Draft Visual Impact Assessment Report

Proposed Alexander Project, Kriel, Mpumalanga Province

Yonanda Martin (Pri Sci Nat)

Newtown Landscape Architects

PROPOSED ALEXANDER PROJECT

KRIEL, MPUMALANGA PROVINCE

Submitted to:

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NLA Project No:	2121/V15MP
Report Revision No:	Draft
Date Issued:	June 2016
Prepared By:	Mitha Cilliers (Pr LArch) and Yonanda Martin (Pri Sci Nat)
Reviewed By:	Graham Young (Pri.Sci.Nat)
Reference:	Alexander Project

EXPERTISE OF SPECIALISTS

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:	33 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:	9 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	11 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.

DECLARATION OF INDEPENDENCE

I, Yonanda Martin, declare that –

- I am contracted as the Visual Impact Assessment Specialist for the Alexander Project;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the National Environmental Management Act (Act 107 of 1998), Environmental Impact Assessment Regulations 2010 and 2014, and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in Regulation 8;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing – any decision to be taken with respect to the application by the competent authority; and – the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Yonanda Martin

SACNASP Professional Reg No: 400204/09

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SPECIALIST REPORTING REQUIREMENTS

Specialist Reporting Requirements According to Appendix 6 of the National Environmental Management Act (Act 107 of 1998), Environmental Impact Assessment Regulation 2014	
Requirement	**Relevant section in report**
Details of the specialist who prepared the report	Page ii, Appendix E
The expertise of that person to compile a specialist report including a curriculum vitae	Page ii , Appendix E
A declaration that the person is independent in a form as may be specified by the competent authority	Page iii
An indication of the scope of, and the purpose for which, the report was prepared	Section 1.3 – 1.4
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.2
A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 3
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 5 & 6
An identification of any areas to be avoided, including buffers	Section 7
A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 18 - 20
A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 11, 13 and 14
Any mitigation measures for inclusion in the EMPr	Section 12
Any conditions for inclusion in the environmental authorisation	Section 12
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	N/A
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and	Section 15
If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 12 and 15
A description of any consultation process that was undertaken during the course of carrying out the study	Section 6

A summary and copies if any comments that were received during any consultation process	Section 6
Any other information requested by the competent authority.	N/A

ACRONYMS, ABBREVIATIONS & GLOSSARY

Acronyms & Abbreviations	
CSIR	Council for Scientific and Industrial Research
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
IFC	International Finance Corporation
NLA	Newtown Landscape Architects
ROM	Run-of-mine
SACLAP	South African Council for the Landscape Architectural Profession
VIA	Visual Impact Assessment

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 Alexander Project Study area refers to the proposed project footprint / project site as well as the 'zone of potential influence' (the area defined as the radius about the centre point of the project beyond which the visual impact of the most visible features will be insignificant) which is a 10km radius surrounding the proposed project footprint / site.
Project Footprint / Site	For the purposes of this report the Alexander Project *site* / *footprint* refers to the actual layout of the project.
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

Synergistics Environmental Services (Synergistics) is the independent firm of consultants that has been appointed to undertake the Environmental Impact Assessment (EIA) and related processes for the proposed Alexander Project. Newtown Landscape Architects was appointed as specialist to undertake the Visual Impact Assessment.

The proposed project is located between Kriel and Bethal, Mpumalanga Province. The activities being proposed as part of this Project are:

- Underground mining;
- Shaft Complex;
- Waste Rock Dump (WRD);
- Soil stockpiles;
- Return Water Dam; and
- Associated mining infrastructure.

The proposed study area has a common landscape which is characterised by a rolling topography which mainly consists of outstretched grasslands and a network of watercourses (streams and wetlands). The open grassland areas are used for grazing and crop production is taking place as well. This landscape is however compromised by mining activities and therefore the overall visual resource value can be considered to be ***moderate***.

The sense of place is a combination of tranquil farms / open fields with meddling of industrialism / urbanism created by the towns and the mining activities that are taking place.

The proposed Project will have a *moderate* severity as there are existing mining activities taking place and therefore the Alexander Project will not be uncharacteristic to the study area. The topography of the area aids in shielding or partially screening the proposed Project from sensitive viewer locations. Although there are other mining activities in the study area the proposed Project will still be intrusive since it will be located close to the R545 and sensitive viewers and will therefore be more visible.

The overall significance of the visual impact will be *moderate* for the construction and the decommissioning phases but will be *high* for the operational phase, if mitigation measures are implemented successfully.

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1. INTRODUCTION

1.1 Project Overview and Background

Newtown Landscape Architects (NLA) was commissioned by Synergistics Environmental Services (Synergistics – part of the SLR Group) to carry out a Visual Impact Assessment (VIA) for the proposed Alexander Project, Mpumalanga Province ("the Project"). The Project would encompass underground mining with associated top structures and infrastructure. This will include facilities such as the shafts, topsoil stockpiles, waste rock dumps, workshops, offices, parking, roads and other infrastructure.

1.2 Proposed Study area

The Project site is situated approximately 14 km north-west of Bethal and 11.5 km south-east of Kriel. The boundary of the mining right area runs along the southern boundary of Kriel. The Project site is located within two district and local municipalities namely the, Emalahleni Local Municipality in the Nkagala District Municipality and the Govan Mbeki Municipality in Gert Sibande District Municipality of the Mpumalanga Province. The R545 cuts through the study area and runs along the south-east of Kriel, linking Ogies with Bethal. The R544 crosses the study area in the north-eastern region of the study area. Refer to Figure 1: 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

A specialist study is required to assess the visual impacts arising from the Project based on the general requirements for a comprehensive VIA. The following terms of reference was established:

- Conduct field surveys of the proposed project area and photograph the area from sensitive viewing points;
- Assess the impact of the proposed Project and its cumulative effects;
- Rate the project specific and cumulative impacts; and
- Have input, together with Synergistics, other specialists and the technical project team, into project management measures

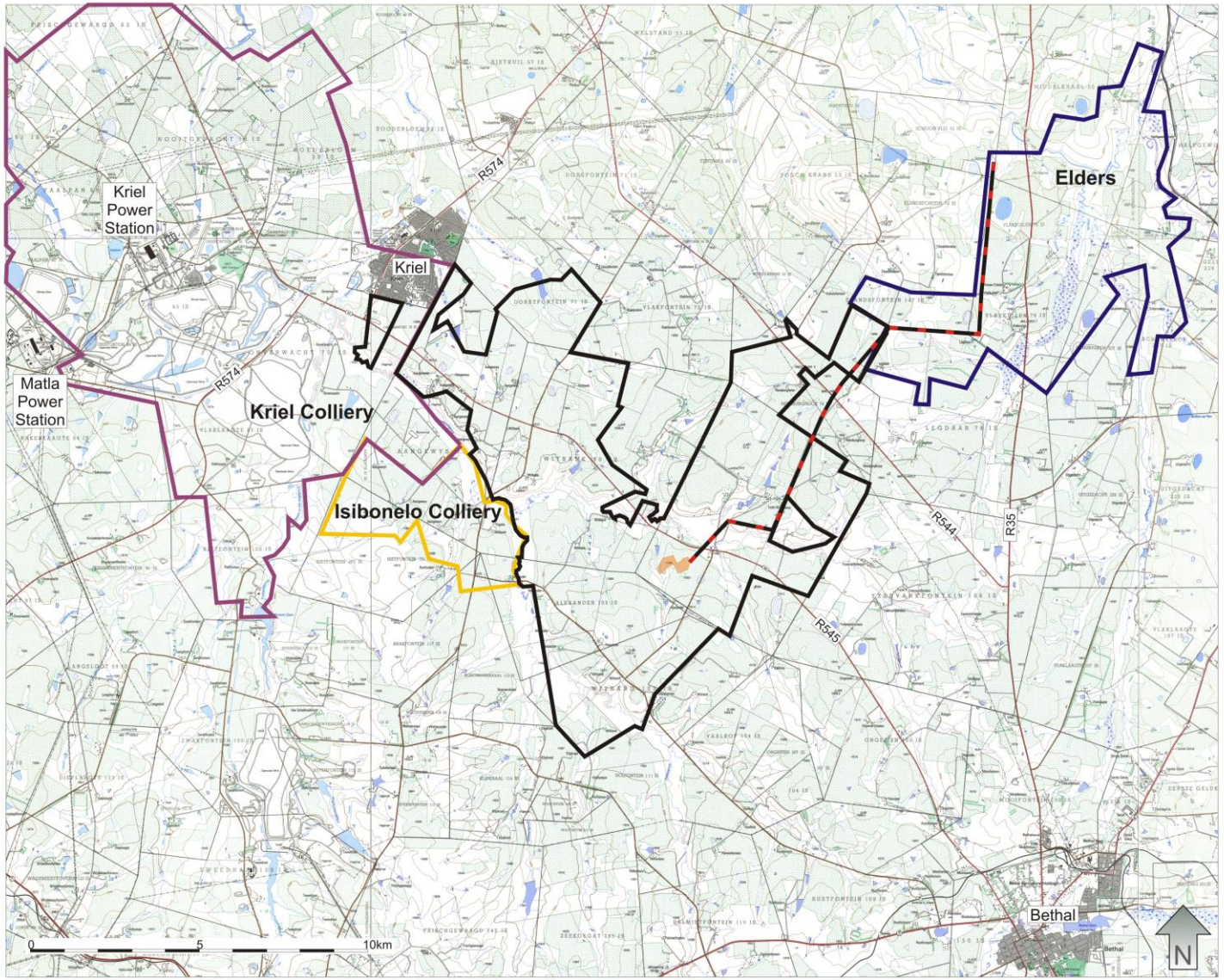


Figure 1: LOCALITY MAP - Alexander Project

June 2016

1.5 Assumption, Uncertainties and Limitations

The following assumptions limitations have been made in the study:

- The study uses the worst case scenario in predicting impacts (day time and night time);
- The viewshed analyses considered only the topography of the area and did not factor in any features such as existing trees and other obstacles. This means that the spatial patterns generated in the analyses are inclined towards the worst case-scenario rather than the actual situation;
- The extent of the study area is determined by the zone of potential influence, which in this study relates to a radius about the project site of 10km. At 10km and beyond the Project would recede into background views.

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 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 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:

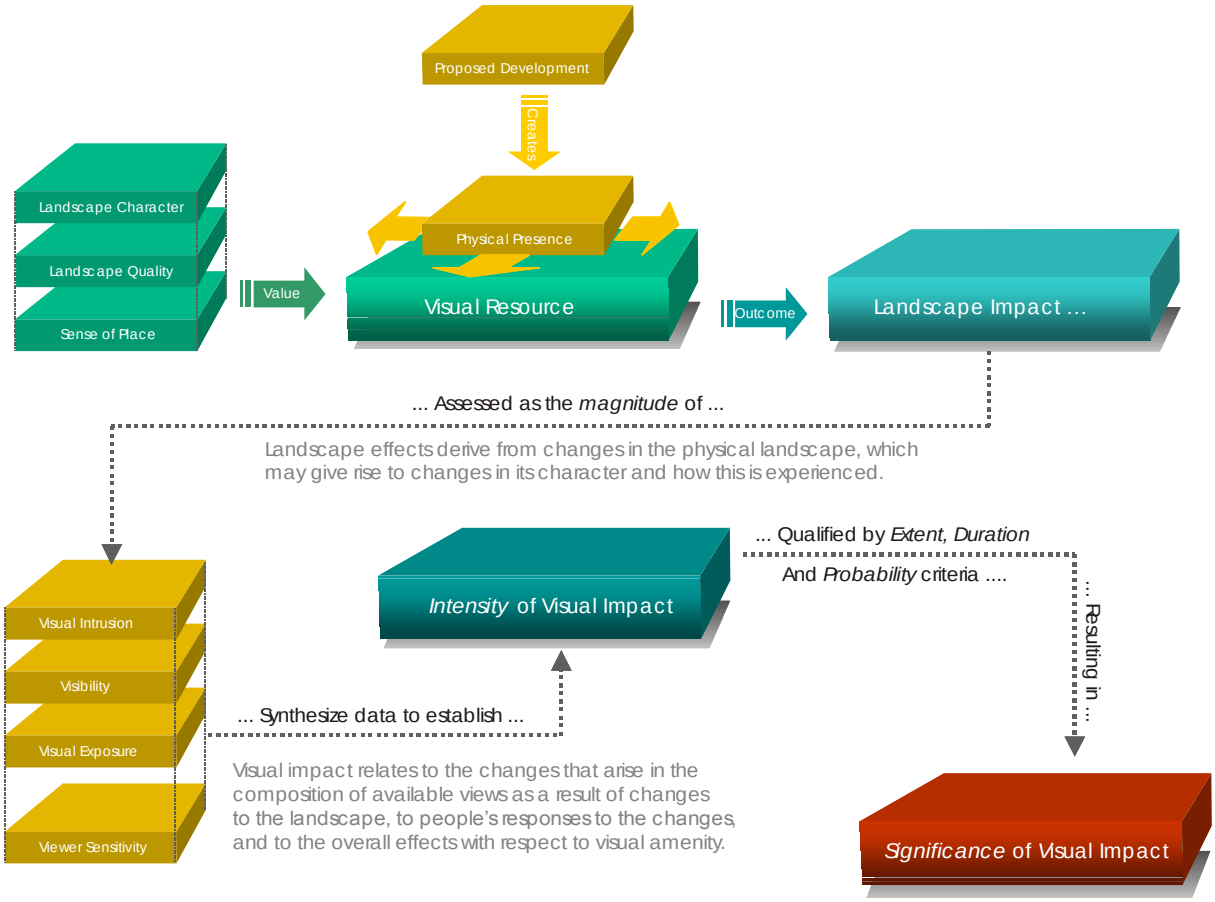


Image 1: Visual Impact Process

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. The field survey was conducted on the 11th of March 2016. During this period of the year the trees are still covered with leaves which illustrate the potential of trees to screen views from sensitive viewer locations.
- 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

The proposed Alexander Project will include underground mining activities and the following surface infrastructure:

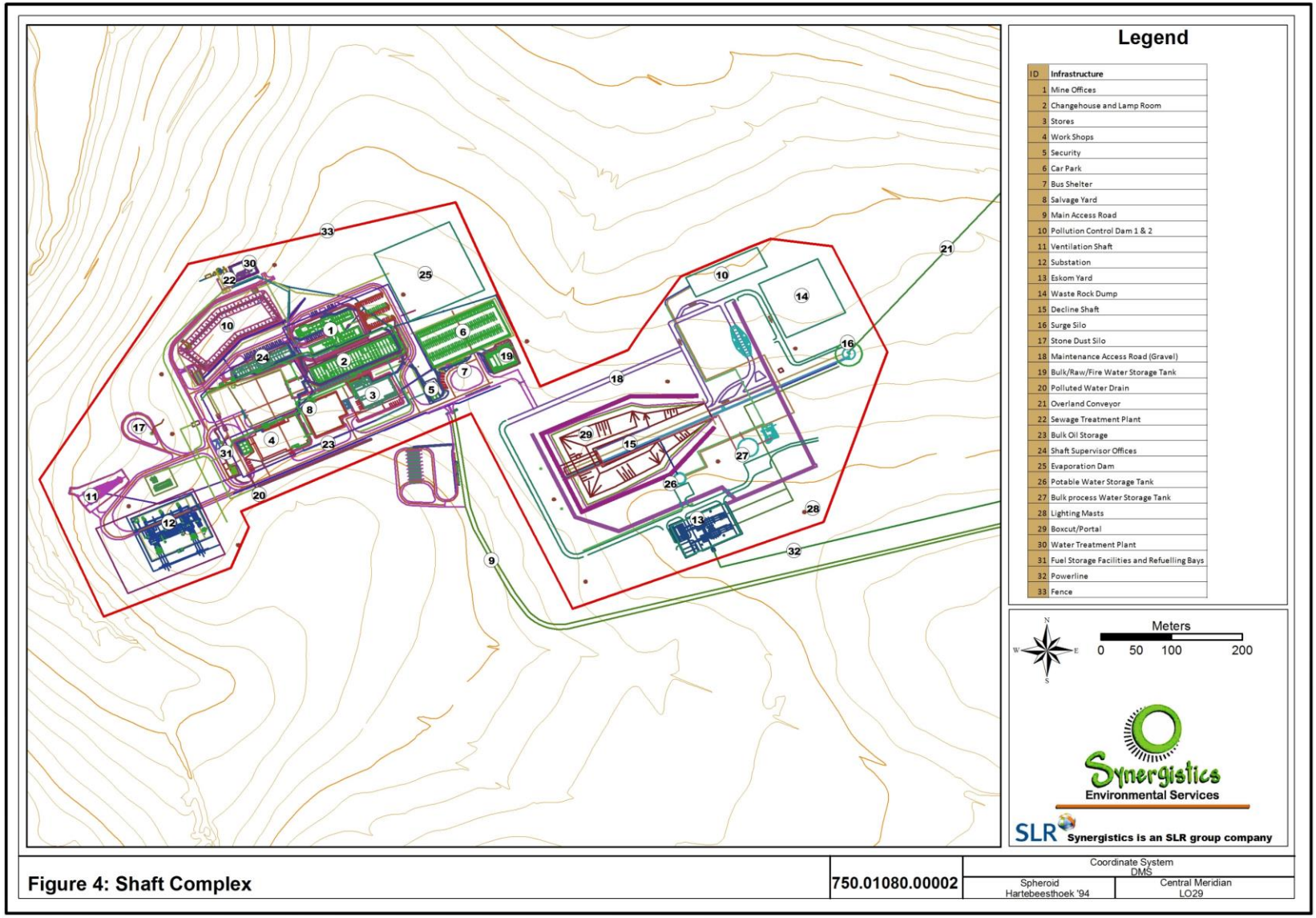
- Fencing;
- Boxcut/portal;
- Incline shaft;
- Vertical shaft and ventilation fans;
- Overland conveyor and surge/surface run-of-mine (ROM) and stonedust silo;
- Topsoil stockpiles and berms;
- Overburden rock dump/ stockpile and berm;
- Main access road (sealed);
- Internal and maintenance access gravel roads;
- Water treatment plant;
- Sewage treatment plant;
- Sub-station (Eskom yard);
- Power lines;
- Change house;
- Water holding facilities (raw water tank, fire water tank, ground level potable water storage tank and elevated bulk process water storage tank);
- Stormwater management facilities (drains, berms and recycled water ponds/ pollution control dam);
- Potable water, process water and sewage effluent pipelines;
- Lighting masts;
- Fuel and oil storage facilities and refuelling bays;
- Waste/salvage yard;
- Administrative block (including mine offices, kitchen, canteen, training centre, mustering/gathering
- centre and clinic/emergency room);
- Control room;
- Car park/ Bus stop and shelter;
- Security gate and office;
- Workshop and wash-bay/ cable yard repair workshop;
- Stores;
- Lamp rooms; and
- Flammable store.

There will not be a mineral processing plant for the Alexander Project as all run-of-mine production will be transported to Elders and from there to the beneficiation plant at Goedehoop.

The following heights were used for the purpose of doing the viewshed analysis and the simulations:

- Conveyor Belt 2m, except when crossing a road (2m + 5m) or river (2m + 2m)
- Surge Silo 60m maximum height
- Vent fans 10m maximum height
- Water tank 15m maximum height
- High-mast lights 10m maximum height

Refer to Figure 2 below for the proposed layout.



Layout as provided by Synergistics Environmental Services

Figure 2: PROPOSED LAYOUT PLAN - Alexander Project

June 2016

5. PROJECT ALTERNATIVES

During the Scoping Phase of the Project Synergistics Environmental Services identified 8 shaft locations. These alternatives were compared with each other and one preferred site was identified with three possible alternatives. This specialist report is only focusing on the preferred site that was selected for the shaft and not the potential alternative sites.

Figure 3 below illustrates the different locations that were considered for the shaft location.

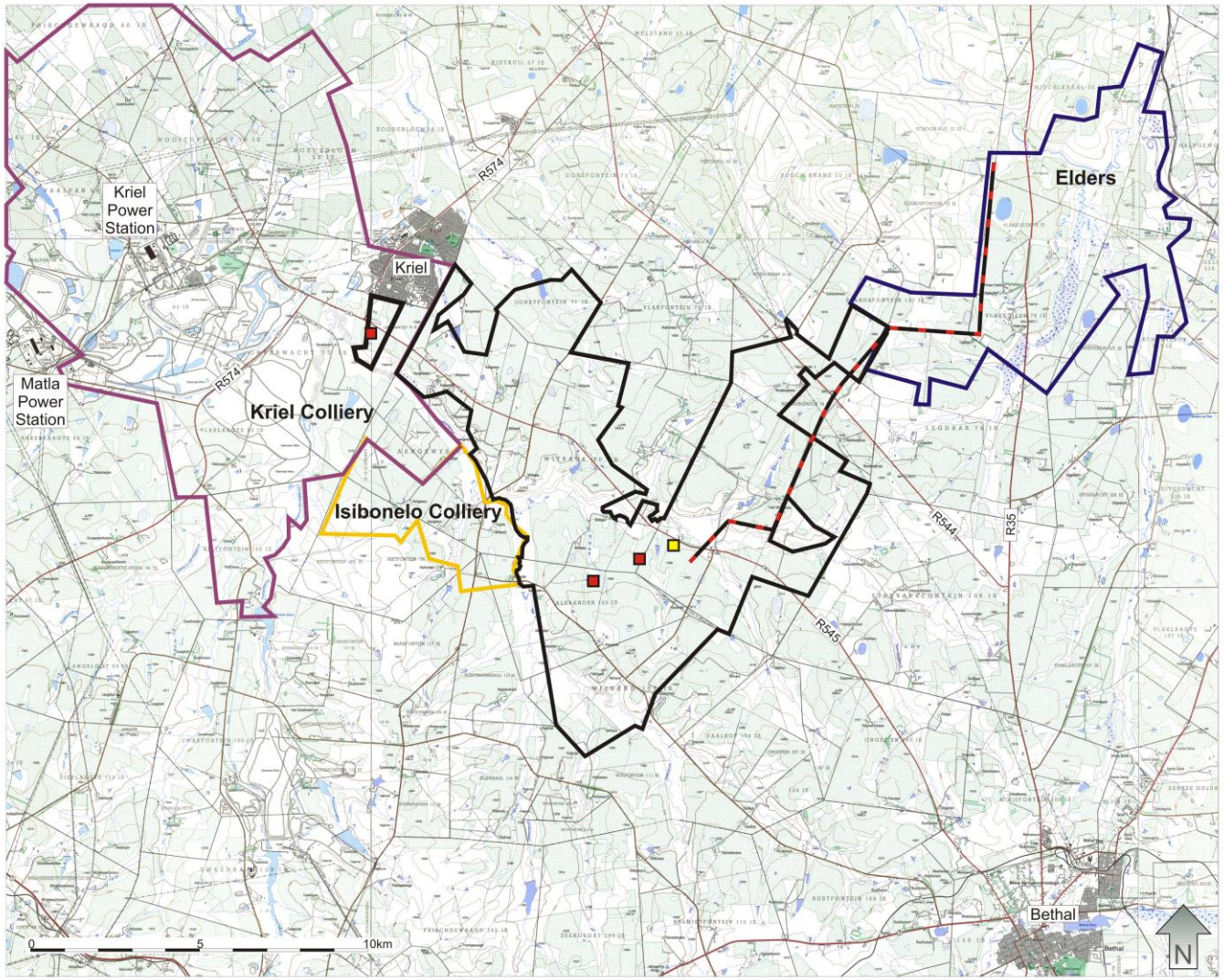


Figure 3: PROJECT ALTERNATIVES - Alexander Project

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6. VISUAL ISSUES

Typical issues associated with mining projects of this nature are:

- Who will be able to see the new development?
- What will it look like and will it contrast with the receiving environment?
- Will the development affect sensitive views in the area and if so how?
- What will be the impact of the development at night?
- What will the cumulative impact be?

The public participation process was done by Synergistics Environmental Services and during this process no visual concerns were raised.

7. THE ENVIRONMENTAL SETTING

7.1 The Study Area

For the following section, refer to views on Figures 5 to 13. The locations for panorama views are indicated on Figure 4.

The project is located in the Grassland Biome in the Eastern Highveld Grassland vegetation unit. This vegetation unit comprises of slight to moderate undulating plains, including some low hills and pan depressions. The vegetation found ideally in this biome is short dense grassland with small scattered rocky outcrops, though most of the surrounding vegetation has been transformed by cultivation and mining activities (Mucina, L. & Rutherford, M.C. (eds), 2006).

7.2 Surrounding Land Use

7.2.1 Residential

The residential component of the study area comprises of farmsteads and workers residences that is scattered throughout the area. Kriel is located along the north-east boundary of the Project area (mining right area). The town of Bethal is located approximately 13km to the south-east of the project site and falls outside the study area.

There is one school located within the study area. The school is located along the dirt road towards Witrand, refer to view 6 Figure 7 and view 7 Figure 8.

7.2.2 Agriculture

The area is well known for its corn and maize production but also includes small scale livestock farming.

7.2.3 Infrastructure, Industries and Mining

The study area is not only well known for its agricultural activities but also for mining activities, more specifically referring to coal mining. Mining in the study area includes the Isibonelo Colliery, the Kriel Colliery and Elders Mine is located outside the study area. The two power stations located to the north-west of the study area is the Kriel Power Station (approximately 6km) and Matla Power Station (approximately 10km), refer to views 1 and 2 on Figure 5 as well as views 15 on Figure 12.

7.2.4 Transportation systems

The nearest road is the R545 which runs from the town Ogies to Bethal. The R545 cuts the study area in half and passes along the south-western boundary of Kriel. The R544 crosses the site area in the north-eastern region of the study area. Other roads include the farm roads which is mostly gravel / dirt roads.

7.2.5 Tourism

Although there are no tourist facilities or accommodation in the study area it should be noted that the study area falls within the “Cosmos Country” and the R545 is one of the main routes identified as part of the “Cosmos Route” (Mpumalanga Tourism Authority, 2016). The “Cosmos Route” was identified for its spectacular display of cosmos flowers during the months of February – April. Although the site visit took place within this period there was very little cosmos in the study area as illustrated in the panoramic views.

7.3 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 on 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 is characterised by a flat to rolling topography. Both the eastern and southern sections of the project area is characterised by a protruding ridge line. The eastern ridge line is associated with a small escarpment whereas the southern ridgeline can be described as a shallow, wide crest with moderately sloping sides. The study area is scattered with dams and wetlands. Several drainage lines and streams criss-cross the study area in various directions, all contributing to the Steenbokspruit. Refer to Views 7 on Figures 8 and View 13 on Figure 11 below.

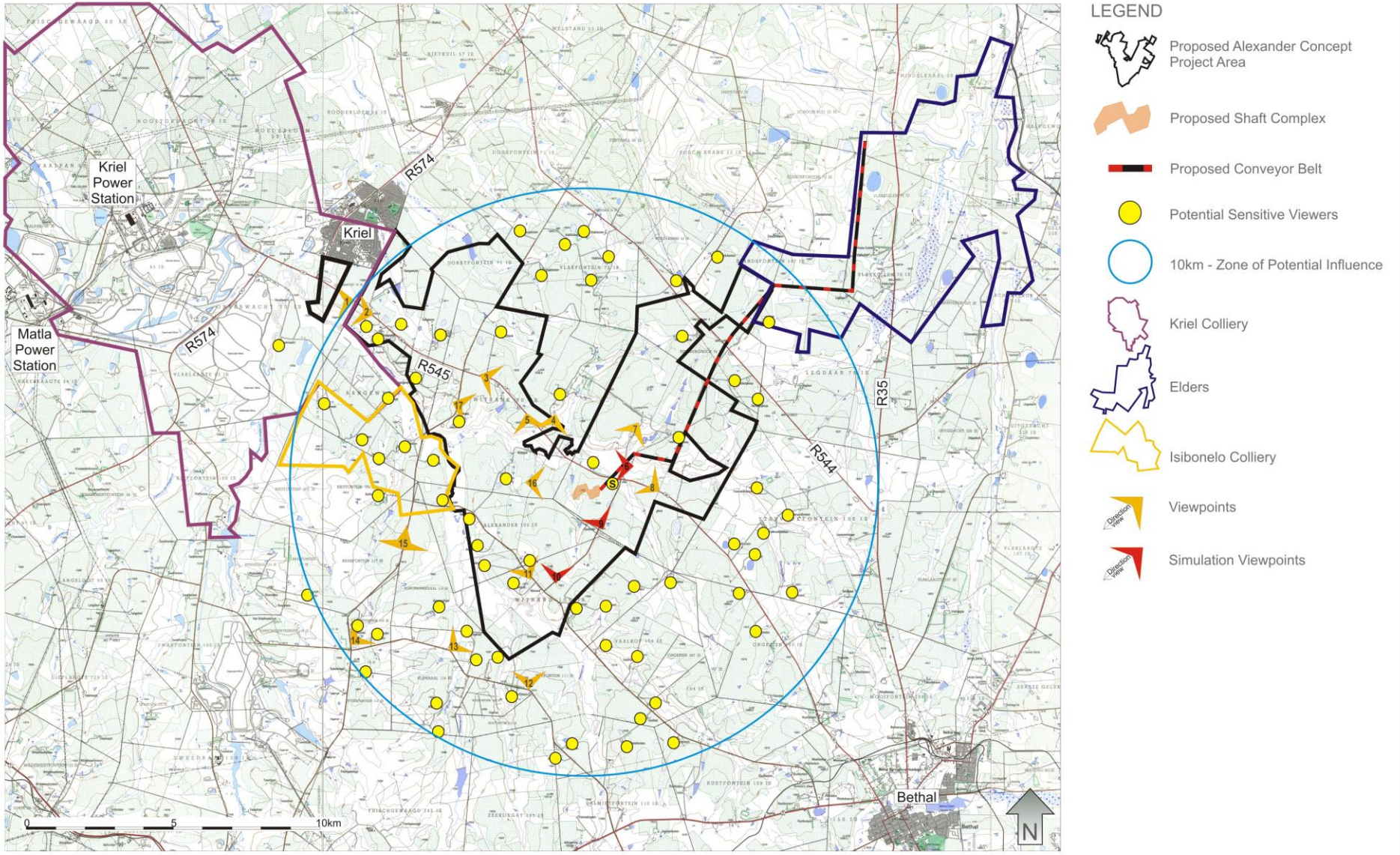

Figure 4: VIEWPOINTS - Alexander Concept

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View 1: Matla Power Station on the left and Kriel Power Station on the right. View from along the R545, looking north-west towards one of the proposed alternatives

View 2: View from the entrance to Aangewys Farm (R545) towards the proposed site alternative
Kriel Power Station and Kriel in the background, this view illustrates the impact of haze

Refer to Figure 4 for location of panoramic views.

Figure 5: LANDSCAPE CHARACTER (Views 1 & 2) - Alexander Project

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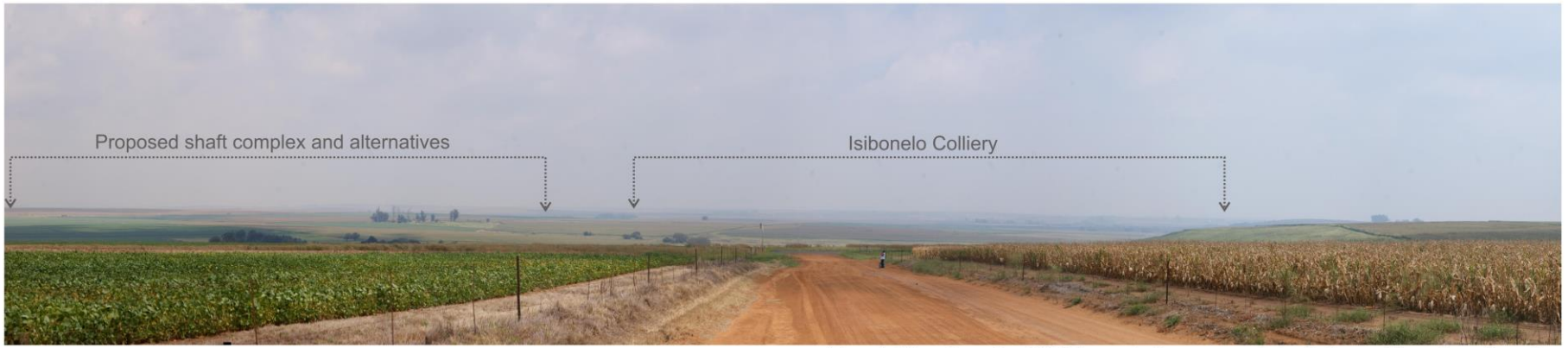
View 3: View from the R545 towards the proposed shaft site and the alternative sites
Photograph taken approximately 5.5km north-west of the proposed shaft complex



View 4: View from the R545 towards the proposed shaft site and the alternative sites
Photograph taken approximately 2.8km north-west of the proposed shaft complex. The Isibonelo Colliery forms part of the background view

Refer to Figure 4 for location of panoramic views.

Figure 6: LANDSCAPE CHARACTER (Views 3 & 4) - Alexander Project

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View 5: View from the R545, looking south-west towards the proposed shaft complex and alternative sites
Photograph taken approximately 3.4km from the shaft complex site

View 6: View from a local farm road, looking south-east towards the proposed shaft complex and alternative sites
Photograph taken approximately 1.1km from the shaft complex site. The shaft complex will be partially screened by the row of trees along the R545

Refer to Figure 4 for location of panoramic views.

Figure 7: LANDSCAPE CHARACTER (Views 5 & 6) - Alexander Project

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View 7: View from a local farm road, looking south-east towards the proposed shaft complex and alternative sites
Photograph taken approximately 2.5km from the shaft complex site. The shaft complex will be partially screened by the row of trees along the R545

View 8: View of the escarpment associated with ridge line in the eastern section of the study area
Photograph taken along R545, looking north-east towards the proposed shaft complex and alternative sites with the Matla and Kriel Power Stations in background view

Refer to Figure 4 for location of panoramic views.

Figure 8: LANDSCAPE CHARACTER (Views 7 & 8) - Alexander Project

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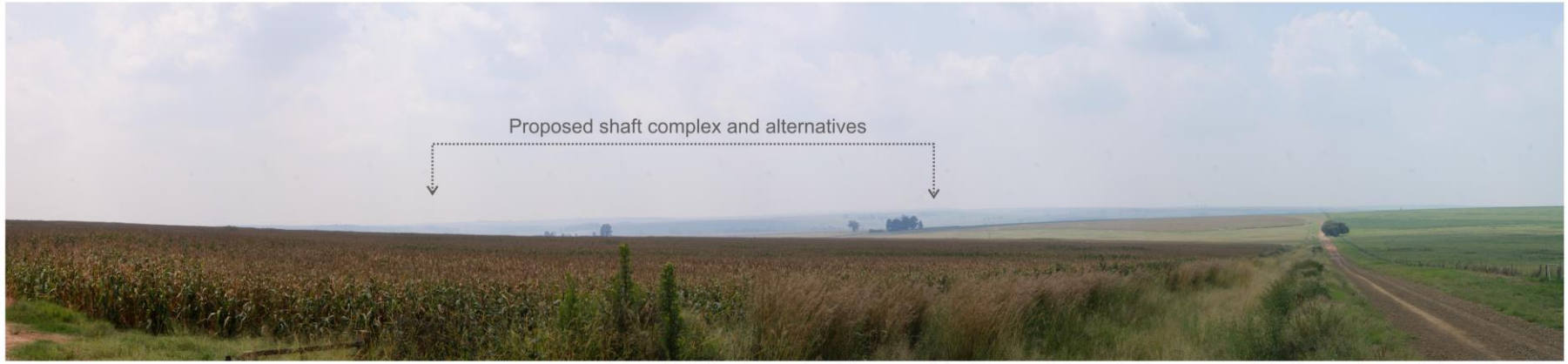
View 9: View from a local farm road, looking north towards the proposed shaft complex and alternative sites
Photograph taken approximately 1.1km from the shaft complex site



View 10: View from a local farm road, looking north towards the proposed shaft complex and alternative sites
Photograph taken approximately 3.5km from the shaft complex site. Topography will assist with screening the proposed shaft complex

Refer to Figure 4 for location of panoramic views.

Figure 9: LANDSCAPE CHARACTER (Views 9 & 10) - Alexander Project

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View 11: View from a local farm road (Witrand), looking north-west towards the Isibonelo Colliery
Photograph illustrates the impact of haze on the views

View 12: View from a local road, looking north towards the proposed shaft complex and alternative sites
Photograph taken approximately 8.2km from the shaft complex site. Topography will assist with screening the proposed shaft complex

Refer to Figure 4 for location of panoramic views.

Figure 10: LANDSCAPE CHARACTER (Views 11 &12) - Alexander Project

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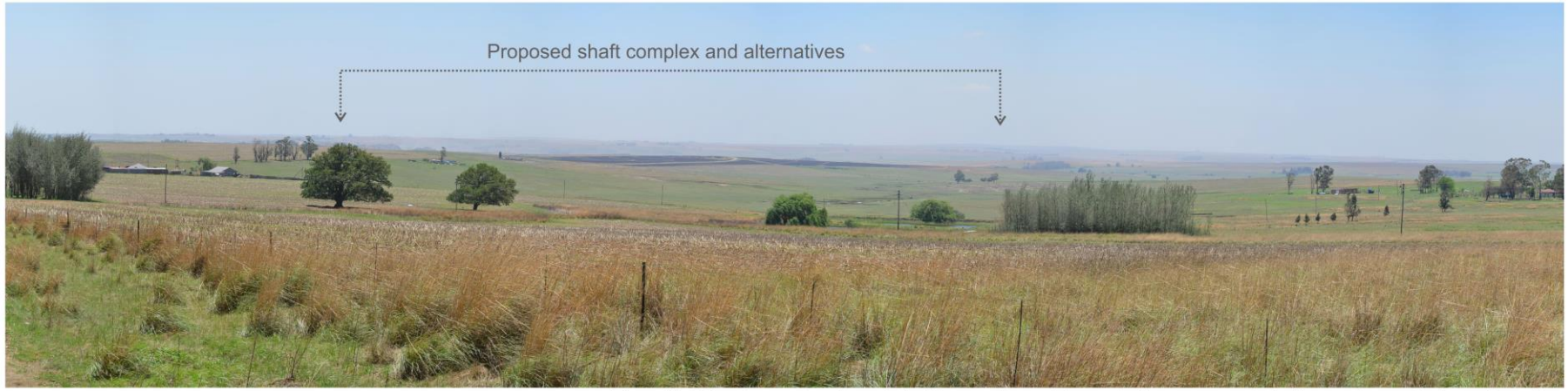

View 13: View from a local road, looking north-east towards the proposed shaft complex and alternative sites
Photograph taken approximately 8.3km from the shaft complex site. Topography will assist with screening the proposed shaft complex

View 14: View from a local road, looking north-east towards the proposed shaft complex and alternative sites
Photograph taken approximately 10.2km from the shaft complex site. Topography will assist with screening the proposed shaft complex

Refer to Figure 4 for location of panoramic views.

Figure 11: LANDSCAPE CHARACTER (Views 13 &14) - Alexander Project

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View 15a: View from a local farm road, looking north towards the Isibonelo Colliery, Matla and Kriel Power Stations in the background

View 15b: View from a local road, looking north towards the proposed shaft complex and alternative sites
Photograph taken approximately 7.8km from the shaft complex site. Photograph illustrates the impact of dust on views

Refer to Figure 4 for location of panoramic views.

Figure 12: LANDSCAPE CHARACTER (Views 15) - Alexander Project

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View 16: View from a local farm road, looking west towards the Isibonelo Colliery and east towards the proposed shaft complex and alternative sites
Photograph taken approximately 1.9km from the shaft complex site

Refer to Figure 4 for location of panoramic views.

Figure 13: LANDSCAPE CHARACTER (Views 16) - Alexander Project

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8. VISUAL RESOURCE

8.1 Visual Resource Value / Scenic Quality

The spatial distribution of the landscape types discussed in 5.3 is illustrated in Figure 14: Landscape Types and Figure 15: Landscape Quality. The figures also rate the relative scenic quality of each landscape type and its 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 14 and Figure 15. The *highest* value is assigned to Steenkoolspruit, Debeerspruit, Piekespruit and associated streams and wetland systems. The ridge, other waterbodies and grassland vegetation was considered to have a *moderate* scenic value.

The agricultural fields, farmsteads and towns were rated as *moderate*. The landscape types with the *lowest* scenic quality include the roads, power lines, mines and power stations. The combination of these ratings resulted in the overall study area to have a ***moderate*** visual resource value. As a result of this rating, the study area is regarded to be moderately sensitive to change to the landscape. A summary of the visual resource values is tabulated in Table 1 below.

Table 1: Value of the Visual Resource

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

High	**Moderate**	**Low**
Steenkoolspruit, Debeerspruit, Piekespruit, associated streams and wetland systems	Ridge, Grassland, Agricultural Fields, Farmsteads, Towns	Roads, power lines, mines, power stations
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	

8.2 Sense of Place

The sense of place for the proposed study area derives from the combination of all landscape types and their impact on the senses. The ridgeline, rivers / streams, grassland vegetation and agricultural fields give the area a pastoral sense of place which has been degraded by the mining activities and power stations in the background. The result is therefore a pastoral sense of place which has been compromised by the industrial sense of place created by the mining activities.

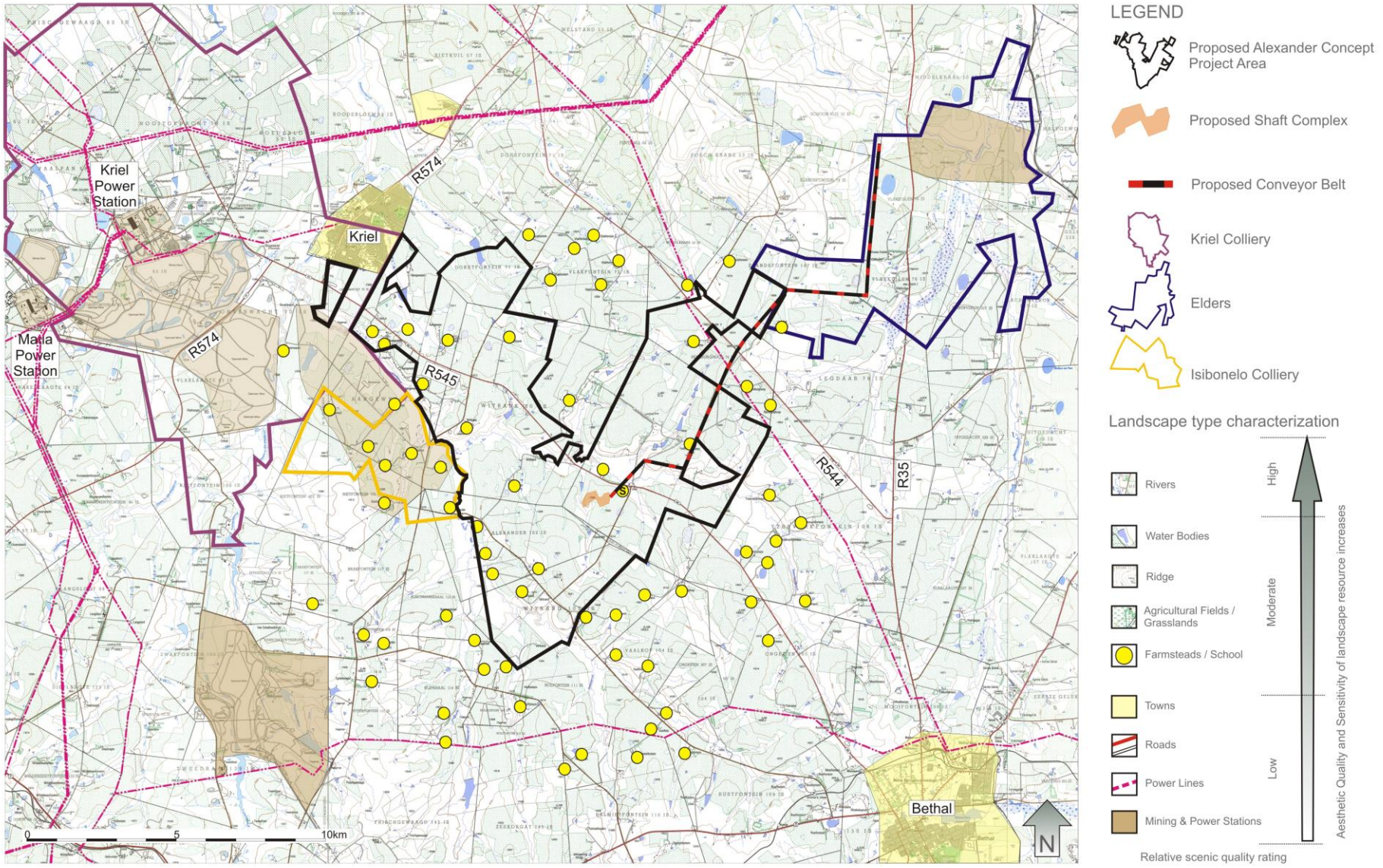

Figure 14: LANDSCAPE TYPES - Alexander Concept

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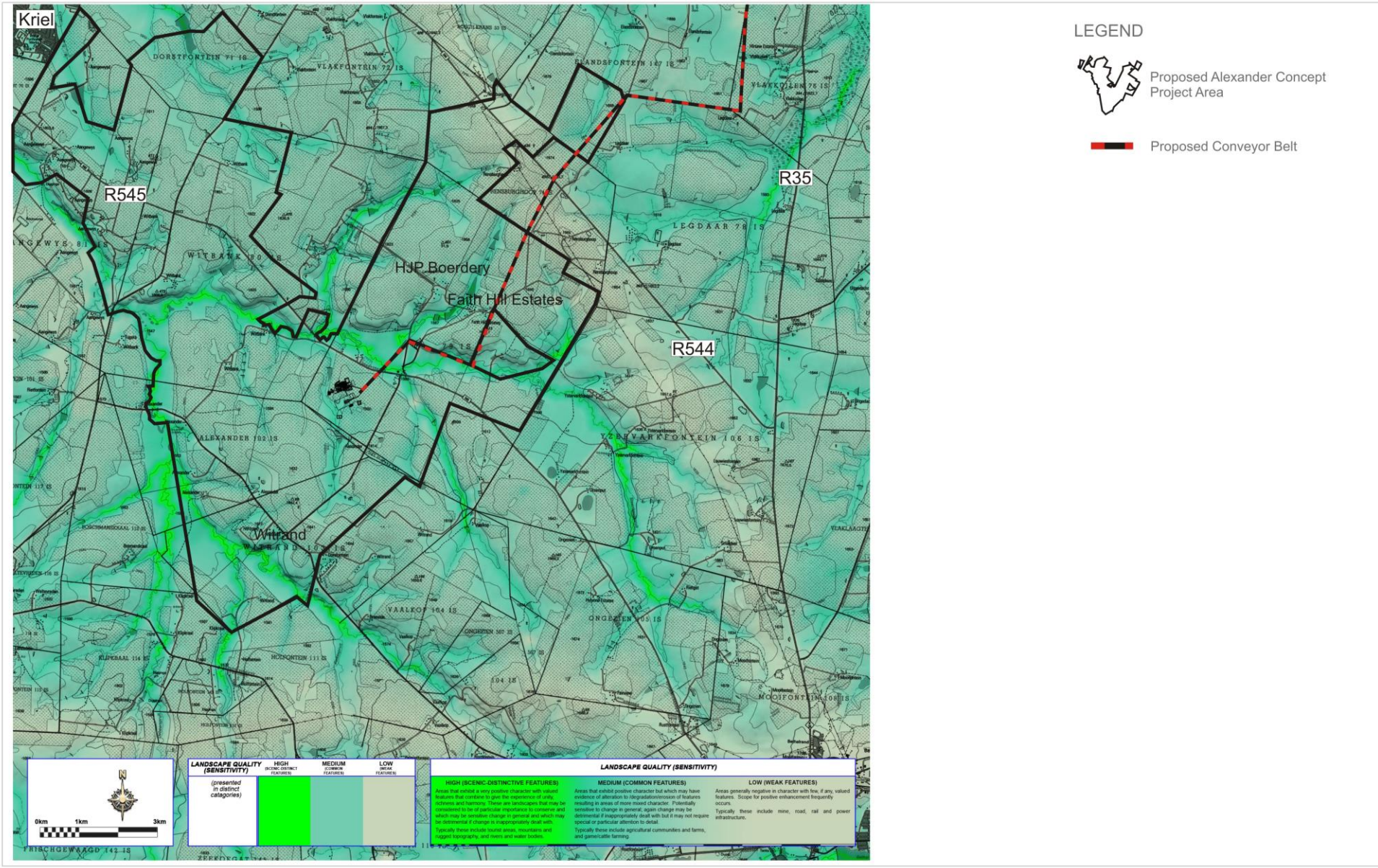

Figure 15: LANDSCAPE QUALITY (SENSITIVITY) - Alexander Project

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9. VISUAL RECEPTORS

9.1 Views

Visual receptors would include people travelling along the R545 and local farm roads, residents staying in the farmsteads or workers' residences located within the study area, as well as viewers from the local school.

9.1.1 Sensitive Viewers

The following viewers were identified as potential sensitive viewers during the site visit, refer to Figure 16: Potential Sensitive Viewer Location

- Farmsteads, including the following farms:
  - Witrand
  - Witbank
  - HJP Boerdey
  - Faith Hill Estate
- Worker's residences, such as the accommodation located along the R545;
- The local school;
- Travellers using the R545, especially for the scenic quality (Cosmos Route);
- Farmers using the dirt roads.

Table 2: Potential Sensitivity of Visual Receptors – the Project

High	**Moderate**	**Low**
Farmsteads, worker's residence's, farmers travelling along dirt roads, travelers along the R545 scenic route (Cosmos Route)	School, motorist travelling through the study area	Employees in the mining / industrial sector or motorist travelling for mining purposes
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.

From the table above farmsteads and worker's residences were rated as having a *high* sensitivity. Travellers / tourist traveling along the R545 and other local roads as part of their journey through Cosmos Country were regarded as *high* sensitive viewers. Farmers travelling along the local dirt roads were also considered as *high* sensitive viewers. People travelling through the area or from and to work were considered as having a *moderate* sensitivity due to their views being temporary in nature and not necessarily scenic views. Pupils and staff from the local school were also considered as having a *moderate* sensitivity since their attention is not focused on the aesthetic value of the area. People employed in the mining sector had been rated with a *low* sensitivity since they are related to the industry and their attention may be focussed on their work.

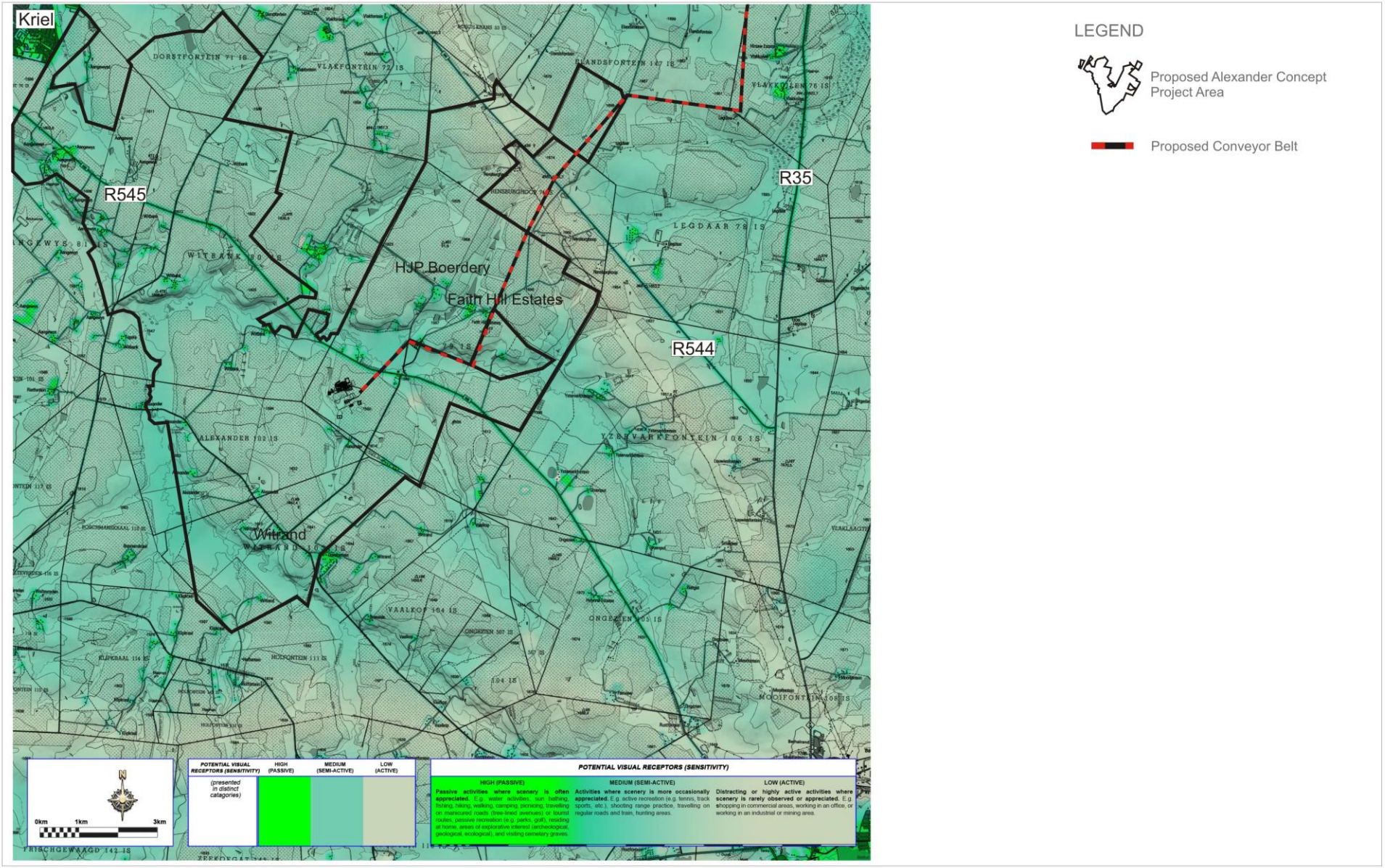

Figure 16: POTENTIAL SENSITIVE VIEWER LOCATIONS - Alexander Project

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10. LANDSCAPE IMPACT

10.1 Landscape Impact

The *landscape impact* (i.e. the change to the fabric and character of the landscape caused by the physical presence of the intervention) of the proposed Project will be ***high.*** The dominant land use within the study area is cultivated fields or open grassland that is used for grazing purposes. Even though there are mining activities (Isibonelo Colliery) located within the study area as well as the Power Stations located further north-west, these structures are part of the backdrop for the proposed Project. The proposed Project will therefore bring a change in the character of the landscape of the study area.

As stated in the approach section, the physical change to the landscape at the Project site must be understood in terms of its visibility (impact on sensitive views) and its effect on the visual aesthetics of the area (impact on the baseline resource). The following sections discuss the effect that the Project could have on the visual and aesthetic environment.

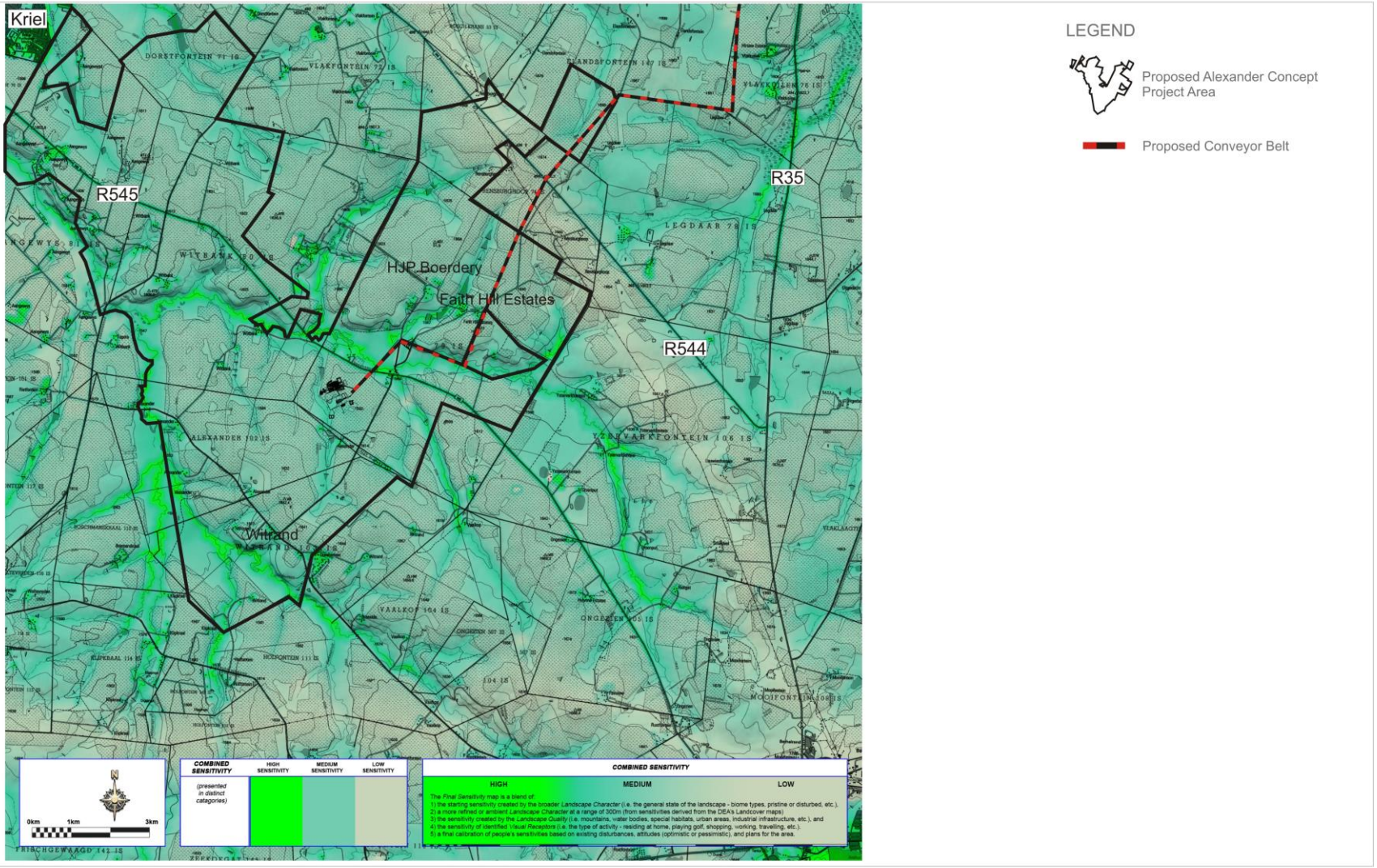

Figure 17: SENSITIVITY - Alexander Project

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11. VISUAL IMPACT

Visual impacts will be caused by activities and infrastructure in all project phases i.e. construction, operational, decommissioning and closure. The activities associated with the shaft complex and the conveyor belt is visible (day and night), to varying degrees from varying distances around the project site. During construction of infrastructure within the Project site this visibility will be influenced by the increase in activities, removal of vegetation on site and the construction of the structures. During operation/decommissioning/closure phases the visual qualities of the project study area will be influenced by the presence of infrastructure, the shaft complex and the effectiveness of rehabilitation measures. The more significant activities and structures are considered to be construction and operational aspects.

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). See Figure A.

11.1 Visibility, Visual Exposure and Visual Intrusion

The 'Zone of Potential Influence' (ZoPI) 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. Refer to view 2 Figure 5 and view 11 Figure 10 for examples of the impact atmospheric conditions and distance have on visibility.

At night the proposed Project's light sources would not be able to 'blend' with the existing light sources generated by the current mining operations. The directly surrounding area comprises of farming activities and farmsteads and is therefore not lit up by lights in the evening. Cumulatively, the lights associated with the proposed Project and the current mining activities would stand out against the dark background and would not be 'absorbed' as easily into the background as project activities would be in a day time view and therefore the cumulative impact of unwanted light sources would be more severe.

11.1.1 Visibility

In determining the visibility of the proposed Project (day and night) the proposed heights, as described in Section 4, of the shaft complex and associated infrastructure were used. Offsets equivalent to these heights were used to generate the viewshed, which is evident in Figure 18. The Zone of Potential Influence for the Shaft Complex was estimated to be 10km whereas the conveyor belt was estimated to be approximately 1km. In most cases the conveyor belt will only be visible when directly next to a road or when the conveyor belt crosses a river or road.

The topography of the study area aids in shielding or partially screening the proposed Project from sensitive viewer locations within the study area. This is evident in Figure 18: Viewshed, where approximately 40% of the Zone of Potential Influence will be visible which results in a moderate visibility of the Project. The visibility of the proposed Project will be high for viewers located within an approximate distance of 2km from the Project site. The proposed Project will be visible for motorist travelling along the R545 and the visibility will

increase as the motorist approach the Project site. The visibility of the proposed Project will increase for viewers that are located on an elevated area such as HJP Boerdery and Faith Hills Estate. Atmospheric haze will have an impact on the visibility for viewers located further than 2km from the Project site, as illustrated in view 4 Figure 6 and view 7 Figure 8.

11.1.2 Visual Exposure

Visual exposure is determined by qualifying the view with a distance rating to indicate the degree of intrusion and visual acuity.

Table 3 below indicates the exposure of the various sensitive viewing areas to the Project. 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.

Table 3: Sensitive Receptors – Visual Exposure of the Shaft Complex and Conveyor Belt

	Foreground view i.e. 0 – 2km from Project Site	Middle-ground view i.e. 2 - 5km from Project Site	Background view i.e. 5km - 10km from Project Site	Far Background i.e. greater than 10km from Project Site
Farmstead & Worker's Accommodation (R545)	**x**			
HJP Boerdery		**x**		
Faith Hills Estate	**x**	**x**		
Witrand		**x**		
Witbank		**x**		
Local School	**x**			
R545	**x**	**x**	**x**	**x**
Local Farm Roads	**x**	**x**	**x**	**x**

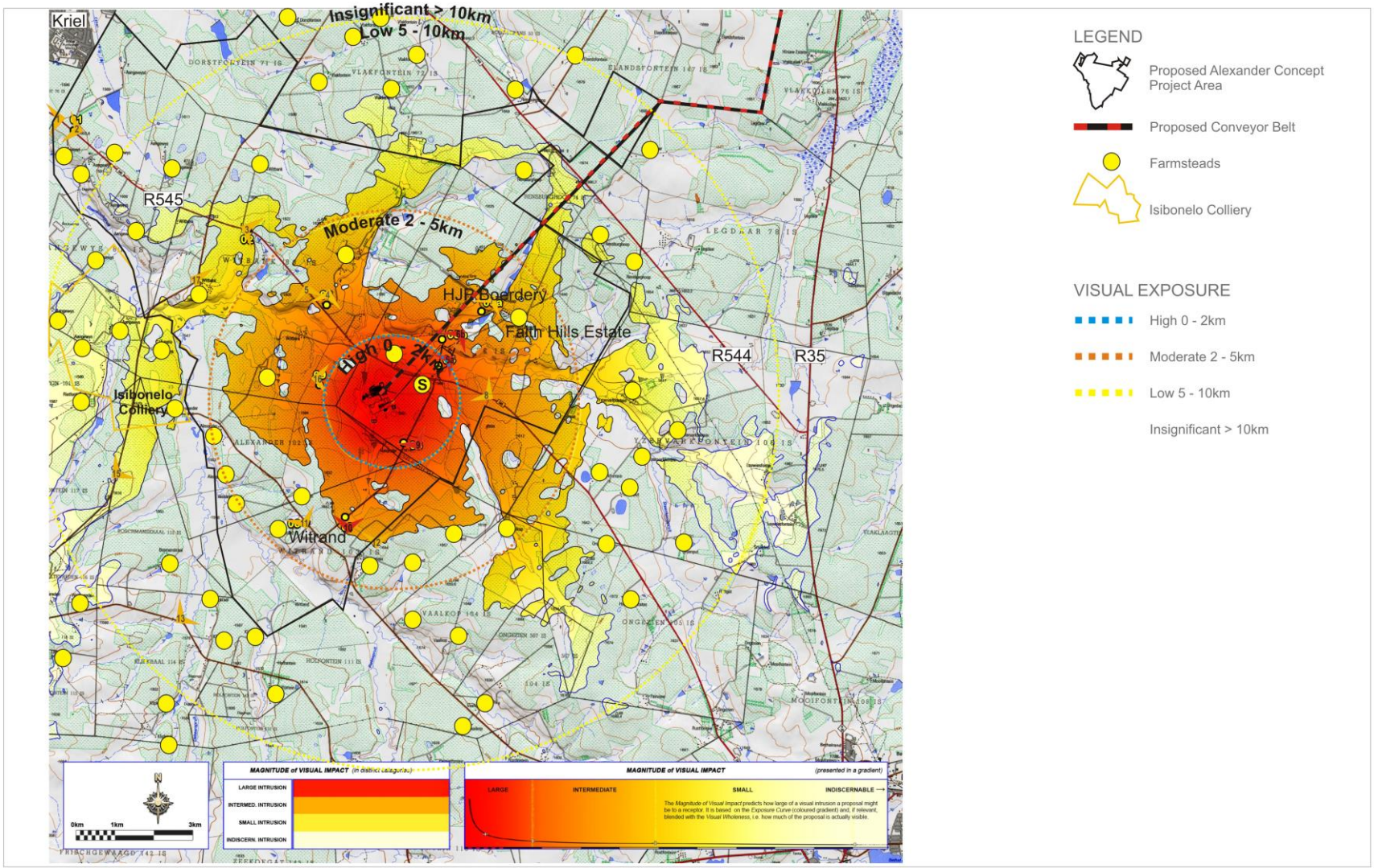

Figure 18: VIEWSHED ANALYSIS - Alexander Concept

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11.1.3 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?

The simulations in Figures 19 to 21 (ground views) illustrate the effect the Project will have on the landscape within its landscape context and when viewed from a variety of sensitive viewing locations about the site. The simulations illustrate the Project components at their completed elevations i.e. the worst case scenario. It is evident, when one considers the before (current situation) and after scenarios (with the shaft complex and conveyor belt) that the proposed Project will have an impact on sensitive viewing areas located within the Zone of Potential Influence. The proposed Project will also contribute to the cumulative impact of the mines in the area.

Figure 19 illustrate the view from a local farm road at a distance of approximately 1.1km from the proposed shaft complex. The proposed Project appears in the foreground view from this perspective but is partially screened by the ridge (topography) and the trees along the R545. The surge silo and waste rock dump is however prominent as it stretches out above the natural ridge line of the area and is therefore visually intrusive from this specific viewpoint.

Figure 20 illustrate the view from a local farm road at a distance of approximately 1.1km (south-east) from the proposed Project site. The proposed project appears in the foreground view and even though there are similar mining structures in the view, the proposed Project will not be absorbed by the existing activities and will therefore be intrusive to the viewer.

Figure 21 illustrate the view from a local farm road at a distance of approximately 3.5km (south) from the proposed Project site. The proposed project appears in the middle to background view. It is evident from this simulation that the haze will assist in lowering the visibility of the structures but on a clear day the proposed Project will be visible.

It is evident from the simulations (Figure 19 to 21) that even though there are current mining operations in the area the proposed Project will still be visible and intrusive to the area, especially for viewers located within the foreground and middle – ground distances from the project site. The topography of the area (ridge) as well as the trees along the R545 is natural visual buffers that assist in screening views from sensitive viewer locations.

Night Lighting

The impact of night lighting created by the proposed Project will contribute to the overall impact of the lights at night that is created by the mining activities. The visual intrusion at night will however be high for viewers located within the fore- and middle-ground distance of the proposed Project.

Table 4 rates and summarises visual intrusion of the project components when the *worst case scenario (no mitigation)* is taken into account.

Table 4: 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 elements that define the structure of the immediate landscape;** - **Contrasts with land use, settlement or enclosure patterns of the immediate environment;** **- Cannot be 'absorbed' into the landscape from key viewing areas.**	Because the proposed project: - Has a moderate negative effect on the visual quality of the landscape; - Contrasts with the patterns or elements that define the structure of the landscape; - Is partially compatible with land use (utilities) patterns of the general area; - Is partially 'absorbed' into the landscape from key viewing areas.	Because the proposed project: - Contrasts minimally with the patterns or elements that define the structure of the landscape; - is mostly compatible with land use, (utility) patterns; - is 'absorbed' into the landscape from key viewing areas.	The proposed 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 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.

View 6: View from a local farm road, looking south-east towards the proposed shaft complex and alternative sites
Photograph taken approximately 1.1km from the shaft complex site. The shaft complex will be partially screened by the row of trees along the R545

Figure 19: SIMULATION (View 6) - Alexander Project

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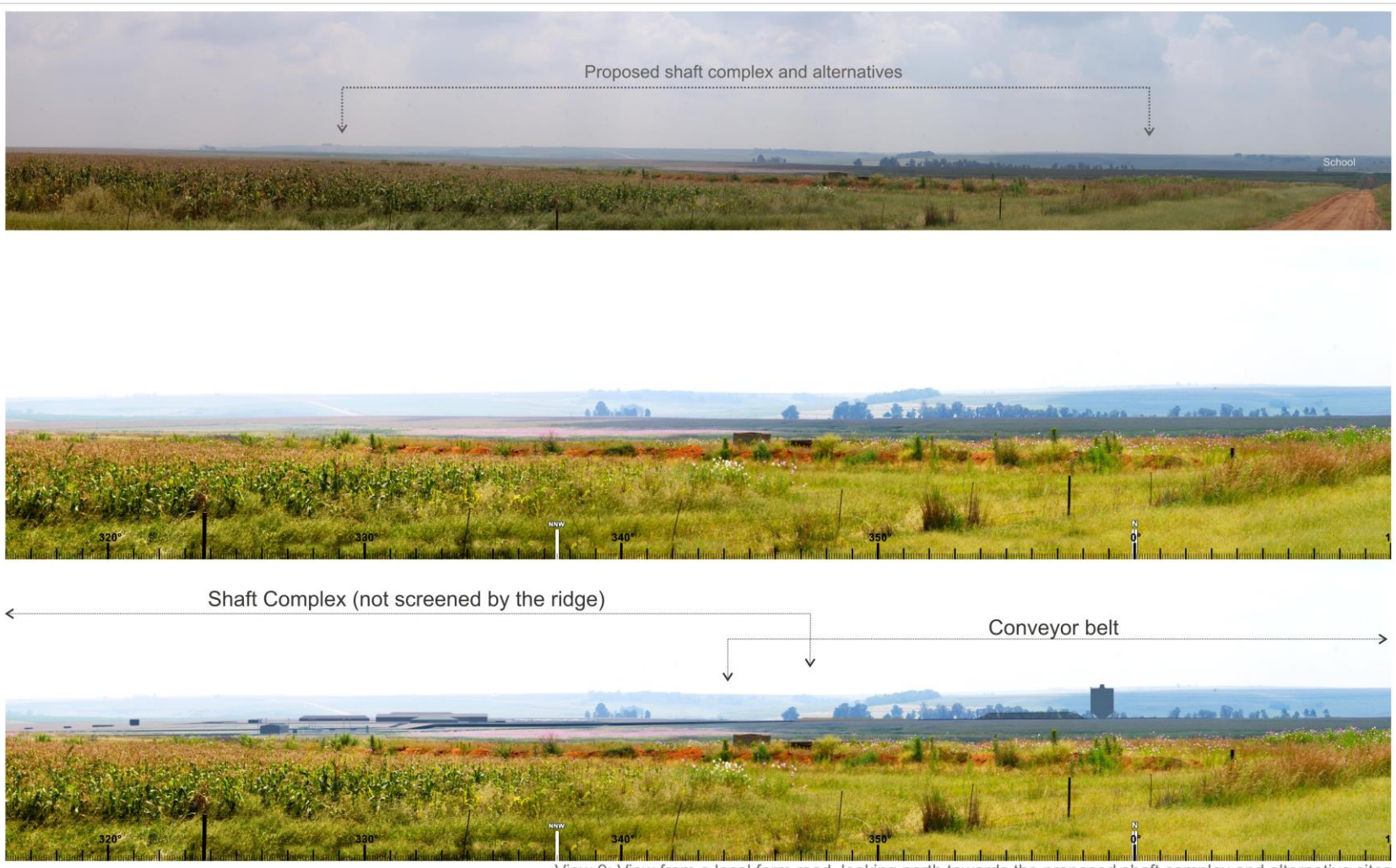

View 9: View from a local farm road, looking north towards the proposed shaft complex and alternative sites
Photograph taken approximately 1.1km from the shaft complex site

Figure 20: SIMULATION (View 9) - Alexander Project

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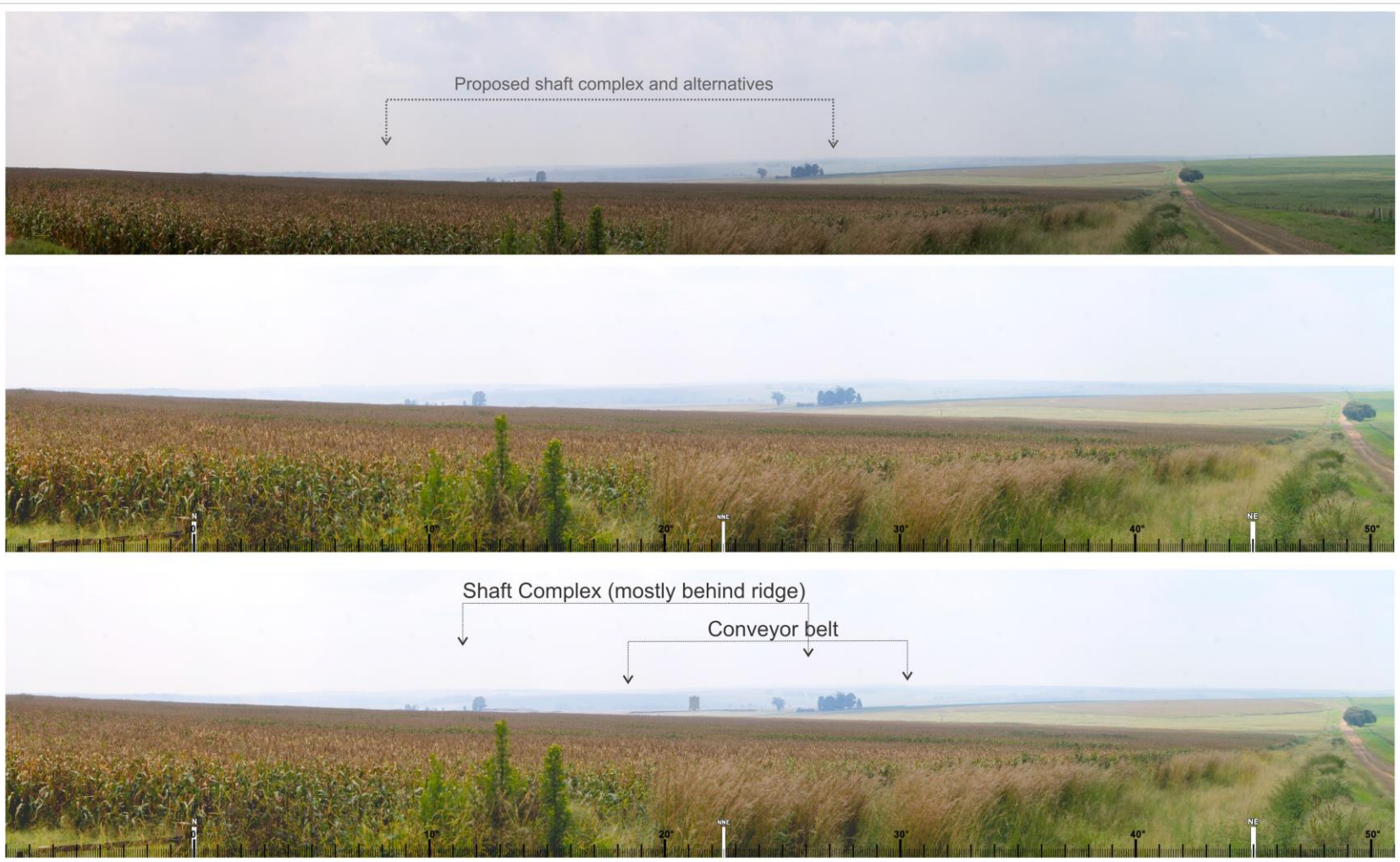

View 10: View from a local farm road, looking north towards the proposed shaft complex and alternative sites
Photograph taken approximately 3.5km from the shaft complex site. Topography will assist with screening the proposed shaft complex

Figure 21: SIMULATION (View 10) - Alexander Project

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11.1.4 Severity of Visual Impact

Referring to discussions in Section 11 above and using the criteria listed in Table 4, the visual intrusion and *severity* of visual impact of the Project, relative to the current situation, is rated in Table 5 below. To assess the severity 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

In synthesising 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).

According to the results tabulated below in Table 5 the *severity* of visual impact (based on the worst case scenario) of the proposed Project will be ***moderate*** as it will cause a moderate alteration to the key elements/ features / characteristics of the baseline environment.

Table 5: 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.

The severity of impact is predicted to be *moderate* (during construction, operational and decommission phases) on sensitive views for the following reasons:

- The proposed Project will have a moderate negative effect on the visual quality of the landscape and is partially compatible with the patterns that define the study area's landscape. The study area's visual resource is rated as low (mining areas and towns) to moderate (open grassland and farming areas) with some features such as the wetlands and ridges that are rated as high.
- The proposed Project will have a high impact on sensitive viewing points. The proposed Project will appear in the fore to middle-ground distance of most of the views and will not necessarily blend into the existing mining backdrop.
- The proposed project will be partially screened from sensitive viewers due to the topography of the area as well as the trees along the R545.

12. 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 and should be included as part of the Environmental Management Programme (EMPr).

12.1 Project Area Development

- It is proposed that as little vegetation as possible be removed during the construction phase.
- Ensure, wherever possible, all existing natural vegetation is retained and incorporated into the project site rehabilitation.
- The row of trees along the R545 must be kept as these trees partially screen the view for viewers located to the north-east of the project site.

12.2 Earthworks

- Dust suppression techniques should be in place at all times during the construction, operational, the decommissioning / 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.

12.3 Landscaping

- A registered Professional Landscape Architect should be appointed to assist with the rehabilitation plan for the proposed mine.
- Rehabilitate / restore exposed areas as soon as possible after construction activities are complete.
- Only indigenous vegetation should be used for rehabilitation / landscaping purposes.
- It is suggested that trees should be planted along the R545. The trees will partially shield / screen the view of travelers that travel on the route but will also assist with screening the view from viewers located to the north of the project.

12.4 Waste Rock Dump

- Final shaping and dumping should be engineered such that the sides of the dumps are articulated in a fashion that create areas of light and shadow interplay;
- Harsh, steep engineered slopes should be avoided if at all possible as these could impose an additional impact on the landscape by contrasting with existing topographic forms.

- The reclaimed landscape can be no more stable than the adjacent undisturbed landscape; therefore, it can be assumed that the reclaimed areas will be less stable and must be designed accordingly, with gentler slopes, higher density drainage and smaller drainage basins;
- Maintain the final landform height and slope angles for stockpiles as low as possible.
- Where slopes compatible with the surrounding landscape can be achieved, an attempt should be made to visually soften stepper areas by avoiding strait engineered ridges and sharp changes of angle;
- Grass seeding of the dumps should be undertaken to emulate the groupings of natural vegetation in nearby hills.
- Dust control measures such as the product provided by I-CAT, Soil & Dust Solution or Dust-A-Side, should be implemented to minimize the visual impact of dust. Should water be used as a dust suppression measure it is suggested that storm water or rain water is used. The type of dust measure will depend on availability and weather conditions such as drought.

12.5 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.

12.6 Lighting

Even though there are light at night in areas of the study site, 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.

13. SIGNIFICANCE

The *severity* of impact, rated in Tables 6 and 7, is further qualified with *extent*, *duration* and *probability* criteria to determine the *significance* of the visual impact. The following table summarises the *significance* of the visual impact. These results are based on worst-case scenario when the impacts of all aspects of the Project are taken together using the impact criteria in Appendix C.

Significance = consequence x probability

Consequence is a function of severity, spatial extent and duration

Table 6: Determining the Consequence

Project Activity	**Before Mitigation**				**After Mitigation:**			
	S	**SS**	**D**	**C**	**S**	**SS**	**D**	**C**
Construction	M	H	L	**M**	M	M	L	**M**
Operational	M	H	H	**H**	M	M	M	**M**
Closure / Decommissioning	M	H	L	**M**	L	L	L	**L**

Note:

S = Severity

SS = Spatial Scale

D = Duration

C = Consequence

Table 7: Visual Impact Assessment

Potential Visual Impact	ENVIRONMENTAL SIGNIFICANCE							
	Before mitigation				After mitigation:			
	C	x	P	SIG	C	x	P	SIG
Proposed Project – Construction								
Alteration to the visual quality of the study area due to the physical presence and construction activities taking place. The Project and its associated infrastructure with a moderate impact on key residential views in the area. Mitigation measures are feasible and would result in a drop in impact, if the mitigation measures are effectively implemented and managed in the long term.	M		VH	**H**	M		M	**M**
Proposed Project – Operational								
Alteration to the visual quality of the study area due to the physical presence, scale and size of the Project and its associated infrastructure. Mitigation measures are feasible but will not be able to hide / screen the proposed activities completely. Mitigation is possible it should be remembered that the proposed mitigation measures will take time to before fully successful.	H		VH	**VH**	M		**M**	**M**
Proposed Project – Decommissioning / Closure								
Alteration to the visual quality of the study area by removing structures and creating dust. Mitigation measures are feasible and would result in a drop in impact at closure if they are effectively implemented and managed in the	M		VH	**H**	L		M	**M**

long term								

Note:

C = Consequence

P = Probability

Sig = Significance

14. CUMULATIVE IMPACT OF ADJACENT MINES

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 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)).

14.1 Cumulative effect of the proposed Project

The impact of the surrounding mining activities already has a high negative effect on the visual environment. The physical presence of the proposed Project will increase the visibility of the mining activities and will therefore contribute to the *negative* impact on the landscape aesthetics of the area. The additional lights from the proposed Project will contribute to the negative impact the mining activities have on the night view for viewers in the study area.

15. CONCLUSION

During the Construction and Decommissioning Phases the proposed Project will exert a MODERATE negative impact on the visual and aesthetic environment, if mitigation is implemented successfully. The Operational Phase is predicted to exert a VERY HIGH impact (both day and night) without mitigation and a HIGH impact with effective mitigation when compared against the baseline primarily due to the scale, size and form of the project facilities and the effects of night lighting.

Mitigation measures are feasible and can reduce the impact but not all mitigation measure will be effective immediately as the vegetation screen will have to establish before assisting in mitigating the visual impact.

****NLA****

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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	Flowing, or still, but not dominant in the landscape.	Absent, or present, but not noticeable.

	dominant factor in the landscape. **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.

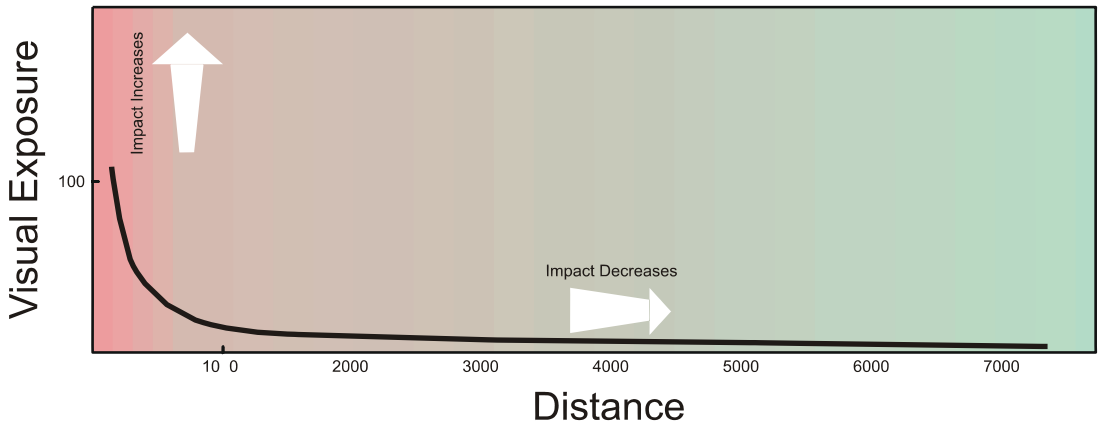
Areas seen from 800m to 5.0km are considered middle ground; vegetation appears as outlines or patterns. Depending on topography and vegetation, middle ground is sometimes considered to be up to 8.0km.

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

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of intensity, spatial extent and duration**
Criteria for ranking of the INTENSITY of environmental impacts	**VH**	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.

	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.
Criteria for ranking the DURATION of impacts	**VL**	Very short, always less than a year.
	L	Short-term, occurs for more than 1 but less than 5 years.
	M	Medium-term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity)
	VH	Very long, permanent, +20 years (Irreversible. Beyond closure)
Criteria for ranking the EXTENT of impacts	**VL**	A portion of the site.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours
	H	Local area, extending far beyond site boundary.
	VH	Regional/National

PART B: DETERMINING CONSEQUENCE

SEVERITY = VL

DURATION	Very long	**VH**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Long term	**H**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Medium term	**M**	**Low**	**Low**	**Medium**	**Medium**	**Medium**
	Short term	**L**	**Very low**	**Low**	**Low**	**Medium**	**Medium**
	Very short	**VL**	**Very low**	**Low**	**Low**	**Low**	**Medium**

SEVERITY = L

DURATION	Very long	**VH**	**Medium**	**Medium**	**High**	**High**	**High**
	Long term	**H**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Medium term	**M**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Short term	**L**	**Low**	**Low**	**Medium**	**Medium**	**Medium**
	Very short	**VL**	**Very low**	**Low**	**Low**	**Medium**	**Medium**

SEVERITY = M

DURATION	Very long	**VH**	**Medium**	**High**	**High**	**High**	**Very High**
	Long term	**H**	**Medium**	**Medium**	**High**	**High**	**High**
	Medium term	**M**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Short term	**L**	**Low**	**Medium**	**Medium**	**Medium**	**High**
	Very short	**VL**	**Very low**	**Low**	**Medium**	**Medium**	**Medium**

SEVERITY = H

DURATION	Very long	**VH**	**High**	**High**	**High**	**Very High**	**Very High**
	Long term	**H**	**Medium**	**High**	**High**	**High**	**Very High**
	Medium term	**M**	**Medium**	**Medium**	**High**	**High**	**High**
	Short term	**L**	**Medium**	**Medium**	**Medium**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**Medium**	**High**

SEVERITY = VH

DURATION	Very long	**VH**	**High**	**High**	**Very High**	**Very High**	**Very High**
	Long term	**H**	**High**	**High**	**High**	**Very High**	**Very High**
	Medium term	**M**	**Medium**	**High**	**High**	**High**	**Very High**
	Short term	**L**	**Medium**	**Medium**	**High**	**High**	**High**
	Very short	**VL**	**Low**	**Medium**	**Medium**	**High**	**High**
			VL	**L**	**M**	**H**	**VH**
			A portion of the site	Whole site	Beyond the site boundary, affecting immediate neighbours	Local area, extending far beyond site boundary.	Regional/ National
			EXTENT				

PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	**VH**	**Medium**	**High**	**High**	**Very High**	**Very High**
	Probable	**H**	**Medium**	**Medium**	**High**	**High**	**Very High**
	Possible/ frequent	**M**	**Low**	**Medium**	**Medium**	**High**	**High**
	Conceivable	**L**	**Low**	**Low**	**Medium**	**Medium**	**High**
	Unlikely/ improbable	**VL**	**Very low**	**Low**	**Low**	**Medium**	**Medium**
			VL	**L**	**M**	**H**	**VH**
			CONSEQUENCE				

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.
Very Low	It will not have an influence on the decision. Does not require any mitigation

***VH = very high, H = high, M= medium, L= low and VL= very 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.

Since 1994

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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.

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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

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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.