THE PROPOSED 3.6MWP SOLAR PV PLANT, GAUTENG PROVINCE, SOUTH AFRICA

Visual Impact Basic Assessment Report

Final v_1

DATE: Nov 2021

Document prepared for Soventix SA PV (Pty) Ltd
On behalf of Ecoleges Environmental Consultants

Visual Resource Management Africa cc
P O Box 7233, George, 6531
Cell: +27 (83) 560 9911
E-Mail: steve@vrma.co.za
Web: www.vrma.co.za

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

APHP	Association of Professional Heritage Practitioners
BLM	Bureau of Land Management (United States)
BPEO	Best Practicable Environmental Option
CALP	Collaborative for Advanced Landscape Planning
DEM	Digital Elevation Model
DoC	Degree of Contrast
EIA	Environmental Impact Assessment
EMPr	Environmental Management Plan
GIS	Geographic Information System
GPS	Global Positioning System
IDP	Integrated Development Plan
IEMA	Institute of Environmental Management and Assessment (United Kingdom)

KOP	Key Observation Point
LVIA	Landscape and Visual Impact Assessment
MAMSL	Metres above mean sea level
NELPAG	New England Light Pollution Advisory Group
PoS	Public Open Space
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRM	Visual Resource Management
VRMA	Visual Resource Management Africa
ZVI	Zone of Visual Influence

GLOSSARY OF TECHNICAL TERMS

Technical Terms	**Definition** (Oberholzer, 2005)
Degree of Contrast	The measure in terms of the form, line, colour and texture of the existing landscape in relation to the proposed landscape modification in relation to the defined visual resource management objectives.
Visual intrusion	Issues are concerns related to the proposed development, generally phrased as questions, taking the form of "what will the impact of some activity be on some element of the visual, aesthetic or scenic environment".
Receptors	Individuals, groups or communities who would be subject to the visual influence of a particular project.
Sense of place	The unique quality or character of a place, whether natural, rural or urban.
Scenic corridor	A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed. This reflects the area, or the extent thereof, where the landscape modification would probably be seen.
Visual Absorption Capacity	The potential of the landscape to conceal the proposed project.

Technical Term	**Definition** (USDI., 2004)
Key Observation Point	Receptors refer to the people located in the most critical locations, or key observation points, surrounding the landscape modification, who make consistent use of the views associated with the site where the landscape modifications are proposed. KOPs can either be a single point of view that an observer/evaluator uses to rate an area or panorama, or a linear view along a roadway, trail, or river corridor.
Visual Resource Management	A map-based landscape and visual impact assessment method development by the Bureau of Land Management (USA).

Zone of Visual Influence	The ZVI is defined as 'the area within which a proposed development may have an influence or effect on visual amenity.'

Table 1. Specialist declaration of independence.

This document was completed by Silver Solutions 887 cc trading as VRM Africa, a Visual Impact Study and Mapping organisation located in George, South Africa. VRM Africa cc was appointed as an independent professional visual impact practitioner to facilitate this VIA. I, Stephen Stead, hereby declare that VRM Africa, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Stephen Stead
APHP accredited VIA Specialist

Table 2 Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014), as amended in 2017

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
Details of the specialist who prepared the report	Stephen Stead, owner / director of Visual Resource Management Africa. steve@vrma.co.za Cell: 0835609911
The expertise of that person to compile a specialist report including a curriculum vitae	Registration with Association of Professional Heritage Practitioners
A declaration that the person is independent in a form as may be specified by the competent authority	Table 1. Specialist declaration of independence.
An indication of the scope of, and the purpose for which, the report was prepared	Terms of Reference
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Visual Resource Management (VRM) Classes
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	NA
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Methodology
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	Baseline Visual Inventory
An identification of any areas to be avoided, including buffers	NA
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 16
A description of any assumptions made and any uncertainties or gaps in knowledge;	Assumptions and Limitations
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Visual Resource Management Classes
Any mitigation measures for inclusion in the EMPr	Environmental Management Plan
Any conditions for inclusion in the environmental authorisation	NA
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	NA

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Conclusion
Regarding the acceptability of the proposed activity or activities; and	Conclusion
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	It is the recommendation that the proposed **Alternative 1 PV project should be authorised with mitigation** as the site scenic resources are Low and the surrounding screening trees effectively reduce the project Zone of Visual Influence. **Alternative 2 is not recommended** due to the loss of the wetland that should be considered a fatal flaw. **Alternative 3 is not recommended** due to the loss of strategic trees and PoS buffering the industrial context and protecting the existing residential and recreational receptors to the west.
A description of any consultation process that was undertaken during the course of carrying out the study	NA
A summary and copies if any comments that were received during any consultation process	NA
Any other information requested by the competent authority.	NA

1 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by Ecoleges Environmental Consultants (Pty) Ltd to complete the ***Visual Impact Assessment*** on behalf of Soventix SA (Pty) Ltd. (Proponent). The site visit was undertaken on the 5th of October 2021. The proposed development site is located in the Gauteng Province and within the City of Ekurhuleni Metropolitan Municipality. The Proponent proposes to construct a 3.6MWp Solar PV plant for Unilever in Boksburg East on Erf 757 and 758 Boksburg East and portions 127 and 189 of Vogelfontein 84.

Ekurhuleni is a metropolitan municipality found in the province of Gauteng, South Africa, located east of Johannesburg; and south of Tshwane along the east-west Johannesburg-Maputo corridor and the east-west gold and coal mining corridor as well as the north-south iron and steel corridor (Ekurhuleni Metropolitan Municipality , 2015).

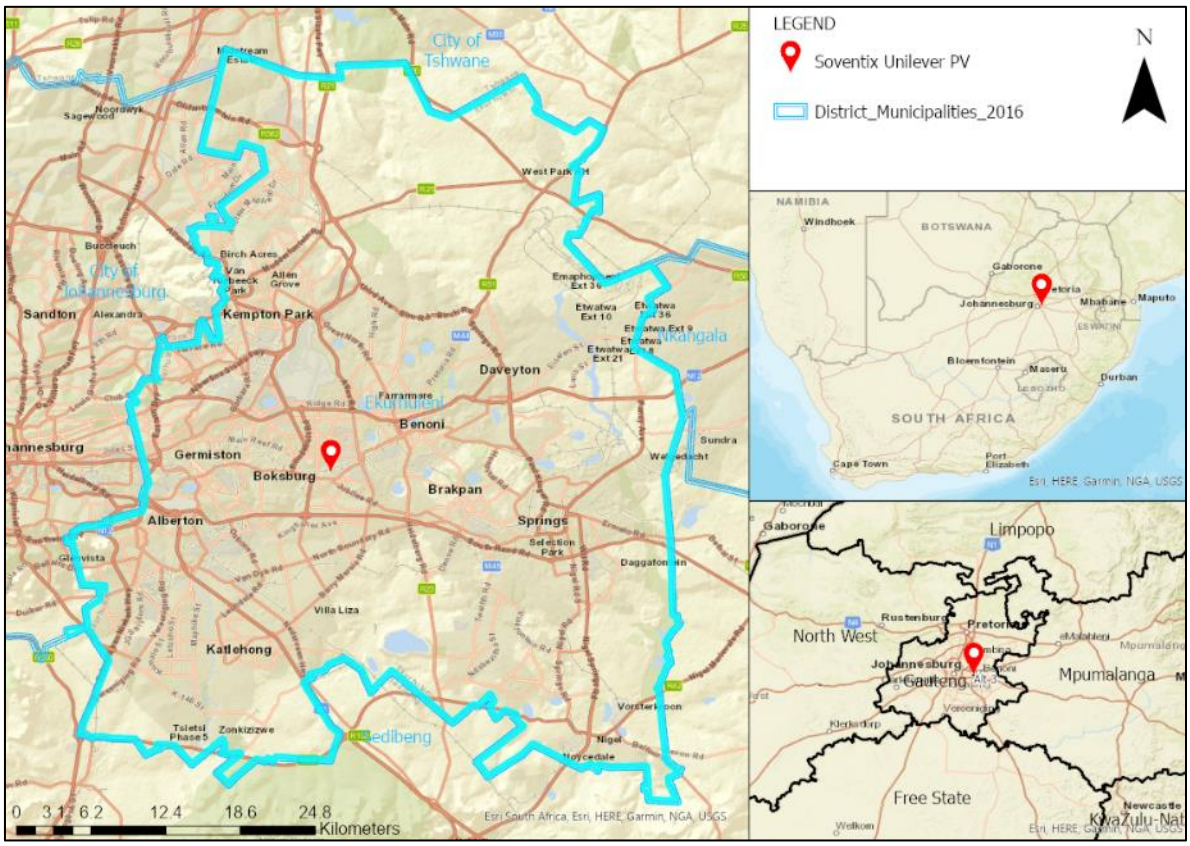


Figure 1. National locality map with the project location identified.

1.1 Terms of Reference

The scope of this study is to cover the entire proposed project area. The broad terms of reference for the study are as follows:

- Collate and analyse all available secondary data relevant to the affected proposed project area. This includes a site visit of the full site extent, as well as of areas where potential impacts may occur beyond the site boundaries.
- Specific attention is to be given to the following:
  - Quantifying and assessing existing scenic resources/visual characteristics on, and around, the proposed site.

- Evaluation and classification of the landscape in terms of sensitivity to a changing land use.
- Determining viewsheds, view corridors and important viewpoints in order to assess the visual impacts of the proposed project.
- Determining visual issues, including those identified in the public participation process.
- Reviewing the legal framework that may have implications for visual/scenic resources.
- Assessing the significance of potential visual impacts resulting from the proposed project for the construction, operation and decommissioning phases of the proposed project.
- Assessing the potential cumulative impacts associated with the visual impact.
- Generate photomontages of the proposed landscape modification.
- Identifying possible mitigation measures to reduce negative visual impacts for inclusion into the proposed project design, including input into the Environmental Management Programme (EMPr).

1.2 Study Team

Contributors to this study are summarised in the table below.

Table 3: Authors and Contributors to this Report.

Aspect	Person	Organisation / Company	Qualifications
Landscape and Visual Assessment (author of this report)	Stephen Stead B.A (Hons) Human Geography, 1991 (UKZN, Pietermaritzburg)	VRMA	• Accredited with the Association of Professional Heritage Practitioner and • 16 years of experience in visual assessments including renewable energy, powerlines, roads, dams across southern Africa. • Registered with the Association of Professional Heritage Practitioners since 2014.

1.3 Visual Assessment Approach

The process that VRM Africa follows when undertaking a VIA is based on the United States Bureau of Land Management (BLM) Visual Resource Management method (USDI., 2004). This mapping and GIS-based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria.

The following approach was used in understanding the landscape processes and informing the magnitude of the impacts of the proposed landscape modification. The table below lists a number of standardised procedures recommended as a component of best international practice.

Table 4: Methodology Summary Table

Action	***Description***
Site Survey	The identification of existing scenic resources and sensitive receptors in and around the study area to understand the context of the proposed development within its surroundings to ensure that the intactness of the landscape and the prevailing sense of place are taken into consideration.
Project Description	Provide a description of the expected project, and the components that will make up the landscape modification.
Reviewing the Legal Framework	The legal, policy and planning framework may have implications for visual aspects of the proposed development. The heritage legislation tends to be pertinent in relation to natural and cultural landscapes, while Strategic Environmental Assessments (SEAs) for renewable energy provide a guideline at the regional scale.
Determining the Zone of Visual Influence	This includes mapping of viewsheds and view corridors in relation to the proposed project elements, in order to assess the zone of visual influence of the proposed project. Based on the topography of the landscape as represented by a Digital Elevation Model, an approximate area is defined which provides an expected area where the landscape modification has the potential to influence landscapes (or landscape processes) or receptor viewpoints.
Identifying Visual Issues and Visual Resources	Visual issues are identified during the public participation process, which is being carried out by others. The visual, social or heritage specialists may also identify visual issues. The significance and proposed mitigation of the visual issues are addressed as part of the visual assessment.
Assessing Potential Visual Impacts	An assessment is made of the significance of potential visual impacts resulting from the proposed project for the construction, operational and decommissioning phases of the project. The rating of visual significance is based on the methodology provided by the Environmental Assessment Practitioner (EAP).
Formulating Mitigation Measures	Possible mitigation measures are identified to avoid or minimise negative visual impacts of the proposed project. The intention is that these would be included in the project design, the Environmental Management programme (EMPr) and the authorisation conditions.

1.4 Assumptions and Uncertainties

- Digital Elevation Models (DEM) and viewsheds were generated using ASTER elevation data (NASA, 2009). Although every effort to maintain accuracy was undertaken, as a result of the DEM being generated from satellite imagery and not being a true representation of the earth's surface, the viewshed mapping is approximate and may not represent an exact visibility incidence. Thus, specific features identified from the DEM and derive contours (such as peaks and conical hills) would need to be verified once a detailed survey of the project area took place.
- The use of open-source satellite imagery was utilised for base maps in the report.
- Some of the mapping in this document was created using Bing Maps, Open-Source Map, ArcGIS Online and Google Earth Satellite imagery.
- The project deliverables, including electronic copies of reports, maps, data, shape files and photographs are based on the author's professional knowledge, as well as available information.
- VRM Africa reserves the right to modify aspects of the project deliverables if and when new/additional information may become available from research or further work in the applicable field of practice or pertaining to this study.

2 PROJECT DESCRIPTION

The following table outlines the project information that was provided by the client that will be incorporated into the assessment and proposed infrastructure relating to the project would include:

Table 5: Property Information Table

PROJECT AND PROPERTY DETAILS	
Applicant Details	**Description**
Applicant Name:	Soventix SA (Pty) Ltd
Project Name:	Soventix Unilever Solar PV
Property Zoning:	Agricultura

Figure 2: Photographic example of what the proposed PV could look like. (Ecoleges Environmental Consultants)

Table 6. Project Specification Table.

SOVENTIX 3.6MWP SOLAR PV POWER STATION: PROJECT SPECIFICATIONS	
COMPONENT	**SPECIFICATION**
Height of PV	• 3.5m
PV infrastructure	• Fixed tilt ground mount
Area occupied by switching station and transmission lines	• 600m2
Lighting	• Security lighting at the entrance.
Area occupied by both permanent and construction laydown areas	• 100m2
Area occupied by buildings	• 0m2
Width and Length of internal roads	• 3.5m between module tables; jeep track.
Proximity to grid connection	• 450m
Height of fencing	• 1.8m
Type of fencing	• Razor Mesh

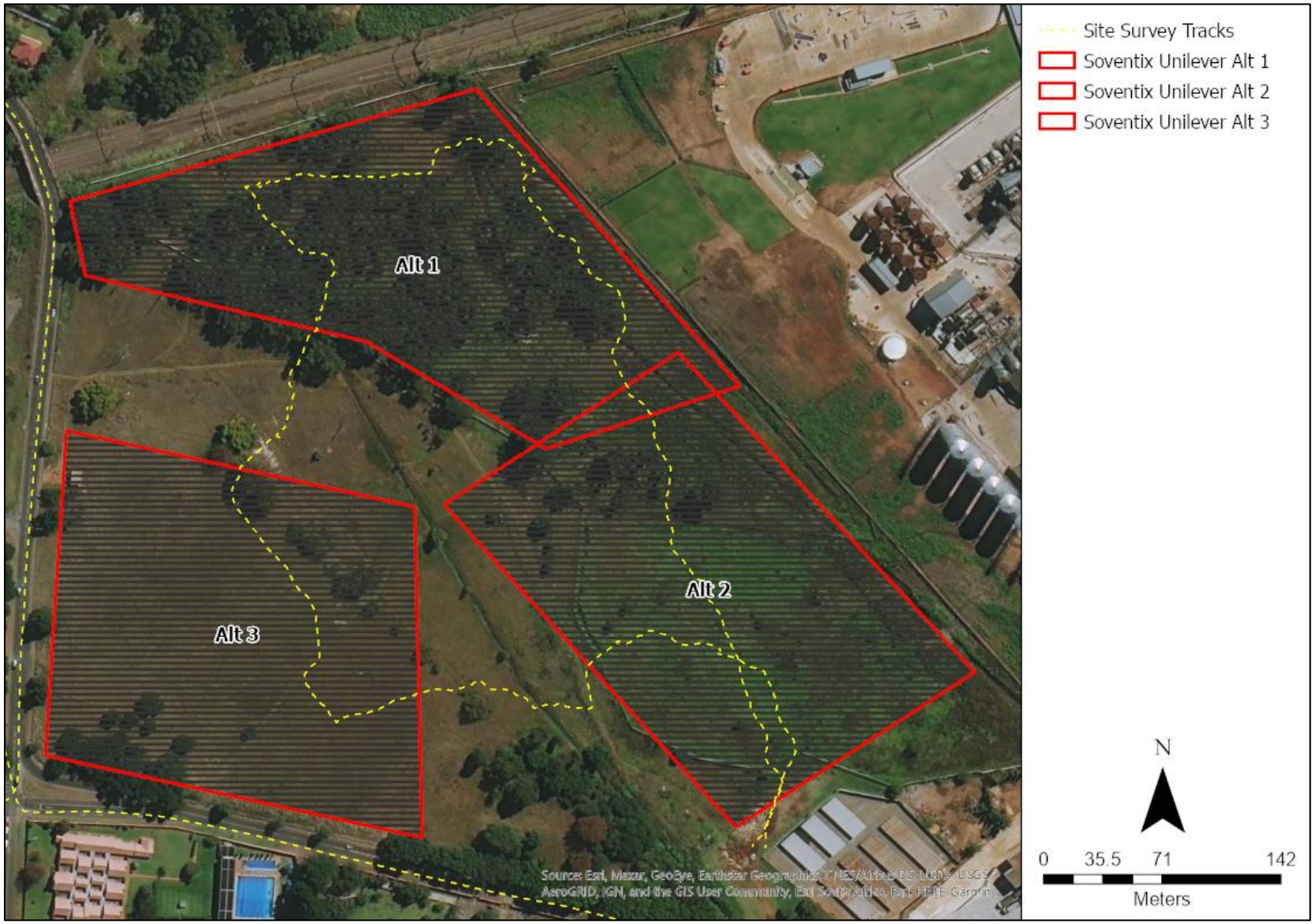


Figure 3: Proposed layout map depicting the 3 proposed alternatives

3 LEGAL FRAMEWORK

In order to comply with the Visual Resource Management requirements, it is necessary to relate the proposed landscape modification in terms of international best practice in understanding landscapes and landscape processes. The proposed project also needs to be evaluated in terms of 'policy fit'. This requires a review of National and Regional policy and planning for the area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the planned sense of place and character of the area.

3.1 International and National Good Practice

For cultural landscapes, the following documentation provides good practice guidelines, specifically:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.
- International Finance Corporation (IFC).
- Millennium Ecosystem Assessment (MEA).
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention (WHC).

3.1.1 Guidelines for Landscape and Visual Impact Assessment, Second Edition

The Landscape Institute and the Institute of Environmental Management and Assessment (United Kingdom) have compiled a book outlining best practice in landscape and visual impact assessment. This has become a key guideline for LVIA in the United Kingdom. "The principal aim of the guideline is to encourage high standards for the scope and context of landscape and visual impact assessments, based on the collegiate opinion and practice of the members of the Landscape Institute and the Institute of Environmental Management and Assessment. The guidelines also seek to establish certain principles and will help to achieve consistency, credibility and effectiveness in landscape and visual impact assessment, when carried out as part of an EIA" (The Landscape Institute, 2003);

In the introduction, the guideline states that 'Landscape encompasses the whole of our external environment, whether within village, towns, cities or in the countryside. The nature and pattern of buildings, streets, open spaces and trees – and their interrelationships within the built environment – are an equally important part of our landscape heritage" (The Landscape Institute, 2003: Pg. 9). The guideline identifies the following reasons why landscape is important in both urban and rural contexts, in that it is:

- An essential part of our natural resource base.
- A reservoir of archaeological and historical evidence.
- An environment for plants and animals (including humans).
- A resource that evokes sensual, cultural and spiritual responses and contributes to our urban and rural quality of life; and
- Valuable recreation resources. (The Landscape Institute, 2003).

3.1.2 International Finance Corporation (IFC)

The IFC Performance Standards (IFC, 2012) do not explicitly cover visual impacts or assessment thereof. Under IFC PS 6, ecosystem services are organized into four categories, with the third category related to cultural services which are defined as "the non-material benefits people obtain from ecosystems" and "may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment" (IFC, 2012).

However, the IFC Environmental Health and Safety Guidelines for Electric Power Transmission and Distribution (IFC, 2007) specifically identifies the risks posed by power transmission and distribution projects to create visual impacts to residential communities. It recommends mitigation measures to be implemented to minimise visual impact. These should include the siting of powerlines and the design of substations with due consideration to landscape views and important environmental and community features. Prioritising the location of high-voltage transmission and distribution lines in less populated areas, where possible, is promoted.

IFC PS 8 recognises the importance of cultural heritage for current and future generations and aims to ensure that projects protect cultural heritage. The report defines Cultural Heritage as "(i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls" (IFC, 2012). The IFC PS 8 defines Critical Heritage as "one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation" (IFC, 2012).

Legally protected cultural heritage areas are identified as important in the IFC PS 8 report. This is for "the protection and conservation of cultural heritage, and additional measures are needed for any projects that would be permitted under the applicable national law in these areas". The report states that "in circumstances where a proposed project is located within a legally protected area or a legally defined buffer zone, the client, in addition to the requirements for critical cultural heritage, will meet the following requirements:

- Comply with defined national or local cultural heritage regulations or the protected area management plans.
- Consult the protected area sponsors and managers, local communities and other key stakeholders on the proposed project; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area". (IFC, 2012).

3.1.3 Millennium Ecosystem Assessment

In the Ecosystems and Human Well-being document compiled by the Millennium Ecosystem Assessment in 2005, Ecosystems are defined as being "essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being". (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment defined the following non-material benefits that can be obtained from ecosystems*:*

- Inspiration: Ecosystems provide a rich source of inspiration for art, folklore, national symbols, architecture, and advertising.

- Aesthetic values: Many people find beauty or aesthetic value in various aspects of ecosystems, as reflected in the support for parks, scenic drives, and the selection of housing locations.
- Sense of place: Many people value the “sense of place” that is associated with recognised features of their environment, including aspects of the ecosystem.
- Cultural heritage values: Many societies place high value on the maintenance of either historically important landscapes (“cultural landscapes”) or culturally significant species; and
- Recreation and ecotourism: People often choose where to spend their leisure time based in part on the characteristics of the natural or cultivated landscapes in a particular area. (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment Ecosystems and Human Well-being: Synthesis report indicates that there has been a “rapid decline in sacred groves and species” in relation to spiritual and religious values, and aesthetic values have seen a “decline in quantity and quality of natural lands”. (Millennium Ecosystem Assessment, 2005)

3.2 National and Regional Legislation and Policies

In order to comply with the Visual Resource Management requirements, it is necessary to clarify which National and Regional planning policies govern the proposed development area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area.

- DEA&DP Visual and Aesthetic Guidelines.
- Regional and Local Municipality Planning and Guidelines.

3.2.1 DEA&DP Visual and Aesthetic Guidelines

Reference to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for involving visual and aesthetic specialists in Environmental Impact Assessment (EIA) processes is provided in terms of southern African best practice in Visual Impact Assessment. The report compiled by Oberholzer states that the Best Practicable Environmental Option (BPEO) should address the following:

- Ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area. The BPEO must also ensure that development must be located to prevent structures from being a visual intrusion (i.e., to retain open views and vistas).
- Long term protection of important scenic resources and heritage sites.
- Minimisation of visual intrusion in scenic areas.
- Retention of wilderness or special areas intact as far as possible.
- Responsiveness to the area's uniqueness, or sense of place.” (Oberholzer, 2005)

3.2.2 Local and Regional Planning

As indicated in the locality map in Figure 1, the proposed development site falls within the Gauteng Province in the Ekurhuleni Metropolitan Municipality.

Table 7: Governance administrative table

Theme	Requirements
Province	Gauteng Province
Municipality	City of Ekurhuleni Metropolitan Municipality
	Region A

The following tables list key regional and local planning that has relevance to the project pertaining to landscape-based tourism, and solar energy projects

Table 8: Ekurhuleni Metropolitan Municipality SDF Section A (Ekurhuleni Metropolitan Municipality, 2015)

Theme	Requirements	Page
Renewable Energy	Gauteng Environmental Framework aims • ***to focus on the sustainability of development through the implementation of initiatives such as: energy efficiency programmes, plans and designs;***	16
	• to facilitate the optimal use of current industrial, mining land and other suitable derelict land for the development of non-polluting industrial and large commercial developments (Gauteng Environmental Framework)	16
Biodiversity	• to protect Critical Biodiversity Areas (CBAs as defined in C-Plan 3.3) within urban and rural environments; • to ensure the proper integration Ecological Support Areas (ESAs as defined in C-Plan 3.3) into rural land use change and development; (Gauteng Environmental Framework)	16
	• identify strategies to prevent loss and degradation of critical biodiversity areas, and • ensure the necessary level of protection for the remaining areas;	1
	Gauteng faces four critical problems: • Unsustainable use of water and declining quality and quantity of water resources; • Rising greenhouse gas emissions … • Poor environmental management; and • Inadequate biodiversity protection.	4

Table 9: Ekurhuleni Metropolitan Municipality SDF Section B (Ekurhuleni Metropolitan Municipality , 2015)

Theme	Requirements	Page
Landscape Character	In the central part of the EMM, the Boksburg East, Anderbolt, Benoni South and Apex industrial areas occur. These are fairly old industrial areas focusing predominantly on heavy and noxious industrial activities.	26
Environmental Constraints	The most significant environmental constraints for development in the Ekurhuleni Metropolitan Municipality include: • Occurrence and distribution of ecological important areas; • Sensitive surface and hydrological features, including wetlands, pans, rivers, streams and ridges; • Significant natural open space connectors;	19

Theme	Requirements	Page
	• Occurrence of high potential agricultural land; and • Potential pollution sources	
Tourism	The development of the tourism potential related to the potential generated by the aerotropolis as well as the proximity of natural spaces for recreational and high-quality living environments.	80

Table 10: Ekurhuleni Biodiversity and Open Space strategy (EBOSS) Report (Ekurhuleni Metropolitan Municipality, 2009)

Theme	Requirements	Page
Renewable Energy	***The development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised (NEMA 1998)***	Appendix B Pg 1
Protection of Open Space	***The primary open space network, as identified and classified in this report represents the minimum open space areas that needs to be retained from a biodiversity perspective.***	170
Visual Impact Mitigations	***Opportunities for open spaces to mitigate visual or air pollution from adjacent land uses should be investigated as a next step to EBOSS, including but not limited to:*** • ***The planting of screening vegetation within open spaces at problematic areas to reduce visual pollution caused by adjacent land uses.***	171
Aquatic Habitats	More than 190 pans occur in the EMM. Only four of these, Westdene Pan (Korsman's Bird Sanctuary), Carlos Rolfes Pan, Blaauwpan (Pamula Park Nature Reserve) and Glen Austin Pan are formally protected. Of these, only Korsman's Bird Sanctuary is considered to be adequately managed for biodiversity.	24
	The natural vegetation is being fragmented by development. Many pans in the EMM have been filled in and wetlands and surface water bodies have become isolated. These pressures all lead to losses of ecosystem function and biodiversity	25
	The EMM Metropolitan Spatial Development Framework (MSDF) has the following as an objective: "To create a sustainable and functional open space network that is accessible to the public	29

Table 11: Bioregional Plan for Ekurhuleni Metropolitan Municipality (Ekurhuleni Metropolitan Municipality , 2014)

Theme	Requirements	Page
General	The Ekurhuleni Metropolitan Municipality falls within the Grassland biome and is home to a disproportionately high percentage of rare and threatened species and threatened ecosystems. A high proportion of South Africa's mining activity, heavy industry, commercial enterprise and urban population occur in the region, and consequently, the pressures placed on the environment and the remaining natural ecosystems are very high, and opportunities for conservation of biodiversity are limited.	3
Aquatic Systems	Where CBAs include floodplains (e.g. areas within the 1:100 year floodline), riperian areas (e.g. as a minimum, the 32m around rivers) or buffers around wetlands, particular attention should applied to ensure that these remain in a natural state or are rehabilitated to this state	32

Theme	Requirements	Page
	The maintenance of connectivity between CBAs, continued ecosystem functioning within the CBA corridors, and the prevention of degradation of adjacent Critical Biodiversity Areas must be achieved;	34

Table 12: Region A Regional Spatial Development Framework Ekurhuleni Metropolitan Municipality (RSDF Ekurhuleni Metropolitan Municipality)

Theme	Requirements	Page
General	Region A is one of six regions in Ekurhuleni. It is the central western region and abuts the City of Johannesburg. ….. It accommodates a variety of land uses and is seen as the core economic area of Ekurhuleni as it includes OR Tambo International Airport, the CBDs of Kempton Park, Germiston and Boksburg, the Bedfordview node, as well as the industrial areas of Spartan, Isando, Jet Park and Anderbolt.	3

3.3 Policy Fit

Policy fit refers to the degree to which the proposed landscape modifications align with International, National, Provincial and Local planning and policy. In terms of international best practice, the proposed landscape modification will not trigger any issues as there no significant landscape/ cultural landscape features within the project area.

In terms of regional and local planning, there is a positive fit for Alternative 1, but not for Alterative 2 & 3. The local planning supports for renewable energy as long as it does not result in a loss of ecological areas or public open space. ***Alternative 2 covers and area that is defined as a wetland, and Alternative 3 is located directly adjacent to the Trichardts Park, and as such there is a poor fit to local planning policy for these alternatives.***

4 METHODOLOGY

The process that VRMA followed when determining landscape significance is based on the United States Bureau of Land Management's (BLM) Visual Resource Management method (USDI., 2004). This mapping and Geographic Information System (GIS) based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria. The following key factors determine the suitability of landscape change:

- *"Different levels of scenic values require different levels of management. For example, management of an area with high scenic value might be focused on preserving the existing character of the landscape, and management of an area with little scenic value might allow for major modifications to the landscape. Determining how an area should be managed first requires an assessment of the area's scenic values".*
- *"Assessing scenic values and determining visual impacts can be a subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, colour, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects. Projects that repeat these design elements are usually in harmony with their surroundings; those that don't create contrast. By adjusting project designs so the elements are repeated, visual impacts can be minimized"* (USDI., 2004).

The assessment comprises two main sections: firstly, the ***Baseline Stage*** to identify the visual resources and key observation locations within the project zone of visual influence; and secondly, the ***Assessment Stage*** which determines the visual impacts and significance of the proposed landscape modifications.

4.1 Baseline Analysis Stage

In terms of VRM methodology, landscape character is derived from a combination of ***scenic quality***, ***receptor sensitivity*** to landscape change and ***distance*** from the proposed landscape change. The objective of the analysis is to compile a mapped inventory of the visual resources found in the receiving landscape, and to derive a mapped Visual Resource sensitivity layer from which to evaluate the suitability of the landscape change.

4.1.1 Scenic Quality

The scenic quality is determined making use of the VRM Scenic Quality Checklist (refer to Annexure D). The checklist identifies seven scenic quality criteria which are rated with 1 (low) to 5 (high) scale. The scores are totalled and assigned an A (High), B (Moderate) or C (low) based on the following split:

A= scenic quality rating of ≥19.
B = rating of 12 – 18,
C= rating of ≤11

The seven scenic quality criteria are defined below:

- **Land Form**: Topography becomes more of a factor as it becomes steeper, or more severely sculptured.
- **Vegetation**: Primary consideration given to the variety of patterns, forms, and textures created by plant life.
- **Water**: That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration.
- **Colour**: The overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) are considered as they appear during seasons or periods of high use.
- **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.
- **Adjacent Land Use**: Degree to which scenery and distance enhance, or start to influence, the overall impression of the scenery within the rating unit.
- **Cultural Modifications**: Cultural modifications should be considered and may detract from the scenery or complement or improve the scenic quality of an area.

4.1.2 Receptor Sensitivity

Receptor Sensitivity levels are a measure of public concern for scenic quality and assessed making use of the Sensitivity Checklist in Annexure D. Receptor sensitivity to landscape change is determined by rating the following factors in terms of Low to High:

- **Type of Users**: Visual sensitivity will vary with the type of users, e.g., recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.

- **Amount of Use**: Areas seen or used by large numbers of people are potentially more sensitive.
- **Public Interest**: The visual quality of an area may be of concern to local, or regional, groups. Indicators of this concern are usually expressed via public controversy created in response to proposed activities.
- **Adjacent Land Uses**: The interrelationship with land uses in adjacent lands. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be as visually sensitive.
- **Special Areas**: Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Critical Biodiversity Areas frequently require special consideration for the protection of their visual values.
- **Other Factors**: Consider any other information such as research or studies that include indicators of visual sensitivity.

4.1.3 Exposure

The area where a landscape modification starts to influence the landscape character is termed the Zone of Visual Influence (ZVI) and is defined by the U.K. Institute of Environmental Management and Assessment's (IEMA) *'Guidelines for Landscape and Visual Impact Assessment'* as 'the area within which a proposed development may have an influence or effect on visual amenity (of the surrounding areas).'

The inverse relationship of distance and visual impact is well recognised in visual analysis literature (Hull & Bishop, 1988)According to Hull and Bishop, exposure, or visual impact, tends to diminish exponentially with distance. The areas where most landscape modifications would be visible are located within 2 km from the site of the landscape modification. Thus, the potential visual impact of an object diminishes at an exponential rate as the distance between the observer and the object increases due to atmospheric conditions prevalent at a location, which causes the air to appear greyer, thereby diminishing detail. For example, viewed from 1000 m from a landscape modification, the impact would be 25% of the impact as viewed from 500 m from a landscape modification. At 2000m it would be 10% of the impact at 500 m.

Distance from a landscape modification influences the size and clarity of the landscape modification viewing. The Bureau of Land Management defines three distance categories:

i. ***Foreground / Middle ground***, up to approximately 6km, which is where there is potential for the sense of place to change.
ii. ***Background areas***, from 6km to 24km, where there is some potential for change in the sense of place, but where change would only occur in the case of very large landscape modifications; and
iii. ***Seldom seen areas***, which fall within the Foreground / Middle ground area but, as a result of no receptors, are not viewed or are seldom viewed.

4.1.4 Visual Resource Management Classes

These findings are then submitted to a VRM Matrix below. The VRM Classes are not prescriptive and are used as a guideline to determine the carrying capacity of a visually preferred landscape as a basis for assessing the suitability of the landscape change associated with the proposed project.

Table 13: VRM Class Matrix Table

		VISUAL SENSITIVITY LEVELS								
		High			Medium			Low		
SCENIC QUALITY	A (High)	II	II	II	II	II	II	II	II	II
	B (Medium)	II	III	III/ IV *	III	IV	IV	IV	IV	IV
	C (Low)	III	IV	IV	IV	IV	IV	IV	IV	IV
DISTANCE ZONES		Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen

* If adjacent areas are **Class III** or lower, assign **Class III**, if higher, assign **Class IV**

The visual objectives of each of the classes are listed below:

- The Class I objective is to preserve the existing character of the landscape, the level of change to the characteristic landscape should be very low and must not attract attention. Class I is assigned when a decision is made to maintain a natural landscape.
- The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.
- The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. The proposed development may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape; and
- The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.

4.1.5 Key Observation Points

During the Baseline Inventory Stage, Key Observation Points (KOPs) are identified. KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the Degree of Contrast (DoC) that the proposed landscape modifications will make to the existing landscape be measured from these most critical locations, or receptors, surrounding the property. To define the KOPs, potential receptor locations were identified in the viewshed analysis, and screened, based on the following criteria:

- Angle of observation.
- Number of viewers.

- Length of time the project is in view.
- Relative project size.
- Season of use.
- Critical viewpoints, e.g., views from communities, road crossings; and
- Distance from property.

4.2 Assessment and Impact Stage

The analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. This requires a contrast rating to assess the expected DoC the proposed landscape modifications would generate within the receiving landscape in order to define the Magnitude of the impact.

4.2.1 Contrast Rating

The contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of landscape modification is assessed by comparing and contrasting existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area.

The following criteria are utilised in defining the DoC:

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

As an example, in a Class I area, the visual objective is to preserve the existing character of the landscape, and the resultant contrast to the existing landscape should not be notable to the casual observer and cannot attract attention. In a Class IV area example, the objective is to provide for proposed landscape activities that allow for major modifications of the existing character of the landscape. Based on whether the VRM objectives are met, mitigations, if required, are defined to avoid, reduce or mitigate the proposed landscape modifications so that the visual impact does not detract from the surrounding landscape sense of place.

Based on the findings of the contrast rating, the Magnitude of the Landscape and Visual Impact Assessment is determined.

4.2.2 Photomontages

As a component in this contrast rating process, visual representation, such as photo montages are vital in large-scale modifications, as this serves to inform Interested & Affected Parties and decision-making authorities of the nature and extent of the impact associated with the proposed project/development. There is an ethical obligation in this process, as visualisation can be misleading if not undertaken ethically. In terms of adhering to standards for ethical representation of landscape modifications, VRMA subscribes to the Proposed Interim Code of Ethics for Landscape Visualisation developed by the Collaborative for Advanced Landscape Planning (CALP) (Sheppard, 2000). This code states that professional

presenters of realistic landscape visualisations are responsible for promoting full understanding of proposed landscape changes, providing an honest and neutral visual representation of the expected landscape, by seeking to avoid bias in responses and demonstrating the legitimacy of the visualisation process. Presenters of landscape visualisations should adhere to the principles of:

- Access to Information
- Accuracy
- Legitimacy
- Representativeness
- Visual Clarity and Interest

The Code of Ethical Conduct states that the presenter should:

- Demonstrate an appropriate level of qualification and experience.
- Use visualisation tools and media that are appropriate to the purpose.
- Choose the appropriate level of realism.
- Identify, collect and document supporting visual data available for, or used in, the visualisation process.
- Conduct an on-site visual analysis to determine important issues and views.
- Seek community input on viewpoints and landscape issues to address in the visualisations.
- Provide the viewer with a reasonable choice of viewpoints, view directions, view angles, viewing conditions and timeframes appropriate to the area being visualised.
- Estimate and disclose the expected degree of uncertainty, indicating areas and possible visual consequences of the uncertainties.
- Use more than one appropriate presentation mode and means of access for the affected public.
- Present important non-visual information at the same time as the visual presentation, using a neutral delivery.
- Avoid the use, or the appearance of, 'sales' techniques or special effects.
- Avoid seeking a particular response from the audience.
- Provide information describing how the visualisation process was conducted and how key decisions were taken (Sheppard, 2000).

4.3 Impact Methodology

The following impact criteria were used to assess visual impacts as they pertain specifically toward landscape and visual impacts. The standardised impact assessment criteria were not used as visual and landscape impacts require a unique approach to assessment. The criteria were defined by the Western Cape *DEA&DP Guideline for involving Visual and Aesthetic Specialists in EIA Processes* (Oberholzer, 2005)*, **are used to define the Visual Impact Significance**.*

Table 14. DEA&DP Visual and Aesthetic Guideline Impact Assessment Criteria Table.

Criteria	Definition
Extent	The spatial or geographic area of influence of the visual impact, i.e.: • *site-related:* extending only as far as the activity. • *local:* limited to the immediate surroundings. • *regional:* affecting a larger metropolitan or regional area. • *national:* affecting large parts of the country. • *international:* affecting areas across international boundaries.
Duration	The predicted life-span of the visual impact: • *short term,* (e.g., duration of the construction phase). • *medium term,* (e.g., duration for screening vegetation to mature). • *long term,* (e.g., lifespan of the project). • *permanent,* where time will not mitigate the visual impact.
Intensity / Magnitude	The magnitude of the impact on views, scenic or cultural resources. • *low,* where visual and scenic resources are not affected. • *medium,* where visual and scenic resources are affected to a limited extent. • *high,* where scenic and cultural resources are significantly affected.
Probability	The degree of possibility of the visual impact occurring: • *improbable,* where the possibility of the impact occurring is very low. • *probable,* where there is a distinct possibility that the impact will occur. • *highly probable,* where it is most likely that the impact will occur. • *definite,* where the impact will occur regardless of any prevention measures.
Significance	The significance of impacts can be determined through a synthesis of the aspects produced in terms of their nature, duration, intensity, extent and probability, and be described as: • *low,* where it will not have an influence on the decision. • *medium,* where it should have an influence on the decision unless it is mitigated. • *high,* where it would influence the decision regardless of any possible mitigation.

5 BASELINE VISUAL INVENTORY ASSESSMENT

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment (IEMA) as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'. It creates the specific sense of place or essential character and 'spirit of the place' (IEMA, 2002). This section of the VIA identified the main landscape features that define the landscape character, as well as the key receptors that make use of the visual resources created by the landscape.

5.1 Site Investigation

A field survey was undertaken to inform the landscape and visual impact assessment. During the site visit, photographs were taken from each viewpoint, and the view direction and GPS location captured. The main landuse was documented as well as the nature of the dominant landscape in the vista. In order to represent views of the proposed landscape modification by means of photomontages for assessment purposes, panoramic photographs were also taken from key viewpoints. The site survey locations mapped on the following page (Figure 4). The photographs are located in Annexure A.

Table 15: List of Sampling Sites where Landscape and Aesthetic Survey was Conducted

ID	FEATURE	REC_TIME	LATITUDE	LONGITUDE	ELEVATION	LOCALITY	VIEW DIRECTION
1	Alt 1	10/04/2021 20:45:49.284 SAST	-26.2184071	28.2698906	1659	Site	90
2	Alt 2	10/05/2021 11:45:25.000 SAST	-26.2196217	28.2669933	1659	Site	109
3	Alt 2 Mitigation	10/05/2021 11:51:11.556 SAST	-26.2207769	28.2667913	1659	Surrounds	210
4	Alt 3	10/05/2021 11:58:22.000 SAST	-26.2200983	28.265325	1656.2	Site	220
5	Alt 1	10/05/2021 12:10:16.000 SAST	-26.2172313	28.2647756	1651.3	Site	280
6	St Dominic's Street	10/05/2021 12:26:24.000 SAST	-26.221305	28.2676333	1660.6	Surrounds	20
7	St Dominic's School	10/05/2021 12:32:15.000 SAST	-26.2210033	28.26638	1653.7	Surrounds	220
8	Kruger Street	10/05/2021 12:49:15.000 SAST	-26.2202133	28.2635117	1653.4	Surrounds	85

The site investigation also flagged landscape features and receptors that should be taken into consideration, and that were communicated to the EAP for early planning. The following landscape value issues were flagged:

- Landscape strongly associated with a large-scale industry that strongly influences the local sense of place.
- ***Loss of mature trees that were likely planted to assist in reducing the visual intrusion of the industrial landscape as seen from the western residential and recreational areas, including St Dominic's School.***
- ***Loss of possible wetland resources with Alternative 2.***
- ***High levels of Visual Exposure to the St Dominic's Girls School (Alternative 3).***
- ***High levels of Visual Exposure to the Kruger Street (Alternative 3).***
- ***Loss of Public Open Space (Alternative 3) that is likely not to be supported in local and regional planning (pending further investigation).***

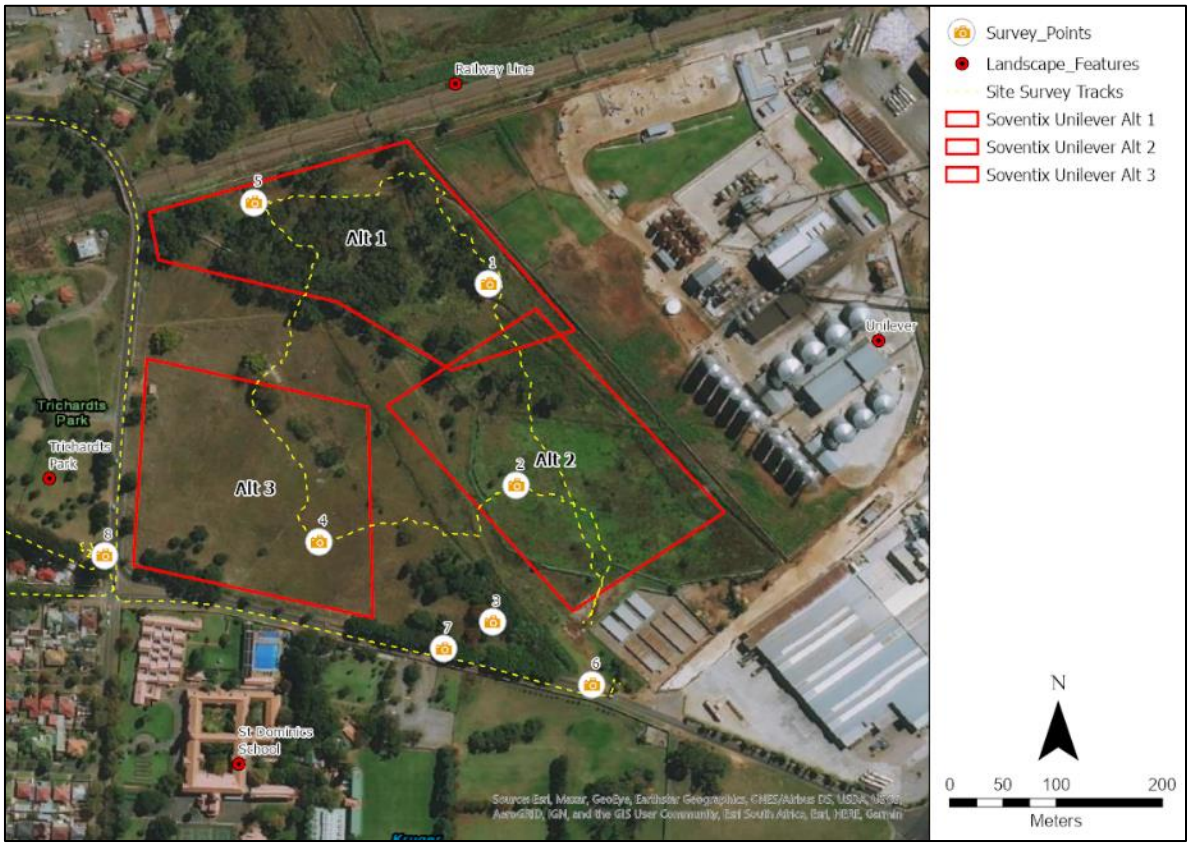


Figure 4: Survey Point Locality Map

5.2 Landscape Context

5.2.1 Regional Locality

The proposed Soventix SA 3.6MWp Solar Photovoltaic Power Station is located in Boksburg East on the East Rand within the City of Ekurhuleni Metropolitan Municipality. Boksburg was historically developed to serve the growing surrounding gold mines. Boksburg has a strong industrial nature with large factories in the area such as Colgate, Tiger Brands and Unilever.

Within the regional context, the property is located in Gauteng Province. Gauteng is highly urbanised and contains the largest city in South Africa, Johannesburg. Ekurhuleni Metropolitan Municipality is one of 5 districts within the Gauteng Province.

The proposed development falls within an industrial and historic mining area surrounded by residential area, including the St Dominic's Catholic School. No active agricultural activities are evident. The proposed site is surrounded by industry, mining and residential (Ecoleges Environmental Consultants). Also included in the landscape is Trichardts Park' located on a portion of the property, as well as to the west of Kruger Street. The park has numerous large trees in the vicinity that adds to the local sense of place, assisting in visual screening of the large Unilever industrial complex located to the east of the proposed site. Close proximity to the residential areas, park and school are likely to increase receptor sensitivity to landscape change, and as such, these areas would need to be included as Key Observation Points to assess the suitability of the landscape change.

5.2.2 Vegetation

Vegetation type has a large factor in determining the scenic quality or the site in terms of colour and texture, as well as influencing the local ability of the landscape to absorb the landscape change. The following paragraph and mapping outline the broad vegetation biome and type.

According to the South African National Biodiversity Institute 2012 Vegetation Map of South Africa, Lesotho and Swaziland, the Bioregion where the development is proposed is Mesic Highveld Grassland in a Grassland Biome. The SANBI vegetation data reflects the vegetation type as Soweto Highveld Grassland.

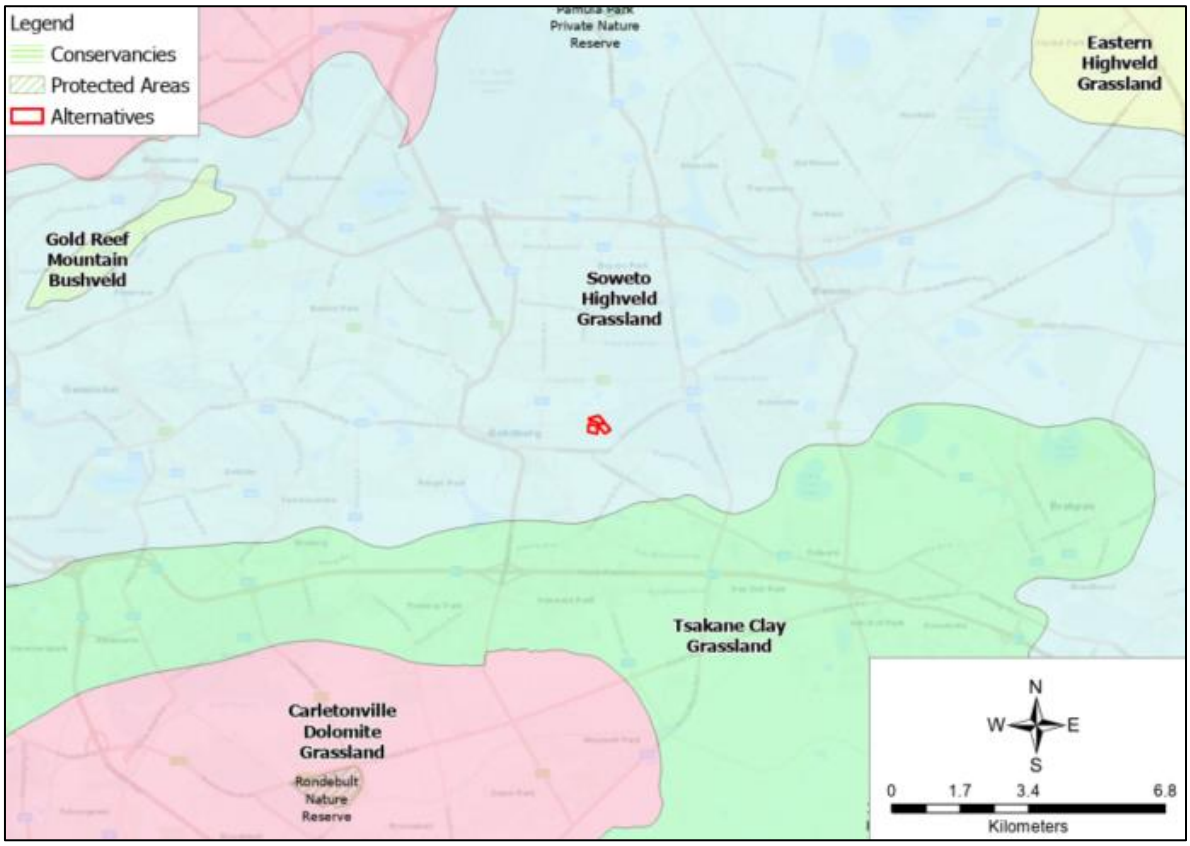


Figure 5. BGIS Vegetation Type Map (South African National Biodiversity Institute, 2018)

Figure 6. Photograph taken on Alternative 1 with Kikuyu grass and gum trees in the background.

Figure 7. Photograph taken on Alternative 3 of the mature trees that assist in visual screening.

Vegetation is largely Kikuyu grass and Eucalyptus sp. trees, with limited indigenous grass & tree species. The site visit also found that the mature non-indigenous trees on site, were effective in reducing visual exposure to the Unilever industrial site to the east of the property. As the trees assist in maintaining the residential/ St Dominic's School sense of

place, these mature trees should be retained as much as possible. The trees exclude the Eucalyptus sp. trees located on Alternative 1 site. The important screening trees are mapped in Figure 8.

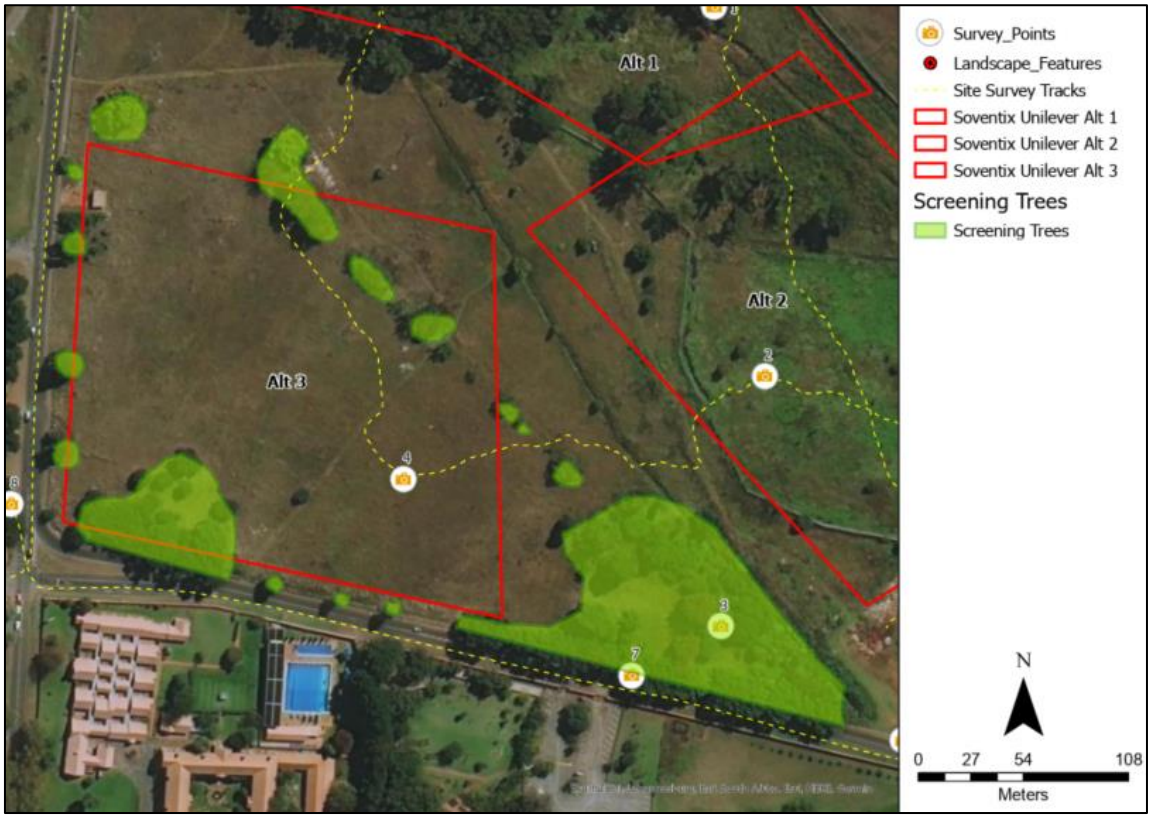


Figure 8. Map depicting important landscape screening trees.

According to the Ecoleges screening document, portions of the preferred footprint fall within a CBA according to the Ekurhuleni Bioregional Plan, as well as an ESA according to the Gauteng C-Plan and a Vulnerable Ecosystem (Ecoleges Environmental Consultants). Although limited evidence of the wetland was found on site during the site visit, a suitable setback should be incorporated as per the Surface Water Specialists findings, should the wetland be found to be of significance.

5.2.3 Mountain and Hill Features

The site visit found that no mountain or hill features were present within the study area, or within the approximate project zone of visual influence. The proposed site is predominantly flat with drainage to the north.

5.2.4 Infrastructure and Road Access

The proposed site is bordered by a railway line (North), secondary roads, Kruger Street to the West and St. Dominic's Street to the South and the Unilever facility to the East (Ecoleges Environmental Consultants). The site visit found a single power line routing (probably 88kV) across the site but was of a size and scale that did not detract from the existing semi-built sense of place. The road has trees planted along the routes that create an avenue effect and enhance the sense of place. The trees along the roads would also assist in reducing visual intrusion of some parts of the proposed landscape change.

Figure 9: Photograph of the power line routed to the north and central areas of the site.

5.2.5 Other Renewable Energy Projects

A mapping review found that no other renewable energy projects were proposed within the property zone of visual influence.

5.2.6 Nature Based Tourism Activities

As the area is located in a built environment that is strongly associated with industrial landscapes, no nature-based tourist activates were identified within the property. There is, however, a park located in the vicinity. As depicted in Figure 10 mapping, Alternative 3 is located on a portion of the park, with the main section of the park located to the east on the other side of Kruger Street. As the loss of public open space does influence the local sense of place, the development of Alternative 3 would need to be questioned in terms of planning alignment. Due to the close proximity of the other alternatives, Trichardts Park would need to be included as a KOP to assess the suitability of the landscape change.

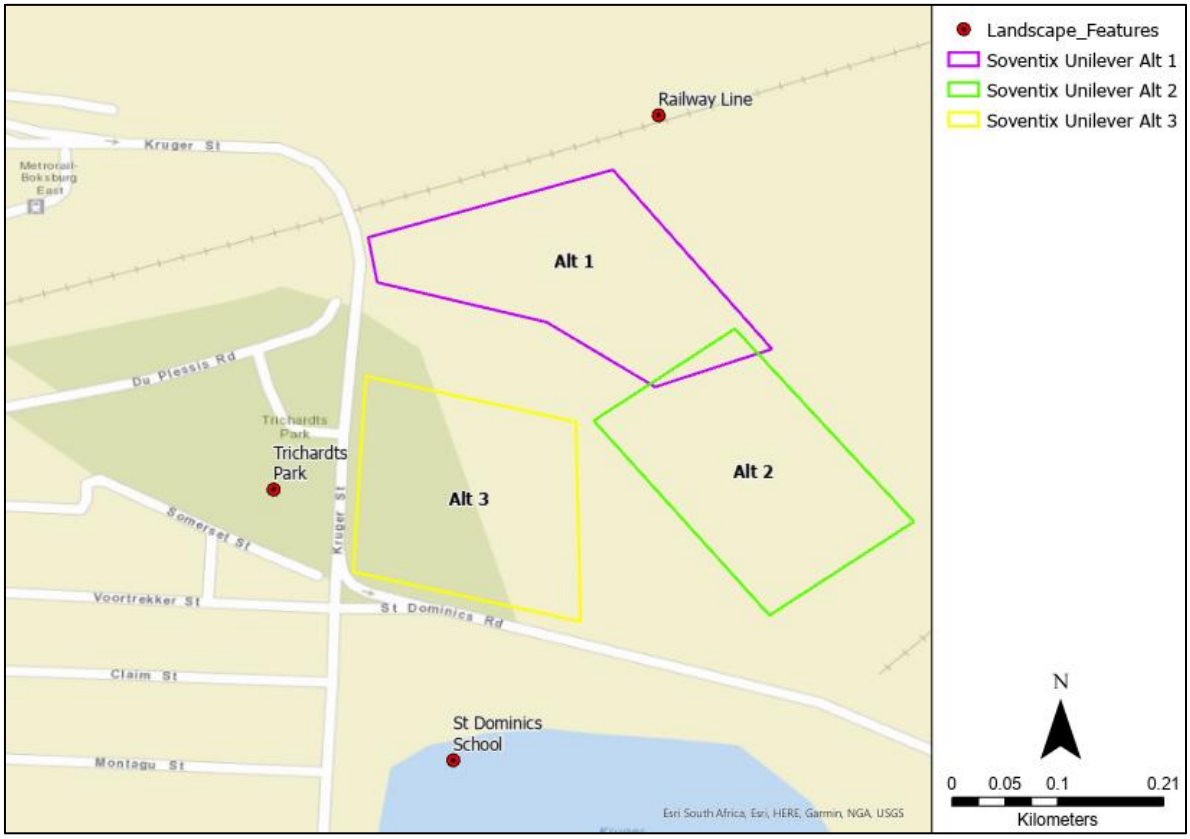


Figure 10: Project Alternatives proximity to Trichardts Park (Open Streets Mapping).

5.3 Project Zone of Visual Influence

The visible extent, or viewshed, is “the outer boundary defining a view catchment area, usually along crests and ridgelines” (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level as indicated in the Table 1 below, table making use of open-source NASA ASTER Digital Elevation Model data (NASA, 2009). The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities, which takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis

literature (Hull & Bishop, 1988). The viewshed is strongly associated with the regional topography and as such this topic is address before the viewshed analysis.

5.3.1 Regional Landscape Topography

Making use of the NASA STRM digital elevation model, profile lines were generated for the area within 8km on either side of the project area. The map depicting the terrain model and the profile lines can be viewed in Figure 11 below. As can be seen in Figure 12 & Figure 13, the terrain is slightly undulating with a regional drainage to low lying lands to the south-west via the Elsburgspruit River. The average elevation of the site is 1630mamsl, which is a mid-range elevation in both the elevation profiles. Other than a small 'koppie' at elevation 1700mamsl located to the north-west of the site, no other prominent landform features are apparent. The North to South Profile ranges from 1680mamsl in the north, to 1600mamsl in the south, a drop in elevation of 80 over approximately 12km. The proposed site is located in the mid-range. Elevated terrain to the north and south of the site is likely to reduce the viewshed in both these directions. The East to West Profile ranges from 1660mamsl in the East to a low of 1600mamsl in the East, a change on 60m over a distance of approximately 12km. Elevated terrain to the east is likely to reduce the viewshed in this direction, but open terrain to the west is likely to increase the visual exposure in this direction.

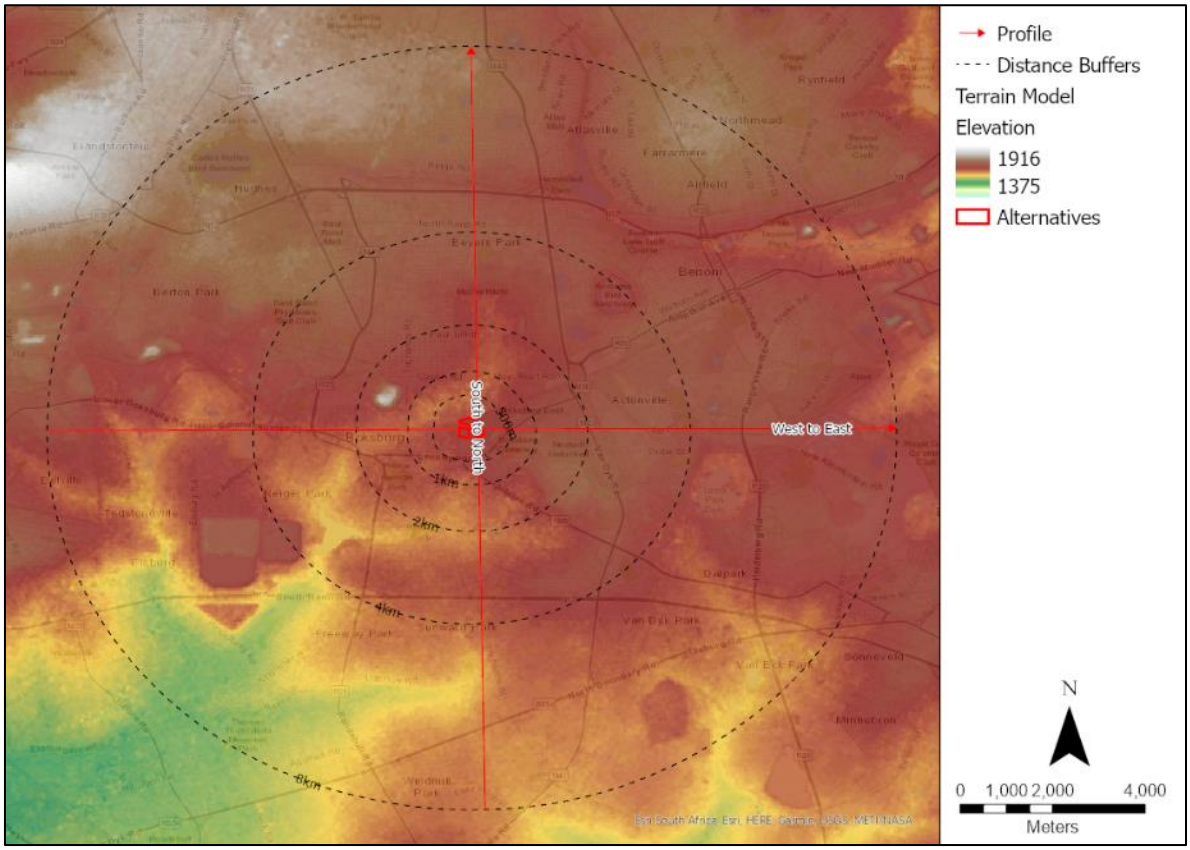


Figure 11: Regional Digital Elevation Model and Profile Line Locality Map

Figure 12: Google Earth North to South Terrain Profile Graph

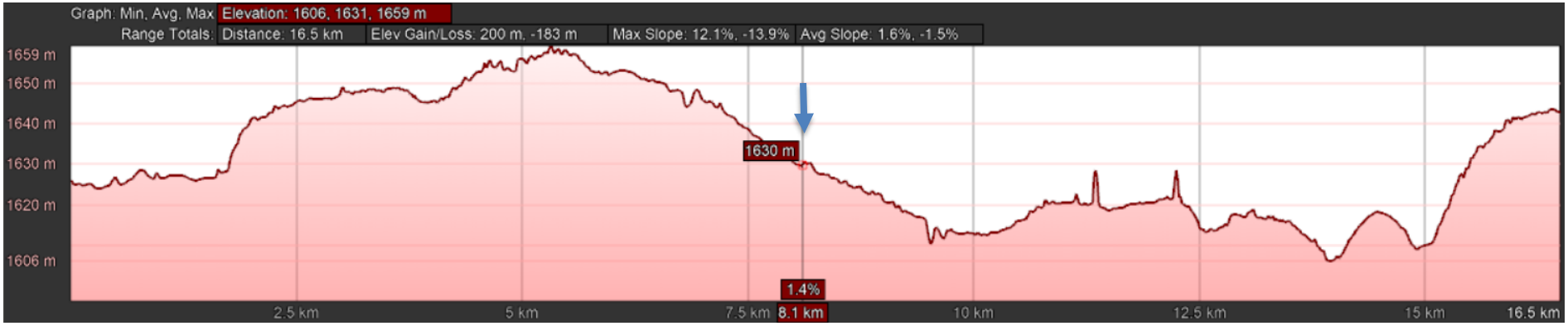


Figure 13: Google Earth East to West Terrain Profile Graph with the project site depicted by the arrow.

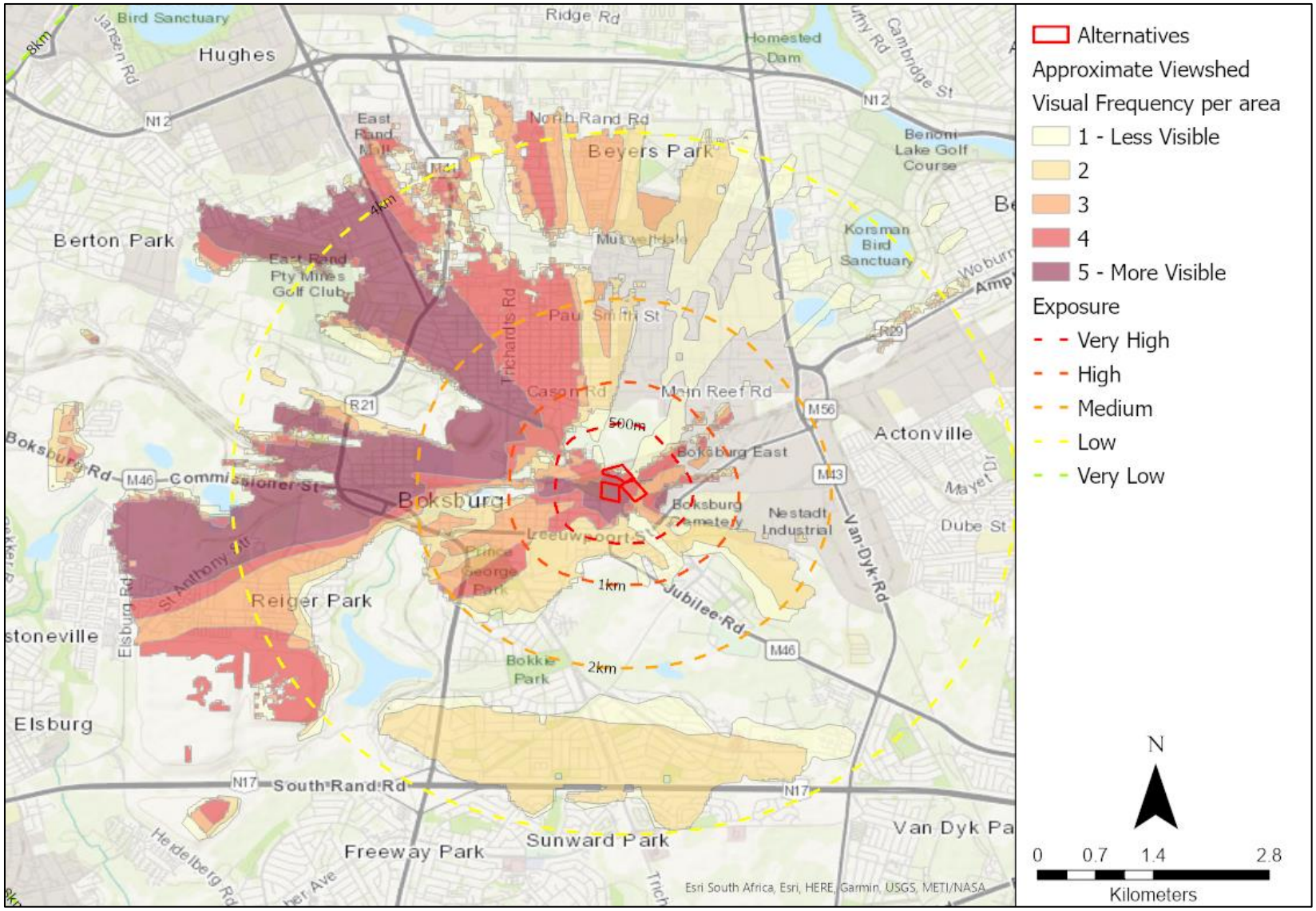


Figure 14: Project Viewshed with PV Offset 3.5m above ground capped at 14km.

5.3.2 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. The Offset value for the PV was set above ground to represent the approximate height of the proposed infrastructure as reflected in the table below.

Table 16: Proposed Project Heights Table

Proposed Activity	Approx. Height (m)	Terrain Model Extent
PV Option	3.5m	14km

Due to the close proximity of the three alternative sites with relatively similar heights, only a single viewshed analysis was generated. As can be viewed in Figure 14 on the previous page, the viewshed has the potential to be widespread, especially to the north and west. However, due to the built nature of the surrounds that do include a significant number of mature trees, the effective Zone of Visual Influence is likely to be much smaller. The site visit found that in most sectors, the influence of the landscape change is unlikely to exceed outside of the 500m Very High Exposure distance zone. The built nature of the surroundings, the trees and the industrial context to the east of the site all increase the Visual Absorption Capacity. This reduces the effective influence of the proposed landscape change. Due to the contained ZVI adjusted for the higher VAC levels, the Viewshed is expected to be Moderate to Low in extent.

5.4 Receptors and Key Observation Points

As defined in the methodology, KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. The following table identifies the receptors identified within the ZVI, as well as motivates if they have significance and should be defined as KOP for further evaluation in the impact assessment phase. The receptors located within the ZVI, and KOPs view lines are indicated the map on the following page. As mapped in Figure 15 and motivated in Table 17 below, the following receptors have been identified, some of which are identified as Key Observation Points with motivation. These KOPs are likely to be the locations from where the landscape change is most likely to influence, and as such should be used as locations to assess the suitability of the landscape change.

Table 17: Receptor and KOP Motivation Table.

Name	KOP	Motivation
St Dominic's Street	No	Located within close proximity to an industrial area with clear views of industrial landscapes, receptor sensitivity to landscape change is unlikely to be high.
St Dominic's School	**Yes**	While receptors located on the ground level portions of the school property will be unlikely to see the proposed landscape change due to the large perimeter wall around the school, upper storey classrooms will afford scholars views of the sites. The entrance to the school is located on St Dominic's Street, with clear views of the proposed landscape changes that could influence the local sense of place.

Trichardts Park (Kruger Street)	**Yes**	Loss of Public Open Space and degradation of park sense of place.
Eastern Residential	No	The built nature of the residential areas that are clearly defined by many street trees, effectively screening the landscape change.

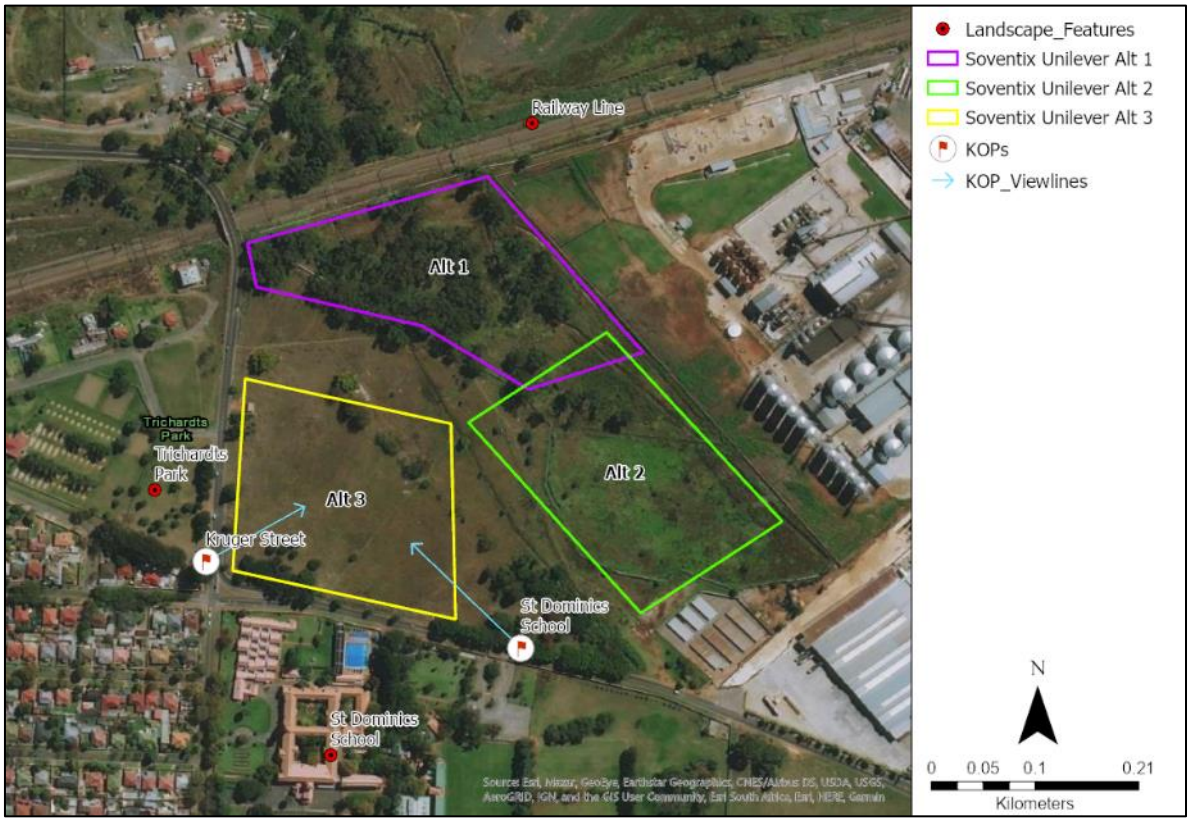


Figure 15: Key Observation Point Map.

6 VISUAL RESOURCE MANAGEMENT

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. Making use of the key landscape elements defined in the landscape contextualisation sections above, landscape units are defined which are then rated to derive their intrinsic scenic value, as well as how sensitive people living in the area would be to changes taking place in these landscapes.

6.1 Physiographic Rating Units

The Physiographic Rating Units are the areas within the proposed PV development area that reflect specific physical and graphic elements that define a particular landscape character. These unique landscapes within the project development areas are rated to assess the scenic quality and receptor sensitivity to landscape change, which is then used to define a Visual Resource Management Class for each of the site's unique landscape/s. The exception is Class I, which is determined based on national and international policy / best practice and landscape significance and as such are not rated for scenic quality and receptor sensitivity to landscape change. Based on the SANBI mapping and the site visit to define key landscape features, the following broad-brush vegetation were tabled.

The Site Locality Map can be seen in Figure 17 above. The property is currently zoned Agriculture, and the current land use of the proposed properties is informal used as open space.

Table 18: Physiographic Landscape Rating Units.

Landscapes	Motivation
Screening Trees	Trees strategically planted to reduce visual exposure to Unilever industrial landscape context. Important in terms of maintaining the remaining sense of place for eastern residential and St Dominic's School receptors.
Eucalyptus Trees	Located to the north of the property, a cluster of Eucalyptus Trees have self seeded, creating a dense thicket of trees. Lack of visibility in this area is facilitating illegal dumping and is likely to become a threat for land invasion/ crime.
High Exposure Field	Flat kikuyu grassed area that has very High Exposure to the eastern Unilever industrial landscape degrading the local sense of place.
Medium Exposure Field	Flat kikuyu grassed area that is partially screened from the eastern Unilever industrial landscape, effectively creating a visual buffer area from the eastern industrial landscape context.
Wetland	NFEPA Wetland that needs to be protected and is defined as a non-development area.

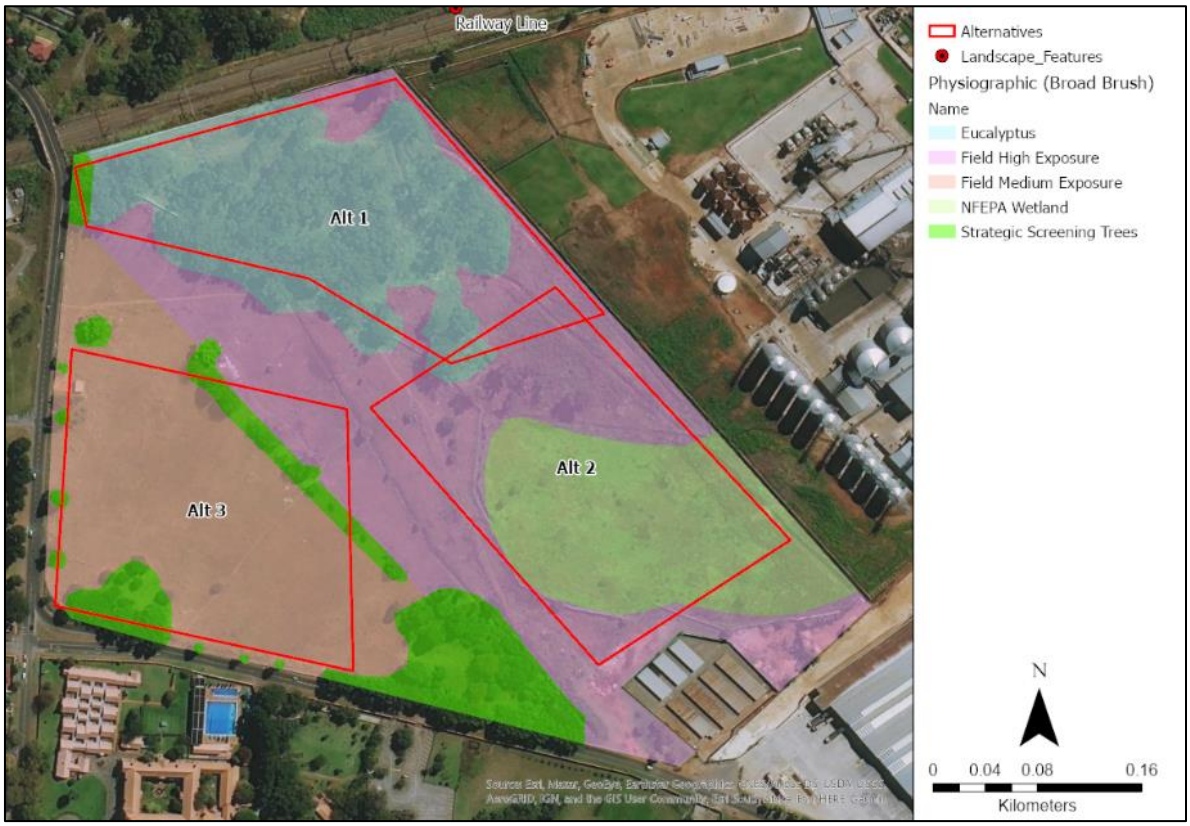


Figure 16: Physiographic Rating Units overlay onto Satellite Image Map.

Table 19: Scenic Quality and Receptor Sensitivity Rating.

Landscape Rating Units	**Scenic Quality**									**Receptor Sensitivity**						**VRM**	
	A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11									H = High; M = Medium; L = Low							
Attribute	**Landform**	**Vegetation**	**Water**	**Colour**	**Scarcity**	**Adjacent Landscape**	**Cultural Modifications**	**Sum**	**Rating**	**Type of Users**	**Amount of Use**	**Public Interest**	**Adjacent Land Uses**	**Special Areas**	**Rating**	**Inventory Class**	**Management Class**
Ecologically Sensitive • Wetland	**(Class I is not rated)**																
Screening Trees	1	3	0	4	5	1	5	**19**	**A**	H	H	M	M	L	**M**	**II**	**II**
Eucalyptus Trees	1	2	0	2	2	1	1	**9**	**C**	L	H	L	L	L	**L**	**IV**	**III**
High Industrial Exposure Field	1	1	0	1	1	1	-1	**5**	**C**	L	L	L	L	L	**L**	**IV**	**III**
Medium Industrial Exposure Field	1	1	0	1	3	2	2	**10**	**B**	H	H	M	M	H	**H**	**II**	**II**

Red colour indicates change in rating from Visual Inventory to Visual Resource Management Classes motivated in the following section.

The ***Scenic Quality*** scores are totalled and assigned an A (High scenic quality), B (Moderate scenic quality) or C (Low scenic quality) category based on the following split: *A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11* (USDI., 2004).
Receptor Sensitivity levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the key factors relating to the perception of landscape change in terms of Low to High.

6.2 Scenic Quality Assessment

The overall Scenic quality is rated at Medium to Low due to the close proximity of the Unilever industrial complex. The features that are creating the most scenic appeal are the mature screening trees located to the west and north of the site. With linear and clumped planting pattern, these multi species trees create an interesting pattern, adding colour and texture variation to the otherwise bleak landscape. The Eucalyptus trees add some value but are uniform in colour, and do not effectively screen the eastern receptors from views of the industrial site. The close proximity of the High Exposure Field degrades the local landscape, where clear views of the adjacent factory significantly lower site scenic quality. The Medium Exposure Fields are partially screened from the full influence of the industrial development, creating a more park-like setting aligned with Trichardts Park along Kruger Street.

6.3 Receptor Sensitivity Assessment

The general rating for receptor sensitivity to landscape change is Medium to High. While the close proximity to the industrial setting is likely to reduce receptor sensitivity to landscape change, the landscape elements that assist in screening these views are likely to have higher sensitivity attachments. This is related to the open space between the school/ residence/ park areas, as well as the screening trees, most likely planted to screen the views of the Unilever site. This is likely to increase the landscape significance applied to these elements, due to the screening and exposure reduction role that they currently perform. As such, the Eucalyptus and High Exposure Field areas are rated Low, but the eastern open space portions as the Screening Trees, are rated High.

6.4 Visual Resource Management (VRM) Classes

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix below:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value
iii. **Class IV** is of least value

6.4.1 Class I

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape, the level of change to the characteristic landscape should be very low and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process.
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.
- Any heritage area identified as having a high significance.

As such, the wetland area and the setback buffer is defined as a No-go area for development.

6.4.2 VRM Class II

The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.

- Screening Trees.
- Medium Exposure Field (western portions of the property).

Although only Medium to High levels of Scenic Quality, the higher sensitivity to landscape change to these areas and elements in the landscape were assigned a Class II Visual Objective to ensure that the sense of place of the western residents, school and Trichardt Park remains the same for these close proximity receptors.

6.4.3 VRM Class III

The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The following landscape was defined as having Class III Visual Objectives where development would be most suitable:

- Eucalyptus grove.
- High Industrial Exposure Areas (eastern portion of the property).

Although the Visual Inventory was assigned a Class IV due to low scenic quality and medium receptor sensitivity, a Visual Management Class III was assigned as these areas do currently fulfil a buffering and screening role in the landscape. While some landscape change would be accepted, the change should be moderated to allow existing landscape functioning.

6.4.4 VRM Class IV

The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.

Due to the close proximity to the area to the Trichardts Park, the St Dominic's Schools as well as western residential areas, no Class IV areas were defined.

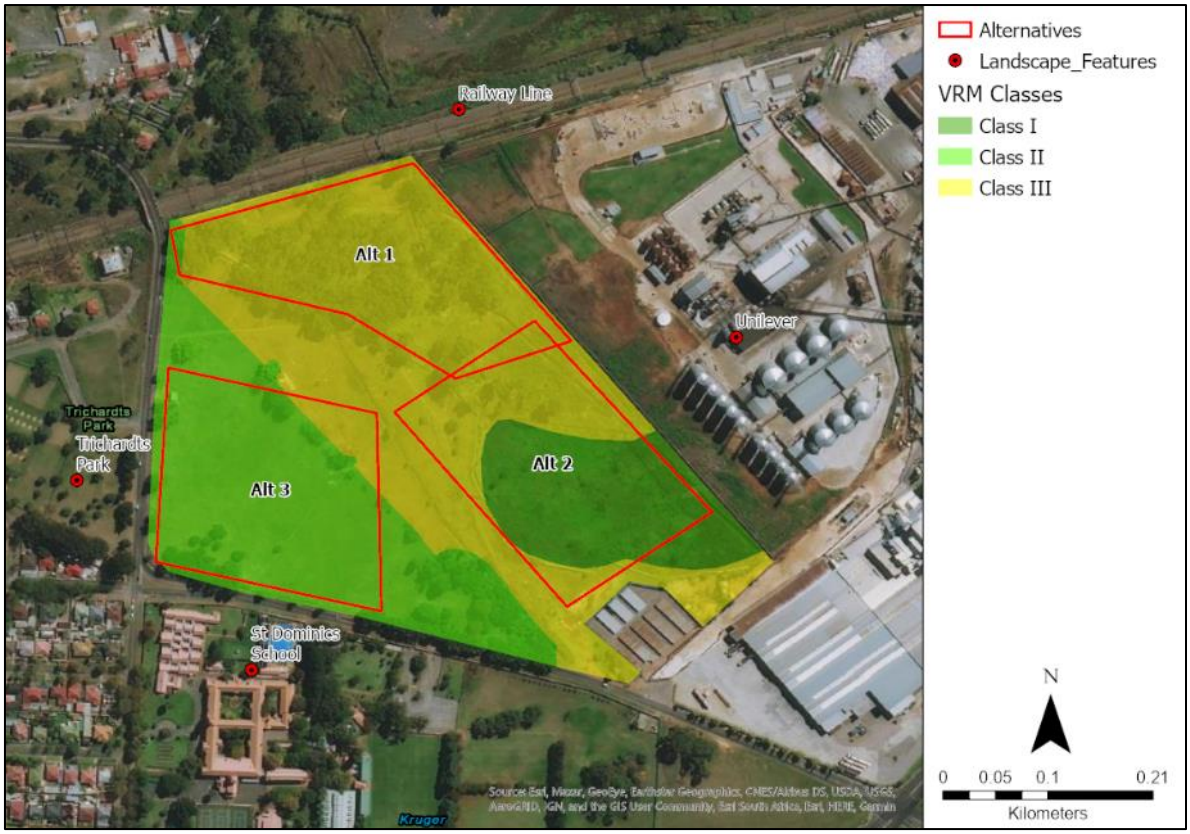


Figure 17: Visual Resource Management Class Map.

7 VISUAL IMPACT ASSESSMENT

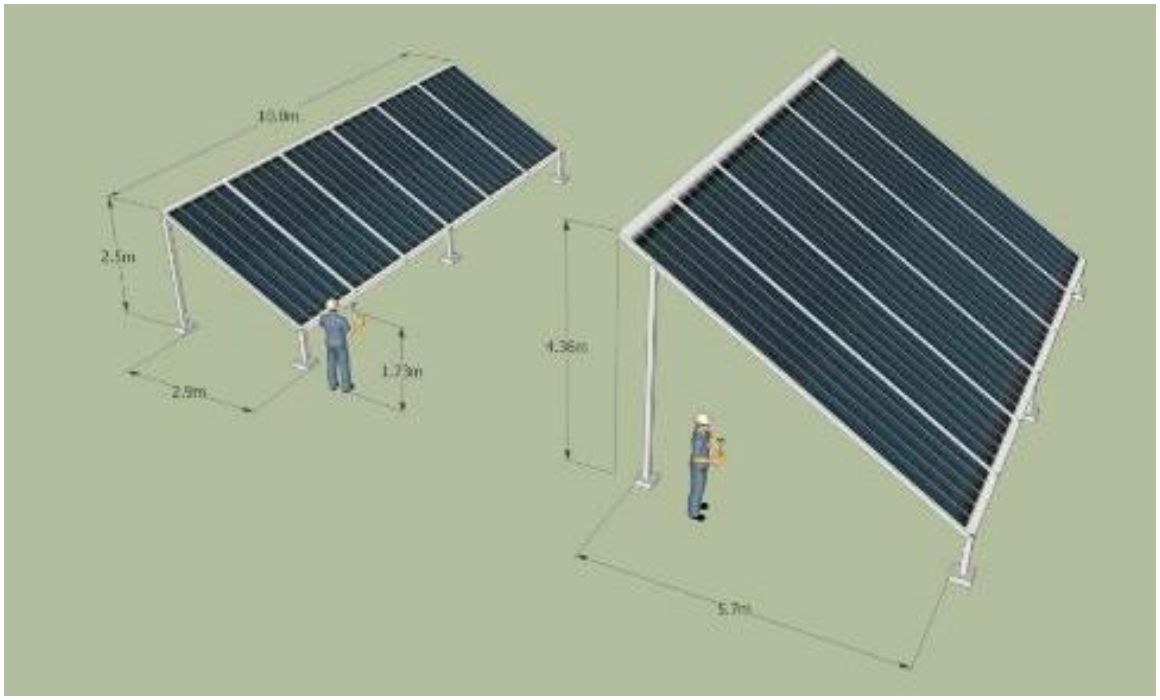
Impacts are defined in terms of the standardised impact assessment criteria provided by the environmental practitioner. Using the EAP impact assessment criteria, the potential environmental impacts identified for the project were evaluated according to severity, duration, extent and significance of the impact. The potential occurrence and cumulative impact (as defined in the methodology) was also assessed. In order to better understand the nature of the severity of the visual impacts, a Contrast Rating exercise was undertaken.

7.1 Photomontages

As a component in this contrast rating process, visual representation, such as photo montages are vital in large-scale modifications, as this serves to inform Interested & Affected Parties and decision-making authorities of the nature and extent of the impact associated with the proposed project/development.

Due to limited views of Alternative 1 & 2 (in general), as seen from the St Dominic's School entrance, an interpretation of the proposed PV landscape change was generated from Trichardts Park region along Kruger Road ***for Alternative 3 only***.

Limitations of the images include the lack of specifications in terms of final layout, as well as utilisation of an approximation of the increased views of the Unilever Plant. The following images were used to inform the landscape change graphics.



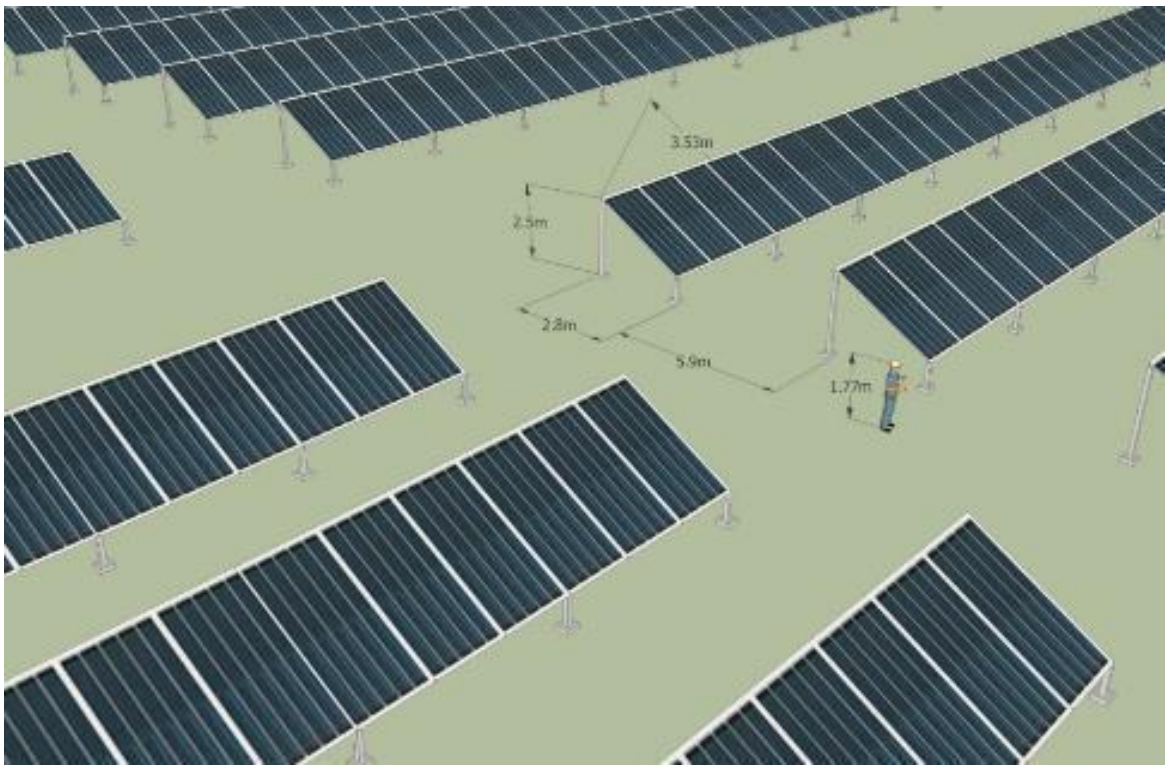


Figure 18: Photographic 3D model used to inform the photomontages showing 2.5m height versus 4.3m height.

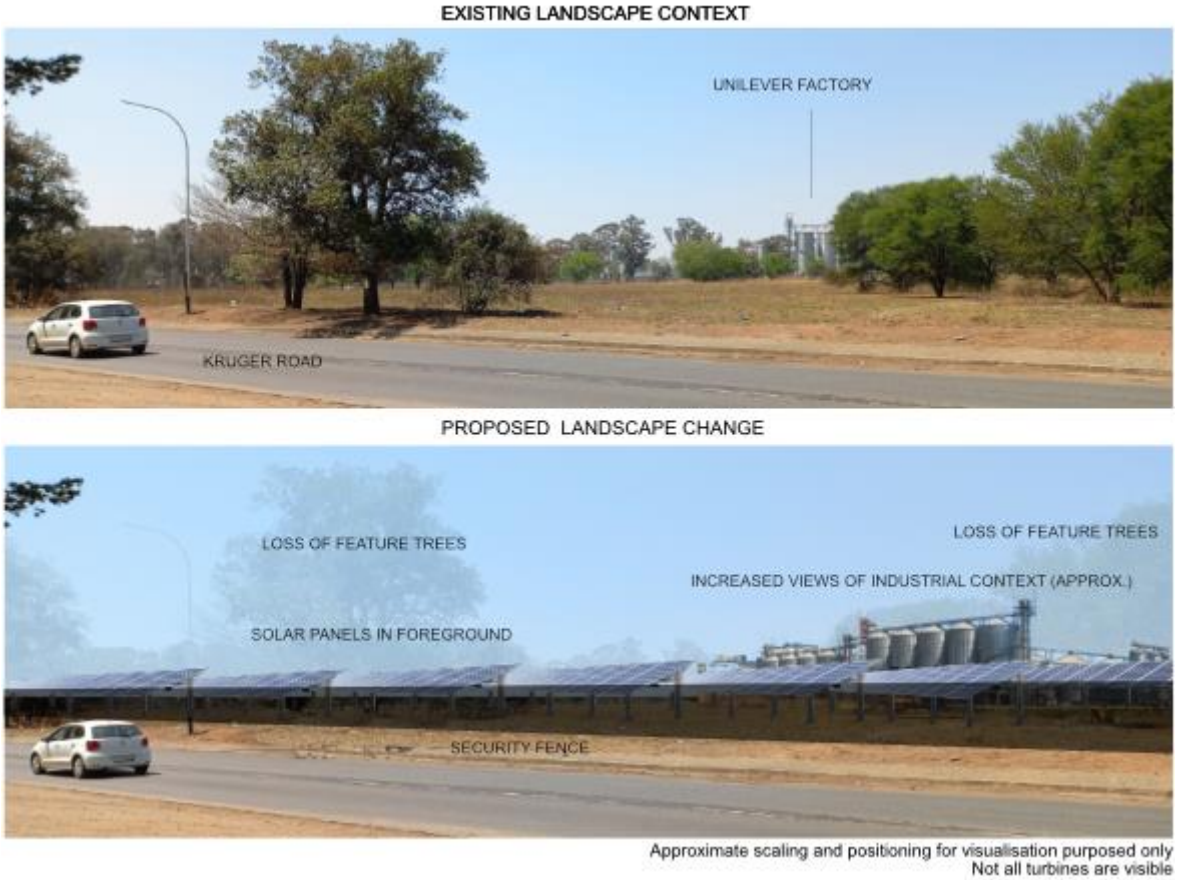


Figure 19. Approximate representation of the proposed PV landscape change as seen from Trichardts Park (Kruger Road).

7.2 Contrast Rating

As indicated in the methodology, a contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of a landscape modification is assessed by comparing and contrasting the existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area.

The following criteria are utilised in defining the DoC:

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

7.2.1 Alternative 1 Contrast Rating.

Table 20: Contrast Rating Key Observation Points for Alternative 1.

	Exposure			Landscape Elements					
Key Observation Point	**Distance**	**Exposure**	**Mitigation**	**Form**	**Line**	**Colour**	**Texture**	**Degree of Contrast**	**Visual Objectives Met?**
St Dominic's School	50m	Medium to Low	W/Out	W	M	M	M	M	Y
			With	W	W	W	W	W	Y
Trichardts Park	160m	Medium	W/Out	W	M	S	S	M	N
			With	W	W	M	M	M	Y

** S = Strong, M = Medium, W = Weak, N = None*

As seen from St Dominic's School, the trees along St Dominic's Road and in the field have limited clear views of the Alternative 1 PV landscape change. All the landscape elements will be dissipated to some degree by the foreground trees effectively screening the PV landscape change. With mitigation, the Line, Colour and Texture elements can be further reduced by increasing the planting of trees along St Dominic's Road, as well as placing a 2.4m high concrete palisade fence along the northern and western boundary. As such, the Class III would be met as seen from this locality with mitigation.

As seen from Trichardts park, the Form will remain limited due to distance and relative flat terrain, but strong Line, Colour and Texture contrast will be generated by the clear views of the Panels that will be black in colour, strongly horizontal in line and shiny in texture. With mitigation and increasing the existing precedent for trees along Kruger Road, the contrast can be reduced to Medium to Low. As such, the Class III would be met as seen from this locality with mitigation.

7.2.2 Alternative 2 Contrast Rating.

Table 21: Contrast Rating Key Observation Points for Alternative 2.

	Exposure			Landscape Elements					
Key Observation Point	**Distance**	**Exposure**	**Mitigation**	**Form**	**Line**	**Colour**	**Texture**	**Degree of Contrast**	**Visual Objectives Met?**
St Dominic's School	120m	Medium to Low	W/Out	W	M	M	M	M	Y
			With	W	W	W	W	W	Y
Trichardts Park	300m	Medium	W/Out	W	M	W	W	W	Y
			With	W	W	M	M	M	Y

** S = Strong, M = Medium, W = Weak, N = None*

As seen from St Dominic's School, the trees along St Dominic's Road and in the field, limited clear views of the Alternative 2 PV landscape change. All the landscape elements will be

dissipated to some degree by the foreground trees effectively screening the PV landscape change. As such, the Class III would be met as seen from this locality without mitigation.

As seen from Trichardts park, contrast will be Moderate or Weak due to the 300m distance with the stronger Line, Colour and Texture contrast absorbed by the backdrop of the Unilever industrial plant in the background. As such, the Class III would be met as seen from this locality with mitigation.

While visibility will be limited, the loss of landscape character of the wetland would be significant. ***As such, development of PV panels in the wetland area would need to be considered as a fatal flaw.***

7.2.3 Alternative 3 Contrast Rating.

Table 22: Contrast Rating Key Observation Points for Alternative 3.

	Exposure			**Landscape Elements**					
Key Observation Point	**Distance**	**Exposure**	**Mitigation**	**Form**	**Line**	**Colour**	**Texture**	**Degree of Contrast**	**Visual Objectives Met?**
St Dominic's School	120m	Medium to Low	W/Out	S	S	S	S	S	N
			With	M	M	S	S	S	N
Trichardts Park	300m	Medium	W/Out	S	S	S	S	S	N
			With	S	S	S	S	S	N

** S = Strong, M = Medium, W = Weak, N = None*

As seen from both Key Observation Points, the very close proximity of the site to the school, would afford second level views of the PV panels with High Exposure. Limited tree screening results in Strong levels of visual contrast by the black form and horizontal line of the panels that will be shiny in texture. Loss of strategic screening trees would also result in strongly views of the Unilever Plant, creating secondary visual impacts.

As the loss of landscape character is likely to be significant with limited potential for mitigation, ***development of PV panels in close proximity to the school and the park area is not recommended.***

7.3 PV Project Impact Ratings and Motivation

The following visual impacts could take place during the lifetime of the ***proposed PV*** project:

Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the PV structures and associated infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.

Operation:

- Massing effect in the landscape from a large-scale modification.
- On-going soil erosion.
- On-going windblown dust.

Decommissioning:

- Movement of vehicles and associated dust.
- Wind-blown dust from the disturbance of cover vegetation / gravel.

Cumulative:

- A long-term change in land use setting a precedent for other similar types of solar energy projects.

7.3.1 Alternative 1 Impact Assessment

Table 23: Preferred Alternative 1 PV Impact Table

Phase	Mitigation	Nature	Extent	Duration	Magnitude	Probability	Significance without	Significance with
Cons.	W/Out	-ve	Local	Short	Med	P	Med	
	With	-ve	Local	Short	Low	P		Low
Ops.	W/Out	-ve	Local	Long	Med	P	Med	
	With	-ve	Local	Long	Med	P		Med to Low
Close	W/Out	-ve	Local	Short	Med	P	Med	
	With	-ve	Local	Short	Low	P		Low
Cuml. Risk	W/Out	-ve	Local	Long	Med	P	Low	
	With	-ve	Local	Long	Med	P		Low

Nature of the Impact

The nature of impact of the Preferred PV Option is rated Negative. The proposed PV landscape has the potential to generate higher levels of colour, form, texture and line contrast to the existing agricultural landscape. In the No-Go option the area is rated Positive as the open space does assist in creating a buffer between the western residential areas and the eastern industrial areas.

Extent of the Impact

Due to the moderately undulating and built environment that includes many trees, the Extent of the Visual Impact is defined as Local. Existing mature trees to the west of the proposed PV site would be effective in containing the Zone of Visual Influence. The Visual Absorption Capacity is also higher due to the proximity to the Unilever Plant.

Duration of the Impact

The Construction and Decommissioning Phases are rated Short Term as the development/ deconstruction is likely to be concluded within one year. Operation Phase is rated Long-Term as the project is likely to remain in the landscape for 20 years. The No-Go Option is expected to be Long Term as no evidence of development is apparent on the property belonging to Unilever.

Magnitude of the Impact

The Magnitude of the PV project Construction and Decommissioning is rated Medium before mitigation, as dust generated from the removal of the vegetation has the potential to become a nuisance factor in the region. With management of wind-blown and vehicle dust, the Magnitude of the impact would be reduced to Low for these phases. For Operational Phases, the Magnitude is rated Medium with and without mitigation. This is due to the longer time period for the additional screening trees to become established to assist in reducing the Magnitude of the visual impact.

Probability of the Impact

Probability of the visual impacts taking place is defined as Probable. The proposed project is relatively large in scale and will be noticeable to some degree within the local area, but with the intensity of the landscape change varying in relation to the mitigation applied.

Confidence of the Impact

The impact ratings for the Preferred Alternative were defined as Certain as sufficient information was provided regarding the nature of the landscape modification in relation to the main key observation points. Due to the lack of knowledge regarding the future changes to the status quo, the confidence was rated Unsure.

Reversibility of the Impact

Due to the limited necessity for major earthworks in the construction of the PV project, the PV project was defined as Reversible, as the existing agricultural landscape could be re-established to some degree with the removal of all the panels. It is likely that the Kikuyu grass would re-establish within a short time-period.

Resource Irreplaceability of the Impact

The existing property is not degraded but has no resource significance as the terrain is flat, there are no obvious drainage lines and vegetation is predominantly alien trees.

Mitigability of the Impact

Planting further trees along Kruger and St Dominic's would assist in reducing the intensity of the PV views to some degree. Mitigability is thus defined as Medium to High.

Visual Significance of the Impact

The Significance of the Visual Impact for Construction and Decommissioning Phases is rated Medium without mitigation, and Low with Mitigation. Dust impacts can be effectively mitigated. Visual Impact Significance for Operational Phase is rated Medium without mitigation, reduced to Medium to Low with mitigation. The shorter time periods and limited extent moderate the impacts for Construction and Decommissioning Phases. For Operational Phase, while the time period is long, landscape change will be partially noticed by the receptors retaining existing screening trees, with the potential for further screening trees to be planted. The Significance is moderated by the lower scenic quality of the site and immediate surrounding landscapes, that do include High Exposure Views of the adjacent Unilever Plant.

The Visual Impact Significance of the No-Go option is rated Medium to Low, as the visual resources of the site are low with limited influence on local scenic quality. The thicket of

gum trees also reduces visibility, potentially creating a 'dangerous space' that could be perceived as a threat to community.

Cumulative Impact Assessment

Negative cumulative effects are mainly related to the degradation of the surrounding landscapes due to higher visual contrast generated by structural intrusion and visual massing where large areas of PV panels change the sense of place. In these instances, the sense of place in the landscape sense of place is already dominated by the adjacent Unilever industrial context, limiting the change to the local sense of place. The site is also well set back and screened from the adjacent residential and institutional related receptors. As such, the Cumulative Impact is rated Low with mitigation. With successful rehabilitation of the area back to Kikuyu, the cumulative visual risk could be reduced to negligible in the long term.

7.3.2 Alternative 2 Impact Assessment

Due the location of the wetland on the majority of the site, development of the Alternative 2 PV project would result in a High Significance Landscape Impact. For this reason, no assessment of this alternative has been undertaken as this development option is ***considered a Landscape Impact Fatal Flaw and is not recommended.***

7.3.3 Alternative 3 Impact Assessment

Table 24: Alternative 3 PV Impact Table

Phase	Mitigation	Nature	Extent	Duration	Magnitude	Probability	Significance without	Significance with
Cons.	W/Out	-ve	Local	Short	Med	P	High	
	With	-ve	Local	Short	Low	P		Med to High
Ops.	W/Out	-ve	Local	Long	Med	P	High	
	With	-ve	Local	Long	Med	P		High
Close	W/Out	-ve	Local	Short	Med	P	High	
	With	-ve	Local	Short	Low	P		Med to High
Cuml. Risk	W/Out	-ve	Local	Long	Med	P	High	
	With	-ve	Local	Long	Med	P		High

Nature of the Impact

The nature of impact of the Preferred PV Option is rated Negative. The proposed PV landscape has the potential to generate higher levels of colour, form, texture and line contrast to the existing agricultural landscape. In the No-Go option the area is rated Positive as the open space does assist in creating a buffer between the western residential areas and the eastern industrial areas.

Extent of the Impact

Due to the moderately undulating and built environment that includes many trees, the Extent of the Visual Impact is defined as Local. Existing mature trees to the west of the proposed

PV site would be effective in containing the Zone of Visual Influence. The Visual Absorption Capacity is also higher due to the proximity to the Unilever Plant.

Duration of the Impact

The Construction and Decommissioning Phases are rated Short Term as the development/ deconstruction is likely to be concluded within one year. Operation Phase is rated Long-Term as the project is likely to remain in the landscape for 20 years. The No-Go Option is expected to be Long Term as no evidence of development is apparent on the property belonging to Unilever.

Magnitude of the Impact

The Magnitude of the PV project Construction and Decommissioning is rated High before mitigation, as dust generated from the removal of the vegetation has the potential to become a nuisance factor in the region. With management of wind-blown and vehicle dust, the Magnitude of the impact would be reduced to Medium to Low for these phases. The Construction Phase will also result in the loss of trees along the St Dominic's and Kruger Roads that effectively screens the eastern industrial context from the western residential and institutional receptors located in Very High Exposure distance zone. For Operational Phases, the Magnitude is rated High with and without mitigation. This is due to the loss of sense of place of the trees, extending the industrial landscape context up to the roads.

Probability of the Impact

Probability of the visual impacts taking place is defined as Definite. The proposed project is relatively large in scale and will be clearly noticeable within the local area.

Confidence of the Impact

The impact ratings for the Preferred Alternative were defined as Certain as sufficient information was provided regarding the nature of the landscape modification in relation to the main key observation points. Due to the lack of knowledge regarding the future changes to the status quo, the confidence was rated Unsure.

Reversibility of the Impact

Due to the necessity for the removal of the trees along the adjacent roads, and the long time periods to regrow these screening trees, the impact is defined as Non-Reversible.

Resource Irreplaceability of the Impact

The existing property is mapped as a Public Open Space in Open Street Mapping. The park status thus requires verification. Should the site zoning be listed as Public Open Space (PoS), the Resource Irreplaceability is rate High.

Mitigability of the Impact

Due to the very close proximity of the PV project to the receptors, and the conflict between shade trees and PV insolation requirements, mitigability is thus defined as Low as screening trees would not be able to be planted along the roads.

Visual Significance of the Impact

The Significance of the Visual Impact for Construction and Decommissioning Phases is rated High without mitigation, and Medium to High with Mitigation. This is due to the short

time periods of the dust impacts that can be effectively mitigated. However, as the Construction Phase would require the removal of strategic screening trees, visual impact from the Unilever Plant will become more dominant. Visual Impact Significance for Operational Phase is rated High with and without mitigation. The loss of the PoS, as well as the negative landscape influence on the St Dominic's School is likely to degrade these visual resources.

The Visual Impact Significance of the No-Go option is rated Medium to Low, as the visual resources of the site are low with limited influence on local scenic quality. The thicket of gum trees also reduces visibility, potentially creating a 'dangerous space' that could be perceived as a threat to community.

Cumulative Impact Assessment

The cumulative effects are rated High with and without Mitigating. This relates to the setting of a strong negative precedent for land-use change in close proximity to recreation and residential receptors, in a regional landscape that is limited in landscape resources.

8 PRELIMINARY ENVIRONMENTAL MANAGEMENT PLAN

8.1 PV Solar Power Project Components

8.1.1 Construction Phase

- Following the removal of the vegetation, wind-blown dust during construction should be monitored by the ECO to ensure that it does not become a nuisance factor to the local receptors. Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the ECO.
- Topsoil from the footprints should be stockpiled dealt with in accordance with EMP for rehabilitation.
- All proposed buildings should be painted a grey-brown colour.
- Fencing needs to be the Truview type and black in colour. This offers some visual screening, as well as stopping wind-blown litter.
- Signage on the adjacent roads should be moderated.
- The height of the PV panels should not exceed 3.5m above ground level without further visual and landscape impact assessment.
- With permission from the local council, planting of suitable fast-growing trees along the St Dominic's and Kruger Road to further reduce visual screening and add to the sense of place.

8.1.2 Operation Phase

- Continued erosion control and management of dust.
- Continued maintenance of the screening trees planted along the roads.

8.1.3 Decommissioning Phase

- All structures should be removed and where possible, recycled.
- Building structures should be broken down (including foundations).
- The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused.

- All compacted areas should be ripped to a depth of 500cm to loosen the soil, and then rehabilitated according to a rehabilitation specialist

9 PRELIMINARY OPPORTUNITIES AND CONSTRAINTS

9.1 Alternative 1

Opportunities

- The ZVI is contained to some degree by local built environment that includes numerous mature trees. This would result in a local zone of visual influence.
- The industrial context to the east of the site degrades the local sense of place to some degree.
- Receptor sensitivity to landscape change is expected to be Medium to Low due to the limited visual resources of the site and surrounds and the close proximity to the industrial context.
- Potential for Medium to Low magnitude visual impact.
- Positive alignment with regional and local planning.

Constraints

- The close proximity to St Dominic's School and Trichardts Park, where views from the receptors will be clear, and the landscape change, will result in a loss of some of the buffer area and screening trees currently reducing visual exposure to the eastern industrial context.

9.2 Alternative 2

Opportunities

- The ZVI is contained to some degree by local built environment that includes numerous mature trees. This would result in a local zone of visual influence.
- The industrial context to the east of the site degrades the local sense of place to some degree.
- Receptor sensitivity to landscape change is expected to be Medium to Low due to the limited visual resources of the site and surrounds and the close proximity to the industrial context.
- Potential for Medium to Low magnitude visual impact.

Constraints

- The close proximity to St Dominic's School and Trichardts Park where views from the receptors will be clear, and the landscape change will result in a loss of some of the buffer area and screening trees currently reducing visual exposure to the eastern industrial context.
- Loss of wetland resulting in High Significance Local Landscape Impact which is Not-Recommended.

9.3 Alternative 3

Opportunities

- The industrial context to the east of the site degrades the local sense of place to some degree.

Constraints

- The close proximity to St Dominic's School and Trichardts Park, where views from the receptors will be clear, and the landscape change will result in a loss of some of the buffer area and screening trees currently reducing visual exposure to the eastern industrial context.
- Long-term Visual Impact setting a negative precedent for inappropriate development resulting in High potential for negative cumulative impacts that are not recommended.

9.4 No-Go Option

9.4.1 Opportunities

- The space of the site and the gum trees currently create a distance and screening buffer to some degree.

9.4.2 Constraints

- The current open space land uses of the property do not significantly add to the regional sense of place due to the illegal dumping on the site and the gum thicket that limits visibility and potentially creates an unsafe area.
- The local scenic quality is degraded by the close proximity to the Unilever industrial context.

10 CONCLUSION

It is the recommendation that the proposed **Alternative 1 PV project should be authorised with mitigation.** The following key reasons provide the motivation:

1. Degraded local landscape with limited scenic quality.
2. Partially visually screened by existing trees in the adjacent PoS that assists in containing the project Zone of Visual Influence.
3. Suitable distance buffer that would allow the proposed PV landscape change to be viewed against the existing Unilever industrial context where there is a higher Visual Absorption Capacity.
4. Medium to Low receptor sensitivity to landscape change due background and partial views of the industrial context.

Alternative 2 is not recommended due to the loss of the wetland that should be considered a fatal flaw.

Alternative 3 is not recommended due to the loss of strategic trees and Public Open Space buffering the industrial context and protecting the existing residential and recreational receptors to the west.

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12 ANNEXURE A: SITE VISIT PHOTOGRAPHS AND COMMENTS

The following photographs were taken during the field survey. The text below the photograph describes the landscape and visual issues of the locality, if applicable.

OBJECTID	1
REMARKS	Industry – Unilever Factory
REC_TIME	10/04/2021 20:45:49.284 SAST
LATITUDE	-26.218407
LONGITUDE	28.269891
ELEVATION	1660
Direction	90
Scenic Quality	Low
Locality	Surrounds

OBJECTID	2
REMARKS	Alt 2
REC_TIME	10/05/2021 11:45:25.000 SAST
LATITUDE	-26.219622
LONGITUDE	28.266993
ELEVATION	1659
Direction	109
Scenic Quality	Medium to Low
Locality	Site

OBJECTID	3
REMARKS	Alt 2 Mitigation
REC_TIME	10/05/2021 11:51:11.556 SAST
LATITUDE	-26.220777
LONGITUDE	28.266791
ELEVATION	0
Direction	210
Scenic Quality	Medium
Locality	Surrounds
KOP	NA
Sensitivity to Change	Medium

Suitability	Low

OBJECTID	4
REMARKS	Alt 3
REC_TIME	10/05/2021 11:58:22.000 SAST
LATITUDE	-26.220098
LONGITUDE	28.265325
ELEVATION	1656.2
Direction	220
Scenic Quality	Medium
Locality	Site
KOP	NA
Sensitivity to Change	High
Suitability	Low

OBJECTID	5
REMARKS	Alt 1
REC_TIME	10/05/2021 12:10:16.000 SAST
LATITUDE	-26.217231
LONGITUDE	28.264776
ELEVATION	1651.3
Direction	280
Scenic Quality	Low
Locality	Site
KOP	NA
Sensitivity to Change	Low
Suitability	High

OBJECTID	6
REMARKS	St Dominic's Street – High Exposure to Alt 3
REC_TIME	10/05/2021 12:26:24.000 SAST
LATITUDE	-26.221305
LONGITUDE	28.267633
ELEVATION	1660.6
Direction	20
Scenic Quality	Medium to Low
Locality	Surrounds
KOP	Yes
Sensitivity to Change	Low
Suitability	Medium

OBJECTID	7
REMARKS	St Dominic's School – High Exposure to Alt 3
REC_TIME	10/05/2021 12:32:15.000 SAST
LATITUDE	-26.221003
LONGITUDE	28.26638
ELEVATION	1653.7
Direction	220
Scenic Quality	High
Locality	Site
KOP	Yes
Sensitivity to Change	High
Suitability	Low

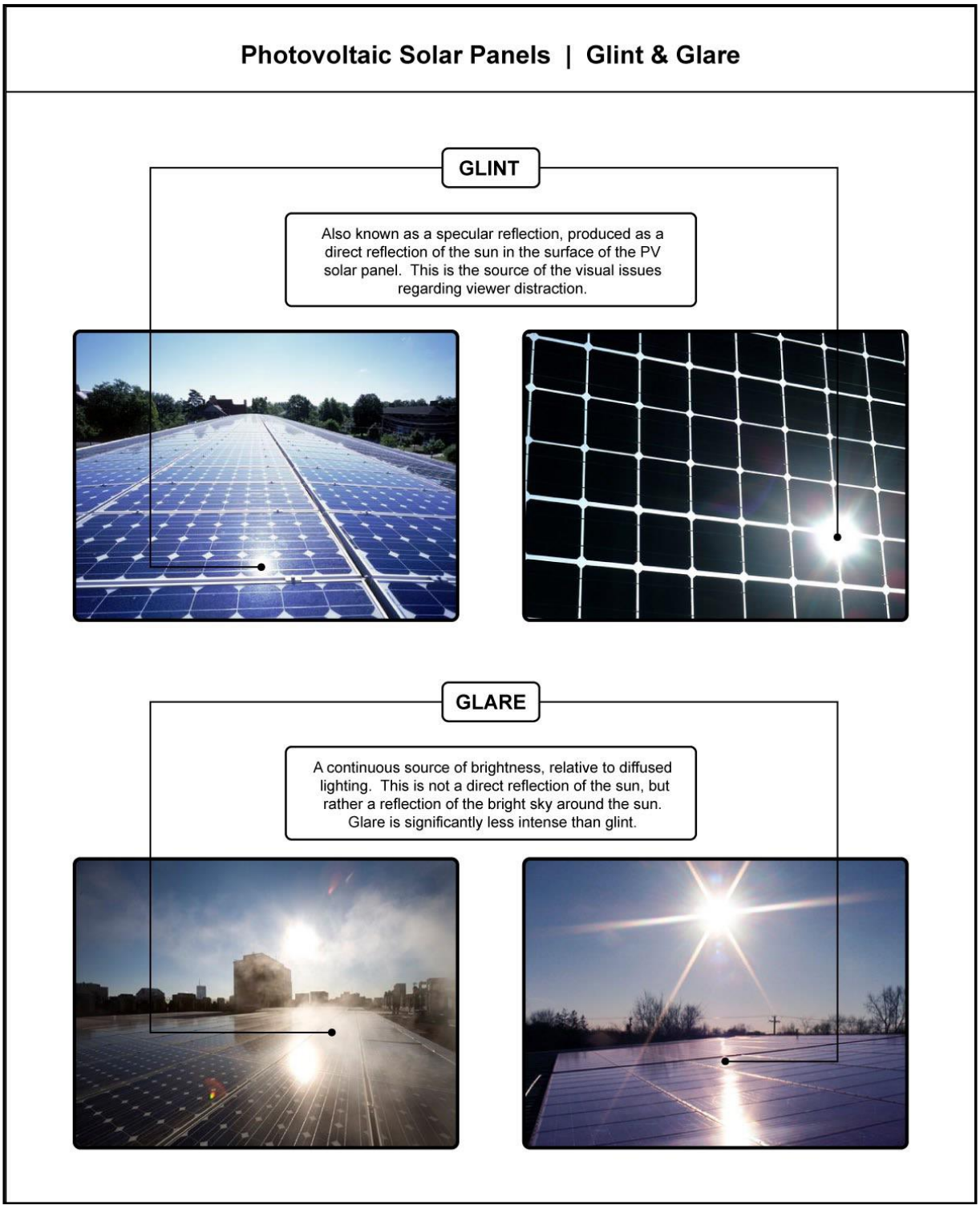
KOP photo towards Alt 3

St Dominic's school sense of place

OBJECTID	8
REMARKS	Kruger Street – High Exposure to Alt 3
REC_TIME	10/05/2021 12:49:15.000 SAST
LATITUDE	-26.220213
LONGITUDE	28.263512
ELEVATION	1653.4
Direction	85
Scenic Quality	Medium
Locality	Surrounds
KOP	Yes
Sensitivity to Change	Medium
Suitability	Medium to Low

13 ANNEXURE B: GLINT AND GLARE

This study does not include the impact of Glint and Glare. Diagram illustrating the potential effect of Glint and Glare from 'Sacramento Solar Highways Initial Study and Mitigated Negative Declaration.' (Sacramento Municipal Utility District)



14 ANNEXURE C: SPECIALIST INFORMATION

14.1 Professional Registration Certificate

14.2 Curriculum Vitae (CV)

1. **Position**: Owner / Director

2. **Name of Firm**: Visual Resource Management Africa cc *(www.vrma.co.za)*

3. **Name of Staff**: Stephen Stead

4. **Date of Birth**: 9 June 1967

5. **Nationality:** South African

6. **Contact Details:** **Tel: +27 (0) 44 876 0020**
   Cell: +27 (0) 83 560 9911
   Email: steve@vrma.co.za

7. **Educational qualifications**:
   - University of Natal (Pietermaritzburg):
   - Bachelor of Arts: Psychology and Geography
   - Bachelor of Arts (Hons): Human Geography and Geographic Information Management Systems

8. **Professional Accreditation**
   - Association of Professional Heritage Practitioners (APHP) Western Cape
     - Accredited VIA practitioner member of the Association (2011)

9. **Association involvement:**
   - International Association of Impact Assessment (IAIA) South African Affiliate
     - Past President (2012 - 2013)
     - President (2012)
     - President-Elect (2011)
     - Conference Co-ordinator (2010)
     - National Executive Committee member (2009)
     - Southern Cape Chairperson (2008)

10. **Conferences Attended:**
    - IAIAsa 2012
    - IAIAsa 2011
    - IAIA International 2011 (Mexico)
    - IAIAsa 2010
    - IAIAsa 2009
    - IAIAsa 2007

11. **Continued Professional Development:**
    - Integrating Sustainability with Environment Assessment in South Africa (IAIAsa Conference, 1 day)

- Achieving the full potential of SIA (Mexico, IAIA Conference, 2 days 2011)
- Researching and Assessing Heritage Resources Course (University of Cape Town, 5 days, 2009)

12. Countries of Work Experience:

- South Africa, Mozambique, Malawi, Lesotho, Kenya and Namibia

13. Relevant Experience:

Stephen gained six years of experience in the field of Geographic Information Systems mapping and spatial analysis working as a consultant for the KwaZulu-Natal Department of Health and then with an Environmental Impact Assessment company based in the Western Cape. In 2004 he set up the company Visual Resource Management Africa that specializes in visual resource management and visual impact assessments in Africa. The company makes use of the well-documented Visual Resource Management methodology developed by the Bureau of Land Management (USA) for assessing the suitability of landscape modifications. Stephen has assessed of over 150 major landscape modifications throughout southern and eastern Africa. The business has been operating for eight years and has successfully established and retained a large client base throughout Southern Africa which include amongst other, Rio Tinto (Pty) Ltd, Bannerman (Pty) Ltd, Anglo Coal (Pty) Ltd, Eskom (Pty) Ltd, NamPower and Vale (Pty) Ltd, Ariva (Pty) Ltd, Harmony Gold (Pty) Ltd, Millennium Challenge Account (USA), Pretoria Portland Cement (Pty) Ltd

14. Languages:

- English – First Language
- Afrikaans – fair in speaking, reading and writing

15. Projects:

A list of ***some*** of the large-scale projects that VRMA has assessed has been attached below with the client list indicated per project (Refer to www.vrma.co.za for a full list of projects undertaken).

Table 25: VRM Africa Projects Assessments Table

YEAR	NAME	DESCRIPTION	LOCATION
2020	Dysanklip & Re Capital 3C BESS	Battery Storage	Northern Cape (SA)
2020	Hotazel PV 2	Solar Energy	Northern Cape (SA)
2020	Hotazel PV Amend	Solar Energy	Northern Cape (SA)
2020	Penhill Water Reservoir	Infrastructure	Western Cape (SA)
2020	Kenhardt BESS x 6	Battery Storage	Northern Cape (SA)
2020	Humansdorp BESS	Battery Storage	Northern Cape (SA)
2020	Bloemsmond PV BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo Prieska BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo De Arr BESS x 3	Battery Storage	Northern Cape (SA)
2020	Sandpiper Estate	Residential	Western Cape (SA)
2020	Obetsebi Lampley Interchange	Infrastructure	Ghana
2019	Port Barry Residential	Settlement	Western Cape (SA)

2019	Gamsberg Smelter	Plant	Northern Cape (SA)
2019	Sandpiper Nature Reserve Lodge	Residential	Western Cape (SA)
2019	Bloemsmond PV 4 - 5	Solar Energy	Northern Cape (SA)
2019	Mphepo Wind (Scoping Phase)	Wind Energy	Zambia
2018	Mogara PV	Solar Energy	Northern Cape (SA)
2018	Gaetsewe PV	Solar Energy	Northern Cape (SA)
2017	Kalungwishi Hydroelectric (2) and power line	Hydroelectric	Zambia
2017	Mossel Bay UISP (Kwanoqaba)	Settlement	Western Cape (SA)
2017	Pavua Dam and HEP	Hydroelectric	Mozambique (SA)
2017	Penhill UISP Settlement (Cape Town)	Settlement	Western Cape (SA)
2016	Kokerboom WEF * 3	Wind Energy	Northern Cape (SA)
2016	Hotazel PV	Solar Energy	Northern Cape (SA)
2016	Eskom Sekgame Bulkop Power Line	Infrastructure	Northern Cape (SA)
2016	Ngonye Hydroelectric	Hydroelectric	Zambia
2016	Levensdal Infill	Settlement	Western Cape (SA)
2016	Arandis CSP	Solar Energy	Namibia
2016	Bonnievale PV	Solar Energy	Western Cape (SA)
2015	Noblesfontein 2 & 3 WEF (Scoping)	Wind Energy	Eastern Cape (SA)
2015	Ephraim Sun SEF	Solar Energy	Nothern Cape (SA)
2015	Dyasonsklip and Sirius Grid TX	Solar Energy	Nothern Cape (SA)
2015	Dyasonsklip PV	Solar Energy	Nothern Cape (SA)
2015	Zeerust PV and transmission line	Solar Energy	North West (SA)
2015	Bloemsmond SEF	Solar Energy	Nothern Cape (SA)
2015	Juwi Copperton PV	Solar Energy	Nothern Cape (SA)
2015	Humansrus Capital 14 PV	Solar Energy	Nothern Cape (SA)
2015	Humansrus Capital 13 PV	Solar Energy	Nothern Cape (SA)
2015	Spitzkop East WEF (Scoping)	Solar Energy	Western Cape (SA)
2015	Lofdal Rare Earth Mine and Infrastructure	Mining	Namibia
2015	AEP Kathu PV	Solar Energy	Nothern Cape (SA)
2014	AEP Mogobe SEF	Solar Energy	Nothern Cape (SA)
2014	Bonnievale SEF	Solar Energy	Western Cape (SA)
2014	AEP Legoko SEF	Solar Energy	Northern Cape (SA)
2014	Postmasburg PV	Solar Energy	Northern Cape (SA)
2014	Joram Solar	Solar Energy	Northern Cape (SA)
2014	RERE PV Postmasberg	Solar Energy	Northern Cape (SA)
2014	RERE CPV Upington	Solar Energy	Northern Cape (SA)
2014	Rio Tinto RUL Desalinisation Plant	Industrial	Namibia
2014	NamPower PV * 3	Solar Energy	Namibia
2014	Pemba Oil and Gas Port Expansion	Industrial	Mozambique
2014	Brightsource CSP Upington	Solar Energy	Northern Cape (SA)
2014	Witsand WEF (Scoping)	Wind Energy	Western Cape (SA)

2014	Kangnas WEF	Wind Energy	Western Cape (SA)
2013	Cape Winelands DM Regional Landfill	Industrial	Western Cape (SA)
2013	Drennan PV Solar Park	Solar Energy	Eastern Cape (SA)
2013	Eastern Cape Mari-culture	Mari-culture	Eastern Cape (SA)
2013	Eskom Pantom Pass Substation	Substation /Tx lines	Western Cape (SA)
2013	Frankfort Paper Mill	Plant	Free State (SA)
2013	Gibson Bay Wind Farm Transmission lines	Transmission lines	Eastern Cape (SA)
2013	Houhoek Eskom Substation	Substation /Tx lines	Western Cape (SA)
2013	Mulilo PV Solar Energy Sites (x4)	Solar Energy	Northern Cape (SA)
2013	Namies Wind Farm	Wind Energy	Northern Cape (SA)
2013	Rossing Z20 Pit and WRD	Mining	Namibia
2013	SAPPI Boiler Upgrade	Plant	Mpumalanga (SA)
2013	Tumela WRD	Mine	North West (SA)
2013	Weskusfleur Substation (Koeburg)	Substation /Tx lines	Western Cape (SA)
2013	Yzermyn coal mine	Mining	Mpumalanga (SA)
2012	Afrisam	Mining	Western Cape (SA)
2012	Bitterfontein	Solar Energy	Northern Cape (SA)
2012	Kangnas PV	Solar Energy	Northern Cape (SA)
2012	Kangnas Wind	Solar Energy	Northern Cape (SA)
2012	Kathu CSP Tower	Solar Energy	Northern Cape (SA)
2012	Kobong Hydro	Hydro & Powerline	Lesotho
2012	Letseng Diamond Mine Upgrade	Mining	Lesotho
2012	Lunsklip Windfarm	Wind Energy	Western Cape (SA)
2012	Mozambique Gas Engine Power Plant	Plant	Mozambique
2012	Ncondezi Thermal Power Station	Substation /Tx lines	Mozambique
2012	Sasol CSP Tower	Solar Power	Free State (SA)
2012	Sasol Upington CSP Tower	Solar Power	Northern Cape (SA)
2011	Beaufort West PV Solar Power Station	Solar Energy	Western Cape (SA)
2011	Beaufort West Wind Farm	Wind Energy	Western Cape (SA)
2011	De Bakke Cell Phone Mast	Structure	Western Cape (SA)
2011	ERF 7288 PV	Solar Energy	Western Cape (SA)
2011	Gecko Industrial park	Industrial	Namibia
2011	Green View Estates	Residential	Western Cape (SA)
2011	Hoodia Solar	Solar Energy	Western Cape (SA)
2011	Kalahari Solar Power Project	Solar Energy	Northern Cape (SA)
2011	Khanyisa Power Station	Power Station	Western Cape (SA)
2011	Olvyn Kolk PV	Solar Energy	Northern Cape (SA)
2011	Otjikoto Gold Mine	Mining	Namibia
2011	PPC Rheebieck West Upgrade	Industrial	Western Cape (SA)
2011	George Southern Arterial	Road	Western Cape (SA)
2010	Bannerman Etango Uranium Mine	Mining	Namibia

2010	Bantamsklip Transmission	Transmission	Eastern Cape (SA)
2010	Beaufort West Urban Edge	Mapping	Western Cape (SA)
2010	Bon Accord Nickel Mine	Mining	Mpumalanga (SA)
2010	Etosha National Park Infrastructure	Housing	Namibia
2010	Herolds Bay N2 Development Baseline	Residential	Western Cape (SA)
2010	MET Housing Etosha	Residential	Namibia
2010	MET Housing Etosha Amended MCDM	Residential	Namibia
2010	MTN Lattice Hub Tower	Structure	Western Cape (SA)
2010	N2 Herolds Bay Residential	Residential	Western Cape (SA)
2010	Onifin(Pty) Ltd Hartenbos Quarry Extension	Mining	Western Cape (SA)
2010	Still Bay East	GIS Mapping	Western Cape (SA)
2010	Vale Moatize Coal Mine and Railway	Mining / Rail	Mozambique
2010	Vodacom Mast	Structure	Western Cape (SA)
2010	Wadrif Dam	Dam	Western Cape (SA)
2009	Asazani Zinyoka UISP Housing	Residential Infill	Western Cape (SA)
2009	Eden Telecommunication Tower	Structure	Western Cape (SA)
2009	George SDF Landscape Characterisation	GIS Mapping	Western Cape (SA)
2009	George SDF Visual Resource Management	GIS Mapping	Western Cape (SA)
2009	George Western Bypass	Road	Western Cape (SA)
2009	Knysna Affordable Housing Heidevallei	Residential Infill	Western Cape (SA)
2009	Knysna Affordable Housing Hornlee Project	Residential Infill	Western Cape (SA)
2009	Rossing Uranium Mine Phase 2	Mining	Namibia
2009	Sun Ray Wind Farm	Wind Energy	Western Cape (SA)
2008	Bantamsklip Transmission Lines Scoping	Transmission	Western Cape (SA)
2008	Erf 251 Damage Assessment	Residential	Western Cape (SA)
2008	Erongo Uranium Rush SEA	GIS Mapping	Namibia
2008	Evander South Gold Mine Preliminary VIA	Mining	Mpumalanga (SA)
2008	George SDF Open Spaces System	GIS Mapping	Western Cape (SA)
2008	Hartenbos River Park	Residential	Western Cape (SA)
2008	Kaaimans Project	Residential	Western Cape (SA)
2008	Lagoon Garden Estate	Residential	Western Cape (SA)
2008	Moquini Beach Hotel	Resort	Western Cape (SA)
2008	NamPower Coal fired Power Station	Power Station	Namibia
2008	Oasis Development	Residential	Western Cape (SA)
2008	RUL Sulphur Handling Facility Walvis Bay	Mining	Namibia
2008	Walvis Bay Power Station	Structure	Namibia
2007	Calitzdorp Retirement Village	Residential	Western Cape (SA)
2007	Calitzdorp Visualisation	Visualisation	Western Cape (SA)
2007	Camdeboo Estate	Residential	Western Cape (SA)
2007	Destiny Africa	Residential	Western Cape (SA)
2007	Droogfontein Farm 245	Residential	Western Cape (SA)

2007	Floating Liquified Natural Gas Facility	Structure tanker	Western Cape (SA)
2007	George SDF Municipality Densification	GIS Mapping	Western Cape (SA)
2007	Kloofsig Development	Residential	Western Cape (SA)
2007	OCGT Power Plant Extension	Structure Power Plant	Western Cape (SA)
2007	Oudtshoorn Municipality SDF	GIS Mapping	Western Cape (SA)
2007	Oudtshoorn Shopping Complex	Structure	Western Cape (SA)
2007	Pezula Infill (Noetzie)	Residential	Western Cape (SA)
2007	Pierpoint Nature Reserve	Residential	Western Cape (SA)
2007	Pinnacle Point Golf Estate	Golf/Residential	Western Cape (SA)
2007	Rheebok Development Erf 252 Appeal	Residential	Western Cape (SA)
2007	Rossing Uranium Mine Phase 1	Mining	Namibia
2007	Ryst Kuil/Riet Kuil Uranium Mine	Mining	Western Cape (SA)
2007	Sedgefield Water Works	Structure	Western Cape (SA)
2007	Sulphur Handling Station Walvis Bay Port	Industrial	Namibia
2007	Trekkopje Uranium Mine	Mining	Namibia
2007	Weldon Kaya	Residential	Western Cape (SA)
2006	Farm Dwarsweg 260	Residential	Western Cape (SA)
2006	Fynboskruin Extention	Residential	Western Cape (SA)
2006	Hanglip Golf and Residential Estate	Residential	Western Cape (SA)
2006	Hansmoeskraal	Slopes Analysis	Western Cape (SA)
2006	Hartenbos Landgoed Phase 2	Residential	Western Cape (SA)
2006	Hersham Security Village	Residential	Western Cape (SA)
2006	Ladywood Farm 437	Residential	Western Cape (SA)
2006	Le Grand Golf and Residential Estate	Residential	Western Cape (SA)
2006	Paradise Coast	Residential	Western Cape (SA)
2006	Paradyskloof Residential Estate	Residential	Western Cape (SA)
2006	Riverhill Residential Estate	Residential	Western Cape (SA)
2006	Wolwe Eiland Access Route	Road	Western Cape (SA)
2005	Harmony Gold Mine	Mining	Mpumalanga (SA)
2005	Knysna River Reserve	Residential	Western Cape (SA)
2005	Lagoon Bay Lifestyle Estate	Residential	Western Cape (SA)
2005	Outeniquabosch Safari Park	Residential	Western Cape (SA)
2005	Proposed Hotel Farm Gansevallei	Resort	Western Cape (SA)
2005	Uitzicht Development	Residential	Western Cape (SA)
2005	West Dunes	Residential	Western Cape (SA)
2005	Wilderness Erf 2278	Residential	Western Cape (SA)
2005	Wolwe Eiland Eco & Nature Estate	Residential	Western Cape (SA)
2005	Zebra Clay Mine	Mining	Western Cape (SA)
2004	Gansevallei Hotel	Residential	Western Cape (SA)
2004	Lakes Eco and Golf Estate	Residential	Western Cape (SA)
2004	Trekkopje Desalination Plant	Structure Plant	Namibia (SA)

1995	Greater Durban Informal Housing Analysis	Photogrammetry	KwaZulu-Natal (SA)

15 ANNEXURE D: VRM CHECKLISTS AND TERMINOLOGY

Table 26: Scenic Quality Checklist

KEY FACTORS	RATING CRITERIA AND SCORE		
SCORE	**5**	**3**	**1**
Land Form	High vertical relief as expressed in prominent cliffs, spires or massive rock outcrops, or severe surface variation or highly eroded formations or detail features that are dominating and exceptionally striking and intriguing.	Steep-sided river valleys, or interesting erosion patterns or variety in size and shape of landforms; or detail features that are interesting, though not dominant or exceptional.	Low rolling hills, foothills or flat valley bottoms; few or no interesting landscape features.
Vegetation	A variety of vegetative types as expressed in interesting forms, textures and patterns.	Some variety of vegetation, but only one or two major types.	Little or no variety or contrast in vegetation.
Water	Clear and clean appearing, still or cascading white water, any of which are a dominant factor in the landscape.	Flowing, or still, but not dominant in the landscape.	Absent, or present but not noticeable.
Colour	Rich colour combinations, variety or vivid colour: or pleasing contrasts in the soil, rock, vegetation, water.	Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element.	Subtle colour variations contrast or interest: generally mute tones.
Adjacent Scenery	Adjacent scenery greatly enhances visual quality.	Adjacent scenery moderately enhances overall visual quality.	Adjacent scenery has little or no influence on overall visual quality.
Scarcity	One of a kind: unusually memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing etc.	Distinctive, though somewhat similar to others within the region.	Interesting within its setting, but fairly common within the region.
SCORE	**2**	**0**	**-4**
Cultural Modification	Modifications add favourably to visual variety, while promoting visual harmony.	Modifications add little or no visual variety to the area and introduce no discordant elements.	Modifications add variety but are very discordant and promote strong disharmony.

Table 27: Sensitivity Level Rating Checklist

FACTORS	QUESTIONS	
Type of Users	**Maintenance of visual quality is:**	
	A major concern for most users	High
	A moderate concern for most users	Moderate
	A low concern for most users	Low
Amount of use	**Maintenance of visual quality becomes more important as the level of use increases:**	
	A high level of use	High
	Moderately level of use	Moderate
	Low level of use	Low
Public interest	**Maintenance of visual quality:**	

	A major concern for most users	High
	A moderate concern for most users	Moderate
	A low concern for most users	Low
Adjacent land Users	**Maintenance of visual quality to sustain adjacent land use objectives is:**	
	Very important	High
	Moderately important	Moderate
	Slightly important	Low
Special Areas	**Maintenance of visual quality to sustain Special Area management objectives is:**	
	Very important	High
	Moderately important	Moderate
	Slightly important	Low

Table 28: VRM Terminology Table

FORM	LINE	COLOUR	TEXTURE
Simple	Horizontal		Smooth
Weak	Vertical		Rough
Strong	Geometric		Fine
Dominant	Angular		Coarse
Flat	Acute		Patchy
Rolling	Parallel		Even
Undulating	Curved	Dark	Uneven
Complex	Wavy	Light	Complex
Plateau	Strong	Mottled	Simple
Ridge	Weak		Stark
Valley	Crisp		Clustered
Plain	Feathered		Diffuse
Steep	Indistinct		Dense
Shallow	Clean		Scattered
Organic	Prominent		Sporadic
Structured	Solid		Consistent

Simple	Basic, composed of few elements	**Organic**	Derived from nature, occurring or developing gradually and naturally
Complex	Complicated; made up of many interrelated parts	**Structure**	Organised; planned and controlled; with definite shape, form, or pattern
Weak	Lacking strength of character	**Regular**	Repeatedly occurring in an ordered fashion
Strong	Bold, definite, having prominence	**Horizontal**	Parallel to the horizon
Dominant	Controlling, influencing the surrounding environment	**Vertical**	Perpendicular to the horizon; upright
Flat	Level and horizontal without any slope; even and smooth without any bumps or hollows	**Geometric**	Consisting of straight lines and simple shapes
Rolling	Progressive and consistent in form, usually rounded	**Angular**	Sharply defined; used to describe an object identified by angles
Undulating	Moving sinuously like waves; wavy in appearance	**Acute**	Less than 90°; used to describe a sharp angle
Plateau	Uniformly elevated flat to gently undulating land bounded on one or more sides by steep slopes	**Parallel**	Relating to or being lines, planes, or curved surfaces that are always the same distance apart and therefore never meet
Ridge	A narrow landform typical of a highpoint or apex; a long narrow hilltop or range of hills	**Curved**	Rounded or bending in shape
Valley	Low-lying area: a long low area of land, often with a river or stream running through it, that is surrounded by higher ground	**Wavy**	Repeatedly curving forming a series of smooth curves that go in one direction and then another
Plain	A flat expanse of land; fairly flat dry land, usually with few trees	**Feathered**	Layered, consisting of many fine parallel strands

Steep	Sloping sharply often to the extent of being almost vertical	**Indistinct**	Vague; lacking clarity or form
Prominent	Noticeable; distinguished, eminent, or well-known	**Patchy**	Irregular and inconsistent;
Solid	Unadulterated or unmixed; made of the same material throughout; uninterrupted	**Even**	Consistent and equal; lacking slope, roughness, and irregularity
Broken	Lacking continuity; having an uneven surface	**Uneven**	Inconsistent and unequal in measurement irregular
Smooth	Consistent in line and form; even textured	**Stark**	Bare and plain; lacking ornament or relieving features
Rough	Bumpy; knobbly; or uneven, coarse in texture	**Clustered**	Densely grouped
Fine	Intricate and refined in nature	**Diffuse**	Spread through; scattered over an area
Coarse	Harsh or rough to the touch; lacking detail	**Diffuse**	To make something less bright or intense

16 ANNEXURE E: GENERAL LIGHTS AT NIGHT MITIGATIONS

Mitigation:

- Effective light management needs to be incorporated into the design of the lighting to ensure that the visual influence is limited to the mine, without jeopardising mine operational safety and security (See lighting mitigations by The New England Light Pollution Advisory Group (NELPAG) and Sky Publishing Corp in 14.2).
- Utilisation of specific frequency LED lighting with a green hue on perimeter security fencing.
- Directional lighting on the more exposed areas of operation, where point light source is an issue.
- No use of overhead lighting and, if possible, locate the light source closer to the operation.
- If possible, the existing overhead lighting method utilised at the mine should be phased out and replaced with an alternative lighting using closer to source, directed LED technology.

Mesopic Lighting

Mesopic vision is a combination of photopic vision and scotopic vision in low, but not quite dark, lighting situations. The traditional method of measuring light assumes photopic vision and is often a poor predictor of how a person sees at night. The light spectrum optimized for mesopic vision contains a relatively high amount of bluish light and is therefore effective for peripheral visual tasks at mesopic light levels. *(CIE, 2012)*

The Mesopic Street Lighting Demonstration and Evaluation Report by the Lighting Research Centre (LRC) in New York found that the 'replacement of white light sources (induction and ceramic metal halide) were tuned to optimize human vision under low light levels while remaining in the white light spectrum. Therefore, outdoor electric light sources that are tuned to how humans see under mesopic lighting conditions can be used to reduce the luminance of the road surface while providing the same, or better, visibility. Light sources with shorter wavelengths, which produce a "cooler" (bluer and greener) light, are needed to produce better mesopic vision. Based on this understanding, the LRC developed a means of predicting visual performance under low light conditions. This system is called the unified photometry system. Responses to surveys conducted on new installations revealed that area residents perceived higher levels of visibility, safety, security, brightness, and colour rendering with the new lighting systems than with the standard *High-Purity Standards* (HPS) systems. The new lighting systems used 30% to 50% less energy than the HPS systems. These positive results were

achieved through tuning the light source to optimize mesopic vision. Using less wattage and photopic luminance also reduces the reflectance of the light off the road surface. Light reflectance is a major contributor to light pollution (sky glow).' *(Lighting Research Centre. New York. 2008)*

'Good Neighbour – Outdoor Lighting'

Presented by the New England Light Pollution Advisory Group (NELPAG) *(http://cfa/ www.harvard .edu /cfa/ps/nelpag.html)* and Sky & Telescope *(http://SkyandTelescope.com/).* NELPAG and Sky & Telescope support the International Dark-Sky Association (IDA) *(http://www.darksky.org/).*

(NELPAG)

What is good lighting? Good outdoor lights improve visibility, safety, and a sense of security, while minimizing energy use, operating costs, and ugly, dazzling glare.

Why should we be concerned? Many outdoor lights are poorly designed or improperly aimed. Such lights are costly, wasteful, and distractingly glary. They harm the night-time environment and neighbours' property values. Light directed uselessly above the horizon creates murky skyglow — the "light pollution" that washes out our view of the stars.

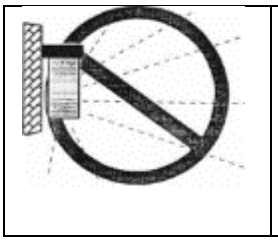
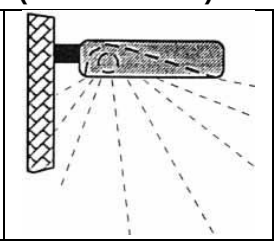
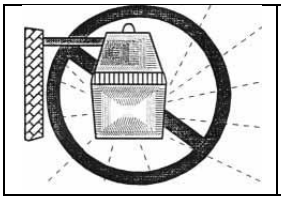
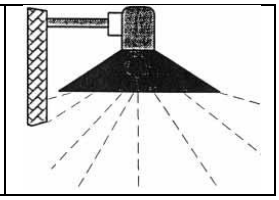
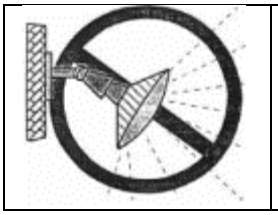
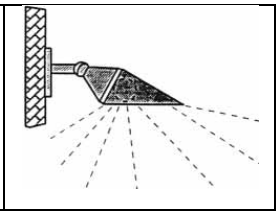
Glare Here's the basic rule of thumb: If you can see the bright bulb from a distance, it's a bad light. With a good light, you see lit ground instead of the dazzling bulb. "Glare" is light that beams directly from a bulb into your eye. It hampers the vision of pedestrians, cyclists, and drivers.

Light Trespass Poor outdoor lighting shines onto neighbours' properties and into bedroom windows, reducing privacy, hindering sleep, and giving the area an unattractive, trashy look.

Energy Waste Many outdoor lights waste energy by spilling much of their light where it is not needed, such as up into the sky. This waste results in high operating costs. Each year we waste more than a billion dollars in the United States needlessly lighting the night sky.

Excess Lighting Some homes and businesses are flooded with much stronger light than is necessary for safety or security.

Good and Bad Light Fixtures

Typical "Wall Pack"	**Typical "Shoe Box" (forward throw)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Typical "Yard Light"	**Opaque Reflector (lamp inside)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Area Flood Light	**Area Flood Light with Hood**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down

How do I switch to good lighting?

Provide only enough light for the task at hand; don't over-light, and don't spill light off your property. Specifying enough light for a job is sometimes hard to do on paper. Remember that a full Moon can make an area quite bright. Some lighting systems illuminate areas 100 times more brightly than the full Moon! More importantly, by choosing properly shielded lights, you can meet your needs without bothering neighbours or polluting the sky.

- Aim lights down. Choose “full-cut-off shielded” fixtures that keep light from going uselessly up or sideways. Full-cut-off fixtures produce minimum glare. They create a pleasant-looking environment. They increase safety because you see illuminated people, cars, and terrain, not dazzling bulbs.
- Install fixtures carefully to maximize their effectiveness on the targeted area and minimize their impact elsewhere. Proper aiming of fixtures is crucial. Most are aimed too high. Try to install them at night, when you can see where all the rays actually go. Properly aimed and shielded lights may cost more initially, but they save you far more in the long run. They can illuminate your target with a low-wattage bulb just as well as a wasteful light does with a high-wattage bulb.
- If colour discrimination is not important, choose energy- efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If “white” light is needed, fixtures using compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent, halogen, or mercury-vapour bulbs.
- Where feasible, put lights on timers to turn them off each night after they are no longer needed. Put home security lights on a motion-detector switch, which turns them on only when someone enters the area; this provides a great deterrent effect!

What You Can Do To Modify Existing Fixtures

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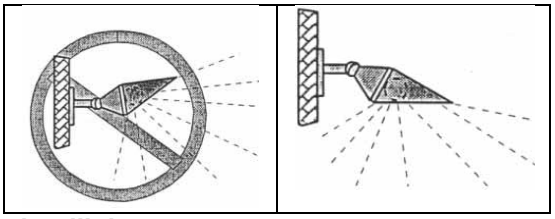

Floodlight:

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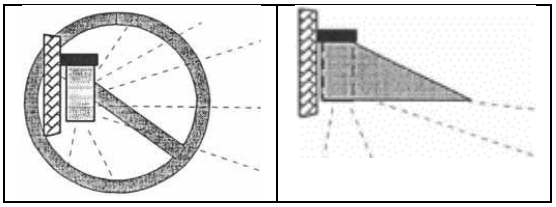
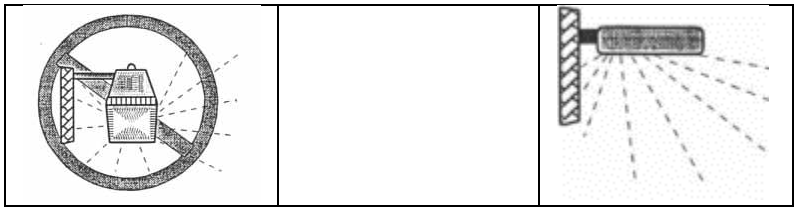


Wall Pack

Change this . . . to this or this



Yard Light | Opaque Reflector | Show Box

Replace bad lights with good lights.

You’ll save energy and money. You’ll be a good neighbour. And you’ll help preserve our view of the stars.