in viewing the landscape. A particular development may be unacceptable to a hiker seeking a natural experience, or a

household whose view is impaired, but may be barely noticed by a golfer concentrating on his game or a commuter trying to get to work on time (Ittleson *et al.,* 1974).

In synthesising these criteria 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 and The landscape Institute (1996)).

Magnitude (Intensity) of Visual Impact

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

Cumulative effects

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 intervisibility (visibility) 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. Intervisibility 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)).

APPENDIX C: CRITERIA FOR SIGNIFICANCE OF IMPACT ASSESSMENT

PART A: DEFINITION AND CRITERIA*		
Definition of SIGNIFICANCE		Significance = consequence x probability
Definition of CONSEQUENCE		Consequence is a function of severity, spatial extent and duration
Criteria for ranking of the SEVERITY of environmental impacts	H	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	L	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	L	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national

PART B: DETERMINING CONSEQUENCE					
SEVERITY = L					
DURATION	Long term	H	Medium	Medium	Medium
	Medium term	M	Low	Low	Medium
	Short term	L	Low	Low	Medium
SEVERITY = M					
DURATION	Long term	H	Medium	High	High
	Medium term	M	Medium	Medium	High
	Short term	L	Low	Medium	Medium
SEVERITY = H					
DURATION	Long term	H	High	High	High
	Medium term	M	Medium	Medium	High
	Short term	L	Medium	Medium	High
			L	M	H
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
			SPATIAL SCALE		

PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	H	Medium	Medium	High
	Possible/ frequent	M	Medium	Medium	High
	Unlikely/ seldom	L	Low	Low	Medium
			L	M	H
			CONSEQUENCE		

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	Decision guideline
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

*H = high, M= medium and L= low and + denotes a positive impact.

APPENDIX D: CRITERIA FOR PHOTO / COMPUTER SIMULATION

To characterize the nature and magnitude of visual intrusion of the proposed project, a photographic simulation technique was used. This method was used according to Sheppard (in Lange 1994), where a visual simulation is good quality when the following five criteria are met.

Representativeness:	A simulation should represent important and typical views of a project.
Accuracy:	The similarity between a simulation and the reality after the project has been realized.
Visual clarity:	Detail, parts and overall contents have to be clearly recognizable.
Interest:	A simulation should hold the attention of the viewer.
Legitimacy:	A simulation is defensible if it can be shown how it was produced and to what degree it is accurate.

To comply with this standard it was decided to produce a stationary or static simulation (Van Dortmont in Lange, 1994), which shows the proposed development from a typical static observation points (Critical View Points).

Photographs are taken on site during a site visit with a manual focus, 50mm focal depth digital camera. All camera settings are recorded and the position of each panoramic view is recorded by means of a GPS. These positions, coordinates are then placed on the virtual landscape (see below).

A scale model of the proposal is built in virtual space, scale 1:1, based on CAD (vector) information as supplied by the architect / designers. This model is then placed on a virtual landscape, scale 1:1, as produced by means of GIS software. The accuracy of this depends on the contour intervals.

The camera views are placed on the points as recorded on the virtual landscape. The respective photographs are overlaid onto the camera views, and the orientation of the cameras adjusted accordingly. The light source is adjusted to suit the view. Each view is then rendered as per the process above.

Declaration of Independence

I, Graham A Young hereby declare that Newtown Landscape Architects cc, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.
Consultant name: Graham A Young

Signature:

Date: 29 November 2013

APPENDIX F: CURRICULUM VITAE

Since 1994

Graham Young PrLArch

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Graham is a landscape architect with thirty years' experience. He has worked in Southern Africa and Canada and has valuable expertise in the practice of landscape architecture, urban design and environmental planning. He is also a senior lecturer, teaching urban design and landscape architecture at post and under graduate levels at the University of Pretoria. He also specializes in Visual Impact Assessments.

EXPERIENCE: **NEWTOWN LANDSCAPE ARCHITECTS cc.** ***Member***

Current — Responsible for project management, landscape design, urban design, and visual impact assessment.

Senior Lecturer: Department of Architecture, University of Pretoria.

1991 - 1994 **GRAHAM A YOUNG LANDSCAPE ARCHITECT** ***- Sole proprietor***

1988 - 1989 — Designed major transit and CBD based urban design schemes; designed commercial and recreational landscapes and a regional urban park; participated in inter-disciplinary consulting teams that produced master plans for various beachfront areas in KwaZulu Natal and a mountain resort in the Drakensberg.

1989 - 1991 **CANADA** ***- Free Lance***

Designed golf courses and carried out golf course feasibility studies (Robert Heaslip and Associates); developed landscape site plans and an end-use plan for an abandoned mine (du Toit, Allsopp and Hillier); conducted a visual analysis of a proposed landfill site.

1980 - 1988 **KDM (FORMERLY DAMES AND MOORE)** - *Started as a Senior Landscape Architect and was appointed Partner in charge of Landscape Architecture and Environmental Planning in 1984*. Designed commercial, corporate and urban landscapes; completed landscape site plans; developed end-use master plans for urban parks, college and technikon sites; carried out ecological planning studies for factories, motorways and a railway line.

1978 - 1980 **DAYSON & DE VILLIERS - *Staff Landscape Architect***

Designed various caravan parks; designed a recreation complex for a public resort; conducted a visual analysis for the recreation planning of Pilgrims Rest; and designed and supervised the installation of various private gardens.

EDUCATION:

Bachelor of Landscape Architecture, 1978, (BLArch), University of Toronto, Canada;
Completing a master's degree in Landscape Architecture, University of Pretoria; Thesis: Visual Impact Assessment;
Senior Lecturer - Department of Architecture, University of Pretoria.

PROFESSIONAL:

Registered Landscape Architect – South African Council for Landscape Architectural Profession (2001);
Board of Control for Landscape Architects of South Africa (1987) – Vice Chairman 1988 to 1989;
Professional Member - Institute of Landscape Architects Southern Africa (1982) – President 1986 - 1988;
Member Planning Professions Board 1987 to 1989;
Member International Association of Impact Assessment;

AWARDS:

Torsanlorenzo International Prize, Landscape design and protection 2nd Prize Section B: Urban Green Spaces, for Intermediate Phase Freedom Park (2009)
Phase 1 and Intermediate Phase Freedom Park: Special Mention World Architecture Festival, Nature Category (2008)
Moroka Park Precinct, Soweto: ILASA Merit Award for Design (2005) and Gold Medal United Nations Liveable Communities (LivCom) Award (2007)
Isivivane, Freedom Park: ILASA Presidential Award of Excellence Design (2005)
Information Kiosk, Freedom Park: ILASA Merit Award for Design (2005)
Moroka – Mofola Open Space Framework, Soweto: ILASA Merit Award for Planning (2005)
Mpumalanga Provincial Government Complex: ILASA Presidential Award of Excellence (with KWP Landscape Architects for Design (2003)

Specialist Impact Report: Visual Environment, Sibaya Resort and Entertainment World: ILASA Merit Award for Environmental Planning (1999);

Gillooly's Farm, Bedfordview (with Dayson and DeVilliers): ILASA Merit Award for Design;

COMPETITIONS:

Pan African Parliament International Design competition – with MMA architects (2007) Finalist

Leeuwpan Regional Wetland Park for the Ekurhuleni Metro Municipality (2004) Landscape Architectural Consultant on Department of Trade and Industries Building (2002) – Finalist

Landscape Architecture Consultant on Project Phoenix Architectural Competition, Pretoria (1999): Winner;

Mpumalanga Legislature Buildings (1998): Commissioned;

Toyota Fountain (1985): First Prize - commissioned;

Bedfordview Bike/Walkway System - Van Buuren Road (1982): First Prize - commissioned;

Portland Cement Institute Display Park (1982): Second Prize

CONTRIBUTOR:

Joubert, O, 10 Years + *100 Buildings – Architecture in a Democratic South Africa Bell-Roberts Gallery and Publishing*, South Africa (2009)

- Freedom Park Phase 1 and Intermediate Phase (NBGM), Pretoria, Gauteng

Galindo, M, *Collection Landscape Architecture*, Braun, Switzerland (2009)

- Freedom Park Phase Intermediate Phase (NBGM), Pretoria, Gauteng

In *1000 X Landscapes*, Verlagshaus Braun, Germany (2008)

- Freedom Park Phase 1 and Intermediate Phase (NBGM), Pretoria, Gauteng
- Riverside Government Complex (NLAKWP), Nelspruit, Mpumalanga;
- Moroka Dam Parks Precinct, Soweto, Gauteng.

In *Johannesburg: Emerging/Diverging Metropolis*, Mendrision Academy Press, Italy (2007)

- Moroka Dam Parks Precinct, Soweto, Gauteng.

Since 1994

Yonanda Martin

M.Env.Sci.
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B.Sc Degree in Environmental Science from the University of North West, Potchefstroom Campus (2003). M.Sc Degree in Ecological Remediation and Sustainable Utilization from the University of North West, Potchefstroom Campus (2007). She is currently employed by Newtown Landscape Architects working on the following projects.

EXPERIENCE: Environmentalist: Newtown Landscape Architects

Responsible for the environmental work, which includes Basic Assessments, Environmental Impact Assessments (Scoping & EIA), Environmental Management Plans (EMP), Environmental Auditing as well as Visual Impact Assessments.

Current Projects:

Orchards Extension 49-53, Pretoria - Environmental Impact Assessment and Environmental Management Plan

Tanganani Ext 8, Johannesburg - Environmental Impact Assessment and Environmental Management Plan

Diepsloot East Development, Diepsloot **-** Environmental Impact Assessment and Environmental Management Plan

Klerksoord Ext 25 & 26, Pretoria – Environmental Impact Assessment

Ennerdale Ext 16, Johannesburg - Environmental Impact Assessment and Environmental Management Plan

Glen Marais Ext 102 & 103, Kempton Park - Basic Assessment and Environmental Management Plan

Princess Plot 229, Princess - Environmental Assessment (S24G Application)

Uthlanong Drive Upgrade – Mogale City Local Municipalty project in Kagiso, Basic Assessment for the upgrade of the stormwater and the roads

Luipaardsvlei Landfill Site – Mogale City Local Municipalty project in Krugersdorp, the expansion of the existing landfill site.

MCLM Waste Water Treatment Works – Mogale City Local Municipalty project in Magaliesburg, the expansion of the existing facility.

Rand Uranium (Golder Associates Africa (Pty) Ltd), Randfontein – VIA

Dorsfontein West Expansion (GCS (Pty) Ltd), Kriel – VIA

Mine Waste Solutions (GCS (Pty) Ltd), Stilfontein – VIA

Ferreira Coal Mining (GCS (Pty) Ltd), Ermelo – VIA

De Wittekrans Mining (GCS (Pty) Ltd), Hendrina – VIA

EDUCATION:

May 2009	Public Participation Course, International Association for Public Participation, Golder Midrand
May 2008	Wetland Training Course on Delineation, Legislation and Rehabilitation, University of Pretoria.
April 2008	Environmental Impact Assessment: NEMA Regulations – A practical approach, Centre for Environmental Management: University of North West.
Feb 2008	Effective Business Writing Skills, ISIMBI
Oct 2007	Short course in Geographic Information Systems (GIS), Planet GIS

Jan 2004 – April 2007	M.Sc Degree in Ecological Remediation and Sustainable Utilization, University of North West, Potchefstroom Campus. Thesis: Tree vitality along the urbanization gradient in Potchefstroom, South Africa.
Jan 2001 – Dec 2003	B.Sc Degree in Environmental Science, University of Potchefstroom

PROFESSIONAL REGISTRATION:

Sep 2009	Professional National Scientist – 400204/09

Since 1994

Mitha Cilliers

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Mitha is a landscape architect with nine years experience. She has worked as Landscape Architect in South Africa and Angola and has valuable expertise in the practice of landscape architecture and environmental planning. She is currently employed by Newtown Landscape Architects.

EXPERIENCE:

Current *Landscape Architect:*
NEWTOWN Landscape Architects cc.
Visual Impact Assessments
Landscape Maintenance Auditing
Landscape Design

2008 to 2013 *Consultant*:
NEWTOWN Landscape Architects cc.
Visual Impact Assessments
KWP Landscape Architects & Environmental Consultants
Landscape Maintenance Auditing
Landscape Design and draughting
REAL Landscapes
Landscape Design

2005 – 2007 *Landscape Architect:*
KWP Landscape Architects & Environmental Consultants
Landscape design for various types of projects ranging from residential garden design to industrial landscaping, including the landscape upgrade of the SASOL plant in Secunda.

General project administration and documentation including Bill of Quantities, Tender Evaluation and site inspections.

Landscape Maintenance Auditing at the Nelspruit Riverside Government Offices

Preparation of Environmental Impact Assessment Reports for proposed housing developments.

Environmental Control Officer on various residential housing developments.

2003 – 2004 *Candidate Landscape Architect:*

Sigma Gibb – part of the GIBB Africa Group

Co-Landscape Architect on a residential housing estate in Luanda, Angola.

Design and draughting for various projects in Angola.

2003 *Candidate Landscape Architect:*

NEWTOWN Landscape Architects cc.

Design and draughting various projects ranging from private residential gardens to public parks.

Project administration including Bills of Quantities and Tender Evaluation and site inspections

PROFESSIONAL:

Registered Landscape Architect – South African Council for Landscape Architectural Profession (2007)

Committee Member – South African Council for Landscape Architectural Profession (2009 & 2011- - 2012)

EDUCATION:

Bachelor of Landscape Architecture, 2001, (BLArch), University of Pretoria.